

RELATIONSHIP BETWEEN EQUITY AND EXCELLENCE IN EDUCATION:  
MULTILEVEL ANALYSIS OF INTERNATIONAL STUDENT ASSESSMENT  
DATA WITH A FOCUS ON TURKEY

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## **ABSTRACT**

### **RELATIONSHIP BETWEEN EQUITY AND EXCELLENCE IN EDUCATION: MULTILEVEL ANALYSIS OF INTERNATIONAL STUDENT ASSESSMENT DATA WITH A FOCUS ON TURKEY**

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This dissertation aims at finding the relationship between equity and excellence in education and how these two dimensions interplay in Turkey. It is found that inequalities in education are not functional as suggested by functionalist theories. On the other hand, findings of this dissertation show that more equity brings more success. Results also show that Turkish education system is neither equitable nor excellent. Moreover, it is found that current education structure in Turkey worsens existing social inequalities.

One of the main research questions of this thesis is: “What is the relationship between equity and excellence in education?” It is found that there is a positive relationship between equity and excellence. Unlike earlier claims about a trade-off between equity and excellence, there are serious hints about a relationship in which these two dimensions of education are enabling each other.

It is also aimed at finding how equity and excellence interact in Turkey by asking the research question: “Which social and educational characteristics are associated with educational excellence in Turkey?” It is found that there are huge performance differences between girls and boys, students from different family backgrounds and students from different regions. The biggest difference is

between school types. It is shown that top performing schools not only receive better performing students from affluent families but also receive more and better resources. Another striking finding of this dissertation is that female students are extra disadvantaged in selective types of schools. Despite being admitted to the most successful types of high schools with a higher probability than boys, girls do not benefit from the educational advantages of these schools as much as boys. Therefore, it is fair to say that education system in Turkey is reproducing existing social inequalities as suggested by conflict theories of sociology of education.

**Keywords:** Equity in Education, Excellence in Education, PISA, Multilevel Modeling, Gender Inequality in Education

## ÖZ

### EĞİTİMDE EŞİTLİK VE NİTELİK İLİŞKİSİ: ULUSLARARASI ÖĞRENCİ DEĞERLENDİRME VERİLERİNİN TÜRKİYE ODAKLI ÇOK DÜZEYLI ANALİZİ

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Bu tezin amacı eğitimde eşitlik ve nitelik arasındaki ilişkinin tespit edilmesi ve eğitimin bu iki boyutunun Türkiye’de nasıl bir etkileşim içinde olduğunun bulunmasıdır. Yapılan analizlerde işlevselci teorilerin öne sürdüğü gibi eğitimdeki eşitsizliklerin işlevsel olmadığı bulunmuştur. Aksine, bu çalışma daha fazla eşitliğin daha fazla başarı getirdiğini göstermektedir. Çalışmanın sonuçları Türkiye eğitim sisteminin ise ne yüksek nitelikli ne de eşitlikçi olduğuna işaret etmektedir. Öte yandan, Türkiye’deki mevcut eğitim yapısının var olan sosyal eşitsizlikleri arttırdığı bulunmuştur.

Bu çalışmanın temel araştırma sorularından birincisi eğitimde nitelik ve eşitlik ilişkisinin nasıl olduğudur. Eğitimin eşitlik ve nitelik boyutlarının pozitif bir ilişki içinde olduğu bulunmuştur. Eşitlik ve niteliğin bir takas ilişkisi içinde olduğu savlarının aksine, eğitimin bu iki boyutunun birbirini beslediği yönünde bulgular vardır.

Çalışmanın diğer araştırma sorusu da Türkiye’de hangi sosyal ve eğitsel değişkenlerin eğitimin niteliği ile ilişkili olduğudur. Yapılan analizlerde kadın ve erkek öğrenciler arasında, farklı sosyo-ekonomik düzeylerden ve farklı bölgelerden öğrenciler arasında büyük başarı farkları olduğu görülmüştür. En

büyük farklılıkların ise farklı okul türlerine bağlı olduğu tespit edilmiştir. En başarılı okulların sadece hem akademik hem de sosyo-ekonomik olarak en önde olan öğrencilere değil aynı zamanda daha fazla ve daha iyi kaynaklara sahip olduğu bulunmuştur. Çalışmanın başka bir çarpıcı bulgusu da kadınların seçici okul türlerinde ekstra bir dezavantaja sahip olduğudur. Başarılı liselere daha yüksek bir olasılıkla yerleşen kadınların bu okulların faydalarından erkeklere oranla daha az yararlanabildiği görülmüştür. Bu nedenlerle çatışmacı teorilerin savladığı şekilde Türkiye eğitim sisteminde var olan sosyal eşitsizliklerin daha da derinleştiği tespit edilmiştir.

**Anahtar Kelimeler:** Eğitimde Eşitlik, Eğitimde Nitelik, PISA, Çok Düzeyli Modelleme, Eğitimde Cinsiyet Eşitsizliği

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# CHAPTER 1

## INTRODUCTION

### 1.1. Introduction:

Education has usually been considered as one of the best mediums to enable upward social mobility especially by structural functionalists (Kretchmar, 2008). In principle, equal educational opportunities are provided for all citizens who are trained for the skills they need in the labour market. Hence, it is assumed that through this way citizens can function in the most suitable way for the society and for themselves. Nevertheless, this view is challenged by conflict theorists, who argue that education is actually reproducing and legitimizing inequalities in the society (Ballantine & Hammack, 2012). This claim is based on the refutation of the assumption of structural functionalists that education is provided equally to all.

These discussions prompted long years of research on equality in education. The issue has been studied for different levels of equality at different stages of educational structure. They can be summarized in four levels as; (i) Equality of access/inputs in terms of reaching basic education, (ii) Equality of content/outputs, (iii) Equality of completion/survival, (iv) Equality of outcomes/labour market chances (Espinoza, 2007; Farrell, 2007).

Due to low levels of literacy or net schooling rates even in basic education, equality of access has widely been studied in Turkey (e.g. Dülger, 2005; Hoşgör, 2005; Smits & Gündüz Hoşgör, 2006; Tomul, 2011). With the recent improvements both in literacy rates and net schooling in basic education, equality of access –at least in

numbers- can be said to be achieved<sup>1</sup> (OECD, 2013c; World Bank, 2011). However, the content of education or in other words the quality of education needs more attention. In this sense, I try to grasp the relationship between quality, which is conceptualized as *excellence* in this study, and *equity* in education with a focus on Turkey in this dissertation.

## **1.2. Conceptual framework**

Pfeffer (2012) summarizes two main aims of education systems as (i) enabling individuals to participate in social, political and economic life; and (ii) offering opportunities for social mobility. This study is focusing on these two dimensions which I call as *excellence* and *equity* in education, respectively. The studies on the role of education in preparing individuals to social life can be dated back to Durkheim (1956b). Furthermore, the studies about the role of education related to social stratification can be dated back to Coleman report (Coleman et al., 1966). Since then, these two topics were the main issues of discussion in sociology of education (Hallinan, 1988). Below, I explain how these two concepts namely *equity* and *excellence* in education are conceptualized in this study.

### **1.2.1. Equity in education**

Two years after the Equality of Educational Opportunity Report (Coleman et al., 1966), Coleman (1968) wrote an article about the concept of equality of opportunity. He outlined different types of inequalities in schooling. Some of these inequalities are related to inputs such as enrolment levels, materials provided for schools or public expenditure in schooling. Some inequalities, on the other hand, related to educational outcomes.

Some other scholars defined inequalities in education by differentiating the concepts of equity, equality and equality of opportunity. Bronfenbrenner (1973) defined equality in relation to quantitative figures like the distribution of income or schooling

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<sup>1</sup> See Appendix Figures A.1-2 for literacy and net enrolment rates.



levels while equity is more related to social justice about the distribution of education. Similarly, Duru-Bellat & Mignat (2011) distinguished between equity and equality in education. They underlined that equity may imply unequal treatment of students since they face unequal starting conditions. Brandsma (2002) outlines these conceptual differences as follows:

the **meritocratic perspective**, which basically means equal educational rights in the case of equal capacities; the **'equal opportunities' perspective**, which means an equal educational investment in each pupil; the **egalitarian perspective**, which means more investment in less talented pupils in order to reach equal achievements. (p. 16)

These different views can be summarized as stating that education systems may be equal through equal rights to or equal sources for education, but they may still not achieve equity unless the differences in student outcomes are independent of factors over which students have no control (Perry, 2009).

A similar typology is offered by Gillborn & Youdell (2000). They outline four different uses of equality/equity in the literature. The first one is **formal equality of access and provision** which is the most limited approach. It deals with formal and explicit obstacles to education. The human rights approach to education policies which was widely used by various UN organizations is an example of this usage of the concept. The second type mentioned by Gillborn & Youdell is **equality of circumstance** referring to various obstacles in front of different population groups to education (despite the elimination of any formal barriers). In Turkey, various studies about the inequalities in education used this approach (Ferreira & Gignoux, 2009; Smits & Gündüz Hoşgör, 2006; Tansel, 2002, 2012; World Bank, 2005).

A third understanding is **equity of participation (treatment)** mostly used in North American literature referring to the structures and processes that define everyday life in schools (Valli, Cooper, & Frankes, 1997). It also refers to the hidden curriculum literature as well as formal curriculum differences.

A final usage of the term is defined as **equity of outcomes** which focuses on the aftermaths of educational practice. Gillborn & Youdell (2000) argue that equitable outcomes of education would at least decrease differences in school achievement, college attendance, employment, etc. between different groups, although it may be impossible to eliminate them all. It is not referring to an education system in which everybody is achieving at the same level. However, if there is no discrimination, different social groups should have similar levels of average achievement. Actually, despite using the term equality of opportunity, Coleman (1968) was also referring to such differences between social groups. He compared achievement levels of children from white and black communities in different stages of their education. It was found out that the achievement gap between white and black pupils were widening as they went further in their education. Nevertheless, if there was equality of opportunity, the achievement gaps would be expected to be closed.

In this study my aim is to focus on inequalities between students in terms of educational outputs. Thus, I prefer to use the term equity referring to equity of outcomes in the way defined by Gillborn & Youdell (2000). As I mentioned above, the focus of the majority of the studies in sociology of education in Turkey was equality of access or equality of circumstances. Various recent reports by international organizations state that Turkey has achieved a great deal in including all children in education (OECD, 2007b; UNDP, 2008; World Bank, 2010). Besides, the same reports also highlight the need to conduct further research on quality of education in Turkey. This brings me to my other main concept.

### ***1.2.2. Excellence in education***

The terms quality and excellence are often used interchangeably in the studies of sociology of education (Smith & Lusthaus, 1995). Moreover, their definitions in the dictionaries do not differ much. However, I prefer to use excellence in this study. The main reason for this is the connotations of ‘quality’ referring to school effectiveness studies (Reynolds & Hopkins, 1994) or total quality management studies in education (Bonstingl, 1992). The motive for me to study excellence is the

need for dealing with the qualities in education particularly throughputs or outputs of education instead of basic inputs in quantities like level of schooling or public expenditure on education. There is a lack of research as I underlined above especially in the case of Turkey.

Pfeffer (2012)'s definition as 'the degree to which national education systems help individuals develop capabilities necessary for their successful social integration' is quite relevant to my focus on excellence in education. The reference to capabilities is essential for my research purposes. *Capability Approach* is one of the three approaches to education policies (Robeyns, 2006; Tikly & Barrett, 2011). First of the other two is *Human Capital Theory* which regards education in terms of its returns in the labour market. It evaluates education as an investment to earn more in later life. In this sense, the quality conceptualization of school effectiveness research is more related to Human Capital Theory. The second approach is the *Human Rights Approach* which evaluates education as a human right for everybody (UNICEF & UNESCO, 2007). However, this approach is widely criticized for concentrating only on the legal rights and ignoring the quality of education. On the other hand, Capability Theory conceptualized by Amartya Sen (1997) is more relevant to this research as it defines capabilities as the functionings to reach and achieve valuable beings and doings in the life of a person.

In line with Pfeffer's definition, Glasser (1992) and Smith & Lusthaus (1995) emphasize the need for including usefulness in the definition of quality/excellence in education. In this sense, I used student performance data from international exams like PISA which is 'designed to assess to what extent students at the end of compulsory education, can apply their knowledge to real-life situations and be equipped for full participation in society' (OECD, n.d.-a) to measure excellence in education. After stating my research questions, I explain my operationalization of both excellence and equity below in detail.

### **1.3. Research Questions, Methods and Methodology:**

The main aims of this dissertation are to investigate the relationship between equity and excellence in education and to reveal how these two dimensions of education interplay in the case of Turkey. To meet these aims, two research questions are constructed. Firstly, it is asked: “***What is the relationship between equity and excellence in education?***” Answering this research question I aim at finding international patterns for the relationship between equity and excellence in education.

It has long been believed that it is almost impossible to have an excellent education system when providing equal opportunities to all (Valverde, 1988). Having its roots in economics, this view claims that there is a necessary trade-off between these two concepts and the relationship between them is strongly negative. However, research in recent years showed that there is not a trade-off between these two dimensions of education (Duru-Bellat & Suchaut, 2005; Micklewright & Schnepf, 2007; Schütz, Ursprung, & Wößmann, 2008). On the other hand, the aim of this work is to look for even a positive relationship between equity and excellence; considering the fact that many of the most successful countries in international exams like PISA, TIMMS or PIRLS are the ones that have more equitable education systems.

My second research question is “***Which social and educational characteristics are associated with educational excellence in Turkey?***” Related also to the first question I also try to find out to which extent the Turkish education system could be seen as facilitating and promoting equity through allowing male and female students to achieve high quality outcomes in education. My main concern at the macro level is to focus on the role of education in abolishing/reproducing inequalities in Turkey. If a high percentage of excellence or attainment level in education for individuals is explained by social background characteristics, it may point out the role of the education system as both reproducing and legitimizing inequalities in the society (Bourdieu & Passeron, 1990; Bowles & Gintis, 1976; Collins, 1979).

Since the research questions are asking for macro level relationships between equity and excellence in education, analysis of secondary meta data is utilized for the

research. It is aimed at revealing patterns related to relationships between equity and excellence when taking into account the effects of other potential influences as well as the varying effects at different levels such as country, school and student level. So that, interpretative statistical techniques like multiple regression analysis, principal components analysis and multilevel modelling are used to analyse data for testing the research questions. Methodologically, a critical approach is followed throughout the dissertation; since one of the basic aims of the research is to uncover the macro level relationships that reproduce existing social positions of the individuals and so that to reveal the relationships of dominance between different social groups.

For the first research question various operationalizations of both equity and excellence are used. To measure equity, several indicators for social, economic and educational features of countries and their education systems are tested across several models. This helps us to discover the most influential characteristics on educational outcomes. So that, it becomes possible to identify which type of inequalities affect which educational outputs to what degree. Similarly, to test educational excellence at country level, various measures from different sources are used. In this sense, country averages from international exams like PISA, TIMSS and PIRLS are used as well as other measures such as the percentage of top or bottom level students in a country.

For the second research question a more specific approach is employed. Data from PISA 2012 is used. Student performance outcomes are utilized as an indicator of educational excellence in Turkey. There are various reasons to use PISA 2012 outcomes as a measure of excellence in Turkey. First of all, it is the most recent international exam data available. Second, PISA 2012 has a focus on Maths which is a more reliable measure than reading or science for comparisons between regions or countries. Third, PISA is conducted among 15-year-old students most of whom have just completed basic education. This enables us to see the outputs of basic education. Last but not the least PISA is designed to measure skills instead of academic knowledge in a subject. In addition to its relevance to my conceptual framework defining excellence in relation to skills that students gained in schools, using PISA

outcomes as excellence measures also make sense for my theoretical framework that I explain below.

#### **1.4. Theoretical Framework:**

The relevant literature for this dissertation is summarized in Chapter 2. Here, I would like to summarize main theories utilized in this work. There are two streams of research outlined. First one is the set of theoretical works on *sociology of education* and the second one is the works on *education policies*.

Approaches to sociology of education can be distinguished as classical and contemporary approaches. Consensus theories, conflict theories and interactionist theories are the three classical streams of theory/research in the area of sociology of education. Among those, conflict theories are widely used in this work. Both of the major research questions are aiming to reveal the underlying patterns of reproduction of social structure through education at the macro level. Thus, conflict theories are quite relevant to the aims of the research. For instance, the approach by Bowles and Gintis (1976) is fairly appropriate. Analysis of student enrolment and attainment data with family background can give us the chance to track if students from certain social certain backgrounds are oriented towards certain schools and also to certain jobs through education system.

In addition to classical approaches, there are also contemporary theories in sociology of education. They can be outlined as code theory, cultural capital theory and hidden curriculum theory. Within the limits of the data and research questions, it is not possible to make use of code theory or hidden curriculum theory. However, similar to classical conflict theories cultural capital theory developed by Bourdieu and Passeron (1990) may also serve for the goals of the research questions. Furthermore, the availability of cultural capital data in various international exam data also makes it easier to make investigations on the subject.

There is another stream of research often called as approaches to policies of education as mentioned above. Among Human Capital Approach, Rights Approach

and Capability Approach; the last one is best suiting both to the conceptual framework and the scope of research questions. Since the further returns of education are not tested, Human Capital Approach will not be used in this study. Similarly, it is the qualities and outputs of education rather than access to education that is problematized in the research questions. Hence, Rights Approach is also not applicable for the work. On the other hand, since one of the major objectives of the research is to track attainment levels of students as an indicator of educational excellence; capability approach which evaluates education both as a capability in itself and as a functioning that enables other capabilities is fitting to the conceptual framework and the aims of the research.

### **1.5. Contribution and significance of the research:**

The number of researches on the relationship between equity and excellence in education has increased in the last two decades thanks to the availability of international examination data. However, most of the research in the topic aimed to disprove the trade-off claims between quality and equality. However, this dissertation is one of the first efforts to track a mutualist relationship between equity and excellence. In other words, despite years of policy implementations assuming a trade-off between equality and quality (Valverde, 1988) or equity and efficiency (Husted & Kenny, 2000) in education, these two characteristics may enhance each other. Evidence provided in Chapter 4 of this dissertation shows that future research on the issue should consider this positive correlation between equity and excellence.

The findings point out the positive relationship between equity and excellence is quite significant in the sense that it may change the direction of education policies. As I underline above, education is expected to enable upward social mobility and reduce inequalities in this way. However, if excellence in education is also affected positively by equity, then it is possible to say that the relationship has a two-way characteristic and it would be proved that it is impossible to have an excellent education system without being egalitarian at the same time. Therefore, policy

implementations putting performance measures, benchmarks, vast spending on private education etc. throughout the world should be reconsidered.

In addition to its contribution to education studies in international literature, this research has also significance for Turkey. As mentioned above, research in the area of sociology of education in Turkey has mostly dealt with quantities in education. Since the foundation of the Republic the main aim of the national education policies were to increase literacy and enrolment rates. In this sense, inequalities in reaching education were a major concern for the studies in sociology of education. Nevertheless, in the last few decades, both the literacy rates and enrolment in primary education at least for younger population reached the levels over 90%. Thus, the qualities in the education system became the major discussion issue. From a sociological point of view, it is hard to say that previous social inequalities in access to education do not persist after –almost- all children reach basic education. Hence, this research will contribute to the area of sociology of education in Turkey in the sense that it will be one of the broadest efforts to grasp social inequalities reproduced in the schooling process.

One of the most important contributions of this dissertation for the case of Turkey is its focus on gender inequalities. The unequal access of boys and girls to education in Turkey has been studied for years. In the last decade, inequality of access especially to primary education is almost abolished according to official statistics<sup>2</sup>. However, this dissertation shows that gender inequalities in terms of educational outcomes persist in the Turkish education system.

Moreover, it is also found that in Turkey, education system itself creates or reproduces socio-economic inequalities, too. Considering the findings regarding the positive relationship between equity and excellence, this thesis aims at pointing out the false direction of educational reforms in Turkey. In such an education system, priority should be mitigating the attainment gaps between students from different

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<sup>2</sup> By 2014-2015, sex ratio in primary and junior secondary levels of education was just over 100 % in Turkey. This means that the schooling rates of girls and boys are almost equal. (TURKSTAT, n.d.)



social backgrounds. However, almost none of the recent educational reforms in Turkey addressed this need. Before moving on to following chapters, I present a brief overview of education system in Turkey and recent educational reforms in the next section.

## **1.6. Background of the study:**

### ***1.6.1. Education system in Turkey***

Turkey has a population of over 76.5 million by the end of 2013<sup>3</sup>. Over 15 million of this population is between the ages of 6 and 17 which are the ages of compulsory schooling. Since the early years of the Republic which was founded in 1923, the education system in Turkey has been highly centralized under the Ministry of National Education (MoNE). MoNE is responsible for designing the curriculum for all schools and hiring teachers and principals and providing all materials for public schools. About 3% of schools in compulsory education are private institutions which are also subject to same regulations under MoNE. Gershberg (2005) points out that the Turkish education system is far more centralized than most of the middle income countries or EU countries. In line with Gershberg, Dincer (2013) underlines that the Turkish education system leaves very little room for school autonomy compared to other OECD countries.

In Turkey, children from 3-6 years can attend pre-primary level schools, which are non-compulsory. Despite the pressure from international organizations and efforts of the government to increase enrolment levels, by 2013 only 27.7 % of the children between 3-5 years and 42.5 % of 5 year olds attended pre-primary schools.

Compulsory primary education in Turkey was 5 years until the legislation in 1997 which is mentioned below in detail. In 1997, compulsory education was extended to 8 years including 3 years of junior secondary schools as well as 5 year primary schools. Finally, with the recent legislation in 2012 compulsory education was

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<sup>3</sup> Statistics are taken from Turkish Statistical Institute, [www.tuik.gov.tr](http://www.tuik.gov.tr), accessed on 11/10/2014

extended to 12 years consisting of 3 levels as primary level, junior secondary level and secondary level. Each level lasts 4 years. In the last few decades Turkey has achieved a great deal in terms of enrolment levels especially in primary education. Net schooling rates increased up to 99.6 % in 2013 compared to 89.3 % in 1994.

However, there is still a long way to go in secondary education in which the enrolment rate is 93.1 % for junior secondary schools and 70.1 % for upper secondary level. Secondary schools, which used to be 3 years and was extended to 4 years in 2005, are consisted of various types of schools some providing vocational education and some providing academic education. Some types of secondary schools admit students according to achievement in central examination(s). For the admission to various selective secondary schools, there used to be a single exam named OKS (Exam for Secondary School Admissions) until 2007, then a new series of exams named SBS (Level Measurement Exams) were implemented, which are taken at the end of 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> grades. 2 years later, SBS was reduced to a single exam again which is to be taken at the end of 8<sup>th</sup> grade. Finally, in 2012 it is decided to remove SBS and to conduct several exams (TEOG-Transition from basic education to secondary education) in several subjects during the semester time from 5<sup>th</sup> to 8<sup>th</sup> grades in order to calculate a score to be used for admissions and central placement in secondary schools.

Science High Schools, Anatolian High Schools, Anatolian Teacher Training High Schools and Social Sciences High Schools are the most successful types of secondary schools admitting students according to central examination scores and previous academic records. However, they only have 20 % of all the secondary school pupils (MoNE, 2013). On the other hand, about 40 % of about 5 million students in secondary education attend various types of vocational/technical schools, about 20% attend general high schools and other types of schools and about 20 % are in distant/open education all performing very badly in PISA (EARGED, 2010) or University Entrance Exams (Y. Şahin, Özdemir, & Selvi, 2012).

Tertiary education in Turkey is non-compulsory. It is free in public universities. Net enrolment level in tertiary education is 39.9 % by 2013. Every year a series of central exams on several subjects is conducted for the entrance into universities. In 2014, less than 20 % of over 2 million applicants were placed in undergraduate programmes and about 16 % were placed in two-year vocational associate degree programmes<sup>4</sup>.

The presence of ferocious competition both in the transition from junior secondary to secondary and from secondary to tertiary education created an alternative education system in Turkey. The private tutoring institutions known as ‘dersane’ in Turkish prepare students for national entrance exams. Many students attend these courses in the evening, in the weekend or in the semester breaks as families pay a vast amount of money. As Tansel (2012) shows the total private educational expenditure in Turkey in 2002 was at 2.5 % of GDP (TURKSTAT, 2011 in Tansel, 2012) which is quite high when compared to OECD countries (OECD average: 0.9 % in 2008) when the total public expenditure is 4.76 % which is below the OECD average of 5.0 % (OECD 2011, in Tansel, 2012). Tansel and Bircan Bodur (2012) indicated that the private expenditure of families on private tutoring was 1.9 % of GDP in 2002<sup>5</sup>.

### ***1.5.2. Recent reforms in the Turkish education system***

In the last two decades Turkish education system has gone under huge transformations. First of these reforms was in 1997 when compulsory schooling was expanded from 5 years to 8 years (MoNE, 1997) in line with world-wide commitment to basic education via the ‘Education for All’ campaign of UNESCO (Aydagül, 2009). The legislation was supported with a massive funding investment including a \$2 billion from a World Bank loan to establish new school buildings,

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<sup>4</sup> Statistics taken from OSYM (Student Selection and Placement Centre): <http://dokuman.osym.gov.tr/pdfdokuman/2014/OSYS/yerlestirme/2014-OSYS-YerlestirmeSonuclar%C4%B1naIlskinSayisalBilgiler23072014.pdf>, accessed on 11/10/2014.

<sup>5</sup> Due to a recent legislation, private ‘dersane’ institutions will be abolished and converted into private schools starting from September 2015.

provide new educational materials and equipment, and recruit additional teachers (Güven, 2007).

The second reform was the broad curriculum change in 2005 which aimed to change considerably the focus and content of the whole national curricula between 4<sup>th</sup> and 8<sup>th</sup> grades with a view to preparing young citizens better for the real world (Aksit, 2007). The new curricula are designed with the aim to meet EU acquis (Aksit, 2007) and to respond to criticisms after the poor results in PISA, TIMMS and PIRLS exams (Gür, Çelik, & Özoğlu, 2012).

Finally, in 2012, compulsory schooling was increased from eight to twelve years (MoNE, 2012b). After the expansion of primary school reform in 1997, primary and junior middle level schools were integrated in a comprehensive system. The 2012 legislation restructured compulsory education as consisting of 3 levels as primary, junior secondary and secondary schools. Since, each level lasts four years this reform is widely called as 4+4+4 reform. With the new legislation religious junior secondary schools which were shut down in 1997 were reopened. They offer some additional religious courses in addition to a general curriculum. Starting age for primary schools was changed from 6 to 5 years<sup>6</sup>. Students were allowed to complete junior secondary and secondary levels of compulsory education with distant/open education<sup>7</sup>. Some new elective courses including some religious courses like the “The life of our Prophet” and “The Holy Qur’an”, etc. were offered for 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> grades (ERG, 2013b).

### ***1.5.3. Social composition of schools***

Even though there is not any study on the social characteristics of schools in the Turkish education system, various studies underline the segregation between schools in Turkey (Alacacı & Erbaş, 2010; Dinçer & Oral, 2013; Tomul & Savasci, 2012; World Bank, 2011, 2013). Since primary education was 8 years and comprehensive

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<sup>6</sup> This regulation was then changed to 5,5 years and then 6 years again after objections from the public.

<sup>7</sup> After severe criticism from public this regulation was repealed for junior secondary level.

until 2012, the only formal difference between primary schools was being a public school or private school. Considering the low share of private schools (about 3% (MoNE, 2013)), the expected amount of differences between the primary schools might be low. However, as Alacaci & Erbas (2010) argue that students from similar socio-economic groups are clustered in same schools even in the public school system. After the implementation of the 4+4+4 reform in 2012 mentioned above, primary education was divided into two stages consisting of 4 years each. At the second stage, students/families can choose between general junior secondary schools or religious junior secondary schools (consisting about 7% (MoNE, 2013) of all junior secondary schools). This differentiation may also be expected to increase social segregation between schools.

Moreover, as a result of the highly competitive examination(s) system for the transition to high schools, segregation between the schools increases at the secondary level. Gümüş & Atalmış (2012) point out that huge amounts of money are spent on private tutoring which makes it easier to enter better high schools. This leads segregation in terms of income at the secondary school level. The most successful school types are Science High Schools, Anatolian High Schools and Anatolian Teacher Training High Schools whereas Vocational High Schools are the worst performing types in many cases. However, with recent legislations the number of different school types was reduced from over 70 to less than 10 for the last few years. Schools with academic curricula were transformed into Anatolian High Schools or Religious High Schools and schools with vocational or technical curricula were transformed into Anatolian Vocational and Technical High Schools. Tomul & Savaşçı (2012) showed in their studies, which analysed data from secondary school placement exams, that place of residence is one of the major determinants of school segregation. Students from village schools are less probable to enter better performing schools like Science High Schools or Anatolian High Schools. World Bank reports published in 2011 and 2013 indicate that half of the students in the vocational and technical high schools which are the worst performing schools in PISA exams are from the lowest two quintiles of the socio-economic index. On the

other hand, 65% of the students attending Science High Schools, which are the best performing schools, are from the top socio-economic quintile (World Bank, 2011, 2013).

### **1.7. Outline of the thesis:**

Following the Introduction Chapter, I give a brief account of literature related to my research in Chapter 2. In addition to major streams of research in both sociology of education and education policies, I also review recent international research on the relationship between equity and excellence and research in Turkey about effects of social, economic and educational factors on educational attainment. In the following Methodology and Methods Chapter, I give detailed information on my methodological stance, methods used in this work, operationalization of the concepts and variables analysed throughout the thesis.

After the first three introductory chapters, there are two main analysis Chapters. I try to answer my two major research questions under these two chapters. In the fourth chapter I aim at tracking international patterns on the relationship between equity and excellence. Based on the existing research, I test various operationalizations and methods to analyse equity and excellence. Finally, I employ my original approaches to improve the evidence on the positive relationship between equity and excellence.

The next analysis Chapter has a focus on Turkey. In the first section of the fifth chapter, I utilize Multilevel Regression Models to show the associations between various socio-economic and educational characteristics of students and schools, and PISA attainment. Moreover, I also employ two further approaches to investigate better the associations found in multilevel models. In section 5.2, selection models are tested to explore the relationships between equity and excellence in the complex structure of the Turkish education system. Furthermore, in section 5.3, socio-economic background effects are investigated in detail to explore the effects of particular occupational, cultural and educational measures of socio-economic status separately.

Finally, in the last Chapter, I discuss my findings in relation to existing research in the world and in Turkey. I try to pave the way for new policy implementations for a more equitable and excellent education system in Turkey.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1. Introduction:**

In this section, I try to summarize the relevant literature regarding my research. Starting with different theoretical approaches to Sociology of Education, I also try to associate these with recent theories developed by various sociologists in the second half of twentieth century. Moreover, I try to scrutinize the views of each theoretical approach on inequality. Afterwards, I outline different theoretical approaches to education policies. In the third and fourth sections, recent research on equity and excellence in education both around the world and in Turkey are summarized respectively.

#### **2.2. Different Theoretical Approaches to Sociology of Education:**

Education has been a major concern for sociology since its first years. Three classical paradigms in sociology from its early years are Consensus Theory, Conflict Theory and Interactionist Theory. I try to summarize these traditions starting from mentioning the fundamental ideas of their founders. Then, I give a summary of main stances of the approach and then provide examples of the earlier works which were influential in the sociology of education for the last 50-60 years. Afterwards, criticisms to each view are mentioned shortly. Finally, I try to mention the relevance of each approach to my research.



Especially after 1960's some new approaches either combining the classical approaches or criticizing them emerged such as code theory, cultural capital theory and critical pedagogy. These views are also summarized at the end of this section.

### ***2.2.1. Classical Approaches to Sociology of Education:***

#### *2.2.1.1 Consensus Theories:*

First of the main paradigms in sociology is consensus theories which is also called as functionalist theories. Consensus theory analyses the parts of society according to their functions to sustain stability in the society. Despite objections to classify Emile Durkheim as a consensus theorist (Dawe, 1970; Giddens, 1976), it can be said that starting from Parsons consensus theorists based their ideas on Durkheim's concepts and views. In his theories, Durkheim put great emphasis on education. Durkheim (1956a, 1961) evaluated education as the best tool to give the moral values of the society to the individuals. According to Durkheim, society has been transforming from mechanical division of labour to organic division of labour (Durkheim, 1947). Mechanical division of labour can be observed in small communities where all individuals share the same beliefs and they are connected to the community without any intermediary. On the other hand, organic division of labour is described in analogy to human body in which each organ performs a different function. Types of moral order also transform in line with the division of labour. Durkheim defines them as mechanical and organic solidarity. In mechanical solidarity, it is the collective conscious that bring people together. These are mechanical causes like "affinity of blood, attachment to the same soil, ancestral worship, community of habits etc." (Durkheim, 1947, p. 278). In organic solidarity, despite the lack of a strong collective conscience, interdependence of the individuals according to their roles in the society brings them together. This transformation created a need for a new moral order to prevent anomie in the society (Durkheim, 1947). And, education is the best means to teach this new moral order. Furthermore, Durkheim also values education for its role in keeping the stability of the society through preparing individuals to their places in the division of labour. In other words, education is one

of the most important mediums to reproduce the social order in the society. In “Education: its nature and its role”, Durkheim (1956b, p. 123) defines education as “the means by which society perpetually re-creates the conditions of its very existence”. However, despite some of his successors defined it in a static way, for Durkheim education is a dynamic process. He argued that education does not create the social change but transformed through it since education is “the image and reflection of the society” (Durkheim, 1951).

After Durkheim, functionalist theories dominated sociology and sociology of education in particular for long years. Influenced by Durkheim, functionalists in sociology of education emphasized the importance of role differentiation and social solidarity in the society (Feinberg & Soltis, 1992). They could be taught within the family or within the community in primitive societies. However, in modern societies both role differentiation and social solidarity are more complex and they have to be taught in a formal structure. In functionalist approach, education has both manifest and latent functions (Feinberg & Soltis, 1992). Teaching courses to students in order to adapt them to economic, political and social institutions of the society is the manifest function of education. Besides, education has also latent functions like producing people who share the same norms.

Although functionalist theory uses some of the concepts borrowed from Durkheim, some scholars regard Talcott Parsons as the founder of the functionalist approach (Dahrendorf, 1959; Giddens, 1976; Pope, 1973). Parsons (2000) argued that individuals in the society are placed in certain occupational roles according to their skills and achievement. And, society has a consensus on this arrangement. In “The school class as a social system”, Parsons (2000) underlined two functions of the schools. First, education gives the child the knowledge for his/her occupational role in the future and also the knowledge for proper attitudes to live in the society. Second, school also gives the child a set of values related to the appreciation of achievement and the principle of meritocracy. Hence, possible conflicts due to unequal roles and rewards in the future are prevented.

Another functionalist theorist, Robert Dreeben (1968), defined four norms learned at school. First one of these is 'independence', referring to individual responsibility and personal accountability. Second is 'achievement' which means that individuals are judged by their own achievement and not for their effort or intentions. The third norm is 'universalism' indicating the uniform treatment of individuals as members of society. The last one is 'specificity' which teaches students that exceptions in universalism are only made on legitimate grounds.

Functionalists' understanding of equality or inequality in education is very similar to Dreeben's conceptualization of norms taught in school. They underline the concepts of achieved and ascribed rewards (Feinberg & Soltis, 1992). They argue that there is a progress towards ascribed to achieved rewards in modern societies.

On these grounds, Davis and Moore (1945) argued that stratification is a necessity for the survival of the society. In other words, inequality is functional for the society. According to them, some positions in the society are more important than others for the survival of the society. And, these positions need more skill and/or talent than others. Hence, a motivational system is needed to fill these positions in a legitimate way. In this sense, education plays an important role for both teaching the knowledge required and sort and select individuals for these important positions. In addition to Davis and Moore, Hyman (1953) claims that middle class families more internalized this value system and disadvantaged families hang on pre-modern values.

Functionalist approach in sociology of education initiated new theories for the last few decades. Human capital theory, which has been very influential in sociology of education for the last 50 years, has been one of the most popular of them and can be seen as a useful tool for functionalist view of the sociology of education. Human capital theory, having its roots in economics, was first employed by scholars such as Becker (1964) and Schultz (1963). Human capital theory evaluates actions of people as investments for their future well beings such as schooling, training, and health care. Thus, education is evaluated as a rational investment of people for themselves. Despite its similarity with the views of Davis & Moore in relation to their evaluation

of motivation for training for future rewards, human capital theory focuses on economic gains instead of societal functions (Davies & Guppy, 2010). In other words, education is seen as an individual investment. The more individuals invest in time, money, effort, etc. for their education the higher their future incomes are. Human capital theory took many criticisms such as neglecting the intrinsic values of education and only focusing on its economic values. For instance it is criticized for ignoring the gender inequalities in the labour market, since women are getting lower wages than males for the same jobs although they have same amounts of educational investments (Robeyns, 2006). Yet, human capital theory is still very popular in the sociology of education.

Functionalist theories in education are criticised for several points. One of them is the role of power in the society. Since Durkheim, society has been considered as a perfect union in which everybody agree upon moral norms (Davies & Guppy, 2010). However, the morality which is accepted as the official morality of the society is usually the morality of powerful groups. Another criticism is about the relationship between the structure and the agency. Society is defined in a very strict structure that individuals cannot act independently. It is the case in education, too. School is seen as a disciplining social mechanism to endorse social cohesion. However, education theorists like John Dewey (1962) criticized this view and have underlined individualism and defined education as an institution to develop personal skills.

Another major criticism to consensus approach in sociology of education is about the issues of inequality. Scholars like Davis & Moore explained the need for inequality but it is still questionable that who are benefiting from the stratification or in other words inequality is functional for whom (Davies & Guppy, 2010). Although functionalists argue that there is an equality of opportunity and meritocracy in modern societies, they still ignore to notice inequality of conditions. Some parts of this dissertation are also in line with this criticism. Despite formal equality in terms of access to education, systematic failure of children from certain social groups in education makes the norms like meritocracy or universalism in functionalist education theory questionable. Analyses in the following chapters reveal such

patterns using international student performance and socio-economic background data. In this sense, counter theoretical arguments against consensus approach to sociology of education is employed in this dissertation. The major of them is the conflict approach which is mentioned in the next section.

#### *2.2.1.2 Conflict Theories:*

Second approach to the sociology of education is conflict theories. Unlike consensus theories, conflict approach sees consensus as a temporary stage and more focus on social change caused by social conflicts. Conflict approach has its roots in the works of Marx and Weber. Similar to the criticisms for describing Durkheim as a functionalist/consensus theorist, some argue that it is problematic to say that Marx and Weber used only social conflict as a tool for their analyses and were not interested in social consensus (Lipset, 1990; Ritzer & Goodman, 2003; Wood, 1983). Nevertheless, it is fair to say that most of the later scholars who are classified as conflict theorists based their works on the views of Marx and/or Weber. First and foremost, many conflict sociologists argue that education teaches individuals their positions in the society and served to reproduce existing social positions as said by Marx and Weber.

In their famous piece, *The communist manifesto*, Marx & Engels (1848) stated that all history of humankind is the history of class struggles which take the form of the struggle between the slave and the master in earlier ages, between the serf and the feudal in feudalism and the proletariat and the bourgeois in the capitalist era. In this history, the ruling ideas in each epoch have been the ideas of the ruling class. Hence, education has been crucial to diffuse the ruling ideas throughout the history. According to Marx (1976), schools in the capitalist system give the children the values and the skills needed for the functioning of the capitalist workplace. In this sense, Durkheim and Marx have the common claim that education reproduces existing social order. However, while Durkheim argues that everybody should benefit from the education system to secure a fair competition, Marx is suspicious

and critical about both the starting conditions of children from different classes and the contents of education.

Max Weber also analysed the transformation from traditional societies to industrial societies like Durkheim and Marx. However, his focus was more on the process of rationalization. According to Weber, as societies are transforming from traditional and religious values to rationalization, a new authority which he conceptualized as rational-legal authority is emerging (Weber, 1978). Legitimacy of this new authority is based on careful planning and precise calculation. This mind-set created modern bureaucracies which brought efficiency but created an iron cage at the same time. In this new order, education has a key role. Schools are essential in modern societies as churches in traditional societies (Davies & Guppy, 2010). As Durkheim, Weber also noted the role of education in securing meritocracy which provides legitimacy for bureaucratic authority (Weber, 1958). On the other hand, he also noted that this legitimacy is valid in appearance and as Marx he is cautious about equality of conditions (Davies & Guppy, 2010). According to Weber (1958) the selection process through education is in favour of property. Another important point about education that Weber underlined is the importance of educational certificates in gaining social prestige. Weber (1958) claims that education certificates is also an exclusionary device. They are restricting the supply for important positions in the workforce and create a monopoly. In this sense, Weber is considered as a conflict theorist. Unlike Marx, Weber believed that conflict in the society is not only based on economic relations, i.e. class, but also stemmed from inequalities in the distribution of other sources like social prestige, i.e. status, or political power, i.e. party.

In conflict theories, society is analysed according to the exploitative relationship between dominant and subordinate groups. They claim that the driving force in societies is the unending struggle between different groups to hold power and status. Unlike functionalists they do not believe that education system is ideologically neutral and every child can have the highest level of education and get the highest rewards in a meritocratic system. Conflict theorists in sociology of education argue

that dominant groups impose their values on subordinate groups through education structures and the schools reproduce the attitudes and dispositions that are required for the continuation of the present system of domination by the privileged class (Feinberg & Soltis, 1992; Parelius & Parelius, 1987).

Based on the thoughts of Marx and Weber, new conflict theories of education emerged especially in the 1970s. Among those, Bowles & Gintis (1976) had a structural Marxist view that underlines the economic relationships in a deterministic view (Gewirtz & Cribb, 2009). In their research they found a correspondence between schools and workplace in the US. According to Bowles & Gintis (1976) working class students are taught to be docile, obedient and compliant in their schools while children of elite families are trained as autonomous self-directed learners in order to be prepared for their future roles. They argued that schools in capitalist societies are designed to prevent the upward social mobility of working class children. In their research, Bowles & Gintis also tested several relationships. Using USA data, they found that economic success cannot be explained by intelligence (as measured by IQ scores) and there is no relationship between the trend toward equalizing the years of schooling and the equalization of income. Bowles & Gintis concluded that education is a means to reproduce and sustain existing inequalities in the society. Moreover, they claimed that an education reform to fully equalize educational opportunities is impossible unless economic and political system is changed.

On the other side of the Marxist spectrum, there is the cultural Marxist approach which emphasizes the subjectivities of students and teachers in reconciling the relationship between the economy and the education system (Gewirtz & Cribb, 2009). Paul Willis' (1977) 'Learning to labour' is an example of cultural Marxist approach to sociology of education. In his ethnographic research in a working class school in the UK, Willis sought the reasons for why working class kids accept to get working class jobs. Willis found out that counter-school culture created by working class kids is a way of resistance to socialization offered by education into certain rules in society. He underlined that traditional forms of culture are utterly

incompatible with the middle-class alignments of schools. According to Willis, this cultural clash is a reflection of class struggle and the counter school culture of these kids is a way of resistance.

In addition to Marxist approaches to sociology of education, there are also conflict approach scholars influenced by Weber like Randall Collins. Influenced by Weber's (1978) 'tyranny of educational credentials', Collins created the concept of 'credentialism'. Collins (1979) argued that education serves as a gate keeping mechanism for the higher classes. They keep the higher positions in the social structure away from the demand from the lower classes through a selection and elimination process. Collins rejects and refutes the functionalist claim that increasing technology use in the workplace led to increasing years of schooling needed for employment. Moreover, he also showed that school curricula are not strongly connected to the practices in the workplace as should be expected by human capital theory. On the other hand, he emphasized two facts that triggered 'credential inflation'. First of all, there are not enough jobs in the market to employ educationally qualified people. Hence, education serves a mechanism to create new jobs, e.g. more and more teachers are needed as educational credentials are inflated, and put people off job seeking as they are studying. Second, influenced by Weber's professional monopolization, Collins argued that certain professions, e.g. lawyers, medical practitioners, are seeking more and more credentials. Collins conceptualizes this fact as professionalism which is used for lowering the supply of new professionals and securing their status positions. Hence, for Collins education is a medium of status competition and 'is a part of a system of cultural stratification' (Collins, 1979, p. 192).

As consensus theories, conflict theories are also criticized for neglecting the role of agency. Sarup (1978) argued that Marxist approaches to education neglected micro-level relations like teacher-student interaction. Similarly, Giroux (1983) claimed that conflict approach tend to portray students and teachers as passive and as if their actions are only determined by the demands of corporate capital. He argued that the



idea of domination is overemphasized in conflict theories and they failed to provide insights from individuals like students or teachers.

Another set of criticisms to conflict theories are about the mechanisms that reproduce inequalities. Some scholars claimed that there are not enough evidence about the causal relationship between capitalism and the structure of schooling (Feinberg & Soltis, 1992). Moreover, it is also claimed that while focusing too much on class, other patterns of inequality such as age, gender or race are neglected by conflict theories of education (Davies & Guppy, 2010).

These criticisms triggered a move away from grand theorizing starting from 1980s. Spender and Sarah's (1980) 'Learning to lose' drawing attention to gender issues in education, 'Critical Race Theory' underlining the inequalities due to race in the USA (Delgado & Stefancic, 2000; Ladson-Billings & Tate, 1995; Ladson-Billings, 1998), and Walkerdine's (1981) analysis of power and pedagogy with a poststructuralist view are examples of works stemming from the criticism of conflict theories in education.

The view of conflict theory is central to this dissertation. Unlike functionalist theories mentioned in the previous section, conflict theories focus on the reproduction of social inequalities through education system. Major research questions of this thesis aim at finding the relationship between social inequalities and educational outputs. In Chapter 4 the relationship between equity and excellence in education is underlined. It is shown that social inequalities are closely related to overall achievement in education. Moreover, in Chapter 5 which focuses on the effects of various socio-economic variables on student performance in Turkey, I try to reveal how upward social mobility of disadvantaged children are prevented and social stratification in Turkey is reproduced through various characteristics of education system. Therefore, conflict approach is broadly exploited throughout the analyses in this dissertation.

### *2.2.1.3 Interactionist theories:*

Interactionist theories in the sociology of education are stemmed from micro-level theories in sociology such as symbolic interactionism or labelling theory. Theoretical foundation of these theories goes back to the social psychological studies of G. H. Mead and works of sociologists like C. Cooley and E. Goffmann. Mead (1934) underlined the importance of nonverbal communication in social relations and stressed that interactions between individuals and meanings attached to these interactions are key to understanding social relations. Mead stated that selves are social constructs. And this social construction takes place through interactions. He also defined three stages in construction of the self. These are the play stage in which a child learns the social roles from the people around like parents, teachers, etc., game stage in which the child can induce the roles of other people; and finally the generalized other stage in which a person can infer the behaviour that is appropriate according to the social roles.

Symbolic interactionist view in sociology of education focuses on the systems of meaning of people and is interested in what teachers and students 'do' at school. Scholars using this approach focus on the relationship taking place at the school between students or between students and teachers, rather than focusing on macro structures. According to interactionist view, individuals construct systems of meaning from their experiences and through them they make sense of the world around themselves (Gewirtz & Cribb, 2009). In this sense, there is a contrast between structuralist views (either functionalism or Marxism) and interactionism. Unlike structural views, interactionism focuses on the actions of individual agents and subjectivity. Hence, both students and teachers are active participants in school. Moreover, for instance the inequalities between students are rooted from the symbols they bring to school (Ballantine & Spade, 2015). Because, people from similar culture usually expected to share the same meanings and thus same experiences and expectations (Ballantine & Roberts, 2007). Furthermore, children also develop their sense of the self in the school. Through their interactions with their peers and teachers they learn their roles and behaviours expected from them in the society.

One of the earliest studies from an interactionist view in sociology of education is the PhD research of Howard Becker (1952a, 1952b, 1953). He analysed how public school teachers in Chicago maintained their authority in the classroom. To do this he focused on the interactions of teachers and other agents in the school environment. Using in-depth interviews with teachers as his data, Becker revealed the strategies that teachers use to preserve their authority against the challenges from students, principals or parents. Doing this, Becker (1953) stated that he tried to show sociological patterns in a self-contained system of social control, i.e. school.

Labelling theory, which argues that people internalize the labels attached to themselves and form their conceptions of the self, according to these labels, is another example of interactionist approach to education. One of the biggest contributors to the theory is from Erving Goffmann. Goffmann (1963) defines 'stigma', which is the label that attached to individuals and defines their self-concept and social identity. Stigmas are the results of a request for normality according to Goffmann. He states that stigmatized person is both told that (s)he is not different from others and is expected to declare himself/herself 'as a resident alien who stands for her/his group' (Goffmann, 1963, p. 108). The concept of self-fulfilling prophecy is key to understand the application of labelling theory to education. The self-fulfilling prophecy is the set of beliefs which is usually false but becomes reality due to restructuring of the self in deference to these beliefs (Wiley, 2003). Labeling theory with the concept of self-fulfilling prophecy helps to understand how expectations from students based on their social characteristics determine their self-perceptions and educational success.

Ray Rist's (1970) study on teacher expectations is one of the earliest examples of the application of labelling theory in education. He showed that expectations of the teachers for the students determine real success of pupils and their future positions in the labour market or in the society. And, these expectations are once internalized by the students it is hard to alter then. Moreover, teacher expectations can also operate at greater levels such as the level of classroom, school or region. According to for example past behaviours or successes of certain individuals, teachers may keep their

expectations at low levels for the whole classroom or schools and it is found that these expectations have significant effect on the future performances of the whole class, school or even a region.

Ray McDermott is another interactionist who studied classroom behaviour. McDermott (1977) argues that classroom interaction may promote or retard learning. He shows how cultural contexts can affect teaching styles. In an ethnographic study McDermott & Hood (1982) researched how certain roles operate in classroom setting. They stated that status and meaning are negotiated in the process of everyday interaction in the classroom. Success and failure are the results of these interactions which McDermott & Hood call as the politics of everyday classroom life. They argue that most educational studies are mistaken since they define the individual as the unit of analysis. McDermott & Hood argue that 'the proper unit of analysis for what people do together is what people do together' (p. 240).

Although, it contains some macro level notions, I reckon that social capital theory can also be related to the interactionist approach to sociology of education. Social capital is the amount of interactions of individuals through their personal networks and its scope depends on the capacity of these networks in terms of their economic and cultural capital. Social capital theorists argue that social capital have profound effects on the educational success of individuals as well as the other forms of capital (Coleman, 1988; Helliwell & Putnam, 1999; Putnam, 1997). Coleman and Hoffer (1987) gave a striking example about Asian American families in the US. It has been found that parents of some Asian American pupils in the United States buy two from each of the school textbooks. One is for the student and the other one is for themselves since they are willing to help their children for their schools. Coleman and Hoffer evaluate this example as a case where the cultural capital is low but the social capital is high. They say that it is also possible that in a family whose cultural capital is very high but since the social capital is low the children may fail to make use of these cultural capital.

Main criticism to interactionist approach to sociology of education is that it fails to provide a view about social structure (Haralambos & Holborn, 2004). This critique states that focusing too much on micro level interactions, bigger picture is missing in interactionist analyses. Giddens (1996) underlined this issue and argued that large scale structures and processes are missing in interactionist theories. Similarly, Macionis and Plummer (2002) argued that relations between activities in school and the functioning of the whole society is underemphasized in interactionist studies of education.

Another criticism for interactionist view is that it lacks to notice the effect of social forces and institutions on social interactions (Andersen & Taylor, 2013). For instance, the effect of systemic racism or gender discrimination may not be accounted for in interactionist studies of education although they are most likely to affect social interactions in school.

A final set of criticisms to interactionist theory in education is about methodological issues. It may be problematic to treat children differentially in order to test a theory (Wienclaw, 2013). Moreover, it is also hard to define concepts like teacher expectations operationally which are fundamental for interactionist theory.

The data employed in this dissertation is a quantitative one. At the macro level it is hard to relate this research to interactionist theory. Thus, the use of interactionist view is at the minimum level throughout the thesis. However, some of the findings especially the ones about social inequalities and their reproduction are in line with the findings of earlier interactionist studies such as Rist's or McDermott's researches.

### ***2.2.2. Contemporary Approaches to Sociology of Education***

In addition to the three main approaches above, a 'New Sociology of Education' emerged after 1960's. Some of the thinkers in this approach defined the sociology of education as a sub-discipline under the sociology of knowledge. They argued that knowledge is socially constructed and education is a means to this construction. The

term 'new sociology of education' appeared after Michael Young's (1971) edited book 'Knowledge and control: new directions for the sociology of education'. Among the articles in the book, two articles from Bernstein (1971b) and Bourdieu (1971) were quite influential. Research in this approach tried to combine the macro-level and micro-level explanations and three classical approaches mentioned above. While even interactionist theories had not paid much attention to the content of education, new sociology of education tried to focus more on the content and the knowledge transmitted (Gewirtz & Cribb, 2009).

#### *2.2.2.1 Code theory and Bernstein:*

Code theory is developed by British sociologist Basil Bernstein. He wanted to reveal how the codes as systems of meaning are related to macro social, economic and political structures. His work combined classical approaches to the sociology of education. Sadovnik (2001) argues that although he is also categorized as Neo-Marxist, functionalist, Weberian conflict theorist or an interactionist his theoretical effort is to develop a Durkheimian structuralist theory that explains how different forms of division of labour create different meaning systems. Bernstein (1961, 1962, 1971a) made a differentiation between 'restricted code' which is associated to working class children and 'elaborated code' which is associated with middle class children. He argued that restricted code is composed of short, grammatically simple and often unfinished sentences. Most of the time, it is context dependant and particularistic. On the other hand, meanings of the elaborated code are independent of the context and universal. Bernstein claims that working class kids are limited to the restricted code whereas middle class children use elaborated codes. Moreover, the fact that teaching is in elaborated code creates a disadvantage for working class children. On the other hand, this relationship is not independent from division of labour and production relations. Bernstein (1996) claims that in the context of production restricted codes are more relevant while elaborated code of the middle class has more capacity to respond to changes necessitated by the new forms of division of labour.

Bernstein (1971b) also studied on curriculum. He argued that different curricula may lead to different pedagogic possibilities and hence it may have different outcomes in terms of educational identities, forms of consciousness and social relationships. Bernstein offered two concepts to understand the form of curricula. These are classification and framing. Classification is about the organization of curricula. Strong curricula are organized around discrete subjects and disciplines. It creates clear-cut, bounded and pure students (and teachers). This type of curriculum leads to early selection and differentiation to track who 'belongs to' and who 'does not belong'. On the other hand, framing is individuals' (either teacher or student) level of control over pedagogy, i.e. what is thought and how. For instance, in a weak curriculum there is more room for the independence of teacher and students about the content and pace of knowledge taught. Combinations of classification and framing end up with different pedagogical possibilities. In a strong classification and framing the relationships in the schooling process is more hierarchical and the pupil has less room for move. For example, it is harder for a working class kid to break these bounds and continue to higher levels of education while it is easier for a middle-class student.

#### *2.2.2.2 Cultural capital theory:*

Cultural capital is the form of capital that is the accumulation of cultural possessions of the individual related to her/his position in the society, according to Bourdieu (1973, 1986). It can take the embodied state in the ideas of the people; its objectified state in the material possessions such as books, paintings, music discs, etc.; or the institutionalized state in the level of schooling. Bourdieu and Passeron (1977) argue that the values and knowledge taught at the school are the values and ideas of the dominant classes. Thus, for example, the children of the bourgeois families come to the school with cues about these values that they are already familiar with. On the other hand, the children of the proletariat are disadvantageous since they have to learn these values first. In this sense, schools are the medium of cultural and social reproduction via a symbolic process. They advantage the middle and upper classes. Bourdieu claims that the major role of the schools is cultural reproduction (1971,

1974). They perform the social function of elimination both in the form of 'examination failure' or 'self-elimination'.

In order to understand Bourdieu & Passeron's reproduction theory, two other concepts are crucial. The first of these is symbolic violence. Symbolic capital can be defined as the resources created for a person through honour, prestige and recognition. It can be in any forms of capital (economic, social or cultural) which perceived through socially inculcated classificatory schemes (Wacquant, 2008). And, the exercise of symbolic capital produces symbolic violence. It helps dominant groups to exact their understandings as legitimate and at the same time to hide the inequalities of power. Through symbolic violence, social reproduction is not necessarily exercised through coercion. Education is the key to this process which creates the social consensus. It is the main medium to diffuse the cultural values of dominant classes.

The other key concept is habitus. Bourdieu (1977) defines habitus as the way in which the culture of a social group is internalised in the individual. In this sense, both the structure and the agency take part in the construction of habitus. It is directly related to class and individuals make sense of the world around them through their habitus. For the case of education, it helps to reproduce inequalities embedded in the process of schooling like symbolic violence. Bourdieu & Passeron (1990) argue that educational inequalities are produced not only through formal mechanism like tracking or selection but also through self-selective and self-exclusionary processes and choices which are the products of one's habitus. In this sense, they underline that school success is not a result of academic talent but the result of cultural competence which is already biased towards upper and middle classes.

### *2.2.2.3 Critical pedagogy and hidden curriculum:*

Critical pedagogy is a counter-philosophy of education which claims that schools serve for the needs of the dominant groups and calls for an action against this domination. The term first raised by Paulo Freire (1970) who claimed that traditional pedagogy oriented students to passively admit oppressive attitudes and practices



through schooling. Freire, as an educator himself rejected the older teaching which he blames for promoting inequalities between students and teachers and offered a new pedagogy in which teachers and students learn, teach and question each other (Gewirtz & Cribb, 2009). The term later raised by scholars like Henry Giroux and Peter McLaren who tried to build an educational movement, 'to help students develop consciousness of freedom, recognize authoritarian tendencies, and connect knowledge to power and the ability to take constructive action' (Giroux, 2010).

The term hidden curriculum is widely used by critical pedagogy thinkers. Actually, the concept is applicable to almost all theories mentioned above. It is very similar to the latent function of education pronounced by structural functionalists. Some conflict theorists like Bowles & Gintis used the term directly; or theories of Bourdieu or Bernstein are also very similar. Hidden curriculum is described as the lessons, which are by-products of the education system, taught in schools or non-schools settings but are not openly intended (Martin, 1976). Pupils learn behaviours like discipline, obedience, hard work, competitive spirit or gender differences unconsciously through the school experience. Hence, it also helps to reproduce the existing inequalities. Critical pedagogy thinkers claim that domination is embedded at the very centre of modern society and it is operated via the hidden curriculum in education. Critical pedagogy thinkers call for resistance against all forms of oppression by overthrowing orthodox ways of thinking (Gewirtz & Cribb, 2009).

Despite not being a critical pedagogy thinker, as an anarchist Ivan Illich also used the hidden curriculum concept widely. Illich (1970) argued that schooling system evaluates individuals as they are incapable of doing anything without formal education. He conceptualized schools as repressive, failing to indoctrinate creativity and imagination but instead make students accept the interests of the powerful thorough the hidden curriculum. Education is served as a commodity to be consumed and so that students become passive consumers. Illich suggested deschooling to liberate the individuals from the consumption society.

In addition to conflict theories, new sociology of education theories can all be related to the aims of this dissertation. However, within the limits of the data it is not possible to test them widely. Reproduction of social inequalities via language codes may be existent in an education system which is as non-egalitarian as Turkey. However, to test this view micro level data would be needed. Still, the variables related to mother tongue in PISA data might give a hint about the issue. Nevertheless, they are found to be statistically insignificant in Chapter 5. This does not necessarily indicate that language is not important in the reproduction of inequalities in Turkey. Since, the variability created by language differences may be represented by other variables such as school types or regions. Further studies on the role of language codes, as defined by Bernstein, have the potential to contribute to the aims of this dissertation. Cultural capital theory is also relevant for my main research questions. In addition to inequalities created by class differences, as mainly measured by occupational status indices, cultural differences may contribute to individual student performance. The index for socio-economic background in PISA data includes some items related to cultural capital. They are investigated in detail at the end of Chapter 5. Finally, critical pedagogy and hidden curriculum theories can also be related to the aims of this dissertation. Again, the limitations caused by quantitative meta data make it almost impossible to test the arguments of these theories. However, results of the analyses especially in Chapter 5 show that education does not function as indicated by consensus theories especially in Turkey. Thus, as a further step, studies focusing on the contents of education like curricula and teaching styles using relevant data can give additional insights about the nature of inequalities created by the education system. Testing the claims of both the classical and new approaches to sociology of education brings the policy issues to the front. In the next section, different approaches to education policies are summarized.

## **2.2. Three Approaches to the Education Policies:**

Testing of the research questions of this dissertation results in identification of some problems about the education system. Thus, in addition to theories mentioned above, further stance is needed to define the policies needed to tackle the problems

identified. Besides the theoretical approaches to sociology of education there are few more theoretical conceptualizations within the limits of broader social sciences especially focusing on education policies. Three major of them are namely Human Capital Approach (which is briefly mentioned above), Human Rights Approach and Capabilities Approach. Among them Capability Approach is the most relevant to the issues defined throughout the thesis. Although, it is not central to the analysis procedures in the following chapters, Capability Approach is closely linked to the operational definition of the dependent variables. Below, main approaches to education policies are summarized.

### ***2.2.1. Human Capital Approach:***

As stated above, Human Capital Approach has an economic view of education policies. Born in the Post-Washington Consensus context, Human Capital Approach emphasizes the economical returns of education policies. It evaluates education as an investment of individuals on themselves which raises their future incomes (Woodhall, 1997). Stemming from the works of Schultz (1963) and Becker (1964), Human Capital Theory has been widely used in education research. Education has been started to be understood as an investment towards alleviating poverty, expanding economic growth and promoting social welfare. Human Capital Approach values education for providing skills and knowledge which are income-generating abilities especially in a knowledge economy (Robeyns, 2006). In this sense, for example, provision of primary education as an investment priority has expanded to secondary education in recent years (Tikly & Barrett, 2011).

In addition to research that criticize Human Capital Theory in the sense that higher levels of education does not necessarily bring higher levels of income or productivity (Berg, 1971; O'Toole, 1975), another problem with the Human Capital Approach is that it does not take into account the issues other than economics like gender, culture, history, etc. (Block, 1990; Fine, 2002). Thus, human capital approach is widely criticized as neglecting the non-instrumental dimensions of education.

Human Capital Theory can be tested with data including containing information about the outcomes of education in the labour market. However, this dissertation is focused on the performance and skills of students who are still in the education system. Thus, Human Capital Approach is not utilized.

### ***2.2.2. Human Rights Approach:***

As a response to Human Capital Approach that values economic returns of education, Human Rights Approach evaluates education as a right for all people. In addition to access to educational provision, it underlines the elimination of discrimination in all levels of education. Education is regarded as a necessity ‘for the fulfilment of any other civil, political, economic or social right’ by the Human Rights Approach (UNICEF & UNESCO, 2007). It has been advocated especially by United Nations and some international non-governmental organizations. Robeyns (2006) says that whilst Human Capital Approach regard human beings as input factors for economic production and growth, Human Rights Approach regards individuals as the ultimate ends of moral and political concerns.

However, Human Rights Approach is also criticized by some scholars as being limited to the legal rights only and extremely government centred (Robeyns, 2006). It is also criticized for the reason that the provision of education itself is insufficient in many cases (Tomasevski, 2008; Unterhalter, 2004).

As mentioned above, access to education has been studied widely in Turkey. In this dissertation, the emphasis is on the education process itself. Therefore, Human Rights Approach is not relevant neither to the aims nor to the findings of this thesis.

### ***2.2.3. Capabilities Approach:***

The last approach is the Capability Theory which was proposed by Amartya Sen (1992, 1997, 1999). Capabilities are defined by Sen as various functionings that a person can get such as being healthy, being well nourished, having shelter and access to clean water, being mobile, being well-educated, having paid work or being safe.

Freedom of the agency is central in Sen's conceptualization. Hence, in addition to skills one has, capabilities refer to 'freedom and opportunity for an individual to convert whatever resources she/he may have at her disposal into achievements or outcomes of different kinds' (Tikly & Barrett, 2009, p. 7). Education as a capability is valued much in Sen's and other capability theorists' work. In addition to be a capability in itself, education has the potential to enable other capabilities (Alkire, 2002; Nussbaum, 2004).

Capability Approach is widely criticized as being difficult to operationalize (Sugden, 1993). Moreover, it has also been claimed that it is problematic to determine which capabilities are valuable (Nussbaum, 1987; Qizilbash, 2009).

Capability Theory is closely linked to the content of this thesis. International exam data, particularly PISA, aims to measure skills of students which they can use in the rest of their education careers and their lives. Thus, it is the outputs of education in terms of skills that is measured as dependent variable(s) throughout the dissertation. These skills can be regarded as educational capabilities. In this sense, Capability Approach is quite relevant to the aims of this dissertation. In addition to the analyses, it is also referred in the last Chapter in terms of policy recommendations.

In addition to Conflict Theories and Capability Approach there is a wide range of empirical studies on the relationship between equity and excellence that are relevant to the aims of this dissertation. In the next section, I try to give a brief account of them.

### **2.3. Recent studies on equity and excellence in education:**

It was the Coleman report (Coleman et al., 1966) that made the concept of equality of opportunity popular in the field of sociology of education. In their report for the US Department of Education, Coleman et al. stated that educational attainment of students were mostly determined by social background characteristics instead of educational resources. Moreover, they also claimed that education system did not close the gap between different social groups and serve a meritocratic base.

Conversely, educational differences between children from different backgrounds, e.g. white and non-white students, were widening as they went further in educational levels. Coleman (1968) offered the concept of equality of opportunity referring to equality of educational outputs rather than a formal equality in terms of inputs. After Plowden (1967) came out with similar results in the UK, the concept became quite popular in the field.

In a recent study, Gamoran & Long (2007) replicated the research done for Coleman report and found similar results. There are still huge achievement gaps between different social groups in most countries. Thanks to the availability of international student performance data, research on the issue boomed in the last decade.

For years, policy makers acted as if there is a trade-off between equality and efficiency in education (Valverde, 1988). If there are limited resources, it is impossible to achieve excellence and equity for all at the same time. Some scholars also supported this view (Glazer, 1987; Savage, 1988). On the other hand, some others claimed that these concepts are complementary (Willie, 1987), there is no quality without equality and equality without quality is meaningless (Schaefer, 1990) and the definitions of both concepts (whether it is equality or equity; or quality, efficiency or excellence) should include each other (Smith & Lusthaus, 1995).

In a larger perspective, for years educational sociologists claim that more egalitarian societies in terms of opportunities are also more equal and successful in terms of educational achievement (Boudon, 1974; Duru-Bellat & Suchaut, 2005; Kenworthy, 2008). A similar claim came from Wilkinson & Pickett (2009). Their argument is that the countries with more equal distribution of income and resources are better off in many areas including education. Similarly, recently Condron (2011) showed a negative relationship between inequality (measured by GINI) and educational outcomes (measured by average PISA performance).

For the last two decades, researchers all around the world take the claim about the trade-off between equity and excellence for serious and tested it with several indicators (Gamoran & Mare, 1989; Hanushek & Wößmann, 2006; Micklewright &

Schnepf, 2007; Wößmann, 2008b). Some of them clearly refuted this claim including Brown et al. (2007) using TIMSS 1995 averages as the measure for excellence and difference between top and bottom fifth percentile students as the measure for inequity; Hanushek & Wößmann (2006) using data from six different international student assessment researches to track the changes in education systems moving from a more tracked education system to a more egalitarian one; and Micklewright & Schnepf (2007) using PISA data. Furthermore, some scholars even find an opposite relationship in which equity and excellence are positively correlated. In their research using PISA 2000 data Duru-Bellat & Suchaut (2005) claimed that a high degree of social inequality in educational attainment is related the level of differentiation between students through education system and overall success. Similarly, Chiu & Khoo (2005) concluded that overall achievement decreases with inequality based on their analyses with PISA 2000 data.

Many sociologists studied the relationship between equity and excellence in education via the characteristics of education systems. One of them is the level of segregation in education system. Through segregation of students into different schools or classrooms according to either previous achievement or residential addresses, education systems may reinforce existing social inequalities. This is first underlined in the Coleman report (Coleman et al., 1966). Correlation between school composition and academic attainment was found to be stronger than the relationship between individual socio-economic status and achievement in the report. Later studies confirmed these results in many other countries (e.g. Agirdag, Van Houtte, & Van Avermaet, 2011; OECD, 2004; Sirin, 2005; Teddlie, Stringfield, & Reynolds, 2000). Some scholars claimed that the effect of school socio-economic composition is a direct effect via peer influence and school climate (Kreft, 1993; Wells & Crain, 1997). On the other hand some others claimed that school composition has an influence on teacher expectations and teacher expectations influence achievement levels of students (Van Houtte, 2010b). In this way, school composition affects both equity and excellence.

In her study Dunne (2010) had a similar finding. Through her analyses with PISA 2006 data, she found that children of higher socio-economic status families perform better in school only if they attend to a high socio-economic status school. Hence, the effect of socio-economic background is mediated through school socio-economic status composition. Using international exam data, many others come out with similar results. Comparing countries in PISA 2006, Montt (2010) found that there are bigger achievement gaps in countries with higher socio-economic segregations between schools. Similarly, Coleman (1990), Schreens (1997) and OECD (2007a) all claimed that the biggest predictor of between school differences in attainment is school's socio-economic composition.

In addition to school segregation, it is also claimed that within school segregation is also increasing inequalities. Using TIMSS 2003 data, Huang (2009) compared mathematics achievement levels of fourth and eighth grade students. And, he concluded that classroom homogeneity increases achievement inequalities.

As Kerckhoff (2001) noted, educational organization influences educational inequalities. Socio-economic segregation of schools is also associated with differentiation in terms of curriculum (e.g. vocational or academic tracks) through early selection and tracking mechanisms in the education systems. Several scholars claimed that differentiation in the education system reinforced stratification (Bourdieu & Passeron, 1990; Lynch, 1989; Morrow & Torres, 1994). Moreover, scholars like Allmendinger (1989) and Shavit & Müller (1998) focused on labour market data and concluded that in countries with more standardized education systems people change jobs less frequently.

In the last decade, many studies used international exam data to investigate the effects of curriculum differentiation. Montt (2010) and Hanushek & Wößmann (2006) found that there are more equal distributions of attainment in comprehensive school systems. Similarly, Zimmer & Toma (2000) claimed that early differentiation is affecting learning opportunities negatively.



Some other scholars focused on several standardization features of education systems like central exams, standardized distribution of funds or central curriculum and concluded that standardization decreases the effects of socio-economic background on attainment (Bol, Witschge, Van de Werfhorst, & Dronkers, 2014; D. Horn, 2009; Muller & Schiller, 2000; Park, 2008; Schütz et al., 2008; Wößmann, 2003a, 2003b, 2005)

The issue of standardization and differentiation in schooling is analysed by various scholars particularly via early selection and tracking mechanisms. There are several studies investigating the effects of tracking on overall achievement levels. While some of these found no relationships between tracking and achievement (Duru-Bellat & Suchaut, 2005; Vandenberghe, 2006), some found a negative effect of tracking on overall attainment (Brunello & Checchi, 2007; Hanushek & Wößmann, 2006; D. Horn, 2009; Schütz et al., 2008). The only exception is Ammermüller et al.'s (2005) study covering seven Eastern European countries. Among seven countries in the study, top four performers have tracked systems while bottom three countries have more comprehensive education systems.

It is confirmed in many studies that students from lower socio-economic groups or ethnic minority groups are more frequently placed in technical and vocational tracks which makes it harder to continue up to university degree (Au, 2008; Hilliard, 2000; Van Houtte, 2010a) . In line with these studies, using PISA 2000 data Marks (2005) claimed that children from lower family backgrounds are oriented towards less performing schools in highly tracked education systems.

In many other studies using several international exam data, it is confirmed that early selection and tracking increase the effect of family background on achievement and thus escalate social inequalities. Earlier studies using historical data confirmed this relationship in various countries. Gamoran's (1996) study using data between 1984 and 1990 to test curricular reform in Scotland, Duru-Bellat & Kiefer's (2000) study in France with data from 1919 to 1973, Meghir & Palme's (2005) research on Swedish data from 1948 and 1953 cohorts to test educational reform in 1950s and

Pekkarinen et al.'s (2009) study to test Finnish education reform via data from 1972 to 1977 all confirmed that removal or postponement of tracking in education systems resulted in a decline in the effects of family background on student attainment. Lately, several other scholars tested this relationship with international exam data. Using data from PISA 2003, International Adult Literacy Survey, International Social Survey Project and European Community Household Panel Brunello & Checchi (2007) concluded that tracking in education systems increase the effect of family background on educational achievement. Similarly, Hanushek & Wößmann (2006) used data from six international exams from 1995 to 2003 and employed a difference-in difference method to observe changes in countries which changed their tracking systems. Ammermüller (2005), Schütz et al.(2008), Strakova (2010) and Zimmer & Toma (2000) also confirmed these results with different datasets and countries. Despite these findings, Waldinger (2006) points that removal of early selection and tracking might not be the ultimate solution, since there may be other mechanisms of segregation such as private education sector, residential segregation or choice of subjects.

Another stream of research about the relationship between equity and excellence in education is at the individual level. These studies tracked the effects of family background on individual achievement. Research dated back to 1960s all found the positive effect of socio-economic status on student performance (e.g. Coleman, 1990; Coleman et al., 1966; Kwong, 1983; Lareau, 1987; Plowden, 1967; Shavit & Blossfeld, 1993). Research in the last decade with international exam data also identified family background either measured by an index of socio-economic status or educational level or occupational status of parents as one of the biggest predictors of achievement (e.g. Chiu & Khoo, 2005; Dronkers, Van Der Velden, & Dunne, 2012; Marks, 2005; Montt, 2010; OECD, 2001, 2004, 2009, 2010, 2013; Shapira, 2012) Moreover, several reviews underlined that this effect is found to be depended upon several other factors such as socio-economic status measure, grade level, minority status, school socio-economic composition and school location (Dunne, 2010; Sirin, 2005; White, 1982). Furthermore, in their research covering 29 low and

high income countries Heyneman & Loxley (1983) showed that the effect of socio-economic background on academic achievement in a country is decreasing as the level of development decreases. Nevertheless, in a later study Baker et al. (2002) found out that the effect of socio-economic background in developing countries reached to the level in developed countries as they reached the same levels of schooling and Heyneman & Loxley's claim is not valid any more.

To sum up, extant literature on equity and excellence provide mixed results about the relationship of these dimensions of the education systems (Van de Werfhorst & Mijs, 2010). Especially, in Chapter 4 of this dissertation, I try to extend these discussions on the relationship between equity and excellence via employing further methods and data. In addition to testing the direct relationship between two concepts via several indicators, I also investigate the effects of all country, school and student level characteristics.

#### **2.4. Recent research in Turkey on equity and excellence in education:**

Despite endless changes and reforms, education system in Turkey has been problematic for years. Aydagül (2009) stresses that none of the six 'Education For All' aims stated in 2000 in Dakar Conference has been achieved by Turkey. Similarly, Akkoyunlu-Wigley & Akkoyunlu (2008) contends that education system in Turkey lags behind in terms of mitigating capability deprivation. It cannot help to increase basic educational functionings especially for the poor and females. Aydagül (2006) states that, as a country trying to access to European Union, Turkey needs to progress urgently in equity, quality education, education for democratic citizenship and formation of social capital.

Despite discursive importance attached to education by policy makers there are still problems in financing of education in Turkey. In his study, Ergen (2004) analysed educational expenditure data in Turkey between 1983 and 2002 and concluded that expenditure in education has not changed much in 20 years and the claim that education is a priority in government expenditures is not true. In line with Ergen, R.

Horn (2005) also underlined the ineffective financing in education for promoting equity and quality. A major problem in the financing of Turkish education system is the existence of a shadow education system. Highly competitive central exams for the transitions from primary to secondary education and from secondary to higher education created a new sector of private tutoring courses called as 'dersane'. Chawla (2005) found that the private sources account for 36 % of total spending on education which is much higher than most countries. In her study, Tansel (2012) also pointed out that private educational expenditure in Turkey is higher than most of the OECD countries. While OECD average of private spending on education is % 0.9, it is % 2.5 in Turkey due to the private tutoring sector. Tansel stresses that, since families with more income and higher education levels can invest more in these courses, private tutoring system also creates inequalities between children and intensifies social stratification in Turkey.

The focus of sociology of education studies in Turkey has been the low literacy and enrolment rates for years. Despite inequalities between male and female students and regional differences (Smits & Gündüz Hoşgör, 2006), both literacy and primary school enrolment rates converged to top levels in the last couple of decades (Dülger, 2005; Hoşgör, 2005; World Bank, 2011). Using census data between 1975 and 2000, Tomul (2011) showed that there is a negative relationship between average years of schooling and educational inequalities (measured by education GINI). On the other hand, it is found that the relationship between rate of increase in average years of schooling and decrease in education GINI is positive.

Although there have been some progress lately, gender inequalities in education in Turkey is still a problem. A recent report by 'Education Reform Initiative' (ERG, 2014b) underlines that girls are not enrolling to secondary level of education as much as boys. Sarier (2010) also came out with same results, claiming that the difference between males and females increase against the favour of girls as education level increases. Ferreira & Gignoux (2010) also pointed the same issue and stated that gender gaps are more pronounced in Eastern provinces, poorer and larger households. In addition to these variables, Smits & Gündüz Hoşgör (2006) stressed

the role of parental education, number of siblings, income, father's occupation and mother language for the access of girls to schools. In addition to non-enrolment, drop-outs are also a problem for girls and in some cases for boys, too. Gökşen et al. (2006) stated that while mothers' education is the most influential variable on girls' drop-out, the need to work outside the school has the biggest influence on boys' drop-out from primary education. In another study, depending on 1988 Turkish Family Structure Survey, Rankin & Aytaç (2006) found that residing in places close to metropolitan areas and living in less patriarchal families increase the likelihood of attending school for girls. In a recent paper, Cemalcılar & Gökşen (2014) showed that school related social capital is also very important to decrease the number of drop-outs based on their survey in six cities which have the top drop-out rates in Turkey. Another form of gender inequality occurs also after schooling. Tansel (2005) and Mete (2005) states that females earn less than males with the same educational credentials in the Turkish labour market.

Even though Turkey progressed significantly in enrolment rates, at least in primary level, numerous recent studies underlined the need for focusing on quality education and inequalities in terms of qualities (Aydağül, 2009; Kuitunen, 2005; A. E. Şahin, 2005; UNDP, 2008; World Bank, 2011). For the last 10-15 years, several scholars focused on the issues of inequalities and quality of education and conducted relevant research in Turkey. In her research on the achievement levels of the urban-poor, Engin-Demir (2009) conducted a survey among 719 6<sup>th</sup> to 8<sup>th</sup> grade students in poorer neighbourhoods in Ankara. Through multiple regression analysis, student characteristics like gender, work status, well-being at school, scholastic activities and parental support are found to be the most influential effect on student achievement. Family background characteristics and school quality indicators are also found to be effective. In another survey using secondary school transition exam (SBS-2008) scores and results of a questionnaire applied to 3136 students in Burdur; Tomul & Savaşçı (2012) contend that socio-economic variables account for 45 % of the differences in exam scores. The biggest influences are identified as attending a private tutoring course, father's education level and income. Similarly, Gelbal (2008)

conducted a survey and a Turkish reading test to 30714 8<sup>th</sup> grade students around Turkey and found that mother education level and resources at home are the most effective variables on Turkish reading skills. On the other hand, in another survey applied to top performing primary school graduates in İstanbul, Mohammadi et al. (2011) found that attending private schools is the biggest contributor to secondary school transition exam (OKS-2006) scores of top performers. Unlike the overall population, parental education, parental occupational status, number of siblings and home ownership are not found to be significant regarding secondary school transition exam scores of top performing students. When socio-economic background variables and private school and private course attendance are shown to be highly influential in primary to secondary school transition, the differences between school types become more visible in transition from secondary level to higher education. Bilen et al. (2014) clustered secondary level schools in İstanbul according to university entrance exam results (LYS, 2011) and identified Science High Schools, Anatolian High Schools and Anatolian Teacher Training High Schools as the top level schools whereas Vocational Schools are in the bottom cluster. Berberoğlu & Kalender (2005) and Şahin et al. (2012) also identified school type as the biggest influence on university entrance exam performance. Moreover, in their research based on 1997 Formal and Adult Education Survey, Ogawa & Tansel (2005) states that the quality of education is low in vocational schools and these schools are far from providing the skills needed by the labour market to their students.

In addition to these researches, the majority of studies on educational inequalities and excellence in Turkey have used international exam data. Using data from PISA, TIMSS and PIRLS; many scholars studied on the effects on educational achievement in Turkey. Family background characteristics, regional differences and school types are the major three influences mentioned in these studies.

Anıl (2009) used PISA 2006 science performance data and through procedural multi-regression models she identified father's occupation as the most influential variable. Comparing different datasets both from international exams and national statistics, the report by ERG (2014b) stressed that socio-economic status of the family is the

most influential effect especially in primary level. Oral & McGivney (2013) used TIMSS 2011 results and they showed that students in Turkey are accumulating in top and bottom performance levels which indicate severe inequalities in Turkey in terms of educational excellence. They stated that resources at home and school and language spoken at home are effective on outcomes as well as parental education. Analysing TIMSS 1999 data with structural equation modelling Yayan & Berberoğlu (2004), with PISA 2006 data and regression analysis Ferreira & Gignoux (2010) and Dinçer & Uysal (2010), with PISA 2006 data and multilevel models Çalışkan (2008), with PISA 2009 data and one-way ANOVA method Yalçın et al. (2012), with PISA 2009 data and structural equation modelling Bahadır (2012) and with PISA 2009 data and multilevel models Yılmaz (2009) all showed that family socio-economic status is highly influential on student performance.

As in the enrolment levels, there are also huge gaps between regions in Turkey in terms of reaching quality education (İ. Şahin & Gülmez, 2000). Comparing TIMSS 1999, PIRLS 2003 and PISA 2003 results Berberoğlu (2005) and comparing PISA 2003 and PISA 2009 results Gümüş & Atalmış (2012) showed serious achievement gaps between regions. In their study analysing the composition of resilient students, who are from bottom socio-economic levels but performing at the top levels in PISA 2009, Dinçer & Oral (2013) stated that students from Aegean and West Marmara regions are more probable to be resilient while it is harder for students from Middle East Anatolia and Southeast Anatolia regions. Nevertheless, when Tomul & Çelik (2009) compared the effects of family background variables across regions in PISA 2006, they found that the effects of family background variables decrease as regional development decreases.

In Turkey, school type is the biggest contributor to student achievement particularly in PISA which measures the performance of mostly secondary level students. According to Dinçer & Uysal (2010) and ERG (2014b) allocation of students to different school types is mostly influenced by socio-economic status. The effect of school socio-economic composition which is already found to be effective in exams applied to students in lower grade levels like TIMSS or PIRLS (Akyüz, 2014; Oral &

McGivney, 2013; Yildirim, 2012; Yilmaz, 2009) is represented by the school type variable in PISA. In their analysis of PISA 2006 data, Alacacı & Erbaş (2010) revealed that % 55 of the variance in student performance is due to school-to-school differences. Using university entrance exam data in addition to PISA data studies of both Berberoğlu & Kalender (2005) and Şahin et. al. (2012) stressed that the effect of school type is too high compared to regional differences. Furthermore, Dinçer & Oral (2013) also contended that the percentage of resilient students is higher in particular types of secondary level schools such as Science High Schools, Anatolian High Schools and Anatolian Teacher Training High Schools.

In Chapter 5, I apply multilevel modelling on recent PISA 2012 Turkey data to contribute to the above set of studies. With a focus on inequalities, I examine the effects of various school and student level indicators simultaneously.



## CHAPTER 3

### METHODOLOGY AND METHODS

#### 3.1. Research questions and methodology:

As noted in Chapter 1, the two main research questions of this study are: “*What is the relationship between equity and excellence in education?*” and “*Which social and educational characteristics are associated with educational excellence in Turkey?*” I try to answer these questions in chapters 4 and 5, respectively. In Chapter 4, using various international data sets, which are explained in detail below, I analyze the relationship between equity and excellence. To do this, various alternative operationalizations of the main concepts, namely equity and excellence, from different data sources are tested. Results are compared with extant literature mentioned above. The main hypothesis in Chapter 4 is that “there is a positive relationship between equity and excellence in education”.

In Chapter 5, the focus is on Turkey. In this case, there are fixed operationalizations for equity and excellence. With reference to capability approach (Sen, 1997) and equity of outcomes (Gillborn & Youdell, 2000), PISA 2012 Mathematics scores are selected as the indicator for educational excellence. Again in line with the theoretical framework explained in the previous chapter, equity is operationalized in reference to performance gaps between students from different groups. The hypotheses in Chapter 5 are that socio-economic indicators are not effective on mathematics outcomes (if there is perfect equity). Here, socio-economic background index is tested as the main indicator for socio-economic differences. Moreover, many other variables available in the dataset are also tested since they may represent various

other social, economic and cultural differences as mentioned in previous studies noted in the Literature Review Chapter. These variables are explained in detail in the next section. In line with the conflict theories mentioned above, the main aim of this dissertation is to reveal patterns that reproduce inequalities in education both internationally and in Turkey.

Methods and methodology make a social research scientific. Moreover, the research methodology gives the contours of the theoretical framework of a research. Throughout this dissertation, I use Critical Social Science (CSS) approach<sup>8</sup>. CSS underlines the need for being critical towards social practice and this critique should have an emancipatory character (Sayer, 1997). Hence, CSS tries to uncover the historically specific, oppressive, social structures (Harvey, 1990). However, CSS is criticized for being another tool for patronizing or condescending people, opening ways for another form of domination or for focusing on certain forms of suppression while neglecting others (May, 2001; Sarantakos, 2013). New social research methodologies like postmodern methodology and feminist methodology emerged from these criticisms.

The main reason to employ CSS in this dissertation is the aim of this research to uncover the role of education as reproducing/abolishing class structure in the society. Despite the common belief that education is a medium to enhance meritocracy in society through giving opportunities for people from lower classes of the society to

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<sup>8</sup> There are three classical alternatives to methodology in social research. These are Positivist Social Science (PSS), Interpretive Social Science (ISS) and Critical Social Science (CSS). They are separated by their answers to the question: "What makes the social research scientific?" (Neuman, 2006). PSS argues that there is only one logic in science and social sciences share this logic with natural sciences (Keat & Urry, 2011). So, the approach of social research must be the same as natural sciences and it should use the same methods. Through this, social researchers can reveal the causal mechanisms in the social world. However, positivist methodology is criticized for lacking the subjective states of individuals and social contexts (Dash, 2005). On the other hand, ISS takes into account the social context of action and individuals' definitions of the social reality (Neuman, 2006). The main aim of ISS is to understand these context specific social actions. So, there are not any universal laws of social reality out there to be discovered according to ISS. However, ISS is also criticized for neglecting material reality and not providing any criticisms to social life (Bevir & Rhodes, 2002). The third classical approach in social research methodology is CSS. It agrees with ISS's criticisms towards PSS as not taking social context and individuals' meanings of the social world into account. Moreover, CSS also criticizes ISS for being too subjective and relativist (Neuman, 2006).

move upwardly, findings of this dissertation points out an opposite function. It is found that, in Turkey, education system is reproducing class structure through its institutions, structure, elimination mechanisms and funding.

To achieve these aims, I employ quantitative methods such as regression analysis or multilevel models. It is quite common that some methods are matched with certain methodological approaches. Quantitative methods like data collection via surveys or experiments and analyses of them via statistical techniques are considered to be positivist techniques while ISS is often matched with qualitative techniques like biographical, phenomenological or ethnographic research or case studies (Dash, 2005). On the other hand, critical social scientists generally use historical comparative methods and action-oriented research (Neuman, 2006). However, although some methods seem to be more suitable for particular methodological approaches, no method of data collection or analysis technique is inherently positivist, interpretive or critical (Harvey, 1990). Carroll (2004) argues that if used reflexively, quantitative methods can provide rough representations of the social practice, contribute to unveiling of social inequality and to kindle public discussion.

My aim in this thesis work is quite similar to what Carroll pointed. I try to show a different representation of the relationship between equity and excellence in education and also to uncover the patterns that reproduce class structure in the society. To reach this aim, I employ various macro level data sets and statistical methods which I explain in detail in the following sections.

### **3.2. Data:**

Throughout this dissertation, I make use of various data sets from various sources. In Chapter 4, my aim is to track the relationship between equity and excellence. To reach this aim, I test several arguments from existing research literature on the topic. Accordingly, instead of using a single operational definition of equity or excellence, I have collected as many measures of both concepts as possible and tested every single one of them.

To operationalize excellence, I use international exam data. PISA, TIMSS and PIRLS have become quite popular in the last couple of decades and used by many education researchers. I used data about student outputs in these exams to measure excellence in education. Despite similar rankings of countries in terms of average student performance, these exams are measuring different competencies of students from different age groups or education levels. I explain these data sets below in detail.

Similarly, various measures of equity are also used. In fact, it is not only equity but also various conceptualizations of equity or equality that is used in Chapter 4. Moreover, these are not limited to measures of educational inequalities. Various other measures about income differences are also used. These data are collected from the data banks of international organizations as well as from surveys attached to international examinations mentioned above.

In addition to measures of equity and excellence various other variables are also used in Chapter 4. In order to construct models that control as many influences on equity-excellence relationship as possible, several indicators mentioned in the previous researches are also collected. In addition to datasets of international exams and international organizations, international education data banks such as Eurydice are also used. Data sources are explained in detail in the following section.

### ***3.2.1. Data sources:***

#### *3.2.1.1 PISA*

Programme for International Data Assessment which is widely known as PISA is a survey that measures the extent of key knowledge and skills that are essential for full participation in modern societies (OECD, 2013c). It covers students from all over the world at the age of 15. The survey is conducted every three years since 2000. The last one took place in 2012. Fifth wave of PISA which was conducted in 2012 included 65 countries and 510 000 students. Samples represent all 15-year-old students who have completed at least 6 years of compulsory education in every

participating country. The survey is conducted by OECD and national ministries of education.

Instead of measuring students from the same grade levels like in TIMSS or PIRLS exams, PISA samples students according to their ages. Due to differences in pre-primary education, school entry age or the structure of education systems, grade levels vary widely among countries. However, age of 15 is the time when students just finished or are at the end of compulsory education in most of the education systems. Therefore, it can be said that PISA measure the skills and knowledge gained through compulsory education.

The aim of the assessment is not only to track the ability of students to reproduce knowledge but also to measure “how well students can extrapolate from what they have learned and apply that knowledge in unfamiliar settings, both in and outside of school” (OECD, 2013c). There are three subjects assessed in PISA. These are Mathematics, Reading and Science. A subject is the focus and has deeper assessment in every wave. It was Reading in 2000 and 2009, Mathematics in 2003 and 2012 and Science in 2006. Exams are composed of both multiple choice and open-ended questions. Students are given different booklets which are smaller samples of a big set of questions. Each different booklet is distributed to sufficient number of students in order to ensure reliable estimates of outcomes. This is discussed in detail in the Plausible Values section below.

In addition to question booklets students answer a 30-minute questionnaire about themselves and their families. School principals are also given questionnaires about the school resources, structure and learning environment. In some countries, parents are also given questionnaires.

With its big dataset containing student performance data as well as data about social background of students and characteristics of school systems, PISA provides one of the best international data on education.

### *3.2.1.2 TIMSS:*

Trends in International Mathematics and Science Study (TIMSS) is conducted by International Association for the Evaluation of Educational Achievement (IEA). The aim is to measure the knowledge of 4<sup>th</sup> and 8<sup>th</sup> grade students in Mathematics and Science throughout the world. The study is conducted every four years since 1995. The last wave was in 2011. 52 countries participated for the exam in 4<sup>th</sup> grade and 45 countries participated for the 8<sup>th</sup> grade exam in the last wave. Furthermore, few other countries in which 4<sup>th</sup> and 8<sup>th</sup> grade students find the exams too difficult took the exams for 6<sup>th</sup> and 9<sup>th</sup> graders (Martin & Mullis, 2013). As in PISA, background data are also collected from students, teachers and school principals in TIMSS.

### *3.2.1.3 PIRLS:*

Progress in International Reading Literacy Study (PIRLS) is another international examination conducted by IEA. PIRLS aims to measure reading comprehension skills of 4<sup>th</sup> grade students throughout the world (Mullis, Martin, Foy, & Drucker, 2011). It is conducted every five years since 2001. The most recent wave took place in 2011. 49 countries participated in this wave with a total sample of 325 thousand. Students answer a reading comprehension test and a background survey. Reading comprehension test aims to measure two dimensions of reading. These are reading for literary experience and reading to acquire and use information (Mullis et al., 2011). Background questionnaire, on the other hand, aims to track reading behaviours and attitudes (Mullis, Martin, Gonzalez, & Kennedy, 2003). Moreover, there are also teacher questionnaire, home questionnaire and curriculum questionnaire to gather more background data.

### *3.2.1.4 Other data sources:*

In addition to international examination data, various other data sets are also used. First of these is Eurydice. Eurydice is a network working under European

Commission. It is consisted of 40 European countries. The network provides information and analyses about education systems and policy across Europe <sup>9</sup>.

Several other national indicators are also used especially in Chapter 4 when making country comparisons. Databases of international organizations are used broadly. First one of these is OECD statistics database<sup>10</sup>. In addition to national education data, population, economy and national development statistics are available in OECD database. The World Bank provides a similar database<sup>11</sup>. Poverty and inequality indicators in this study are taken from the World Bank. With indexes like Human Development Index (HDI) or Gender Inequality Index (GII), UNDP is another source for country level data<sup>12</sup>. A final source in CIA World Factbook <sup>13</sup>. It provides actual data or estimates on various national indicators.

### **3.2.2. Variables:**

#### *3.2.2.1 Dependent Variables:*

The main relationship that is tested throughout this dissertation is the one between equity and excellence. To reveal this relationship, the main hypothesis is: “There is a statistically significant effect of equity on educational excellence”. Especially, Chapter 4 is focused on this hypothesis. In order to do that, no fixed operational definition is used at the beginning. Instead, I use several definitions and operationalizations of both equity and excellence.

For the dependent variable, the major sources for educational excellence measurements are international exam results. Since, the above hypothesis is tested at the country level, average attainment scores of countries in different exams are used.

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<sup>9</sup> [http://eacea.ec.europa.eu/education/eurydice/index\\_en.php](http://eacea.ec.europa.eu/education/eurydice/index_en.php), accessed on 18/11/2014

<sup>10</sup> <http://stats.oecd.org/>, accessed on 18/11/2014

<sup>11</sup> <http://data.worldbank.org/>, accessed on 18/11/2014

<sup>12</sup> <http://hdr.undp.org/en/data>, accessed on 18/11/2014

<sup>13</sup> <https://www.cia.gov/library/publications/the-world-factbook/>, accessed on 18/11/2014

Moreover, as used in some other studies (Condrón, 2011; Marks & Cresswell, 2005) the percentage of students above a certain level of achievement is also used.

After using these different measures, the main dependent variable is determined as PISA 2012 Mathematics scores. In Chapter 4, average PISA Maths scores of countries are presented initially. However, other measures are also compared via applying identical analyses with different excellence measures. Results of the most of these identical analyses are given in appendices. As can be seen in Chapter 4, outcomes are quite similar across these analyses.

On the other hand, in Chapter 5 a fixed operational definition of educational excellence is used. It is again PISA 2012 Mathematics scores of students. However, in some cases, in order to better explain some relationships, identical models/analyses with PISA 2012 Reading and Science outcomes are also used. This provides a comparison of the effects of various variables on performance in different subjects.

There are several reasons to use PISA 2012 Mathematics scores as the main dependent variable. First of all, among diverse set of countries or student level educational achievement indicators, results from international exams are making more sense in terms of excellence. As explained in the Introduction chapter, this dissertation is aiming to focus on qualities related to the content of education instead of general quantity figures like total years of education or completed degree levels. It may also be reasonable to use school grades. However, there would be serious problems related to comparability of school grades due to non-standardized measurement of students. Another alternative particularly for Turkey would be using national examination data. Students all over the country are attending national standardized exams during or at the end of junior secondary level to enter high schools and also after secondary level to enter universities. However, data from national examinations are not available to public. In this sense, international exams provide best standardized data for making both intra-country and inter-country comparisons.



Among international exams, PISA is preferred initially due to PISA 2012 being the most recent international exam data. Moreover, PISA is selected in this study for its definition of excellence. Unlike TIMSS or PIRLS, PISA is designed to measure skills to solve real life issues using existing academic knowledge instead of memorization of raw information (OECD, n.d.-a). This definition is in line with my conceptualization of excellence in relation to capability approach and is compatible with how well education supports individuals to participate in society (Pfeffer, 2012).

Lastly, Mathematics results are used from PISA 2012 as an indicator of educational excellence. As mentioned above, PISA focuses on a particular subject in every wave. In 2012, the focus was Mathematics. Maths questions consisted two thirds of the test contents with a deeper measurement of students' skills. Hence, it provides a more reliable measure of student outputs. Moreover, Mathematics is considered as a more reliable measure also when compared to Science or Reading.

In conclusion, as mentioned below, PISA is a suitable tool to assess student outputs in relation to life skills. This is the case for Maths test, too. It aims to measure Maths literacy as a skill that can be developed over lifetime (OECD, 2013c). Maths proficiency in PISA is defined as below:

An individuals' capacity to formulate, employ, and interpret mathematics in a variety of contexts. It includes reasoning mathematically and using mathematical concepts, procedures, facts and tools to describe, explain and predict phenomena. It assists individuals in recognising the role that mathematics plays in the world and to make the well-founded judgements and decisions needed by constructive, engaged and reflective citizens. (OECD, 2013c, p. 28)

PISA Maths exam is consisted of four main topics, namely quantity, space and shape, change and relationships, and uncertainty and data. Mathematics literacy in these topics are applied in personal, occupational, societal and scientific contexts in PISA tests (OECD, 2013c). Below is an example of a PISA Maths questions:

A result of global warming is that the ice of some glaciers is melting. Twelve years after the ice disappears, tiny plants, called lichen, start to grow on the rocks. Each lichen grows approximately in the shape of a circle. The

relationship between the diameter of this circle and the age of the lichen can be approximated with the formula:

$$d = 7.0 \times \sqrt{t - 12} \quad \text{for } t \geq 12$$

where  $d$  represents the diameter of the lichen in millimetres, and  $t$  represents the number of years after the ice has disappeared.

Using the formula, calculate the diameter of the lichen, 16 years after the ice disappeared. Show your calculation. (OECD, n.d.-b)

### *Plausible Values:*

A final issue that needs to be mentioned is the plausible values in PISA. In PISA (and also in other large scale tests) five plausible values are calculated for each student for every test subject, instead of providing a single achievement score. Plausible values are multiple imputations of latent achievement level for every student (Wu, 2005). Instead of making a single point estimate about a student's achievement in a certain topic, a distribution of point estimates with particular probabilities are calculated. Plausible values are random selections from these distributions (Wu & Adams, 2002).

There are several statistical advantages of plausible values over point estimates. Most importantly, they provide unbiased estimates of achievement scores. However, it also brings some difficulties. In order to have an unbiased estimate of the population, each analysis has to be run separately for every plausible value and then the results should be aggregated (OECD, 2009b). This might be quite burdensome or sometimes impossible in many software packages. For this reason, in many articles about PISA it is hard to find proper uses of plausible values. Some scholars prefer to use the average of five plausible values as their dependent or independent variable (Akyüz, 2014; Dronkers, Velden, & Dunne, 2011; Dunne, 2010). However, this would not be an unbiased estimator (OECD, 2009b). It is stated in PISA data analysis manual (OECD, 2009b) that using just one plausible value would also provide unbiased estimates. Biggest disadvantage of using just one plausible value is that it does not

estimate imputation error. However, in large datasets this error is negligible. In Chapter 4, I used country averages from original reports of the exams. So, dependent variables are properly calculated. However, in Chapter 5, due to software constraints I only used first plausible values for all subjects. These variables are PV1MATH for Mathematics, PV1SCIE for Science and PV1READ for Reading tests in PISA 2012.

### 3.2.2.2 *Independent Variables:*

Since, a multi-level approach is used at the end of Chapter 4 and throughout Chapter 5, I present the independent variables at different levels, namely student, school and country levels, separately. Moreover, despite PISA being the main source, data from several other sources are also used for country level variables. Hence, I give the source in brackets at the end of the explanation for every variable at country level.

#### *Student Level Variables:*

*Gender:* Student's sex, male or female. Coded as ST4Q01 in PISA. In some of the analyses in this dissertation, this variable is converted into a dummy variable named *female* for females.

*ESCS:* ESCS is the abbreviation for 'PISA Index of Economic, Social and Cultural Status'. It is calculated using three other indices, namely PARED, hisei and HOMEPOS, which are explained below. It is derived using a Principal Component Analysis of sub-indices. ESCS is the standardized first factor loading of this analysis (OECD, 2013c). The Index has a mean of 0 and standard deviation of 1 for OECD countries.

*PARED:* It is the index for highest parental education in years. In the PISA student questionnaire, there are questions asking mother and father education level of students. Answers are coded according to ISCED<sup>14</sup> categorization (OECD, 2013c).

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<sup>14</sup> International Standard Classification of Education. See <http://www.uis.unesco.org/Education/Pages/international-standard-classification-of-education.aspx> for detailed explanation of the classification.

Among them highest level is chosen and converted to education level in estimated years for PARED index.

*miscd*: Mother education level coded according to ISCED.

*fiscd*: Father education level coded according to ISCED.

*hisei*: Highest occupational status of parents. Similar to PARED, father and mother occupations are asked to students in PISA student questionnaire. Answers are coded as four-digit ISCO<sup>15</sup> codes and then converted to international socio-economic index of occupational status (ISEI) (Ganzeboom, Graaf, & Treiman, 1992) scores (Ricci, 2010). Finally, highest parental occupational score is copied into *hisei*.

*HOMEPOS*: Home possessions index. It is also constructed using three other indices, namely HEDRES, CULTPOSS and WEALTH. They are constructed according to availability of several items at home. HOMEPOS has an OECD mean of 0 and a standard deviation of 1 (OECD, 2013a).

*HEDRES*: Home educational resources index. It is calculated according to availability of some items at home related to education. These are a desk and a quiet place to study, a computer that students can use for schoolwork, educational software, books to help with students' school work, technical reference books and a dictionary (OECD, 2013a).

*CULTPOSS*: Cultural possession index. It is calculated according to availability of cultural items such as classic literature books, books of poetry and works of art (e.g. paintings) (OECD, 2013a).

*WEALTH*: Index of family wealth. It is calculated according to availability of several items at home. In addition to universal items, namely a room of their own, a link to the Internet, a dishwasher, a DVD player, number of cellular phones, number of televisions, number of computers, number of cars and number of rooms with a bath

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<sup>15</sup> International Standard Classification of Occupations. See <http://www.ilo.org/public/english/bureau/stat/isco/> for detailed explanation of the classification.

or shower; three country-specific items are asked in the student questionnaire (OECD, 2013c). Country specific items in Turkey are air-conditioned type heating and cooling system, video camera and home theatre system.

*Books:* Coded as ST28Q01 in PISA. Number of books at home. Answers are taken in intervals: 0-10, 11-25, 26-100, 101-200, 201-500, more than 500 books.

*Language at home:* Coded as ST25Q01. It is asked universally and responded as language of the test or other languages. In Turkey, it is Turkish vs. others. In some of the analyses in this dissertation, this variable is converted into a dummy variable named as *native\_lang* for international comparisons or as *turkish* for Turkish speakers in Turkey analyses.

*Pre-primary Education:* Originally this question is coded as ST05Q01 in PISA and asked to students if they had attended ISCED 0 level educational institutions and if yes, how many years. For Turkish case, since the percentage of students who had not had pre-primary education is too high, it is converted into a dummy variable named *preprimary* comparing the ones that had pre-primary education and the rest.

*Grade year:* International grade year of student. Coded as STQ01 in PISA student questionnaire.

*School level variables:*

*School\_ESCS:* This variable is created via calculating arithmetical averages of ESCS scores of students in each school.

*School Type:* This variable is derived from variable *Unique national program code (progn)* in PISA student questionnaire. 12 unique school types in Turkey are recoded in this new variable. These school types are: Primary School, General High School, Anatolian High School, Science High School, Social Sciences High School, Anatolian Teacher Training High School, Vocational High School, Anatolian Vocational High School, Technical High School, Anatolian Technical High School, Multi Programme High School and Police High School. In the PISA 2012 Turkey

sample, some students attending the same schools are registered to different types of schools. This is because some General High Schools were transformed into Anatolian High Schools or some Vocational/Technical Schools have more than one type of Vocational High School, Technical High School, Anatolian Vocational High School or Anatolian Technical High School. In these cases different types are considered as different school level units in order to evaluate school type as a school level variable and distinguish between students attending different types in the same school.

*Region:* This variable is derived from a sampling variable coded as *SUBNATIO* in PISA 2012. Regions are chosen according to NUTS<sup>16</sup> Level 1 classification of Turkey. Level 1 regions in Turkey are İstanbul, West Marmara, Aegean, East Marmara, West Anatolia, Mediterranean, Central Anatolia, West Black Sea, East Black Sea, Northeast Anatolia, Middle East Anatolia and Southeast Anatolia.

*Location:* Location of the school variable is coded as SC03Q01 in PISA school questionnaire. It classifies the location of the school according to size of the location as village (less than 3 000 people), small town (3 000 to 15 000 people), town (15000 to 100 000 people), city (100 000 to 1 000 000 people) and big city (1 000 000 and over) (OECD, 2009b).

*CLSIZE:* Average classroom size in the school.

*SCHSIZE:* Total number of students in the school.

*TCSHORT:* Teacher shortage index. It is derived from four other questions on school principals' perceptions on lack of qualified science teachers, lack of qualified mathematics teachers, lack of qualified test language (Turkish in Turkey) teachers and lack of qualified teachers of other subjects. High scores indicate bigger teacher shortage in this index (OECD, 2013b)

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<sup>16</sup> Nomenclature of territorial units for statistics. See [http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts\\_nomenclature/introduction](http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/introduction) for detailed information.

*SCMATEDU*: The index of quality of school educational resources. It is calculated using answers of principals to six questions about shortage of science lab equipment, instructional materials, computers for instruction, internet connectivity, computer software and library materials (OECD, 2013b).

*SCMATBUI*: The index of quality of school infrastructure. It is calculated using answers of principals to three questions about shortage or inadequacy of buildings and grounds, heating/cooling and lighting, and instructional space (OECD, 2013b).

*Country level variables*:

*ESCS on Math (inequity)*: Percentage of variation in PISA Maths scores explained by ESCS. It is used as an indicator of equity by OECD (2013a) [PISA].

*Resilient students*: Percentage of students in the bottom quarter of ESCS in their country and perform in the top quarter of students from all countries, after accounting for socio-economic status (OECD, 2013a) [PISA].

*Index of academic inclusion*: Country average of index to measure “the degree to which students with different academic abilities and needs share the same school, or the degree to which schools have different average performance levels” (OECD, 2013a). It is calculated as  $100 * (1 - \frac{\text{variation in student performance between schools}}{\text{sum of the variation in student performance between schools and the variation in student performance within schools, i.e. intra-class correlation}})$ . The range of the index is from 0 to 100, increasing scores indicating higher inclusion (OECD, 2013a) [PISA].

*Index of social inclusion*: Average percentage of the total variation of ESCS found within schools in a country. It is calculated as  $100 * (1 - \text{intra-class correlation of ESCS between school and student levels})$ . The range of the index is from 0 to 100, increasing scores indicating higher inclusion (OECD, 2013a) [PISA].

*Immigrant students*: Percentage of students with immigration background in the country sample [PISA].

*Between school variation (btw\_sch\_var):* Variation between schools derived from multilevel models, i.e. school level variation (OECD, 2013a) [PISA].

*Within school variation (with\_sch\_var):* Variation within schools derived from multilevel models, i.e. student level variation (OECD, 2013a) [PISA].

*Private schools:* Percentage of students attending private education institutions in the country sample [PISA]

*GDP:* Gross domestic product per capita in 2012 [World Bank].

*Spending on education (spend):* Public spending on education as percentage of GDP [OECD].

*GINI:* Gini index which measures the inequality of income in a country. Most recent available figures are taken [World Bank].

*HDI:* Human Development Index which measures human development level in a country using life expectancy, education and income statistics for the year 2012 [UNDP].

*GII:* Gender Inequality Index which measures gender inequality in a country using reproductive health, women empowerment and women labour force participation statistics for the year 2012 [UNDP].

*Number of educational tracks (tracks):* Number of different tracks for 15 year old students in a country [OECD and Eurydice].

*Early selection (first\_select):* The age a student is selected to an education track for the first time in an education system [OECD and Eurydice].

*Ability grouping (ab\_group):* Percentage of school in the sample with ability grouping [PISA].

*Population:* Population of country [CIA].



*Student population:* Population of 15 year old students in the country [PISA].

*STRATIO:* Average student/teacher ratio of schools in the county sample [PISA].

*Autonomy:* Average index of school autonomy. Index of school autonomy is measured via questions in PISA school questionnaire asking principals about their responsibility on selection of teachers for hire, firing teachers, establishing teachers' starting salaries, determining teachers' salary increases, formulating the school budget and deciding on budget allocations within the school (OECD, 2013b) [PISA].

*Curriculum autonomy:* Average index of school autonomy over curriculum and assessments. The index is measured via questions in PISA school questionnaire asking principals about their responsibility on establishing student assessment policies, choosing textbooks, determining course content and deciding which courses are offered (OECD, 2013b) [PISA].

*Variation in grade (grade\_var):* Variation among students in the country sample in terms of grade years (OECD, 2013b) [PISA].

*Grade repetition rate (repeat\_var):* Percentage of students who repeated one grade or more in country sample (OECD, 2013b) [PISA].

*Student selection:* Percentage of students in schools whose principals reported whether "students' records of academic performance" and "recommendations of feeder schools" are considered for admittance (OECD, 2013b) [PISA].

*Assessment:* Percentage of students in schools that use achievement data to have their progress tracked by administrative authorities (OECD, 2013b) [PISA].

*Late:* Percentage of students who arrived late for school in the two weeks prior to the PISA test (OECD, 2013b) [PISA].

*Skip:* Percentage of students who skipped some lessons or a day of school in the two weeks prior to the PISA test (OECD, 2013b) [PISA].

*Student feedback (stu\_fback)*: Percentage of students in schools that seek written feed-back from students for quality assurance and improvement (OECD, 2013b) [PISA].

*scmatedu*: Average index of quality of school's educational resources (OECD, 2013b) [PISA].

*preprimary*: Percentage of students attended pre-primary education (OECD, 2013b) [PISA].

*salary*: Teachers' salaries relative to GDP per capita (%) (OECD, 2013b) [PISA].

*dedres*: Difference in the index of quality of schools' educational resources between socio-economically advantaged and disadvantaged schools. For the definition of socio-economically advantaged and disadvantaged schools, see Box IV.3.1 in (OECD, 2013b, p. 98). [PISA].

### **3.3. Methods:**

A series of quantitative techniques are employed in this dissertation. In Chapter 4, various statistical techniques are used. In order to validate some claims present in the literature, several analyses of recent papers are repeated. Moreover, I also try to extend these analyses through employing further techniques. On the other hand, in Chapter 5, there is one main method, namely Multilevel Modelling (or Hierarchical Linear Modelling). Furthermore, some supplementary methods are also used like logistic regression models and selection models in order to better investigate some findings. Below, I explain main methods used throughout this dissertation in detail.

#### ***3.3.1. Correlation and Simple and Multiple Regression:***

Correlation is a method to investigate the linear association between two variables. It is measured by a correlation coefficient which lies between -1 and 1. When -1 indicates a perfect negative linear relationship between two variables, 1 means a perfect positive relationship. On the other hand, 0 means there is no association at all.

The relationship shown by correlation coefficient is a symmetrical one and it does not necessarily indicate a causal relationship (Crow, 2006).

For instance, if two variables, say  $x$  and  $y$ , have a high correlation coefficient, it may mean that  $x$  causes  $y$  as well as  $y$  causes  $x$ . Another alternative is that  $x$  may affect a third variable which also affects  $y$ . This third variable is called as intervening variable. There is also the possibility that  $x$  and  $y$  are affected by a third variable but not actually related to each other. In this case, there might be a correlation between them which is called a spurious relationship. Similarly, third variable may affect  $x$  and  $y$  in a way that hinders the actual relationship between them. In this case, this third variable is called a suppressor variable.

Regarding all these possibilities, bivariate correlations should be treated carefully. However, as mentioned in Chapter 4, some of the works on the relationship between equity and excellence or stand-alone effects of various variables on equity or excellence not only treat these relationships as meaningful (e.g. (Wilkinson & Pickett, 2009)) and in some cases even in a causal way (e.g. (OECD, 2013b)).

A way to deal with the drawbacks of bivariate correlations is to use regression models. In simple linear regression, two variables are defined as independent and dependent at the beginning based on existing knowledge or hypotheses (Byrne, 2006). The main aim in regression is to predict the value of the dependent variable (with a certain degree of error) using the information from independent variable (Singh, 2007). Regression analysis can be used for causal analysis. To do this, one needs an experimental setting where every other potential effect is controlled for. On the other hand, although they are actually only making predictions many researchers use the method for causal analysis (Allison, 2014). For causal analysis in non-experimental settings, which is almost always the case for sociological data, one of the biggest assumptions of regression analysis is that all effects on the dependent variable or other variables correlated with the independent variable are taken into account. Nevertheless, quite similar to correlation analysis, this assumption is

neglected in many studies on the relationship between equity and excellence in education.

An extension of simple linear regression is multiple linear regression where the number of independent variables is two or more. In this case, it is possible to include other variables in the model. However, there are still a number of assumptions that have to be met before calculating any multiple linear models. First of all, as in simple linear regression there is still the assumption that all independent variables that matter for the dependent variable should be included in the model (Allison, 1999). Although it is almost impossible to include everything and be sure that the outcome is not a spurious relationship caused by some yet-to-be-introduced variable (Treiman, 2009), in my original analyses throughout this dissertation, I try to control as many variables of interest as possible.

Secondly, in a multiple regression model there is also the assumption that all variables are measured correctly (Allison, 1999). While some concrete variables are easy to measure (e.g. gender, age, level of education, etc.), many others are vague (e.g. excellence in maths, motivations toward school, etc.). Here, the concepts of reliability and validity enter into discussion. Since I use meta data, I do not test validity and reliability of measurements. However, I mention the works on the validity and the reliability of the data used in analysis chapters when needed.

A third basic assumption in linear regression is about the functional form of the relationship between variables. As can be inferred from its name the assumed relationships between independent variables and the dependent variable are linear whether they are strong or weak relationships. However, in many cases the relationships may be in different forms and this will lead to underestimation of the true relationship (Osborne & Waters, 2002). Furthermore, there is also the possibility that the form of relationship be discontinuous or in other words in a form which is hard to define by a common or easy to grasp algebraic function (Treiman, 2009). And, this relationship can still be a strong one. To overcome these problems, as many functional forms of the variables as possible are taken into account. Several versions

of similar models are tested throughout the dissertation. However, within the limits of a thesis work, many of them are not included in the text, or can only be given in the appendix.

Another assumption of regression models is multicollinearity. It is the case when independent variables are highly correlated and tend to have large standard errors and to be unstable (Treiman, 2009). It is quite common in data sets like the ones used in this thesis. For example, PISA data provides a large set of variables related to student performance. It is something good to satisfy the first assumption mentioned above. However, for most of the time these variables themselves affect each other. And, these results in substantial changes in regression coefficients across models with tiny differences in the set of variables included. The basic method to test multicollinearity is to calculate variance inflation factor and try to keep it as low as possible. For every regression model throughout the dissertation, variance inflation factors are calculated. When I faced with high variance factors, firstly I tried to drop some variables and re-modeled the relationships until I had consistent results. So, the models included in this dissertation are the ones with low variance inflation factors. However, in some cases it may still be hard to detect multicollinearity or to reduce it. In these cases, I use alternative methods such as Principal Component Analysis which is explained in the following section. A further issue about multicollinearity is the possibility of interaction between independent variables and units of measurement (e.g. students, schools or education systems in our case). This is also dealt with Multilevel Regression Models which is mentioned in the section after.

### ***3.3.2. Principal Components Analysis:***

Especially in social research, sometimes there might be a huge set of independent variables effective on the dependent variable. In many cases, these independent variables are highly correlated to each other. Hence, for instance, in a regression model in addition to the problem of having too many regression coefficients, there might also be a problem of multicollinearity. Principal Components Analysis is a technique that aims to solve these problems by linearly transforming the variables

into a smaller number of uncorrelated/less correlated variables that still represent most of the information in the original variable set (Dunteman, 1989).

In this dissertation, Principal Components Analysis is used in Chapter 4, where the effects of various national economic, social and educational indicators on student performance are investigated. Since, many of these indicators are correlated to each other, by using Principal Components Analysis I tried both to reduce the number of variables in the models and to get rid of multicollinearity.

### ***3.3.3. Multilevel Modelling:***

One of many assumptions of regression models is that the error terms are uncorrelated with each other. In cases when the data is grouped, this assumption is most likely to be violated. A solution for this is to take into account the group effects by assigning dummy variables to groups (i.e. fixed effects model). However, it might be quite problematic when the number of groups is too high (Steele, n.d.). Multilevel modelling is a useful statistical technique in such cases when a process is operating at more than one level (Raudenbush & Bryk, 2002; Tanenbaum & Scarborough, 1998). Educational research is an excellent example of these settings. Actually, it is educational research itself that triggered the works to create multilevel modelling (Aitkin & Longford, 1986). Because, most of the time educational settings are structured in a way that students are nested in classrooms, classrooms are nested in schools and schools are nested in education systems. Moreover, all these levels may interact with each other. Most of the datasets used in this dissertation are also designed in a nested structure. This makes the use of multilevel modelling crucial for this thesis. And, it is used widely both in Chapter 4 where international comparisons are made and in Chapter 5 on Turkish case.

In addition to taking into account the hierarchical structure, another advantage of multilevel modelling is that it allows for the calculation of parameters that express the patterns of variation related to the higher level units. This feature called 'random intercepts', allows the researcher to get varying coefficients across groups. For

example, it is possible to calculate different regression coefficients for an independent variable across different schools.

Although the assumption of independence of errors is not present for multilevel models, other assumptions of linear regression still hold. One of them is the normality of errors which is relatively easy to diagnose. This assumption is checked via available features of MLwiN software (see next section for detailed information on MLwiN).

Another major assumption is multicollinearity. Although the statistical problems caused by multicollinearity in multilevel models are accepted, the ways to detect and solve them are not mentioned much (Clark, 2013). For example, it is not possible to calculate variance inflation factors for multilevel models in many statistical software. In this dissertation, I preferred to use existing features in the software. I have calculated variance inflation factors for identical linear regression models in order to see potential multicollinearity issues in multilevel models. If there are high scores, I dropped some variables, re-run the multilevel model and re-run the identical regression model to check multicollinearity.

### **3.4. Software:**

Regarding the size of the data and variety of statistical methods used throughout the dissertation several statistical software packages are exploited.

First one of these is MLwiN 2.30 (Rashbash, Charlton, Browne, Healy, & Cameron, 2009). This software is designed particularly for multilevel models and enables the researcher to use various characteristics at the same time. Throughout this dissertation, most of the multilevel models are calculated in this software. Regarding PISA data, student and school level sampling weights could be incorporated in the analysis of multilevel models with MLwiN. However, it is not possible to use plausible values at the moment. Therefore, since the results produced by a single plausible value is still unbiased (OECD, 2009b), only first plausible values are used as dependent variables.

Another software used in this dissertation is STATA 12 (StataCorp, 2011). In some cases, multilevel models are also calculated with STATA to have double check. However, it is not possible to incorporate every characteristic of especially PISA data in STATA, too. Although, there are some user written commands to use plausible values, it is still not possible to use sampling weights at the same time. Moreover, STATA is also used for other regression models and for some of the graphical representations.

A third software used is SPSS 20 (IBM Corp., 2011). Despite the low performance of SPSS in big data sets, for some of the analysis throughout the thesis SPSS is also used. The major reason for this is that PISA data is released in SPSS format. SPSS is also used for some of the analysis in Chapter 4 since it provides more comprehensible outputs.

In addition to above software, for some graphical representations R (R Core Team, 2011) and MS Office Excel 2010 (Microsoft, 2010) are also used.

### **3.5. Methodological limitations:**

Despite the size of the data used and variety of statistical methods employed analysing them, there are also some methodological limitations of the dissertation.

One of them is about the scope of data in Chapter 4. Data from as many resources as possible is included in country comparisons in that chapter. However, international exams are not covering a representative sample of countries all over the world. Most of the education systems included are among developed countries. Developing countries, especially from Africa are not represented widely in these exams. So, any interpretations made out of country comparisons in Chapter 4 lack universality and only stand for included countries.

Another limitation about data is the represented student population. International exams represent only student population. For example, in PISA it is 15-year-old students that are sampled in every participating country. This is very close to all



people at age 15 in developed economies but it is as less as 70 % in countries like Viet Nam, Albania or Colombia. It is 76 % in Turkey (OECD, 2013a). Hence, it is the whole 15-year-old students in some countries that are compared to less than three quarters of 15-year-olds in some others. And, in these less represented cases, it is highly probable that the most disadvantaged sections of the population are left out due to drop-outs or inability to access to education.

A further limitation in using international exam data for comparisons is about cultural differences. Different education systems prepare students for different types of exercises and for different skills (Duru-Bellat & Suchaut, 2005). Furthermore, there may still be problems about cultural relevance of questions (Asil & Gelbal, 2012; Çetin, 2010; Kankaras & Moors, 2013) although various validity and reliability studies are conducted before and after these exams (Harlen, 2001; OECD, 2009b).

Another limitation about the samples is related to definition of students (and schools for multilevel analysis). There are different forms of studentship in different countries or an institution is called school according to different criteria across countries. These create problems both in the sampling procedure and during analysis (OECD, 2009b).

A final limitation is about the analysis procedures. Especially PISA data set has many diverse properties like student and school level weights, balanced repeated replications, plausible values, etc. As mentioned above, most of the time it is very hard or sometimes impossible to use all these characteristics at the same time. Throughout the dissertation, I tried to employ all these features as much as possible. However, some features like plausible values in multilevel analysis are left out.

## CHAPTER 4

### RELATIONSHIP BETWEEN EQUITY AND EXCELLENCE

This chapter aims to answer the research question: “What is the relationship between equity and excellence in education?” The discussion about the relationship between equity and excellence (also referred to as the relationship between equality and efficiency, the relationship between equity and quality or any other conceptual combination) was imported from economics to sociology of education. Economists like Okun (1975) claimed that there is an essential trade-off between economic growth and equality. In other words, it is not possible to achieve high economic growth in an egalitarian economy. Afterwards, scholars like Glazer (1987) and Savage (1988) claimed that this trade-off is also applicable for education systems. The claim was that education policies should make a choice between equity/equality and quality/efficiency since they cannot be achieved at the same time. Earlier objections to this claim were conceptual. For instance, Smith & Lusthaus (1995) argued that the definition of quality in education should include the notion of equality, so a trade-off is not possible. Later on, especially after the availability of big data from international student surveys, some scholars tried to disprove the trade-off claim. The ones like Duru-Bellat & Suchaut (2005), Schütz et. al. (2008) and Schleicher (2009) all found no trade-off between these two concepts. Lately, few others (Condrón, 2011; Pfeffer, 2012; Wilkinson & Pickett, 2009) started to think about an opposite relationship in which equity and excellence are positively correlated. However, these efforts were not very successful due to various methodological limitations. In this chapter, I try to extend the existing analyses on the issue.

Unlike the majority of these research mentioned, my main hypothesis is that there is a positive relationship between equity and excellence. A negative relationship or a trade-off between equity and excellence may mean that inequality has a functional character in education and also in the society. This would be confirming the functionalist point of view. On the other hand, if there is an opposite relationship in which equity is positively correlated with excellence, it would mean that in inequitable systems education functions as a mechanism to reproduce existing social inequalities as suggested by conflict theorists.

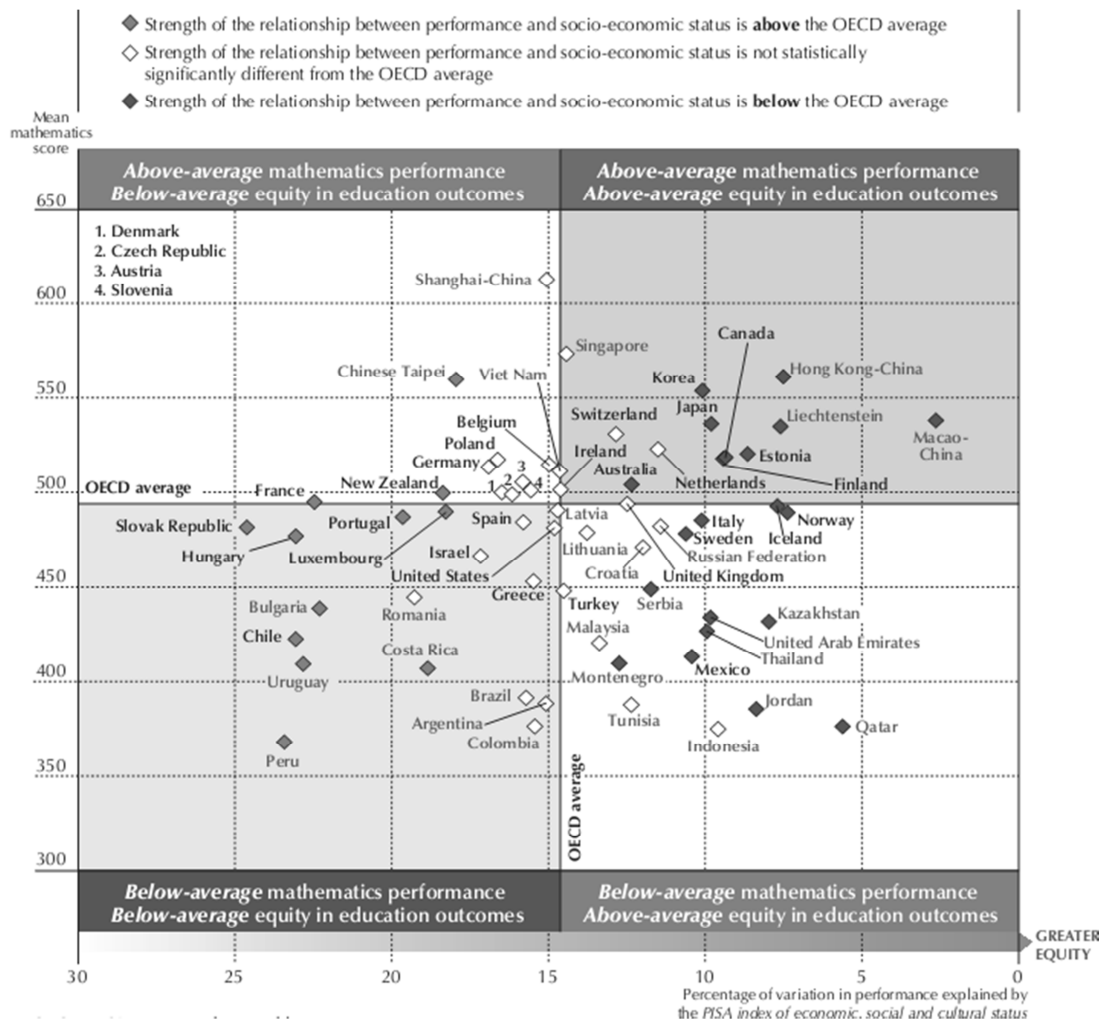
As noted in the Literature Review Chapter, existing research about a trade-off between equity and excellence provide mixed results which are not convincing. Thus, after re-analysing some of these claims in the next section, I use further methods and broader data to test the potential positive relationship between equity and excellence in the following sections. In many of the existing studies, excellence is operationalized as the average student outcomes in international examinations. Thus, the operational definition of excellence depends on the design of the particular examination. PISA is used widely in the literature and is more relevant to my conceptualization referring to capabilities. However, in addition to PISA outputs, I also try to include other studies as much as possible. On the other hand, equity is operationalized as the percentage of variance explained by socio-economic background indices in many studies. The assumption is that if a less part of the student performance is determined by socio-economic background, then the education system is more equitable. This operationalization is quite popular since it is used in OECD PISA reports. However, both OECD reports and other scholars used different indicators for socio-economic status or operationalized equity via other measures. Throughout the chapter, I try to test as many of them as possible.

#### **4.1. Bivariate approaches:**

One of the biggest reasons behind the recent scholarly interest on the relationship between equity and excellence is possibly the emphasis given to the issue by OECD in PISA reports. In the reports of the first three waves of PISA (OECD, 2003, 2004,

2007a), there were chapters on the effects of socio-economic factors on student outcomes. Moreover, OECD published separate volumes (OECD, 2010, 2013a) on the issues related to equity for the last two waves. Considerable parts of these chapters and volumes were allocated to the relationship between equity and average student performance. In the reports, it is claimed that there is no trade-off between equity and excellence. The main support for this claim is the existence of countries which have higher levels of equity and perform well above average at the same time. Below figure is from the PISA 2012 report volume titled “Excellence through equity” (OECD, 2013a). Despite strong criticisms (Hauser, 2009), this figure has been represented as the main visual support for OECD’s claim in every wave.

X-axis of Figure 4.1 represents equity. Equity is operationalized as the percentage of variation explained by socio-economic background in average PISA 2012 Math score for participating countries or economies. If a high percentage of variation in student performance is explained by socio-economic characteristics (measured by ESCS), then it means that the level of equity is low in this country. On the other hand, Y-axis shows average student performance. Two benchmark lines are also added to the figure to represent OECD averages in both variables. Hence, there are four separate areas for combinations of equity and excellence as defined by OECD. Since, there are many countries in the top right rectangle which represents high equity and high performance, it is claimed that there is not a trade-off between equity and excellence.



Source: (OECD, 2013a)

Figure 4.1 Relationship between equity and excellence

However, there is more information in this figure. There is the proof for the refutation of the trade-off claim but there is also some evidence for an opposite claim. In the top-left corner, there is only Chinese Taipei which has an average performance level significantly higher than OECD average and equity level significantly lower than OECD average. This may mean that it is very unlikely if not impossible to have an education system in which the level of equity is low and the level of excellence is high. Although, the evidence is not very strong, it still deserves

more attention. For instance, there might be a relationship between equity and excellence in which equity is not an enough but a necessary condition for high performance in an education system. Or, there might be a non-linear relationship (e.g. exponential or quadratic) between equity and excellence in which equity contributes to average performance less for lower levels but more for higher levels. Figure 4.2 includes such curve estimations for the same data.

**Model Summary and Parameter Estimates**

Dependent Variable: Mean Math Score in PISA 2012

Equation	Model Summary					Parameter Estimates		
	R Square	F	df1	df2	Sig.	Constant	b1	b2
Linear	,018	1,120	1	62	,294	496,029	-1,531	
Logarithmic	,015	,959	1	62	,331	519,242	-17,354	
Quadratic	,027	,833	2	61	,440	462,460	3,625	-,177
Exponential	,015	,965	1	62	,330	492,028	-,003	

The independent variable is Percentage Explained in Math Score by ESCS.

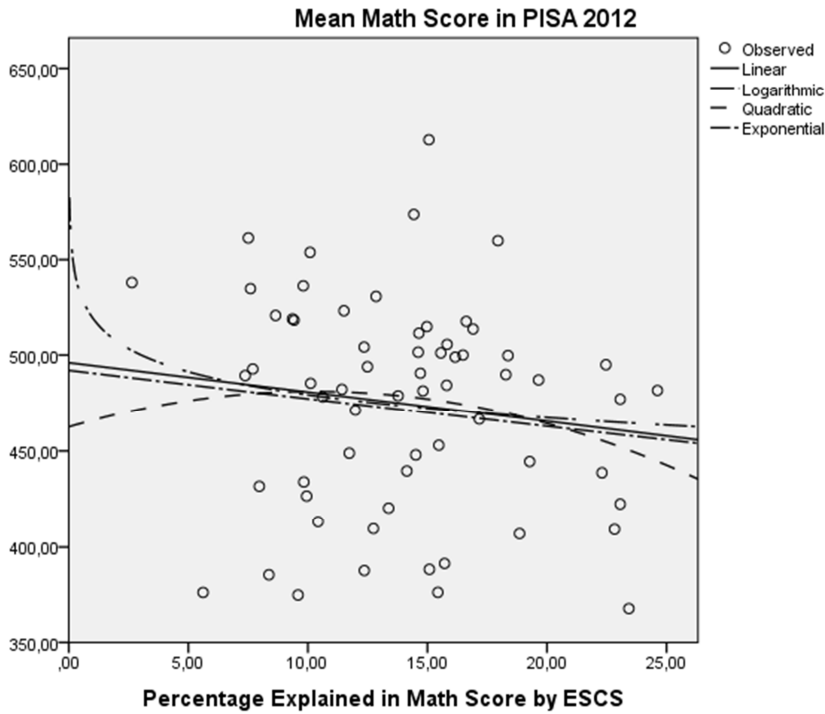
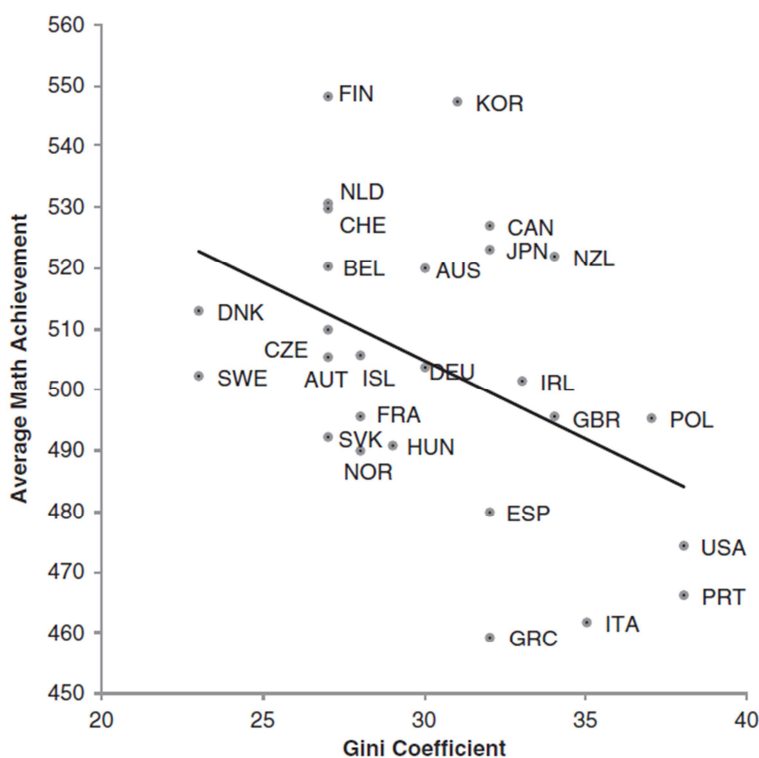


Figure 4.2 Linear and non-linear relationships between equity and excellence

However, it is seen that the correlations are not statistically significant. Thus, it is not easy to claim a strong relationship between excellence and equity defined as the percentage of variation explained in PISA performance by socio-economic status.

In response to criticisms (Hauser, 2009) about the operationalization of equity by OECD, recently some scholars sought the same relationship using a different indicator. The most famous of them is Wilkinson & Pickett's (2009) book. In their bestseller book, *The spirit level*, in addition to many other relationships of GINI with several social indicators, they showed a negative relationship between inequality and average PISA performance of countries. Similarly, Condrón (2011) showed a clear relationship between inequality and excellence using similar indicators (See Figure 4.3).



Source: (Condrón, 2011)

Figure 4.3 Relationship between inequality and average math achievement

Despite the clear pattern showing decreasing average math achievement as inequality increases, Condron is not able to report a high correlation between two variables ( $r^2$ : 0.20). This is mostly due to low number of cases. Condron only included affluent countries in his work. He selected 27 OECD countries from PISA 2006. However, it is possible to increase the number of cases not only by including all nations but also through using the data from other waves of PISA. In Figure 4.4, I plot the same graph with country level data from all 5 waves of PISA and with all participating countries. In addition to all available average PISA scores of countries, latest GINI figures for countries are taken from World Bank. A total of 248 country years are included and cases are weighted according to their populations in order to reduce the high impact of very small countries.

In Figure 4.4, there is a clearer pattern between inequality and PISA mathematics achievement. This time coefficient of determination is 0.49 and the relationship is significant at 99 % confidence level. Moreover, it is also seen that extremely low performing countries in earlier waves which are potentially reducing the correlation are increasing in overall achievement in later waves. This indicates a likely regression to the mean<sup>17</sup>. This pattern is also another evidence to strengthen the claims about the positive relationship between equity and excellence.

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<sup>17</sup> Regression to the mean is a statistical term which means that a measurement tends to be closer to the mean in its further measurements if it is extreme in the first measurement (Everitt, 2002). In Figure 4.4, extremely low cases, e.g. Qatar, Peru, Brazil, in earlier waves converge to the mean in later waves. This pattern might be a result of regression to the mean.





Some scholars approached to the issue of equity-excellence relationship in terms of educational system characteristics and operationalized equity or inequality in reference to these characteristics. Tracking, early selection and ability grouping are the three of the most studied topics. Various recent studies using TIMSS, PIRLS and PISA data showed that early tracking of students increases inequalities in education (Ammermuller, 2005; Brunello & Checchi, 2007; Hanushek & Wößmann, 2006; D. Horn, 2009; Marks, Cresswell, & Ainley, 2006; Marks, 2005). On the other hand, Duru-Bellat & Suchaut (2005), Micklewright & Schnepf (2007) and Vandenberghe (2006) found no relationship between early tracking and inequality. Moreover, Van Elk et. al. (2009) and Marginson et. al. (2007) looked for the effects of tracking on overall student performance and concluded that it reduces efficiency in education. Similarly, Huang (2009) investigated the effects of ability grouping but found that it does not improve overall quality. Some others focused on standardization in education in terms of standardized national curriculum, standardized resources or standardized national exams. Müller & Schiller (2000), Wößmann (2003b, 2005), Schütz et. al. (2008) and Horn (2009) found out that while standardization increases equity, school autonomy reduces it. Moreover Duru-Bellat & Kiefer (2005), Gamoran (1996), Gamoran & Weinstein (1998), Meghir & Palme (2005) and Pekkarinen et al. (2009) also concluded that comprehensive schooling increases average performance and reduces inequality. Despite these findings which can be said to disprove equity-excellence trade-off, there are also some conflicting findings (Van de Werfhorst & Mijs, 2010). For example, Ammermüller (2005) showed a trade-off between equity and excellence in his study covering seven Eastern European Countries. Similarly, Brooded (1997) found evidence in Taiwan about tracking increasing overall performance. Wößmann (2008a) also claimed that inequalities may enhance efficiency in later stages of education. In summary, there are mixed results about the relationship of equity and excellence in education in relation to school system characteristics.

Table 4.1 Relationship of school system characteristics with excellence and equity

		<b>Mathematics performance</b>	<b>Inequity</b>
<b>Vertical stratification</b>	Grade level variation	<b>-0.36</b>	<b>0.26</b>
	Grade repetition rate	<b>-0.34</b>	<b>0.25</b>
<b>Horizontal stratification (between schools)</b>	Early tracking	0.12	<b>0.42</b>
<b>Financial resources</b>	Teachers' salaries relative to per capita GDP	-0.05	-0.21
<b>Material resources</b>	Quality of schools' educational resources	<b>0.51</b>	0.15
<b>Time resources</b>	Pre-primary education rate	<b>0.57</b>	<i>0.23</i>
<b>Inequity in allocation of material resources</b>	Difference in quality of schools' educational resources	<b>-0.44</b>	0.12
<b>School autonomy</b>	School responsibility for curriculum and assessment	<b>0.37</b>	-0.11
<b>Assessment and accountability policies</b>	Tracking by administrative authorities	<b>-0.32</b>	-0.07
	Student feedback on quality assurance	0.20	<b>-0.29</b>
<b>Student truancy</b>	Coming late for school	<b>-0.43</b>	<i>0.22</i>
	Skipping class	<b>-0.41</b>	-0.08

Note: Numbers show correlation coefficients between variables. Bold values indicate statistical significance at 95 % confidence level and italic values indicate statistical significance at 90 % confidence level.

Source: (OECD, 2013b)

In PISA 2012 reports, OECD (2013a, 2013b, 2013c) also tries to show a positive relationship between equity and excellence. Table 4.1 is one of the main discussion items in the fourth volume of the reports (OECD, 2013b). Basically, Table 4.1 shows country level correlations of various school system characteristics with excellence and equity. Excellence is defined as the average PISA mathematics performance in a country and inequity is defined as the percentage of variation in mathematics performance that is explained by ESCS.

OECD's claim that equity and excellence might be positively correlated is based on the pattern of the relationships in the table. Some of the education system characteristics in the table are oppositely correlated with excellence and inequity. In other words, if a variable is positively correlated with excellence it is negatively correlated with inequity or vice versa. For example, the first item, namely, grade level variation, is negatively correlated with mathematics performance and positively correlated with inequity. And, both of these correlations are statistically significant.

However, interpretations from this table –and some others in the papers mentioned above- have two serious problems. First of all, the relationships are bivariate and do not indicate any causality. So, they might actually be reflecting any other latent (or observable) associations. Second, these variables themselves might be related with each other which might mislead the analyst via boosting or suppressing the actual relationship. These two problems also hold for many other analyses mentioned above in this chapter. To deal with them, I employ some further analyses in the following section.

#### **4.2. Analyses with Multiple Variables:**

The easiest way to deal with the problems caused by bivariate analysis is to run a multiple regression model. In this way, all above mentioned education system characteristics can be tested for their effects on overall student performance when controlling for each other. Table 4.2 is a summary of multiple regression models. Four models are constructed in order to compare with the results in Table 4.1. In

Model 1 and Model 3, dependent variable is average PISA 2012 Mathematics score for countries (i.e. excellence defined by OECD). In Model 2 and Model 4, dependent variable is the percentage of variation in maths score explained by ESCS (i.e. inequity defined by OECD). Model 1 and Model 2 are full models in which all variables mentioned in Table 4.1 are put in. In Models 3 and 4 only significant independent variables are taken in.

Table 4.2 Multiple regression model, education system characteristics on excellence and equity

Variable	Model_1	Model_2	Model_3	Model_4
grade_var	-4.439	-.6119		
repeat_var	-.567	.01095		
first_select	1.012	-1.279**		-1.229***
salary	-.01733	-.002939		
scmatedu	50.59***	-.5298	47.89***	
preprimary	.7924**	.01379	.9178***	
dedres	-13.17	-1.763		
autonomy	2.371	-.631		
assessment	-.3233	.03067		
stu_fback	1.403	-6.796		
late	-.3069	.2133*		.1701***
skip	-91.11*	-7.834	-78.38**	
_cons	487.3***	28.96**	436.9***	25.85***
N	53	53	65	59
ll	-254.8	-147	-319.7	-167.1
r2	.7154	.3629	.6381	.2746

legend: \* p<0.05; \*\* p<0.01; \*\*\* p<0.001

Regression outputs in Table 4.2 do not show a pattern as deduced from Table 4.1. In other words, it is very hard to talk about a visible relationship between excellence and inequity considering these variables about education level characteristics.

Despite low VIF scores (i.e. multicollinearity<sup>18</sup>), there is still the problem of more complex relationships for the analyses in Table 4.2. For example, all these education system characteristics may represent some other observable or latent variables. Earlier in the chapter, some other studies are mentioned in which the effects of some other country level variables are found to be significant on equity or excellence. These are macro level indicators like GDP or GINI. GINI is also shown to be effective on PISA performance in Figure 4.4. above.

The models in Table 4.2 can be extended adding such indicators. In Table 4.3, similar models like above models, Model 1 and Model 2, are constructed. GDP and GINI are included in addition. In Model 5, dependent variable is excellence and in Model 6, dependent variable is inequity.

It is seen in Table 4.3 that, for the effects on excellence in Model 5, some of the variability is represented by new indicators (GINI and GDP) although their effects are insignificant. In model 6, GDP come out as a significant effect on inequity. However, effects of other variables also change compared to models in Table 4.2. Hence, it is still hard to find the relationship mentioned in OECD reports referring to results in Table 4.1 but dramatic changes in the effects of some variables are enough to make one suspect about multicollinearity (despite low VIF scores) or any other latent relationship.

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<sup>18</sup> Multicollinearity is a statistical term implying the existence of a strong linear relationship among some or all independent variables of a regression model (Zainodin & Yap, 2013). It is one of the basic assumptions of multiple linear regression. Multicollinearity in a regression model can be identified by a statistic called Variance Inflation Factor (VIF).

Table 4.3 Multiple regression model, education system characteristics and country indicators on excellence and equity

Variable	Model_5	Model_6
grade_var	-1.942	-.3705
repeat_var	-.5427	.05822
first_select	-1.572	-.9481*
salary	-.06281	-.003488
scmatedu	51.71***	2.581
preprimary	.6056*	.0196
dedres	-13.26	-.5021
autonomy	14.78	-.7756
assessment	-.3295	.00845
stu_fback	-19.01	-9.394**
late	.07003	.2374**
skip	-50.19	-13.16*
gdp	.07255	-.1031**
wb_gini	-.1901	.0268
_cons	533.7***	29.5***
N	48	48
ll	-226.6	-121.4
r2	.7314	.5739

legend: \* p<0.05; \*\* p<0.01; \*\*\* p<0.001

The most basic way to deal with such problems is to use a Principal Component Analysis approach. It is one of the statistical dimension reduction techniques like Factor Analysis or Multiple Correspondence Analysis. In Principal Component Analysis, the aim is to construct smaller number of uncorrelated variables from a bigger set of correlated variables (Hotelling, 1933; Pearson, 1901).

In order to further investigate the relationship between equity and excellence, I run a Principal Component Analysis below. In addition to the variables in Tables 4.1-3, several other variables mentioned in the literature are also added to the analysis. In addition to GDP per capita, other indicators about national development and wealth such as Human Development Index 2012 scores (HDI), and public spending on education as percentage of GDP (spend) are included in the model. Similarly, other

than GINI, Gender Inequality Index 2012 scores (GII) are also added. OECD's definition of inequity as percentage of variation explained by ESCS in performance (inequity) is also used as an independent variable. Other indicators mentioned in the literature added in the below Principal Component Analysis are number of educational tracks available for a 15-year-old student in the country (track), between school variance (btw\_sch\_var), within school variance (with\_sch\_var) and percentage of schools without ability grouping (ability\_grouping).

Table 4.4 is the rotated component matrix which shows the correlations of variables with corresponding components. For every variable, the highest correlations and correlations over 0.4 are highlighted to make it easier to see which components are driven by which variables. There are 7 components calculated. These are the components with eigenvalues bigger than one and they account for 76 % of the total variation.



Table 4.4 Rotated component matrix

variables	Component						
	1	2	3	4	5	6	7
first_select	,896	-,004	-,148	,078	,085	,038	,104
repeat_var	-,891	,023	-,041	-,098	-,047	,112	-,071
tracks	-,775	-,053	,099	-,075	,055	-,149	-,012
spending	,517	,074	,647	-,145	,102	-,213	-,017
with_sch_var	,454	,718	,259	,028	,165	,128	-,013
GDP	,054	,834	,092	-,086	-,071	-,380	,008
scmatedu	-,224	,805	,145	-,066	,088	,178	,234
HDI	,055	,741	,540	-,123	-,064	-,040	-,056
GII	,035	-,488	-,730	,020	,203	-,150	,018
GINI	,192	-,369	-,646	,144	,256	-,091	-,216
preprimary	-,234	,121	,694	-,218	-,137	,148	,004
late	,357	-,242	-,025	,688	,138	,299	-,136
autonomy	,047	-,195	,205	-,798	,008	,305	,195
skip	,127	-,196	-,230	,699	-,014	,194	,126
grade_var	-,060	-,156	,221	,470	,440	-,397	,437
ability_grouping	-,061	-,083	,074	,091	-,816	-,024	-,030
salary	,021	-,059	,073	-,226	-,676	,254	,181
assessment	,159	-,159	-,365	,047	,594	,277	,193
dedres	-,046	-,005	-,126	-,054	,042	-,821	-,085
btw_sch_var	-,134	-,142	-,309	-,066	,067	-,319	-,703
inequity	-,287	-,251	,171	,192	,095	,336	-,675
stu_fback	-,145	-,170	-,229	-,131	,419	,335	,543

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 9 iterations.

As the next step, another multiple regression model is calculated to test the effects of these components calculated in Table 4.4. Seven components calculated from the Principal Components Analysis above are used as independent variables. Dependent

variable is again average mathematics performance in PISA 2012. Regression coefficients are given in Table 4.5.

In multiple regression analysis, the effects of components 2, 3 and 4 on average mathematics performance are found to be significant at 99 % confidence. Component 6 is also significant at 95 % confidence level.

Component 2 has a positive effect on excellence. It can be said that this component is mostly driven by variables related to resources. Thus, it is named as “Resources” in the table. The most correlated variable with this component is GDP. Human Development Index (in calculation of which GDP is also used), within school variation and average quality of school educational resources are also highly correlated with “Resources”.

Component 3 is named as “Equity & Resources”. It has high negative correlations with two inequality indices, namely GINI and GII. Moreover, it is positively correlated with pre-primary attendance and public spending on education. “Equity and Resources” has also a positive significant effect on excellence.

The most correlated (negatively) variable with Component 4 is school autonomy. Thus, it is named as “School Dependency”. “School Dependency” has a negative effect on excellence. It can be said that increasing school autonomy has a positive influence (though it is not a direct relationship) on excellence.

Difference in the index of quality of schools’ educational resources between socio-economically advantaged and disadvantaged schools<sup>19</sup> has a very high negative correlation with Component 6 and no other variable has a correlation bigger than 40 %. Hence, this component is named as “Equality in Resources”. Although standardized coefficient for “Equality in Resources” is not as big as the coefficients for “Resources”, “Equity & Resources” or “School Dependency” components, its

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<sup>19</sup> For the definition of socio-economically advantaged and disadvantaged schools, see Box IV.3.1 in (OECD, 2013b, p. 98)

effect is still significant at 95 % confidence level. In this sense, if we consider resource inequality between schools has a negative influence on excellence.

Table 4.5 Multiple regression model with principal components

	Coefficients <sup>a</sup>				
	Unstandardized		Standardized		
	Coefficients		Coefficients		
	B	Std. Error	Beta	t	p
Intercept	473.757	3.853		122.943	.000
Educational Segregation	-4.694	3.898	-.092	-1.204	.236
<b>Resources</b>	<b>29.413</b>	<b>3.898</b>	<b>.577</b>	<b>7.546</b>	<b>.000</b>
<b>Equity &amp; Resources</b>	<b>28.510</b>	<b>3.898</b>	<b>.559</b>	<b>7.314</b>	<b>.000</b>
<b>School Dependence</b>	<b>-14.009</b>	<b>3.898</b>	<b>-.275</b>	<b>-3.594</b>	<b>.001</b>
Classroom Homogeneity	-3.338	3.898	-.065	-.856	.398
<b>Equality in Resources</b>	<b>9.804</b>	<b>3.898</b>	<b>.192</b>	<b>2.515</b>	<b>.016</b>
Educational Equity	6.966	3.898	.137	1.787	.082

a. Dependent Variable: Mean Math Score in PISA 2012

On the other hand, other components which are driven by variables emphasized in many other studies mentioned above are not found to be significant. For example, Component 1 is highly correlated by tracking and early selection indicators (“Educational Segregation”), Component 5 is driven by ability grouping (“Classroom Homogeneity”) and Component 7 is associated with inequity indicator of OECD (Educational Equity”). However, none of these components has a significant effect on excellence in the regression model in Table 4.5.

For further comparisons, identical models are tried for other operationalizations of excellence, too. PISA reading and PISA science averages or the rate of top level

students in PISA are used as dependent variables as well as TIMSS Math averages, TIMSS Science averages and PIRLS Reading averages. However, the results are more or less the same as PISA 2012 Math averages. See Appendix Tables A.1 and Table A.2 for comparisons of models.

Although there are some useful hints underlined above about the effects of various equity indicators on excellence, it is still hard to make clear-cut interpretations just depending on these results. For instance, despite the inclusion of relatively high number of components, some of the components are driven by various different (and seemingly unrelated) variables. Furthermore, some results are conflicting with existing literature. Therefore, further trials with other methods or data would be useful for the confirmations of these findings.

As a further step, I also conduct Multilevel Modelling below. Multilevel Models which are also known as Hierarchical Linear Models, Random Effects Models or Nested Models are statistical models that take into account the hierarchical structure of data (Raudenbush & Bryk, 2002). For example, in the field of education most of the data is designed as students nested in schools and schools nested in education systems. International exam data used in this dissertation is also designed in a nested structure. Other than the above used analysis techniques, multilevel models bring two benefits for my research purposes. First of all, in a regular regression model all variables are at country level. For example, averages of various student and school level variables (e.g. average exam performance or average school resources) are used in the models. In Multilevel Models, these variables can be used at school or student levels. Hence, interactions of variables with higher levels can be taken into account. For instance, a student level variable (and its error term), let's say ESCS, can vary across schools systematically. In other words, some type of schools might have systematically higher proportions of high ESCS students and some others might not. In Multilevel Models, this pattern can be taken into account and controlled for. As the second advantage, in Multilevel Models random effects of lower level variables can be taken into account. For example, the effects of ESCS on exam performance

may differ across schools or across countries. This pattern, which is called as ‘random intercepts’, can also be identified with Multilevel Models.

Despite its advantages, Multilevel Modelling is quite burdensome in big datasets. For example, in the case of PISA 2012 there are about 500 thousand students in the sample. In many of the available software (and with a standard computer), running a model takes long hours.

Below, I provide some Multilevel Models for PISA 2012 data using a three level structure, namely students nested in schools and schools nested in countries. In addition to variables available in PISA data, I wanted also to incorporate some of the above mentioned national indicators which are seemingly effective on educational excellence. Since there are hundreds of variables available in PISA data, as a first step I investigated voluminous Multilevel Models<sup>20</sup> for PISA 2012 provided by OECD (2013a). Among numerous variables, six are identified as having consistent significant effects on PISA performance across countries and across different models. Five of these are student level variables: gender, ESCS, pre-primary education enrolment, immigrant status, language spoken at home. The last one is a school level variable: average school ESCS score.

In Table 4.6 there are summaries of several Multilevel Models<sup>21</sup>. First model is the base model constructed with these six basic variables. Four of these variables are converted into dummy variables. Gender is converted into a dummy variable for being female (against males), pre-primary enrolment is coded as having attended pre-primary education (against having not attended pre-primary education), immigration

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<sup>20</sup> There are sets of Multilevel Models in the web appendix of PISA 2012 Report, 2<sup>nd</sup> Volume (OECD, 2013a). Excel tables are accessible from <http://www.oecd.org/pisa/keyfindings/pisa-2012-results-volume-ii.htm>, accessed on 20/12/2014.

<sup>21</sup> In order not to confuse the reader with tables having lots of coefficients, Table 4.6 is constructed as a summary. Only the direction and significance level of the variables are represented. Red fonts are indicating negative coefficients, one star means significance at 95 % confidence level, two stars at 99% confidence level and three stars at 99.9 % confidence level. Full table with regression coefficients is provided in Appendix Table A.3

status<sup>22</sup> is coded as being native (against having immigrant background) and language spoken at home is coded as native language (against other languages). Although some of these variables are not significant in most of the models, they are kept in all models as control variables.

Table 4.6 Summary of Multilevel Models

Level	Variables	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Student</i>	<b><i>Female</i></b>	***	***	***	***	***
<i>Student</i>	<b>ESCS</b>	*	*	*	*	*
<i>Student</i>	<b>Pre-primary education</b>	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05
<i>Student</i>	<b>Native</b>	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05
<i>Student</i>	<b><i>Native language at home</i></b>	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05
<i>School</i>	<b>School ESCS</b>	**	p>0.05	**	**	**
<i>Country</i>	<b><i>Resources</i></b>		p>0.05			
<i>Country</i>	<b>Equity &amp; Resources</b>		p>0.05			
<i>Country</i>	<b><i>School Dependence</i></b>		p>0.05			
<i>Country</i>	<b>Equality in Resources</b>		p>0.05			
<i>Country</i>	<b>GDP per capita</b>			**	**	**
<i>Country</i>	<b>GINI</b>			**		
<i>Country</i>	<b><i>Inequity</i></b> <b><i>(as defined by OECD)</i></b>				p>0.05	
<i>Country</i>	<b>Year of first selection</b>					p>0.05

Note: \*p<0.05, \*\*p<0.01, \*\*\*p<0.001, *negative effects*

<sup>22</sup> For the definition of immigration status, see (OECD, 2013a, p. 72)

Once the base model is calculated, several other models are tried by including additional variables. In Model 2, four significant components from the Principal Components analysis results above are taken in. However, none of these components are found to be significant despite representing/suppressing the significant effect of school ESCS. Another important finding from Principal Components Analysis is the huge effects of indicators like GINI and GDP. They are also found to be effective on student performance in some of the studies mentioned above. Hence, both GINI (as an indicator of inequality) and GDP per capita (as an indicator of resources) are included in Model 3. Both of the indicators are positively associated with excellence. When the effect of GDP per capita is positive on excellence, GINI has a negative effect. The negative effect of GINI on excellence means that students in countries with lower levels of economic inequalities tend to perform better in PISA mathematics test. Furthermore, I also investigated the effects of other inequality indicators. In Model 4, OECD's inequity indicator as the percentage of variation explained by ESCS is included instead of GINI. Nevertheless, it is not found to have a significant effect on excellence. Similarly, other indicators mentioned in the literature such as early tracking age (in Model 5), number of educational tracks available for 15-year-old students<sup>23</sup>, percentage of schools with ability grouping<sup>24</sup> or difference in the index of quality of schools' educational resources between socio-economically advantaged and disadvantaged schools<sup>25</sup> are also tested separately but none of them is found to be significant. The same procedure applied for alternative indicators instead of GDP per capita. Public spending on education as percentage of GDP<sup>26</sup>, index of quality of school educational resources<sup>27</sup> and other variables which are found to be relevant in Principal Components Analysis such as school autonomy index, percentage of students who skip classes and percentage of students who are

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<sup>23</sup> See Model 6 in Appendix Table A.4.

<sup>24</sup> See Model 11 in Appendix Table A.4.

<sup>25</sup> See Model 7 in Appendix Table A.4.

<sup>26</sup> See Model 8 in Appendix Table A.4.

<sup>27</sup> See Model 9 in appendix Table A.4.

late for school are also tested<sup>28</sup>. However, none of them has a significant coefficient. In summary, multilevel models show that GDP and GINI are two of the best estimators of student performance.

Furthermore, different functional forms of both GDP and GINI are also tested. For GINI, there are not big differences between the linear form and other functional forms<sup>29</sup>. On the other hand, for GDP per capita logarithmic transformation is found to be a better estimator of excellence<sup>30</sup>. It means that the positive effects of GDP per capita on educational excellence is higher for countries with lower levels of GDP per capita while this effect is decreasing for higher average income countries<sup>31</sup>.

To sum up, in this chapter, I tried to extend the discussions on the relationship between equity and excellence in education. I employed a step-by-step approach. First, I replicated and re-tested existing claims and analyses. I found that there are implications of a positive relationship between equity and excellence. Afterwards, I tried to combine various measures of equity and excellence and analyse them in a multiple variable setting. Multiple regression models provided clues about the effects of several variables on educational outcomes. However, the most vivid picture of the relationship between equity and excellence is achieved via multilevel models at the end. The effects of macro-level variables like GINI or GDP along with school and student level variables like school average socio-economic status, family socio-economic status and gender were found to be effective on educational excellence. In conclusion, analyses conducted in this chapter provide the information that excellence is consistently related to GINI rather than other operationalizations of equity. There is evidence about a positive relationship between equity and excellence. Unlike earlier claims about a trade-off between equity and excellence,

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<sup>28</sup> See Model 10 in Appendix Table A.4.

<sup>29</sup> For curve estimation of GINI and excellence, see Appendix Figure A.3.

<sup>30</sup> For curve estimation of GDP per capita and excellence, see Appendix Figure A.4.

<sup>31</sup> For Multilevel Models with transformed GINI and GDP scores, see Appendix Table A.5.



there are serious hints about a relationship in which these two dimensions of education are enabling each other.

As stated in the Introduction Chapter, in addition to investigating the relationship between equity and excellence with international student data, this dissertation also aims at finding the interplay between these two dimensions of education in the case of Turkey. Next chapter investigates the level of equity in the Turkish education system and its effect on educational excellence.

## CHAPTER 5

# EQUITY AND EXCELLENCE IN THE TURKISH EDUCATION SYSTEM<sup>32</sup>

In the previous chapter, it is found that inequalities may reduce average performance in a country. One of the basic arguments of the functionalist theory about inequalities is that they are functional and necessary for the society. However, it is found that inequalities have a negative effect at least on overall performance in education. Another fundamental claim of the functionalist theory is that education provides a meritocratic base for the inequalities in a society. On the other hand, conflict theories claim the reverse. They argue that education serves to reproduce and legitimate existing inequalities. To test these theoretical claims for the case of Turkey, in this chapter, I aim at finding out to which extent the Turkish education system could be seen as facilitating and promoting equity through allowing male and female students to excel in terms of outcomes in education. Using the data from PISA 2012, this chapter looks at how gender, socio-economic background, geographic region and types of educational institution affect the mathematics performance of 15-year-old students in Turkey in 2012. Basically, my hypotheses are that in Turkey, there are significant differences between different social groups (e.g. girls and boys, students from poorer and wealthier families, etc.) in terms of educational performance. If so, the argument of the conflict theories that education reproduces existing social inequalities would be confirmed.

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<sup>32</sup> A version of this chapter is submitted to European Educational Research Journal (EERJ) on September 2014 for publication. The article is currently under review.

As mentioned in the introduction chapter, Turkey is undergoing vast transformations in the areas of economic policy and international relations under the ruling Justice and Development Party (AKP) since 2002, which have attracted kudos both in the media and in academia (Abramowitz & Barkey, 2009; O'Neill, 2013; Schimmelfennig, 2009). Education policies on the other hand have also undergone several reformations but these were less successful. Despite increases in scores in international exams such as PISA, TIMSS and PIRLS; Turkey is still lagging behind when compared to most of the OECD or EU countries (Mullis, Martin, Foy, & Drucker, 2011; Mullis, Martin, & Foy, 2011; OECD, 2013b).

Some recent studies tried to investigate the effects of various social background characteristics on student outcomes in Turkey, using data from international student evaluations (Alacacı & Erbaş, 2010; Berberoğlu & Kalender, 2005; Oral & McGivney, 2013; World Bank, 2010, 2013; Yayan & Berberoglu, 2004). In this chapter, I also try to examine the effects of various socio-economic and educational characteristics on PISA mathematics performances of 15-year-old students in Turkey.

Turkey has been participating in PISA since 2003. Since then Turkey is one of the bottom countries in OECD in terms of student performance. In the last wave of PISA in 2012, Turkey became 32<sup>nd</sup> in Mathematics and Science and 31<sup>st</sup> in Reading among 34 OECD countries; 44<sup>th</sup> in Mathematics, 43<sup>rd</sup> in Science and 42<sup>nd</sup> in Reading among all 65 participating countries and economies<sup>33</sup>. Despite an increase in scores, ranking of Turkey has not changed very much since 2003. Table 5.1 shows Turkey's mean scores and OECD rankings in PISA exams.

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<sup>33</sup> See Appendix Table A.6 for mean scores of all countries in PISA 2012 Mathematics, Reading and Science tests.

Table 5.1 Turkey's PISA performance 2003-2012

	2003		2006		2009		2012	
	Mean score	OECD rank	Mean score	OECD rank	Mean score	OECD rank	Mean score	OECD rank
Maths	423	28/29	424	29/30	445	32/34	448	32/34
Reading	441	29/30	447	29/30	464	32/34	475	31/34
Science	434	29/30	424	29/30	454	32/34	463	32/34

In this chapter, I try to model PISA 2012 performance of 15-year-old students in Turkey. In order to grasp as many effects as possible in the most appropriate manner, a multilevel approach is adopted. Through multilevel regression models, I aim to test the relationship between various student and school level variables with student outcomes. PISA data is organized in a two-level structure in which students are nested in schools. Both student and school questionnaire data is used in addition to student performance data. The PISA 2012 data for Turkey covers 4848 students from 170 schools. All students are aged 15, normally the age for 10<sup>th</sup> grade in Turkish schools, but there are also pupils from other grades from 7<sup>th</sup> to 12<sup>th</sup> in the sample. The sample was constructed according to a two stage stratified design according to school types and socio-economic regions in Turkey.

Dependent variable is selected as the Mathematics outcome. In some cases, in order to have a comparison, Reading and Science performance is also used. Independent variables are taken from both student and school datasets. As many variables mentioned in the extant literature as possible are included to control for all potential effects. Sampling weights from both datasets are utilized. Table 5.2 shows the basic descriptive statistics for all variables used in this chapter.

Table 5.2 Weighted frequencies and descriptive statistics for dependent and independent variables

Categorical variables				Numeric variables			
	N	%	Variable	Mean	Std. Dev.	Min	Max
Gender			PV1MATH	447.4	91.2	177.9	759.9
Male*	2450	50.6	ESCS	-1.5	1.1	-4.6	1.9
Female	2398	49.5	CLSIZE	44	11.1	13	53
Language at home			school_ESCS	-1.5	0.6	-3.5	0.3
Turkish	4492	93.7	TCSHORT	0.9	1	-1.1	3.6
Other*	301	6.3	SCHSIZE	848.3	605.7	2	2829
Preprimary education			SCMATEDU	-0.4	0.9	-3.6	2
Not attended preprimary sch.*	3417	70.5	SCMATBUI	-0.3	1	-2.8	1.3
Attended preprimary sch.	1431	29.5	Grade_year	9.7	0.6	7	12
Location							
Village	111	2.3					
Small Town	513	10.6					
Town*	1491	30.8					
City	1446	29.8					
Large City	1288	26.6					
Region							
Istanbul*	832	17.2					
West Marmara	196	4.1					
Aegean	599	12.4					
East Marmara	476	9.8					
West Anatolia	483	10					
Mediterranean	662	13.7					
Central Anatolia	267	5.5					
West Black Sea	270	5.6					
East Black Sea	190	3.9					
Northeast Anatolia	143	2.9					
Middle East Anatolia	244	5					
Southeast Anatolia	487	10.1					

Table 5.2 (continued)

School type			
Primary School	129	2.7	
General High School*	1490	30.7	
Anatolian High School	1089	22.5	
Science High School	36	0.7	
Social Sciences High School	37	0.8	
Ana. Teacher Tra. High School	217	4.5	
Vocational High School	1196	24.7	
Ana. Vocational High School	278	5.7	
Technical High School	74	1.5	
Ana. Technical High School	120	2.5	
Multi Programme High School	181	3.7	
Police High School	2	0.04	

\* base category

### 5.1. Main effects:

A series of nested models are presented in tables 5.3 and 5.4. All models feature random intercept for the school level clustering. Following the null model (Model 1), a model which includes all the variables except for the school type variable is constructed (Model 2). Then school type is added in the full model (Model 3). This model serves to illustrate individual and school level influences net of school type measures. Finally, a parsimonious model is constructed by dropping insignificant terms from the model in two steps (Model 4). Model 4 shows that grade year, gender, ESCS, region and school type have statistically significant associations with PISA maths scores.

A grade year difference corresponds to a 34.3 points difference in mathematics scores. Females compared to males, students from Aegean, Mediterranean, Central Anatolia, East Black Sea, Northeast Anatolia, Middle East Anatolia and Southeast Anatolia regions compared to students from Istanbul and students attending

Vocational schools compared to the ones attending General High Schools perform worse in maths. On the other hand having a higher socio-economic status, attending Primary School, Anatolian High School, Science High School, Social Science High School, Anatolian Teacher Training High School, Anatolian Vocational High School, Technical High School, Anatolian Technical High School or Police High School have a positive influence on mathematics performance. When other variables are controlled for, on average girls score about 25 points less than boys, students from Mediterranean and Eastern regions score 30 to 50 points less than students from Istanbul and students from Anatolian High Schools, Science High Schools, Social Science High Schools, Anatolian Teacher Training High Schools and Police High Schools score 100 or more points higher than students from General High Schools.

Table 5.3 Multilevel Models with main effects only

	Model 1	Model 2	Model 3	Model 4
	Null Model	Full model w/o school type	Full model	Parsimonious model
Intercept	431.1 (6.7)	326.8 (32.7)	175.0 (28.1)	120.7 (20.0)
Grade_year		<b>32.6 (2.0)**</b>	<b>33.9 (2.0)**</b>	<b>34.3 (2.0)**</b>
Female		<b>-26.2 (1.7)**</b>	<b>-26.0 (1.7)**</b>	<b>-25.5 (1.7)**</b>
ESCS		<b>4.1 (0.8)**</b>	<b>4.0 (0.8)**</b>	<b>4.6 (0.8)**</b>
Turkish		1.2 (3.8)	3.1 (3.8)	
preprim		-0.2 (1.9)	-0.2 (1.9)	
school_ESCS		<b>57.6 (7.4)**</b>	<b>23.7 (8.3)**</b>	
TCSHORT		-2.5 (4.4)	-1.6 (2.3)	
CLSIZE		<b>-0.8 (0.3)*</b>	-0.1 (0.3)	
SCHSIZE		0.0 (0.0)	0.0 (0.0)	
SCMATEDU		<b>17.7 (6.7)**</b>	<b>7.1 (3.5)*</b>	
SCMATBUI		<b>-11.2 (5.4)*</b>	-6.1 (3.2)	

Table 5.3 (continued)

Village		<b>47.0 (12.1)**</b>	-5.5 (11.5)	
Small Town		20.7 (16.1)	7.1 (8.5)	
City		-11.9 (10.6)	0.2 (5.9)	
Large City		<b>-46.2 (14.1)**</b>	-18.6 (10.6)	
West Marmara		<b>-50.5 (24.2)*</b>	-23.9 (16.7)	-20.3 (16.6)
Aegean		<b>-35.3 (14.6)*</b>	-19.0 (9.8)	<b>-17.9 (8.8)*</b>
East Marmara		<b>-43.7 (17.8)*</b>	-17.0 (16.6)	-7.3 (13.8)
West Anatolia		<b>-56.8 (18.4)**</b>	<b>-29.0 (13.3)*</b>	-18.4 (12.5)
Mediterranean		<b>-53.0 (14.4)**</b>	<b>-32.4 (10.0)**</b>	<b>-32.1 (8.2)**</b>
Central Anatolia		-32.3 (21.6)	-19.8 (10.2)	<b>-18.9 (8.3)*</b>
West Black Sea		<b>-63.8 (18.4)**</b>	-32.8 (19.8)	-25.4 (22.5)
East Black Sea		<b>-43.2 (16.0)**</b>	<b>-39.4 (11.0)**</b>	<b>-34.5 (12.6)**</b>
Northeast Anatolia		-15.8 (29.2)	-17.8 (12.7)	<b>-32.6 (12.4)**</b>
Middle East Anatolia		<b>-68.9 (17.5)**</b>	<b>-49.1 (10.2)**</b>	<b>-48.8 (8.1)**</b>
Southeast Anatolia		<b>-44.9 (17.6)*</b>	<b>-46.4 (10.4)**</b>	<b>-38.3 (12.1)**</b>
Primary S			<b>45.3 (14.1)**</b>	<b>32.4 (11.4)**</b>
Anatolian HS			<b>80.1 (12.0)**</b>	<b>99.3 (10.3)**</b>
Science HS			<b>204.8 (18.8)**</b>	<b>261.7 (6.9)**</b>
Social Sciences HS			<b>152.0 (19.0)**</b>	<b>166.5 (12.3)**</b>
Ana. Teacher Tra. HS			<b>127.8 (11.0)**</b>	<b>146.5 (7.3)**</b>
Vocational HS			<b>-25.0 (5.9)**</b>	<b>-22.6 (5.4)**</b>
Ana. Vocational HS			<b>26.8 (10.2)**</b>	<b>39.7 (10.9)**</b>
Technical HS			13.8 (8.3)	<b>16.8 (7.9)*</b>
Ana. Technical HS			<b>26.9 (9.3)**</b>	<b>39.1 (8.6)**</b>
Multi Programme HS			10.4 (15.2)	-2.0 (15.5)
Police HS			<b>169.9 (25.8)**</b>	<b>196.8 (18.8)**</b>
Units (school/student)	245/4848	245/4665	229/4665	245/4806
-2*loglikelihood:	53642.5	50684.8	50477.0	52081.0

Note: (\* $p < .05$ , \*\*  $p < .01$ ) Numbers show regression coefficients and their standard errors (in brackets). -2\*loglikelihood indicates relative fit of model to data. See Appendix Figures A.5-A.9 for regression diagnostics checks.



It is seen in Table 5.3 that there is a dramatic change between Model 2 and Model 3. Several school level variables, namely average classroom size, quality of school physical infrastructure index and school location, disappear after school type is added in Model 3. Moreover, average school ESCS score and quality of school educational resources index also become insignificant when other insignificant terms are dropped from Model 3. That is why they are not included in Model 4. This change in these school level variables means that their effects are represented by school type.

Furthermore, another major change can be observed in the Intra-class Correlation (ICC) (or Variance Partition Coefficient (VPC)). ICC is the measure that shows the proportion of total variance that is due the changes in one level (Steele, n.d.). In our case it is the variability that remains unexplained at school level. This drop, from % 16 to % 6 when switched from Model 2 to Model 3, means that most of the unexplained pattern related to school level effects in Model 2 is explained when school type is included in Model 3 (See Figure 1). Although, there is not a formal statistic like  $R^2$  or adjusted  $R^2$  that is showing the variance explained by models as in standard regression, it is still possible to calculate the percentage explained by the models at each level (i.e. at school level or at student level) in multilevel regression with the below formula (1) (Kreft & De Leeuw, 1998)

$$\frac{\sigma_{u_0}^2(\text{school level error term for the full model}) - \sigma_{u_0}^2(\text{school level error term for the null model})}{\sigma_{u_0}^2(\text{school level error term for the null model})}$$

For Model 2, 65 % of the variance in school level is explained compared to the null model, whereas when school type is added it increases up to 88%. These substantial changes in both ICC and the percentage of explained variability show that school type is the main empirical influence on mathematics outcomes in Turkey.

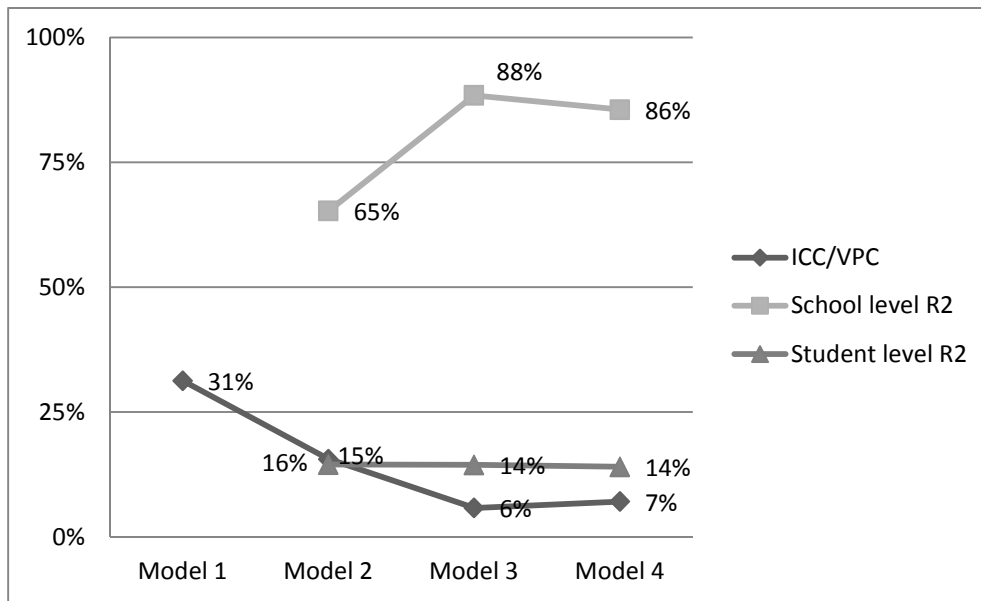


Figure 5.1 Intra-class correlation and percentage of explained variance at the school and student levels

## 5.2. Socio-economic background effects on educational excellence:

One of the significant effects on mathematics performance of 15-year-old students in Turkey is ESCS index. This index is used widely in studies focusing on equity in education using PISA data, since it is the most direct measure of socio-economic differences. ESCS is consisted of numerous other indices which are correlated to each other (see Table 5.4 for correlations between ESCS and its sub-indices). These are occupational status of parents (hisei), highest level of education completed by parents (PARED) and home possessions index (HOMEPOS). HOMEPOS is also consisted of three other indices, namely home educational resources index (HEDRES), cultural possessions index (CULTPOS) and family wealth index (WEALTH).

Table 5.4 Correlations between ESCS and its sub-indices

	ESCS	hisei	PARED	HEDRES	CULTPOS	WEALTH
ESCS	1.00					
hisei	0.83	1.00				
PARED	0.87	0.58	1.00			
HEDRES	0.59	0.33	0.38	1.00		
CULTPOS	0.48	0.29	0.33	0.44	1.00	
WEALTH	0.70	0.41	0.46	0.63	0.41	1.00

Technically, it is best to use ESCS as a single index to avoid multicollinearity. However, to make conclusions from a sociological point of view, it may be hard to interpret an index like ESCS covering many separate items. Hence, in Table 5.5, I give some alternative models in which ESCS is partitioned in its sub-indices.

Table 5.5 Multilevel Models with ESCS sub-indices

	Model 4	3 indices seperated	5 indices seperated	parsimonious model with hisei and HEDRES
Intercept	120.7 (20.0)**	104.2 (20.5)**	109.3 (207)**	103.4 (19.9)**
Grade_year	34.3 (2.0)**	35.5 (2.0)**	34.6 (2.0)**	35.4 (2.0)**
Female	-25.5 (1.7)**	-25.9 (1.8)**	-26.4 (1.8)**	-26.1 (1.8)**
ESCS	4.6 (0.8)			
West Marmara	-20.3 (16.6)	-20.8 (17.5)	-22.2 (17.6)	-22.0 (17.6)
Aegean	-17.9 (8.8)*	-18.5 (8.6)*	-18.5 (8.7)*	-18.9 (8.6)*
East Marmara	-7.3 (13.8)	-8.6 (14.0)	-8.7 (13.7)	-8.3 (13.6)
West Anatolia	-18.4 (12.5)	-19.8 (12.5)	-19.5 (12.4)	-19.5 (12.5)
Mediterranean	-32.1 (8.2)**	-32.8 (8.0)**	-33.2 (8.0)**	-33.5 (8.2)**

Table 5.5 (continued)

Central Anatolia	-18.9 (8.3)*	-21.1 (8.7)*	-21.3 (8.9)*	-22.1 (8.7)*
West Black Sea	-25.4 (22.5)	-23.9 (22.2)	-24.6 (22.2)	-24.9 (22.3)
East Black Sea	-34.5 (12.6)**	-39.2 (13.4)**	-39.6 (13.5)**	-40.1 (13.5)**
Northeast Anatolia	-32.6 (12.4)**	-32.7 (9.3)**	-33.4 (9.5)**	-33.8 (9.2)**
Middle East Anatolia	-48.8 (8.1)**	-44.9 (9.4)**	-43.8 (8.9)**	-44.0 (9.0)**
Southeast Anatolia	-38.3 (12.1)**	-40.8 (11.4)**	-40.4 (11.4)**	-41.8 (11.6)**
Primary S	32.4 (11.4)**	48.9 (11.8)**	47.1 (11.7)**	49.5 (11.8)**
Anatolian HS	99.3 (10.3)**	97.0 (10.4)**	97.1 (10.3)**	98.4 (10.4)**
Science HS	261.7 (6.9)**	258.1 (7.0)**	257.8 (7.0)**	259.5 (7.0)**
Social Sciences HS	166.5 (12.3)**	160.7 (13.2)**	158.9 (13.4)**	161.0 (13.3)**
Ana. Teacher Tra. HS	146.5 (7.3)**	144.1 (7.6)**	143.7 (7.5)**	144.5 (7.6)**
Vocational HS	-22.6 (5.4)**	-24.9 (5.7)**	-25.2 (5.6)**	-24.9 (5.7)**
Ana. Vocational HS	39.7 (10.9)**	37.0 (11.0)**	36.4 (11.1)**	37.8 (11.2)**
Technical HS	16.8 (7.9)*	12.4 (7.8)	13.6 (8.0)	13.3 (7.8)
Ana. Technical HS	39.1 (8.6)**	37.6 (8.7)**	36.8 (8.5)**	37.3 (8.7)**
Multi Programme HS	-2.0 (15.5)	-1.0 (15.7)	-0.8 (15.5)	-0.9 (15.4)
Police HS	196.8 (18.8)**	196.7 (17.8)**	195.4 (17.4)**	196.7 (17.6)**
<b>hisei</b>		<b>0.104 (0.049)*</b>	<b>0.101 (0.051)*</b>	<b>0.138 (0.045)**</b>
<b>PARED</b>		<b>0.257 (0.295)</b>	<b>0.421 (0.299)</b>	
<b>HOMEPOS</b>		<b>3.852 (1.046)**</b>		
<b>HEDRES</b>			<b>3.246 (1.060)**</b>	<b>3.999 (0.859)**</b>
<b>CULTPOS</b>			<b>0.928 (0.952)</b>	
<b>WEALTH</b>			<b>0.076 (1.281)</b>	
Units (school/student)	245/4806	244/4226	244/4160	244/4249
-2*loglikelihood:	52081.0	45774.8	45037.5	45996.2

Note: (\*p<.05, \*\* p<.01) Numbers show regression coefficients and their standard errors (in brackets). -2\*loglikelihood indicates relative fit of model to data. For more detailed information, coefficients and standard error values for sub-indices are given up to three decimal points.

New models in Table 5.5 are based on Model 4 above. Following the base model, ESCS is partitioned into the three main sub-indices. Among them, parental occupational status index and home possessions index is found to be significant. On the other hand, parental education index is not found to be significant. This may be partly due to the fact that this effect is represented by other variables, potentially by occupational status index considering their 58 % correlation. Still, it is valid to say that occupational status is a better estimator of educational outcomes. The other significant index is home possessions index which is also consisted of three other indices. In the next model, these three indices are included instead of home possessions index. Among them, only home educational resources index is found to have a significant effect on student performance. Finally, in the last model only significant items are kept. In summary, parental occupational status and educational resources at home are two dimensions of ESCS index that are affecting mathematics performance of 15-year-old students in Turkey.

It would be valuable to underline one more time that statistically models with ESCS are more reliable than the models with sub-indices since these items are highly correlated with each other though there are not any concrete statistical evidences<sup>34</sup>.

## **5.2. Interaction effects:**

As a further step, interaction terms are also investigated in Table 5.6. Before adding interaction terms a recoding was made on the variables that have multiple categories, to reduce the number of dummy variables. Depending on the effects in the parsimonious model and geographical proximity some regions are merged. Since the effects of West and East Marmara regions do not differ significantly from Istanbul, they are all merged in the new base category ‘Northwest’. Mediterranean and Aegean, two coastal regions having negative effects are merged in ‘Southwest’ category. West Black Sea, West Anatolia and Central Anatolia which have neutral or slightly negative effects compared to Istanbul are merged in the Central category.

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<sup>34</sup> VIF scores are calculated for identical regular regression models for each multilevel model in Table 5.5. None of the VIF scores exceed 10 or none of the model average VIF score exceeds 5. VIF scores can be seen in Appendix Table A.7.

The regions which are in Eastern Turkey and have negative effects on maths attainment, namely; East Black Sea, Northeast Anatolia, Middle East Anatolia and Southeast Anatolia are merged in 'East' category. Similarly, school types are merged into 4 categories considering their curriculum type and their student admission procedures. General High Schools and Primary Schools, which provide academic curriculum, are merged in the same group. Other academic schools which admit students according to their performance in central national exams and differ from General High Schools in Model 4 are merged into the 'selective academic' group. Among the vocational and technical types, Vocational High Schools, Technical High Schools and Multi Programme High Schools are merged in the 'vocational' category. Remaining vocational and technical schools who also admit students based on national exam scores are merged in the 'selective vocational' group. As a further step, natural logarithmic transformation of ESCS is also added to the model, after trying for various functional forms<sup>35</sup> (See Model 5).

After creating new groups and choosing the most suitable functional form for ESCS, several interaction terms are added to the model. The interactions of gender and ESCS both among themselves and with region and school type categories are tested (see Model 7). Finally, insignificant terms are dropped in the parsimonious model (see Model 8).

Firstly, it seems that logarithm of ESCS is a better predictor than the linear effect. Such type of relationship indicates an effect that is decreasing as ESCS increases (See Figure 5.2). This is to say, the same amounts of increase in the socio-economic status lead to bigger increases in maths scores for children from lower socio-economic status families than for children from higher socio-economic status families.

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<sup>35</sup> Quadratic form of ESCS (i.e. the model with ESCS and ESCS<sup>2</sup>) is also significant and gives slightly better log-likelihood value. However, the n-shaped function is indicating decreasing outcomes for the top end of the ESCS. Considering the fact that there are too few cases in the upper end of ESCS, an overfitting of the model is possible. Thus, the functional form of the relationship between ESCS and Math score is forced to have an increasing shape and logarithmic functional form is preferred instead of the quadratic form.

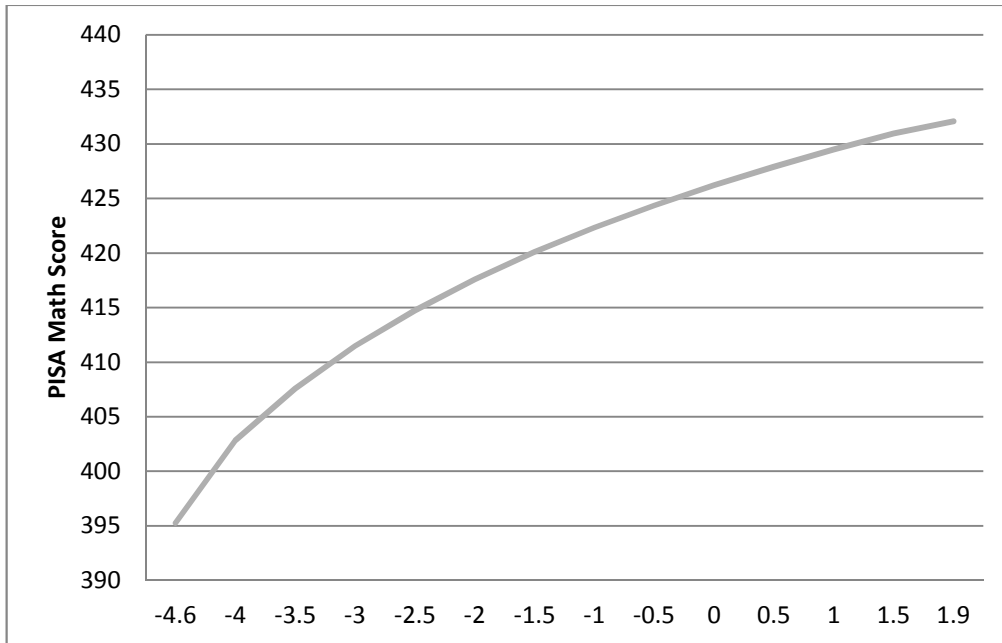


Figure 5.2 The effect of ESCS on PISA maths score based on Model 8, for a 9th grade female student attending a General High School in Istanbul

Furthermore, no significant interactions are found between gender and ESCS, gender and region, ESCS and region and ESCS and school type. On the other hand, there is a significant interaction between gender and school type. Here, it is important to note that the negative effect of being female and the positive effect of selective academic schools persist. Nevertheless, the presence of the negative interaction terms for females attending selective academic schools indicates an inequity against women in selective academic schools. In other words, in addition to being disadvantaged in general, female pupils are not benefiting from the advantages of attending a selective academic school as much as their male peers.

Table 5.6 Multilevel Models with interaction terms

	Model 5	Model 6	Model 7	Model 8
	Parsimonious	Model for	Full	Parsimonious
	model with	Transformed	Interactions	Interactions
	new groups	ESCS	model	model
Intercept	133.6 (20.1)	96.6 (20.9)	81.5 (24.6)	95.6 (20.6)
Grade_year	<b>32.7 (2.0)**</b>	<b>32.7 (2.0)**</b>	<b>32.5 (2.0)**</b>	<b>32.5 (2.0)**</b>
Female	<b>-25.9 (1.7)**</b>	<b>-25.9 (1.7)**</b>	<b>-20.9 (10.4)**</b>	<b>-21.4 (2.7)**</b>
ESCS	<b>4.3 (0.8)**</b>			
ln_ESCS		<b>21.2 (3.5)**</b>	<b>31.5 (8.8)**</b>	<b>21.3 (3.5)**</b>
Southwest	-8.6 (9.4)	-8.5 (9.4)	-1.6 (16.3)	-8.4 (9.4)
Central	-7.8 (10.7)	-7.8 (10.7)	-3.1 (20.1)	-7.9 (10.7)
East	<b>-22.6 (9.7)*</b>	<b>-22.2 (9.7)*</b>	-9.4 (17.1)	<b>-22.2 (9.7)*</b>
selective_academic	<b>103.1 (11.3)**</b>	<b>102.6 (11.3)**</b>	<b>128.7 (16.4)**</b>	<b>107.9 (11.6)**</b>
vocational	<b>-23.1 (7.1)**</b>	<b>-23.5 (7.1)**</b>	-20.0 (14.9)	<b>-22.3 (7.5)**</b>
selective_vocational	<b>27.5 (9.3)**</b>	<b>26.9 (9.3)**</b>	37.4 (22.3)	<b>30.7 (9.8)**</b>
Female.ln_ESCS			-1.1 (6.8)	
Female.Southwest			1.2 (4.4)	
Female.Central			-6.1 (4.6)	
Female.East			5.8 (4.3)	
Female.selective_academic			<b>-9.0 (3.8)*</b>	<b>-10.2 (3.8)**</b>
Female.vocational			-1.2 (4.6)	-2.2 (4.7)
Female.selective_vocational			-7.0 (6.0)	-8.0 (5.9)
ln_ESCS.Southwest			-5.1 (9.9)	
ln_ESCS.Central			-1.4 (10.7)	
ln_ESCS.East			-11.1 (9.4)	
ln_ESCS.selective_academic			-14.2 (8.3)	
ln_ESCS.vocational			-2.2 (8.9)	
ln_ESCS.selective_vocational			-5.4 (12.2)	
Units (school/student)	245/4806	245/4806	245/4806	245/4806
-2*loglikelihood:	52173.2	52167.8	52151.3	52160.1

Note: (\*p<.05, \*\* p<.01) Numbers show regression coefficients and their standard errors (in brackets). -2\*loglikelihood indicates relative fit of model to data. See Appendix Figures A.10-A.14 for regression diagnostics checks.



A further interesting point about the interaction effect between gender and school type is that it persists across different subjects. Internationally, girls perform worse in mathematics and better in reading in PISA and there are smaller differences between boys and girls in PISA science test. However, when we obtain identical models with Model 7 for reading and science, it is seen that the negative interaction term between gender and selective academic schools persists (See Table 5.7).

Table 5.7 Identical models to Model 8 for Reading and Science results

	Model 8 for Maths	Model 8 for Reading	Model 8 for Science
Intercept	95.6 (20.6)	72.8 (18.5)	179.0 (17.7)
Grade_year	32.5 (2.0)**	33.4 (1.8)**	25.9 (1.7)**
Female	-21.4 (2.7)**	33.5 (2.8)**	1.6 (2.7)
ln_ESCS	21.3 (3.5)**	26.3 (3.9)**	8.4 (3.5)*
Southwest	-8.4 (9.4)	-7.4 (7.2)	-8.3 (7.1)
Central	-7.9 (10.7)	-5.6 (8.1)	-10.1 (9.2)
East	-22.2 (9.7)*	-25.0 (7.4)**	-27.3 (7.0)**
selective_academic	107.9 (11.6)**	98.5 (9.3)**	102.9 (8.9)**
vocational	-22.3 (7.5)**	-9.5 (5.9)	-10.5 (6.0)
selective_vocational	30.7 (9.8)**	43.9 (7.1)**	39.9 (8.7)**
<b>Female.selective_academic</b>	<b>-10.2 (3.8)**</b>	<b>-11.0 (4.1)**</b>	<b>-13.6 (4.0)**</b>
Female.vocational	-2.2 (4.7)	3.8 (4.8)	2.1 (4.9)
Female.selective_vocational	-8.0 (5.9)	-10.2 (5.4)	-10.8 (5.1)*
Units (school/student)	245/4806	245/4806	245/4806
-2*loglikelihood:	52160.1	52087.2	51831.3

Note: (\*p<.05, \*\* p<.01) Numbers show regression coefficients and their standard errors (in brackets). -2\*loglikelihood indicates relative fit of model to data. Models for reading and science are constructed just for comparison with Model 8 for maths. They cannot be used to interpret the effects on reading and science scores.

Multilevel models with both main and interaction effects show a high influence of school type on student outcomes in Turkey. Hence, this effect is further investigated in the next section.

### **5.3. Selection models:**

The most effective variable on educational excellence in Turkey is school type as can be deduced from multilevel models above. Until the end of 8<sup>th</sup> grade, students in the Turkish education system are allocated to schools according to their home addresses (unless they attend a private school). After 8<sup>th</sup> grade, students can move on to some selective types of secondary schools providing either an academic curriculum such as Science High Schools and Anatolian High Schools, or a vocational/technical curriculum, like Anatolian Technical High Schools or Anatolian Vocational High Schools, according to their performance in central national exam(s). Analysis of PISA data in this chapter shows that selective school types, especially selective academic schools which correspond to only a fifth of all secondary school pupils, are far more advantaged compared to the rest. In the above models, the coefficient for selective academic schools is about 105 points which corresponds to more than 3 grade year differences compared to general academic schools. For general vocational school types it is even higher. 93 % of the PISA 2012 Turkey sample is consisted of students from 9<sup>th</sup> and 10<sup>th</sup> grades. This is just after the allocation of students to different school types based on central exam scores. It is not surprising that this segregation according to previous academic achievement is reflected in PISA scores. However, disappearance of various other school level variables after the inclusion of school type variable in the above models indicates further segregation of students according to various social and educational characteristics.

In Figure 5.3, averages of student level variables are compared across different school types. It is seen that, students from selective academic schools have far higher ESCS scores compared to other school types. Moreover, the rate of students who had attended pre-primary schools is also higher for the students from selective academic high schools.

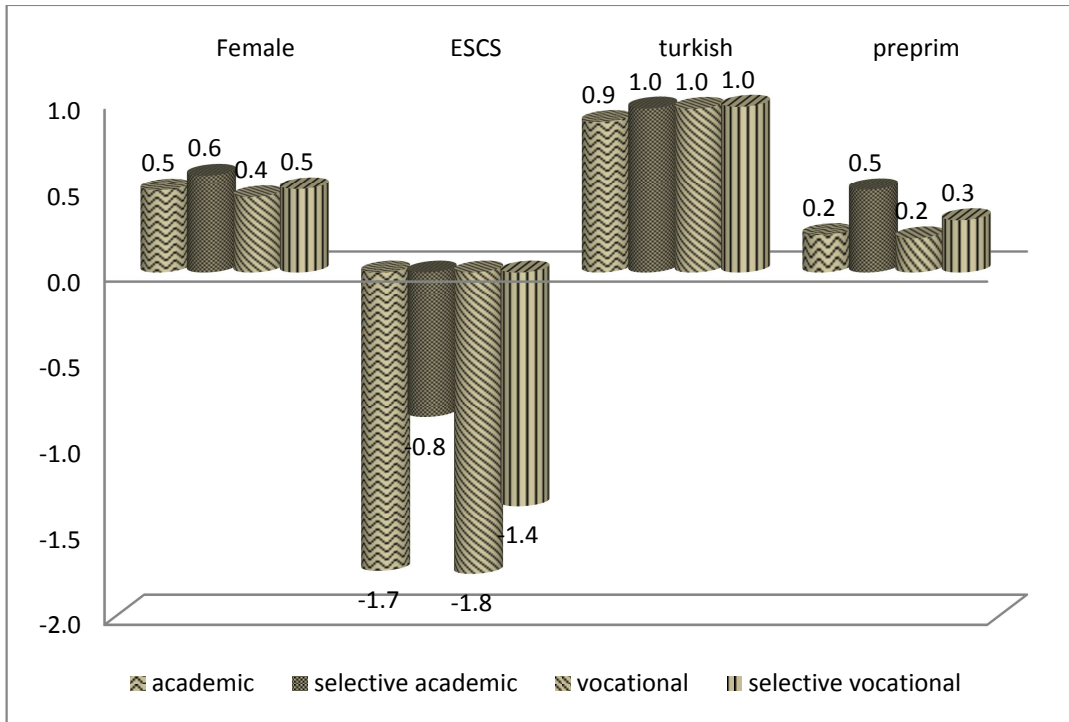


Figure 5.3 Means of student level variables according to school type

Similarly, in Figure 5.4, averages of several standardized school level variables are compared. Differences between school types are even more visible in Figure 5.4. Selective academic schools have higher average ESCS scores, less teacher shortage, smaller classroom and school sizes, higher quality infrastructure and higher quality educational resources. Hence, it is fair to say that in Turkey, students are not only allocated to secondary schools according to their previous achievement but also according to their social background. Furthermore, these schools themselves are also segregated according to socio-economic composition of their students and educational resources. Selective academic schools, which gather educationally and socio-economically advantaged students have better educational conditions and hence better outcomes.

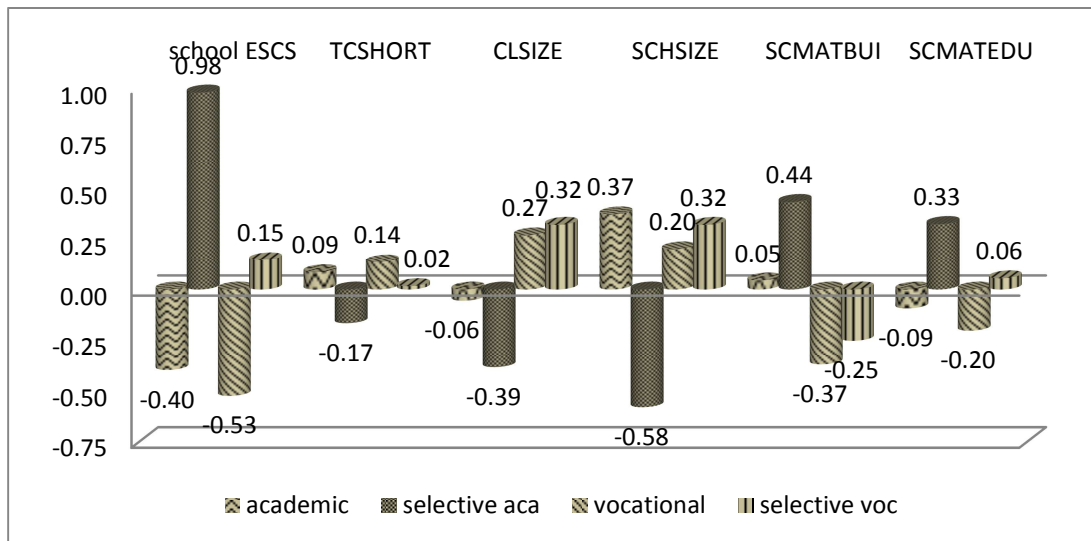


Figure 5.4 Means of standardized school level variables according to school types

A further investigation on the issue can be made through selection models. Selection models is the statistical method developed by Heckman (1979) in order to control for selection bias in regression models. In our case, selection bias may be caused by varying probabilities of students' selection into different types of schools. In other words, students in PISA sample may be allocated to different high schools after 8<sup>th</sup> grade according to various socio-economic characteristics.

In Table 5.8, there are three logistic regression models for selection into different types of high schools. Three models are constructed for entry into general academic schools, selective schools (both academic and vocational) and vocational schools<sup>36</sup>. Within the limits of data, four different variables which might be related to transition

<sup>36</sup> Due to low number of cases, selective vocational schools are combined with selective academic category. The reason for merging selective vocational schools with selective academic schools instead of vocational schools is that they show a positive effect on student outcomes like selective academic schools in the earlier models.

to secondary level education are included in the models. Square of ESCS (ESCSp2)<sup>37</sup> is also included in case there is a non-linear effect<sup>38</sup>.

Table 5.8 Logit models for selection into different types of schools

Variable	selective academic		non-
	and vocational	general academic	vocational
Female	.3709***		-.3493***
ESCS		-.3085***	1.306***
preprimary	.5258***	-.2701***	-.3293***
turkish	.3014*	-.8256***	.8168***
ESCSp2	.0786***		-.2326***
_cons	-2.298***	-0.1635	3.47***
N	4806	4806	4806
ll	-503314	-543031	-469091

Note: \* p<0.05; \*\* p<0.01; \*\*\* p<0.001

Results of the models show that transition from junior secondary to secondary schools is effected by gender, socio-economic background, having pre-primary education and language spoken at home. Girls are more probable to enter high schools that admit students according to national exams while boys are more probable to enter vocational high schools. Socio-economic status has also a positive effect on selective school entrance and this effect is quadratic. In other words, the

<sup>37</sup> Since ESCS has both positive and negative values, before calculating the square term an adjustment is made to the variable. A constant of 5 is added to ESCS in order to have positive values for every student. Then the square of the new value (ESCSp) is calculated and copied into the new variable coded as ESCSp2. Although the square of the adjusted socio-economic index variable (ESCSp2) is added to the model, the original ESCS is kept in the model instead of ESCSp. This procedure helps also reduce potential collinearity between index variable and its square (Treiman, 2009).

<sup>38</sup> For every model, insignificant terms are dropped and a parsimonious model is calculated. The coefficients in the table are for parsimonious models.

positive effect of socio-economic background is growing higher for higher status levels. On the other hand, socio-economic status has a negative effect for general academic school entrance while it has a n-shaped positive effect on the entrance into vocational schools. It means that the positive effect of socio-economic status for vocational school entrance is higher for lower socio-economic levels while this effect is decreasing for higher status groups. Having a pre-primary education does also increase the probability of entrance into selective schools and decrease the probability of entrance into non-selective academic or vocational schools. The last variable which is effective on transition from junior secondary to secondary schools is the language spoken at home. Turkish as the language spoken at home instead of other languages increases the likelihood of entering into selective schools whereas it decreases the probability of entrance into general academic schools.

Even though the models are limited with small number of independent variables available in PISA datasets, they can still provide a rough estimate of selection probabilities of entrance into different types of schools. As the next step, I calculated selection probabilities for every student and constructed models that control for these probabilities. For selection models, sample is divided into three as students attending selective schools, non-selective academic schools and non-selective vocational schools. Then, I constructed models for mathematics performance as in section 5.1. However, this time I also controlled for selection probabilities of students entering these particular schools.

Table 5.9 Selection models summary

	Selective schools	Selection models for selective schools	General Academic schools	Selection model for general academic schools	Vocational schools	Selection model for vocational schools
<i>Female</i>	**	**	**	**	**	**
ESCS	**	p>0.05	**	p>0.05	*	**
<i>turkish</i>	p>0.05	p>0.05	p>0.05	p>0.05	*	p>0.05
preprim	p>0.05	p>0.05	**	p>0.05	p>0.05	p>0.05
school_ESCS	p>0.05	p>0.05	p>0.05	p>0.05	**	**
TCSHORT	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05
<i>CLSIZE</i>	*	*	p>0.05	p>0.05	p>0.05	p>0.05
<i>SCHSIZE</i>	*	*	*	*	*	*
SCMATEDU	*	*	p>0.05	p>0.05	p>0.05	p>0.05
<i>SCMATBUI</i>	p>0.05	p>0.05	p>0.05	p>0.05	*	*
LOCATION:						
<i>Village</i>	**	**	**	**	p>0.05	p>0.05
<i>Small Town</i>	**	**	*	*	p>0.05	p>0.05
<i>City</i>	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05
<i>Large City</i>	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05
REGION:						
<i>West Marmara</i>	p>0.05	p>0.05	*	*	p>0.05	p>0.05
<i>Aegean</i>	**	**	p>0.05	p>0.05	p>0.05	p>0.05
<i>East Marmara</i>	p>0.05	p>0.05	**	**	p>0.05	p>0.05
<i>West Anatolia</i>	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05	p>0.05
<i>Mediterranean</i>	p>0.05	p>0.05	p>0.05	p>0.05	*	*
<i>Central</i>						
<i>Anatolia</i>	p>0.05	p>0.05	*	*	p>0.05	p>0.05
<i>West Black</i>						
<i>Sea</i>	**	**	p>0.05	p>0.05	p>0.05	p>0.05
<i>East Black Sea</i>	**	**	*	*	p>0.05	p>0.05
<i>Northeast</i>						
<i>Anatolia</i>	p>0.05	p>0.05	p>0.05	p>0.05	**	**
<i>Middle East</i>						
<i>Anatolia</i>	*	*	*	**	**	**
<i>Southeast</i>						
<i>Anatolia</i>	p>0.05	p>0.05	**	**	**	**
SELECTION PROBABILITIES:						
<i>selective sch.</i>		p>0.05				
<i>general academic sch.</i>				p>0.05		
<i>vocational sch.</i>						*

Note: \*p<0.05, \*\*p<0.01, *negative effects*.

Table 5.9 is a summary of selection models<sup>39</sup>. Models are identical with Model 2 in Table 5.3 above. School type is not included as an independent variable since samples are divided according to school types. Firstly, in order to have a better comparison full model without selection variable is given. Then, the selection model is given. In selection models probabilities of entrance into particular schools are included additionally. For example, first model is for the effects on mathematics performance for students in selective schools. In second model, which is a selection model, it is the effects on mathematics performance of students in selective schools net of their probabilities of entering selective schools.

The most striking result when models are compared is that the effect of socio-economic background on mathematics performance which vanishes for selective school and general academic school students after controlling for selection probabilities. It is seen in Table 5.9 that, in selective schools and general academic schools the effect of ESCS is disappearing when selection probability is controlled for. In summary, socio-economic status background is highly influential in transition from junior secondary to secondary level in Turkey. Once, students are allocated to different school types the effect of socio-economic background becomes less visible since it is represented by the school type variable.

In this chapter, I aimed to discover the influences on educational excellence in relation to the level of equity in the Turkish education system using maths outcomes of 15-year-old students in PISA exam. In order to do that, I analysed the associations between various social background variables and student performance via multilevel models. Gender, socio-economic status of family, geographical regions and school types were all found to be associated with maths outcomes. To further investigate the effect of socio-economic background, ESCS index was partitioned and parental occupational status and home educational resources were found to be influential on student outcomes. I also investigated interaction effects between different variables.

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<sup>39</sup> In order not to confuse the reader with tables having lots of coefficients, Table 5.6 is constructed as a summary. Only the direction and significance level of the variables are represented. Red fonts are indicating negative coefficients, one star means significance at 95 % confidence level and two stars at 99% confidence level. Full table with regression coefficients is provided in Appendix Table A.7.



Among them, gender and school type interaction was found to be significant. Girls in the selective academic school types were identified as disadvantaged. Furthermore, I made additional analysis on the effects of school type through selection models. The analyses showed that allocation of students to different types of secondary level schools is influenced by gender, socio-economic status of the family, having pre-primary education and language spoken at home. Moreover, it is found that top performing schools not only receive better performing students from affluent families but also receive more and better resources. Therefore, it is fair to say that education system in Turkey is reproducing existing social inequalities as suggested by conflict theories of sociology of education.

## CHAPTER 6

### DISCUSSION AND CONCLUSION

This thesis aims at finding the relationship between equity and excellence in education and how these two dimensions of education interplay in Turkey. It is found that inequalities in education are not functional as suggested by functionalist theories. On the other hand, findings of this dissertation show that more equity brings more success. For the case of Turkey, in the light of the results of the analyses above it would be fair to say that Turkish education system is neither equitable nor excellent. Moreover, it is found that current education structure in Turkey worsens existing social inequalities.

This dissertation is structured on the basis of two main research questions. To answer the first research question, namely “What is the relationship between equity and excellence in education?”, using international student data several statistical analyses are conducted in Chapter 4. One of the basic functionalist claims in sociology of education is that inequalities are functional in the society. Through the mechanisms like the education system, it is possible to allocate right individuals to the right positions based on objective criteria. On the other hand, conflict theories objected this claim and argued that education serves to reproduce inequalities in the society. One of the topics that has been discussed based on these main theoretical positions in sociology of education is the relationship between equity and excellence. In Chapter 4, I try to extend these discussions. As summarized in the Literature Review Chapter, recent research on the relationship between equity and excellence in education provide conflicting results. A negative relationship between equity and excellence in education means that there is a trade-off between these two dimensions of the education system and inequities are inevitable and even functional as suggested by

functionalist approaches. On the other hand, if there is a positive relationship, equity is needed for overall success and in cases where equity is low education would only reproduce existing social inequalities as suggested by conflict theorists.

Mixed results of existing research is mostly due to two reasons. First, some of these studies focus on refuting the claim that equity and excellence are incompatible aims in educational policies. However, they ignore the possibility that there is a positive relationship between these concepts. Throughout the analyses in Chapter 4, I find a pattern which is in line with some recent research (Condrón, 2011; Wilkinson & Pickett, 2009) underlining the effects of macro level measures of inequality and resources. Especially GINI seems to be closely related with educational excellence. Students in countries with lower levels of income inequalities tend to perform better at school. This relationship is valid even when other potential variables and analysis levels are controlled for.

Second problem with many of the existing research is related to limited methodological approach that only focuses on bivariate relationships. Analysis with multiple variables in Chapter 4 showed that –not surprisingly– many of the factors/characteristics about education systems are correlated. And, this complex structure makes it very hard to identify actual relationships between concepts. It is also found in Chapter 4 that many variables/indicators thought to be related with excellence or equity in education are actually not effective or are better represented by other indicators.

In order to overcome these limitations of recent studies on the relationship between equity and excellence in education, a step by step analysis is applied throughout Chapter 4. As the first step, bivariate relationship between equity and excellence is retested. Using OECD's operationalization of equity as the percentage of variation explained by socio-economic background index, no significant relationship is found between equity and excellence. Next, a different indicator for inequality, namely GINI, is re-tested. Although the relationship has not been shown to be statistically

significant in previous studies, increasing the number of cases results in a strong positive relationship between inequality and average student performance.

A third stream of research operationalizes equity via education system characteristics. However, they also deliver mixed results mostly due to analysis limited to bivariate correlations. As the second step, various education system characteristics are tested simultaneously in multiple regression models. Their effects on equity and excellence do not yield a clear picture of the relationship between equity and excellence.

Since, these confusing results may be stemmed from multi-collinearity between variables, as the third step a Principle Components Analysis (PCA) is conducted. Through PCA, several components which represent various equity measures are calculated. These components again tested in multiple regression models to grasp their effects on excellence. Despite some promising results, there appeared another methodological problem. Variables contained in these components (and also in other studies) are from different levels. For example, socio-economic status is a variable at student level, ability grouping is at school level and GINI is at country level. The potential interaction between these levels may distort the regression results.

Therefore, as the final step Multilevel Models are applied to overcome this issue. In Multilevel Models, various variables are tested. Among equity indicators only GINI is found to be significantly effective on excellence.

To sum up, analyses conducted in Chapter 4 provide the information that excellence is consistently related to GINI rather than other operationalizations of equity. There is evidence about a positive relationship between equity and excellence. Unlike earlier claims about a trade-off between equity and excellence, there are serious hints about a relationship in which these two dimensions of education are enabling each other.

However, there is still room for further investigations on the issue. For example, instead of equity indicators mentioned in the literature GINI is found to be effective

on excellence. Hence, it might be (macro level) economic inequalities that really matter about educational excellence. On the other hand, it should be borne in mind that the relationships found in multiple regression models or multilevel models do not tell anything about causality. They just show associations. Therefore, GDP per capita or GINI do not necessarily determine excellence directly. Actual relationship might still be undiscovered and these indicators might just be the best available representations of the real relationships. The fact that GINI is a better indicator for equity in education may be due to the fact that other indicators do not provide a universal estimate of equities. For example, the effect of ability tracking has been investigated widely in the literature to capture the relationship between equity and excellence in education. However, while some studies indicate a significant relationship some others do not. In his analysis, Waldinger (2006) examined the causal relationship both between tracking and equity and tracking and excellence. However, he could not identify any causal relationships. He underlines that tracking systems operate in different ways in different contexts. In many untracked systems, segregation can occur in less visible ways such as residential segregation, private sector or subject choice. Turkey is a good example of this. For the last eighteen years, students are not tracked in Turkey until the end of 8<sup>th</sup> grade which is quite late compared to many countries. However, the report based on TIMSS 2011 results by ERG (2014b) point out the role of family background on student achievement and segregation of students due to family socio-economic status at junior secondary level. Another indicator used broadly, especially by OECD, to represent equity in education is the effect of socio-economic status on student outcomes. The percentage of explained variance in mathematics performance in PISA 2012 in Turkey is calculated as 14.5 % which is just below the OECD average (14.6 %). However, findings in Chapter 5 show how this effect is veiled by school type differences. Thus, student and school level indicators of equity cannot provide clear representations of equity issues in education. On the other hand, GINI as a universal inequality measure provides the best estimates universally. In this sense, I stick to the concept of equity throughout the thesis. Because, my main aim is still to see the potential of education

systems, particularly Turkey, to mitigate achievement differences between different social groups.

As stated above, this dissertation aims also to grasp how equity and excellence interact in Turkey. To meet this aim, in Chapter 5, I try to answer the research question: “Which social and educational characteristics are associated with educational excellence in Turkey?” In order to do that, using PISA 2012 Turkish data, associations between various social background variables and student performance are analysed via multilevel models. Gender, socio-economic status of family, geographical regions and school types are all found to be associated with maths outcomes.

Female pupils, students from lower socio-economic backgrounds, students from eastern regions and students attending vocational or general school types are all found to be disadvantaged in terms of maths outcomes. The biggest gap between students is due to school types. The difference between selective academic schools and general or vocational high schools is more than a hundred points. Regarding the effect of a grade-year difference about 34 points, the difference between an Anatolian High School and a General High School correspond to three grade years. This is even more for vocational types. There is also an interaction effect between gender and school type. The advantage of selective school types for females is observed to be eroding. Results of the analyses show that it is very hard to claim that education system in Turkey is operating in a way that mitigates existing inequalities in the society. To the contrary, there are indications that education system itself reproduces inequalities.

The multilevel models employed in the study show that girls are scoring about 25 points less than boys in PISA maths test in Turkey when other factors are controlled for. This means that female students are three quarters of a grade year behind male students in Turkey. An interesting comparison can be made with TIMSS 2011 maths exam results (Mullis, Martin, Foy, & Arora, 2013) for 4<sup>th</sup> and 8<sup>th</sup> grade students. TIMSS results show that in Turkey 4<sup>th</sup> and 8<sup>th</sup> grade girls are slightly better than boys

in maths. Bearing in mind that TIMSS and PISA are measuring different things, it is still surprising that there is such a big gap between boys and girls in PISA test for students mostly in 9<sup>th</sup> and 10<sup>th</sup> grades.

In summary, there is a disadvantage for girls at secondary level in terms of mathematics performance. And, this disadvantage is growing higher for them especially in high schools admitting students according to national exam results. Hence, findings indicate that the selection system in Turkey before secondary education might be an institutional mechanism that is creating inequities between male and female students in terms of educational excellence. In the last 10-15 years, differences between men and women in terms of access to both primary and secondary education were diminished considerably in Turkey (See Figure 6.1). Moreover, it is stated in a recent World Bank (2013) report that streaming after 8<sup>th</sup> grade has also become more gender neutral for the last decade. However, the gender gap in terms of educational outcomes still needs high attention from policy makers.

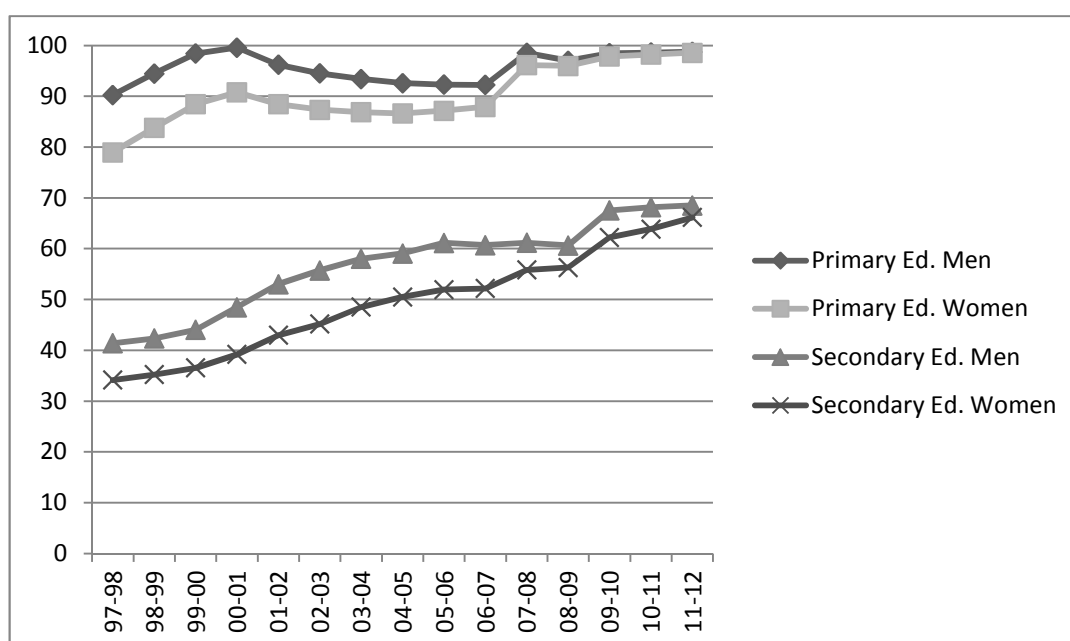


Figure 6.1 Net schooling rates for men and women in primary and secondary education in Turkey between 1997 and 2012

Studies, especially those using the PISA data, show that males outperform females in maths in many other countries, too. However, this result still does not rule out the possibility that these differences are socially constructed. An explanation in the literature for the performance gaps between boys and girls in mathematics is that boys are allocated to higher tracks or school types in many education systems (Marks, 2008; Sorensen & Hallinan, 1986). However, my findings show the opposite for Turkey. First of all, selection models in Chapter 5 show that girls are more probable to enter better performing school types in Turkey. Second, even when the effect of school type is controlled for in the models above, girls are still less successful in maths. Moreover, this dissertation also finds that there is an interaction effect between gender and school types in Turkey. This effect is negative for girls attending selective academic schools. It shows that girls in these selective schools are disadvantaged compared to the other types of schools. This negative interaction is not unique to maths results. It is robust across different subjects like reading in which girls perform better than boys or in science in which there is not a significant difference between girls and boys. Nevertheless, it is still possible that girls are less oriented towards subjects like maths at the secondary level. At the time when PISA is conducted students used to select tracks like quantitative, qualitative or equal weighted track at the end of 10<sup>th</sup> grade. Girls might be oriented towards more to qualitative track when boys are oriented to quantitative track. Starting from 2015, these tracks will be removed but students will continue to select courses in the last two grades of their secondary level of education.

Another explanation in the literature on gender differences in particular subjects is the differing expectations of families and teachers (Eccles, 1994; Else-Quest, Hyde, & Linn, 2010). Girls are expected to enter programmes and have jobs that require less maths knowledge while boys are expected to continue programmes like engineering. In some studies, these expectations also found to overlap and/or interact



with ethnic stereotypes (Catsambis, 1994; McGraw, Lubienski, & Strutchens, 2006; Riegle-Crumb, 2006).

A final explanation is connected to national level characteristics on gender inequality like female labour force participation rate or the rate of women in tertiary education (Baker & Jones, 1993; Marks, 2008). The claim is that in countries with less gender inequalities in the labour market or in society in general, there are also lower attainment differences in education. Within the limits of the data employed in this dissertation, it is not possible to test these last two explanations. However, there is a recent study in Turkey related to the former explanation. In her paper, Taşıtman (2015) focuses on the gender inequalities in vocational high schools in Turkey. She shows how the education in vocational schools is segregated due to gender roles and how these roles are reproduced during the education process.

Another important variable associated with maths performance of 15-year-old pupils in Turkey is socio-economic status of the families. Maths outcomes of students increase as the socio-economic status of their families improve. Moreover, this effect of socio-economic status on maths outcomes is found to have a non-linear characteristic in which the effects are higher at lower socio-economic levels. This result is consistent with previous research arguing diminishing marginal returns of social background on educational outcomes (Chiu & Khoo, 2005; Chiu, 2010) and OECD (2010, p. 55, 2013c, p. 262) PISA reports. The law of diminishing returns is borrowed from economics. The law claims that the expected gain from an input, when all other variables are held constant, does not linearly increase. For higher levels of input the outcome is expected to increase at lower rates and stop increasing eventually. In the area of education the law of diminishing returns is used in search of the effects of national growth or income on educational outputs. Scholars like Meyer & Schiller (2013) and Glyfason & Zoega (2003) found respectively that the effects of GDP and economic growth on national education outputs are in logarithmic form instead of being linear. Few other researchers sought for diminishing marginal returns in education at student level. Chiu & Khoo (2005) and Chiu (2010) argued that the effect of economic resources on the educational

performance of a student fits to law of diminishing marginal returns. In a recent study, Evans, Kelley and Sikora (2014) found a similar relationship between number of books at home and PISA outcomes. They argue that there is a level that a scholarly culture is reached at home and it has a positive effect on school performance. The findings of this paper also confirm a similar relationship. Natural logarithm of ESCS is a better estimator of PISA Math performance than its linear effect. This relationship may also indicate the presence of a benchmark or baseline social status which is required to excel in school. Such relationship indicates the crucial importance of extra investment on the students from the most disadvantaged families to close the achievement gap due to socio-economic status differences. Despite lack of studies on the functional form of ESCS on student outcomes in PISA, extension of such research on the effects of socio-economic background may give more insights especially for policy purposes.

ESCS is a composed index of several other sub-indices. From a statistical point of view, it is the best measure to control for socio-economic background effects in PISA data. It is constructed via principal component analysis. Therefore, potential multicollinearity effects between variables like parental occupation, parental education and family wealth are controlled for. However, from a sociological point of view or a policy perspective it is hard to interpret the results of this combined index. Thus, I try to analyse separate components of ESCS in different models in Chapter 5. When the effect of socio-economic status is examined in detail, it is found that occupational status of parents and educational resources available at home are more influential. It is interesting that variables like parental education status which has been found to be effective in many previous studies in Turkey (Anıl, 2009; Engin-Demir, 2009; Gelbal, 2008; Gökşen et al., 2006; Oral & McGivney, 2013; Smits & Gündüz Hoşgör, 2006) or cultural possessions as suggested by cultural capital theory (Bourdieu, 1984) and found to be effective in some other international studies (Evans et al., 2014; Evans, Kelley, Sikora, & Treiman, 2010) do not have statistically significant effects on educational outputs. Here, I should note that every

single sub-component shows significant effects when put in the models individually. However, when they are included together, effects of some of them disappear.

Nevertheless, for the Turkish case, one should keep in mind that a potential bigger effect may be represented by the school type variable (and potentially by region). It is shown in selection models in Chapter 5 that secondary school students are placed unevenly to schools considering their socio-economic status. Previous studies in Turkey showed that socio-economic background of the family is one of the major factors contributing to educational participation of children (Smits & Gündüz Hoşgör, 2006; Tansel, 2002). Furthermore, using TIMSS 2011 data it is found in a recent report by ERG (2014b) that socio-economic background differences is the main contributing factor on maths scores of 8<sup>th</sup> grade students in Turkey. The findings of this paper also confirm the effect of socio-economic background on student outcomes in Turkey, although a big portion of the effect is represented by the school types.

Another variable that is taken into consideration is migrant status and ethnicity when dealing with the effects of socioeconomic background on student outcomes (Agirdag et al., 2011; Dronkers et al., 2012; Dronkers & Van Der Velden, 2013; Shapira, 2012). However, the total number of students with first or second generation migrant status is less than 1 % in PISA 2012 Turkey sample. It is not surprising that the number of immigrants is low in Turkey as a sending country. Nevertheless, it does not mean that there are not any ethnic issues in Turkey. Even though there are not any official statistics about the proportions of different ethnicities in Turkey, the proportion of Kurdish ethnicity is predicted to be around 20 % (Koç, Hancıoğlu, & Cavlin, 2008; Konda, 2011; McDowall, 2004). In PISA data, the only indicator that can give a hint about ethnicity is the language spoken at home. This variable is included in the models above and not found to be effective on mathematics performance. However, the frequency of languages other than Turkish is only 6 % in Turkey sample. There are two possibilities. First, ethnicities other than Turkish might be underrepresented in the PISA sample. Second, language at home is not the best

indicator to represent ethnicity. Thus, it is hard to tell anything about the influence of ethnicity on student outcomes in Turkey with PISA data.

In Turkey, the biggest association of PISA 2012 maths performance is with school type. Coefficients for selective academic schools are bigger than 100 PISA test score points and robust across models, which indicate an extraordinary difference between the limited number of students in a few successful school types, and the majority of the student population attending other schools. This result suggests that the transition from junior secondary to secondary schools lead to segregation of students in terms of their academic achievement. Moreover, it is also found that various school level variables, which used to be effective on maths outcomes, vanished after school type is added to the model. This means that school type is representing most of the variability associated with these school level variables (like school physical and educational infrastructure, classroom size or average socio-economic status in the school). Thus, selective school types which admit students based on national exam scores not only receive better students but also receive better educational resources. Furthermore, considering also the fact that selective schools have higher average socio-economic index scores, current transition system from junior secondary to upper secondary level of education in Turkey do not only segregate students according to their academic performance but also according to their socio-economic status. To test this claim, selection models are constructed. Through logistics regression models, it is shown that girls, students from affluent family backgrounds, students from families in which the language spoken is Turkish and students who had pre-primary education are more likely to enter the most successful school types. Moreover, when the selection probability of entering into selective school types is controlled for, the effect of ESCS on PISA mathematics outcomes becomes insignificant.

Analyses in Chapter 5 indicate that the school system itself is reproducing existing social inequalities between students, instead of closing the gap. In this sense, the results of Chapter 5 would be consistent with a wider literature on curricular tracking and central examinations. It has long been known that ability tracking has negative

influences on overall achievement levels and social inequalities (Duru-Bellat & Kieffer, 2000; Gamoran & Weinstein, 1998; Gamoran, 1996; Marks, 2005; Meghir & Palme, 2005; Pekkarinen et al., 2009). However, in their recent study Bol et al. (2014) claimed that central examinations may reduce the negative effect of tracking since it makes schools and teachers more likely to invest in low performing students. Nevertheless, it is seen in the Turkish case that, despite central examinations, better resources are allocated to children who are from advantageous social backgrounds and usually achieve better than their peers. From an equity perspective this is quite problematic that it is possible to boost inequalities instead of reducing them.

Region also has strong effects on student achievement in Turkey. Regional inequalities in terms of access to education have been one of the most studied topics for years. Despite several policy attempts, it is hard to say that they are eradicated (Akar et al., 2008; Ferreira & Gignoux, 2010; UNDP, 2008). Analyses in this chapter show that there are still wide regional inequalities in terms of educational outcomes. As students in Istanbul and few other regions around it do pretty well, pupils especially from the Eastern regions of Turkey are seriously disadvantaged with regard to their maths performance in PISA. As in the case of school types, region may represent some other school level variables. Figure 6.2 shows the averages of few school level variables by regions.

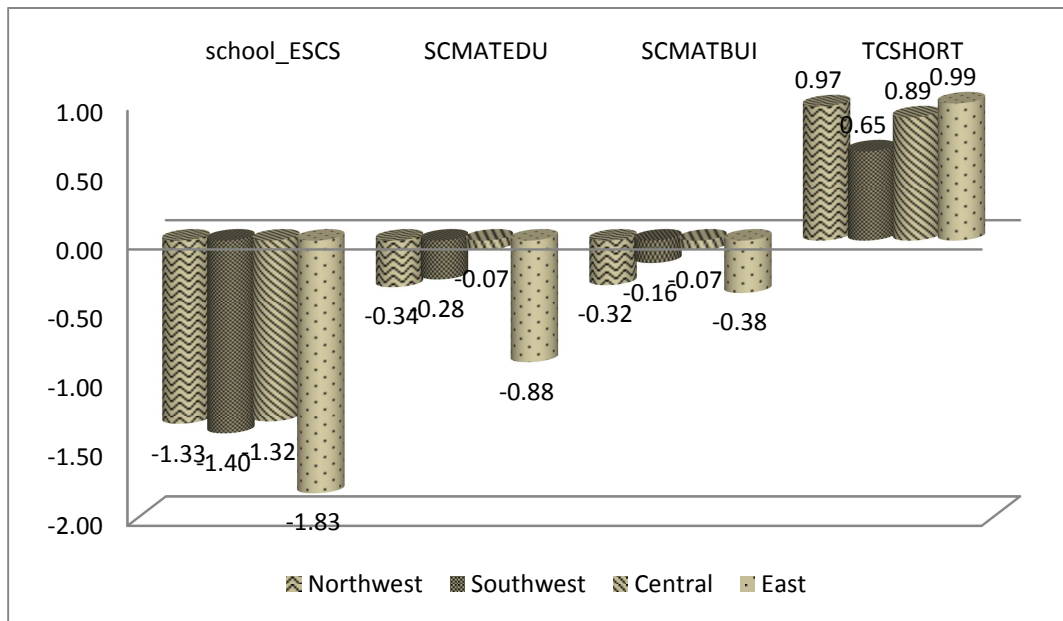


Figure 6.2 Weighted averages of selected school level variables by region

It is seen in Figure 6.2 that all school average ESCS, index of quality of school educational resources, index of quality of school infrastructure and teacher shortage index averages are the worst for eastern regions. These variables have been found to be effective on average student performance in many other international studies (e.g. Dunne, 2010; OECD, 2013b; Sirin, 2005; Teddlie et al., 2000). It is interesting that they are not significant in the analyses above. However, the results make sense when considered with the similar distribution of these variables due to school types and regions. They are basically represented by school type and region.

Another issue related to regional inequalities in terms of educational resources is the teacher vacancies. Despite recent efforts to close the gap, eastern regions, especially Southeast Anatolia and Middle East Anatolia regions have the highest students per teacher rates in all levels of education (MoNE, 2014b). Furthermore, due to the poor conditions of physical and educational environment, experienced teachers are not willing to work in Eastern regions (Özoğlu, 2010). As soon as their compulsory term ends they request to be appointed to the western regions. This results in situations

like a student in an eastern province to have different teachers in each grade of primary level which badly effect their chances building basic educational skills (ERG, 2014c; Özoğlu, 2010). This fact is also exacerbating existing educational inequalities between regions.

Considering these facts, it is fair to say that the effects of many school level variables are represented by school type and region in Turkey. Furthermore, it should be underlined that the distribution of school types across regions is also not even. The numbers of both selective academic and selective vocational schools are the lowest in Eastern regions (See Table 6.1).

Table 6.1 Percentages of school types across regions<sup>40</sup>

<i>Region</i>	<i>School type</i>			
	Academic	Selective academic	Vocational	Selective vocational
Northwest	28.7	36.2	19.7	15.4
Southwest	26.8	31.4	26.7	15.1
Central	13.2	46.0	37.0	3.8
East	44.9	27.7	25.9	1.6
Total	30.1	34.2	26.0	9.7

Besides these interactions of region with other school level variables, students from Eastern regions of Turkey are significantly behind students from Istanbul and some other western parts of Turkey even when all socio-economic status, school types and other effective variables are controlled for. Considering the existing regional inequalities in other areas of social and economic life (Akkoyunlu-Wigley & Wigley, 2009; World Bank, 2010), from an equity perspective eastern regions in Turkey need investment in excellence in education more than anywhere else.

To sum up, analyses in this dissertation with Turkish data show that there are huge performance differences between girls and boys, students from different family backgrounds and students from different regions. The biggest difference is between school types. After completing 8<sup>th</sup> grade, high and low performing students are segregated in different school types. This segregation is also due to various social background characteristics. Moreover, top performing schools not only receive better performing students from affluent families but also receive more and better resources. Another striking finding of this dissertation is that female students are extra disadvantaged in selective types of schools. Despite being admitted to the most

<sup>40</sup> Ministry of National Education and Turkish Statistical Association do not provide the distribution of school types according to region. However, PISA 2012 sample was constructed according to two strata, namely region and school type. Thus, percentages in Table 6.1 are estimates based on PISA 2012 sample.



successful types of high schools with a higher probability than boys, girls do not benefit from the educational advantages of these schools as much as boys. Therefore, it is fair to say that education system in Turkey is reproducing existing social inequalities as suggested by conflict theories of sociology of education.

The fact that school types and regions represent various factors related to social, economic and educational resources indicate that there are two main effects on student outputs. These are gender and socio-economic background. In recent OECD reports on international exams praise Turkey's performance in reproducing inequities in education (Hanushek & Wößmann, 2015; OECD, 2013c). The basis for this praise is the fact that the percentage of variance explained in mathematics performance by ESCS reduced from 28% to 15% between PISA 2003 and PISA 2012 in Turkey. However, these numbers are constructed via cross-country regression models in which country specific variables like school type and region in Turkey are not included. Thus, these estimates ignore the effects of socio-economic influences on student outputs via school type and region. Although these effects are mentioned by few national reports (ERG, 2009; World Bank, 2013), they have not been analysed in detail. In this regard, this dissertation is one of the first and exhaustive efforts to investigate these relationships.

Before concluding, I would like to discuss my findings in relation to the most recent education policy implementations in Turkey. Since PISA 2012 was conducted, several new policies have been implemented in a short period of time in Turkey. The biggest of them is the law number 6287 which extends compulsory education from 8 to 12 years in 2012 (MoNE, 2012b). With the new system, education is structured as 4 years of primary school (which used to be 5 years), 4 years of junior secondary level (which used to be 3 years) and 4 years of upper secondary level (which used to be 3 years). The new legislation took serious criticisms from the public, academicians and NGO's during its rapid implementation process (Eğitim-Sen, 2012; ERG, 2013b; TÜSEV, 2012). After three years, criticisms continue. One of the problems related to the new structuring is the increasing rates in enrolment to distant education. Despite an increase in net enrolment rates in upper secondary level (from

67 % in 2011-12 to 79 % in 2014-15), enrolment into distant education also increases. The share of students in distant education at upper secondary level increased from 20 % to 26 % just after the implementation of the new system (MoNE, 2012c, 2013). These students are not covered in the samples of international student assessment surveys. However, among the senior grade open secondary education students the rate of admission to an undergraduate programme was under 10 % in 2014 which was 24 % for all senior graders in upper secondary level (MoNE, 2015).

An additional issue about the new policy is related to the increasing number of schools switching from full day to half day schooling. A recent report by ERG (2014a) estimates a 10% decrease in the number of full-day schools between 2011-12 and 2012-13 education years. Moreover, the report also shows significant differences between students from full-day and half-day schools in terms of their school grades just before and after the new policy.

The same report also underlines the problems reported by students and teachers in relation to the difficulties in transition from primary to junior secondary level (ERG, 2014a). In addition to adaptation difficulties for 5<sup>th</sup> graders, it is stated in the report that the rate of lectures skipped, especially in the 5<sup>th</sup> grade, increased due to insufficient number of teachers. The number of skipped lectures is also found to decrease school grades in the same report.

With the new 4+4+4 structure, transition from junior secondary to upper secondary level has also been renewed. It is the fifth time that the transition system from junior to upper secondary level has been changed for the last decade. Since 2012, junior secondary level students take national exams each semester. At the end of 8<sup>th</sup> grade, an overall score is calculated for students based on these standardized exams and their school grades. Students make selections and are allocated to upper secondary level institutions according to their scores. Almost all upper secondary level institutions admit students based on these scores. However, there are still serious problems related to the allocation of students to schools which could not be solved

until now (Çakmakçı, 2014; Polat, 2014; “TEOG’da nakil krizi devam ediyor,” 2014).

Another major policy change is the reduction in the number of different school types in secondary education (MoNE, 2008). The number of different types of high school institutions was reduced from 79 to 15 between 2008 and 2014. All general high schools were transformed into ‘Anatolian high schools’ and all vocational and technical types are named ‘Anatolian vocational and technical schools’ except for multi-programme high schools. With the new structure, the three main types are Anatolian high schools that have an academic curriculum, Anatolian vocational and technical schools that have vocational curricula and religious high schools which have additional religious courses with academic curriculum. However, these changes are probable to remain only as name changes. The analyses in this dissertation show that school type is the main effect on student outcomes in Turkey. Nevertheless, it is also shown that school type effect is actually representing various socio-economical and educational effects. Changing the name of school types would only result in a different representation of the actual relationship unless policies target equity issues. Furthermore, as mentioned above, for the last three years almost all students are selected into different schools according to their previous achievement which is probable to create bigger school-to-school differences. It is highly probable that we will face bigger effects for both student and school level ESCS terms in PISA 2015 results.

Another change that could be expected for PISA 2015 is the effect of Religious High Schools. In 2011-2012 education year, the number of students attending religious high schools was just above 250 thousand and there was not a distinct school type category for religious high schools in PISA 2012 sample. On the other hand, the number of students in religious schools reached 550 thousand in 2014-15 education year. If they will be included as a distinct school type in PISA 2015 sample, it will be possible to explore the effect of religious high schools.

Despite not being included in the 4+4+4 legislation another major policy in the Turkish education system is the abolishment of private tutoring courses called as ‘dershane’ (MoNE, 2014a). From September 2015, these private education institutions will be closed down or will be transformed into private schools. Currently, these private courses consist the majority of the total private expenditure on education in Turkey (Tansel, 2012). Considering its size, the ‘dershane’ system in Turkey is defined as “a parallel system of education” in a recent World Bank (2011, p. 25) report. Existing research show that these private courses increase student outcomes (Alkan, Çarkoğlu, Filiztekin, & İnceoğlu, 2008; Altun & Süer, 2015; Gurun & Millimet, 2008; Köse, 2007; Tansel & Bircan, 2006) though some claim that this effect is smaller when compared to other effects like parental education, socio-economic background and prior achievement levels (Berberoğlu & Tansel, 2014). And, access to these private courses are highly effected by socio-economic characteristics like parent educational status and income (Alkan et al., 2008) or regional differences (Gurun & Millimet, 2008; Tansel & Bircan, 2006). In this way, it can be one of the mechanisms that reproduce social inequalities. However, it is not clear if the new policy will solve the inequality problem. First of all, it should be noted that this private tutoring system is a result of highly competitive standardized exams-based selection system (World Bank, 2011). Moreover, in many cases in addition to exam-preparing, these courses are utilized by parents to compensate for the educational inadequacies of the school. In this regard, without making any changes to the exam system or improving the quality of education at schools abolishment of ‘dershane’ system would not remove the causes of the problem. Furthermore, the policy to transform these courses into private schools has also the potential to increase social inequalities (ERG, 2013a; TEDMEM, 2015). PISA 2012 Turkey sample do not have enough number of private schools to make comparisons between public and private schools. However, international comparisons show that private school system increases social inequalities in education in many cases (OECD, 2013b).

An article in the legislation for 4+4+4 law is about the implementation of FATİH Project. The project comprises improvement of technological infrastructure of schools in Turkey. It includes installation of smart boards in 570 thousand classrooms and provision of tablet PCs to every student and every teacher (MoNE, 2012a). The estimated total budget of the project is 8 billion Turkish Liras (TBMM, 2012). Despite the amount of money allocated, there are still doubts about the efficiency of the project (ERG & RTI, 2014; Güven, 2012; Pamuk, Ergun, Çakir, Yilmaz, & Ayas, 2013; TEDMEM, 2013a). There are studies around the world investigating the contribution of tablet use on student performance. However, recent studies have not found a direct relationship between tablet use and student performance (Carr, 2012; Hlodana, 2010; Vilaplano-Prieto, 2014). Furthermore, although the issue is beyond the aims of this dissertation, I have conducted some analysis to test the effects of tablet and computer use on mathematics performance of 15-year-old students in the PISA 2012 sample. I have included the variable 'ICTSCH', which is an index to measure the availability information and computer technologies at school based on the presence of desktop pc, laptop, tablet, internet connection, printer and e-book reader at school, to parsimonious model in Chapter 5. It is found that availability of these devices do not have a significant effect on maths performance when gender, ESCS, region and school type are controlled for<sup>41</sup>. Regarding the insufficient evidence for the impact of these devices on educational outputs and the amount of money allocated to, FATİH project can be expected to draw more criticisms.

A final policy in government agendas for the last 20 years is about teacher competencies. Although the preparations for the implementation go back to 1990's, the policy could not be implemented yet. Teacher competencies development policy aims to define main and sub teacher competencies and performance standards and help to educate and develop teachers according to these standards (OECD & MoNE, 2005). Two policy documents defining these competencies published (MEB, 2008a, 2008b) and a guide for developing teacher competencies has been prepared (MEB,

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<sup>41</sup> See Appendix Table A.9 for the results of the multilevel model with ICTSCH variable.

2007). However, the policy has not been put into action. TALIS 2008 report (OECD, 2009a) shows that Turkey has a young teacher population. Nevertheless, teachers in Turkey receive less in-service training than most of the TALIS countries. Moreover, four out of five of the principals in Turkey think that the low quality of teachers prevent the overall success at their schools. Furthermore, another report (TED, 2009) shows that there is a high rotation among teachers that over 70 % of the teachers in Turkey worked less than five years at their current institution. In line with several reports by international organizations (OECD, 2007b; UNDP, 2008; World Bank, 2011, 2013) and national NGO's (ERG, 2009, 2014c; TED, 2009; TEDMEM, 2013b), this dissertation underlines the issues related to quality of education in Turkey. In this sense, developing teacher competencies should be one of the major and primary policy items.

In conclusion, considering the problems in the implementation process of 4+4+4 reform, doubtful contribution of the FATİH project to student outcomes and uncertainties about transformation of private tutoring courses to private schools; recent reforms are still far from making contributions to excellence in the Turkish education system. Moreover, persisting inequalities in transition from junior secondary to upper secondary levels of education and expansion of private schools do not generate any hopes for a decline in educational inequalities in Turkey in the near future. On the other hand, it is debateable that policies which could contribute to both excellence and equity like teacher competency development are left behind despite their much lower cost.

Finally, in the light of the findings of this dissertation I would like to suggest few points to construct new policies for Turkey to tackle its current problems in education. First of all, analysis of international data shows that educational excellence is related to equity. Increasing the level of equity in Turkey would contribute to educational excellence besides it's many other social gains (Wilkinson & Pickett, 2009).

As stressed above, in Turkey, two main dimensions of inequities in education are socio-economic background and gender. New policies should aim to mitigate inequalities based on these characteristics.

Analyses above showed that minor improvements in the socio-economic status of the most disadvantaged families result in big advances in the achievement levels of their children. Thus, policies targeting the highly disadvantaged children is the shortest way to improve the overall level of excellence in education. Findings of both this dissertation and many recent studies mentioned throughout this dissertation show that primary and secondary level schools in Turkey are segregated due to socio-economic status of families. A recent report by Candaş, Ekim Akkan, Günseli and Deniz (2011) say that some public schools in affluent neighbourhoods are equipped better than private schools thanks to the involvement of parents in providing resources for physical and educational resources. According to the same report, while teacher salaries and some basic needs such as heating, water and electricity are provided by MoNE, many other needs are sponsored by parents. This includes the salaries of janitors and porters in schools, maintenance of school buildings or provision of basic educational materials in most cases. Thus, schools with a higher socio-economic status family profile have better resources while schools in poorer areas lack many basic needs. My findings confirm this inequality which is one of the fundamental reasons for achievement inequalities in Turkey. Hence, in order both to tackle inequity and improve excellence basic needs of the schools should be provided by MoNE. It is sure that the returns for such public spending would be much higher than policies like FATİH project.

Recent policy to reduce the number of different school types at secondary level may be seen as an effort to diminish the segregation between schools. Moreover, it could be thought that this policy is designed in response to the criticisms after PISA results in which there are huge gaps between different school types. However, as long as the segregation due to socio-economic status via central selection system, insufficient provision of schools by the central authority and compensation of basic needs by

parents continue it is highly likely that the change in school names to result only in representation of inequities by different variable(s). A way to lessen the gap between achievement differences between school types may be to improve teacher quality in less performing schools. Increasing teacher competencies via in service trainings as mentioned above may be a step in this direction. Moreover, currently there are more than 100 thousand teacher vacancies according to the Minister of National Education<sup>42</sup>. The fact that most of these vacancies are in less developed regions is another contributing factor to educational inequities in Turkey. Filling these vacant teacher positions will be another huge step for equity and excellence in education in Turkey. Another attempt may be to reduce inequalities in terms of teacher qualities between different schools and regions. As mentioned above, teachers tend to leave schools in less developed regions. Incentives to attract better teachers to less performing schools would also contribute to reduce inequities.

The other dimension of inequities in education in Turkey is gender. Firstly, there is a general gap between boys and girls in terms of mathematics achievement. As underlined above, this gap seems to widen at the secondary level of education. Marks (2008) shows that countries with more egalitarian gender regimes have less differences between the maths achievement levels of boys and girls. In other words, high female labour force participation rates, high levels of enrolment of women in tertiary education, gender equality in occupational status and earnings go hand in hand with similar mathematics achievement of boys and girls. Thus, the basic solution to level mathematics performance of boys and girls is to achieve gender equality at the national level.

Moreover, for the Turkish case there is a special condition. As shown in Chapter 5, girls are extra disadvantaged in mathematics in selective academic types of high schools. Once again, I should underline that the data used in this dissertation is not enough to make final conclusions about the reasons behind this pattern. Hence,

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<sup>42</sup> <http://www.trthaber.com/haber/turkiye/115-bin-ogretmen-acigi-var-176231.html>, accessed on 20/07/2015



further ad-hoc research on the issue would provide better information for policy implementations.

Nevertheless, existing literature points educational aspirations as the potential reason for such a relationship. Educational and occupational expectations of parents, teachers and students themselves shape their subject choices at high school, major disciplines at university and so that their future occupations (Sewell, Haller, & Ohlendorf, 1970; Sewell, Haller, & Portes, 1969; Sewell & Hauser, 1975). Moreover, Legewie & DiPrete (2012) argue that gender specific study plans are formed in high school environments. Similarly, in a recent study based in Israel, Gabay-Egozi, Shavit & Yaish (2015) argue that subject choices of secondary school students are shaped by their socialization process and rational choice factors. They show that female pupils attribute lower utility and greater risks to subjects like engineering and mathematics, and their parents and peers are less likely to encourage them to select these subjects. Legewie & DiPrete (2012) argue that school environments that challenge gender stereotypes result in more girls moving to science, technology, engineering and mathematics subjects while at the same time more boys choosing subjects like humanities, arts and teaching. They also show that less gender segregation in extracurricular activities and interventions projects that encourage girls to participate in science and engineering projects help to create gender parity environments in high schools (see also Bystydzienski, Eisenhart, & Brunning, 2015). After conducting more specific research on the issue, developing such projects to challenge gender stereotypes in high school environments could also help develop gender equity in the Turkish context.

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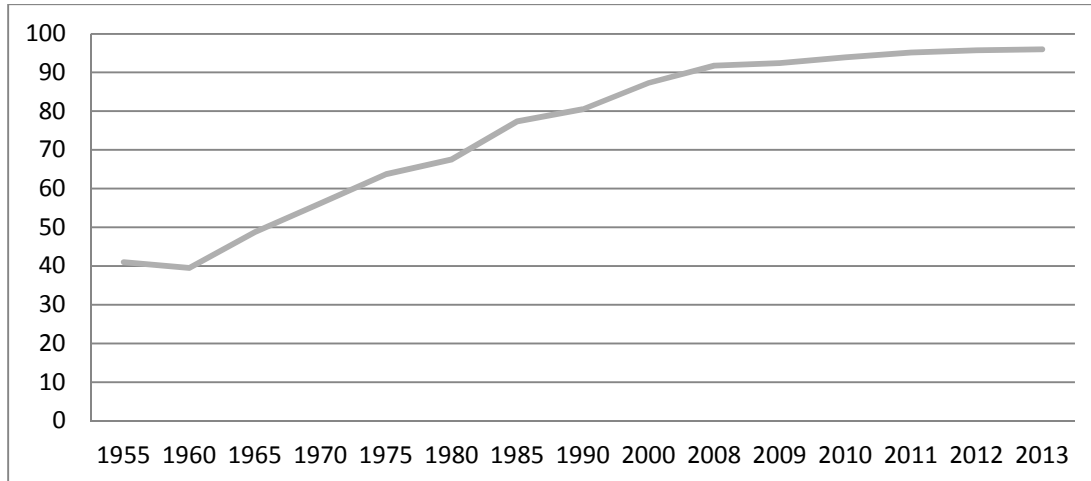
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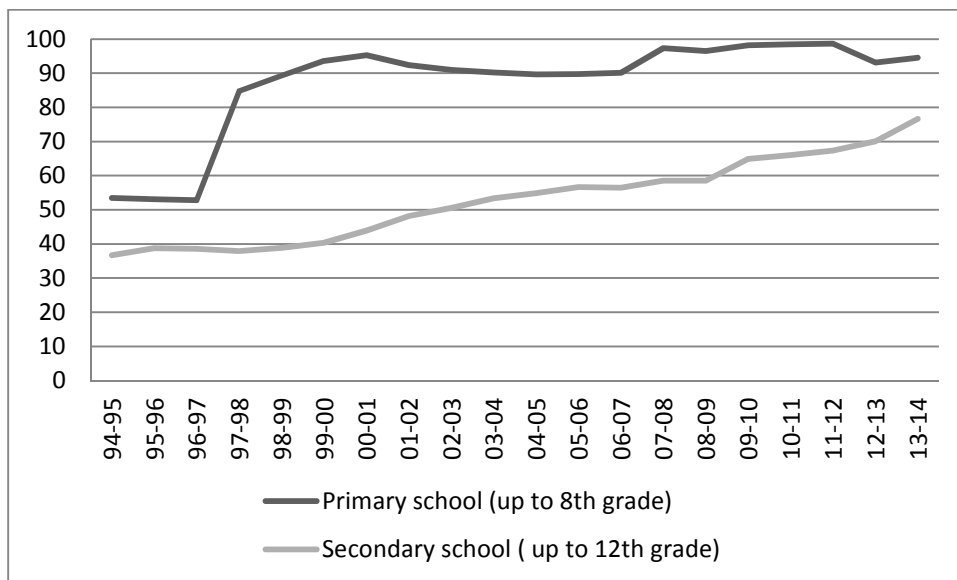
## APPENDICES

### A. ADDITIONAL RESULTS



Source: TURKSTAT

Figure A.1 Literacy rates between 1955-2013 (%)



Source: TURKSTAT

Figure A.2 Net enrolment rates in primary and secondary education (%)



Table A.1 Regression models summary with principal components-1

Variable	PISA_Math	PISA_Reading	PISA_Science	PISA_top_m
component1	-4.694	1.335	.1457	-1.957*
component2	29.41***	25.61***	26.59***	4.787***
component3	28.51***	23.05***	26.74***	2.714**
component4	-14.01***	-12.18**	-13.76**	-3.398***
component5	-3.338	-4.751	-4.41	.2421
component6	9.804*	7.814	10.03*	1.459
component7	6.966	4.948	7.193	1.116
_cons	473.8***	477***	481.5***	10.52***
N	44	44	44	44
ll	-200.6	-200.5	-202.7	-129.8
r2	.7895	.727	.7476	.6919

legend: \* p<0.05; \*\* p<0.01; \*\*\* p<0.001

Note: Top row shows dependent variables. PISA\_Math is country averages in PISA 2012 Maths test (the same model as in Table 4.5). PISA\_Reading is country averages in PISA 2012 Reading test. PISA\_Science is country averages in PISA 2012 Science test. PISA\_top\_m is the rate of top students (PISA proficiency levels 5 & 6) in PISA 2012 Maths test.

Table A.2 Regression models summary with principal components-2

Variable	TIMSS_Math	TIMSS_Scie	PIRLS
component1	-20.86	-11.73	2.341
component2	24.62**	21.77*	10.2
component3	37.08***	32.24**	26.68***
component4	-20.74*	-10.4	-3.787
component5	11.76	-1.919	3.057
component6	12.64	6.931	11.2*
component7	11.34	3.653	4.304
_cons	487.9***	505.5***	518.9***
N	22	22	29
ll	-105.6	-104.3	-129.5
r2	.74	.6659	.6625

legend: \* p<0.05; \*\* p<0.01; \*\*\* p<0.001

Note: Top row shows dependent variables. TIMSS\_Math is country averages in TIMSS 2011 Maths test for 8<sup>th</sup> graders. TIMSS\_Scie is country averages in TIMSS Science 2011 Science test for 8<sup>th</sup> graders. PIRLS is country averages in PIRLS 2011 Reading test for 4<sup>th</sup> graders.

Table A.3 Multilevel Models (Model 1-5)

Variable	mod1	mod2	mod3	mod4	mod5
PV1MATH					
female	-8.534***	-7.603**	-8.536***	-8.534***	-8.538***
escs	12.4*	13.34*	12.38*	12.4*	12.39*
preprim	2.367	2.007	2.354	2.367	2.386
native	18.46	17.53	18.47	18.46	18.61
native_lang	-7.25	-7.891	-7.339	-7.25	-7.287
school_escs	13.68**	16	13.66**	13.68**	13.77**
component2		-5.969			
component3		4.017			
component4		-7.35			
component6		3.676			
gdp			.8881**	.8843**	.8814**
gini			-2.141**		
inequity				-1.292	
first_select					.2565
_cons	463.6***	466.2***	509.4***	454***	434.3***
lns1_1_1					
_cons	3.951***	3.976***	3.627***	3.809***	3.839***
lns2_1_1					
_cons	3.982***	3.957***	3.98***	3.982***	3.985***
lnsig_e					
_cons	4.097***	4.102***	4.096***	4.097***	4.097***
Statistics					
N	360717	211762	335156	360717	344338
ll	-1.02e+10	-9.02e+09	-1.01e+10	-1.02e+10	-1.01e+10
bic	2.03e+10	1.80e+10	2.03e+10	2.03e+10	2.02e+10

legend: \* p<0.05; \*\* p<0.01; \*\*\* p<0.001

Table A.4 Multilevel Model (Model 6-11)

Variable	mod6	mod7	mod8	mod9	mod10	mod11
PV1MATH						
female	-8.534***	-8.548***	-8.091***	-8.536***	-8.551***	-8.527***
escs	12.4*	12.39*	12.82*	12.38*	12.37*	12.4*
preprim	2.367	2.384	2.279	2.354	2.37	2.361
native	18.46	18.61	17.86	18.47	18.63	18.45
native_lang	-7.25	-7.283	-7.83	-7.339	-7.372	-7.26
school_escs	13.68**	13.75**	16.26*	13.65**	13.71**	13.65**
gdp	.9611***	.9448***			.8186*	.9151***
tracks	1.899					
dedres		-2.199			-8.537	
spending			-3.298			
gini			-3.034***	-3.029***	-1.961*	
SCMATEDU				.0001301	.0001059	
SCHAUTON					.0000649	
skip					-39.36	
late					-.2672	
ab_group						.5552
_cons	428.2***	435.2***	585.7***	566.9***	528.1***	423.6***
lns1_1_1						
_cons	3.814***	3.837***	3.805***	3.781***	3.662***	3.807***
lns2_1_1						
_cons	3.982***	3.985***	3.975***	3.98***	3.983***	3.979***
lnsig_e						
_cons	4.097***	4.097***	4.099***	4.096***	4.096***	4.097***
Statistics						
N	360717	351141	260070	335156	325580	355822
ll	-1.02e+10	-1.01e+10	-9.67e+09	-1.01e+10	-1.01e+10	-1.01e+10
bic	2.03e+10	2.02e+10	1.93e+10	2.03e+10	2.02e+10	2.03e+10

legend: \* p<0.05; \*\* p<0.01; \*\*\* p<0.001

### Model Summary and Parameter Estimates

Dependent Variable: Mean Math Score in PISA 2012

Equation	Model Summary					Parameter Estimates		
	R Square	F	df1	df2	Sig.	Constant	b1	b2
Linear	,248	18,438	1	56	,000	589,159	-3,373	
Logarithmic	,227	16,406	1	56	,000	891,666	-119,035	
Quadratic	,270	10,185	2	55	,000	434,092	5,065	-,110
Compound	,263	20,034	1	56	,000	611,799	,992	
Growth	,263	20,034	1	56	,000	6,416	-,008	
Exponential	,263	20,034	1	56	,000	611,799	-,008	
Logistic	,263	20,034	1	56	,000	,002	1,008	

The independent variable is GINI (World Bank).

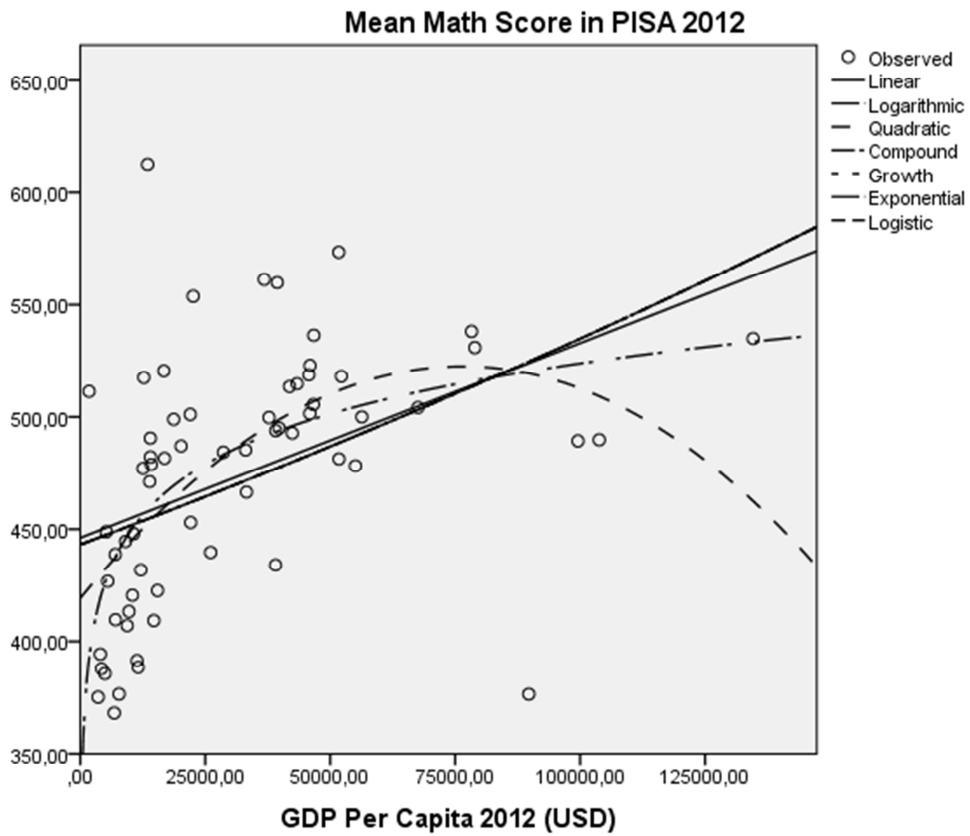


Figure A.3 Curve estimation for GINI

**Model Summary and Parameter Estimates**

Dependent Variable: Mean Math Score in PISA 2012

Equation	Model Summary					Parameter Estimates		
	R Square	F	df1	df2	Sig.	Constant	b1	b2
Linear	,186	14,440	1	63	,000	446,144	,001	
Logarithmic	,311	28,428	1	63	,000	149,764	32,495	
Quadratic	,309	13,842	2	62	,000	419,209	,003	-1,772E-008
Compound	,189	14,676	1	63	,000	443,148	1,000	
Growth	,189	14,676	1	63	,000	6,094	1,881E-006	
Exponential	,189	14,676	1	63	,000	443,148	1,881E-006	
Logistic	,189	14,676	1	63	,000	,002	1,000	

The independent variable is GDP Per Capita 2012 (USD).

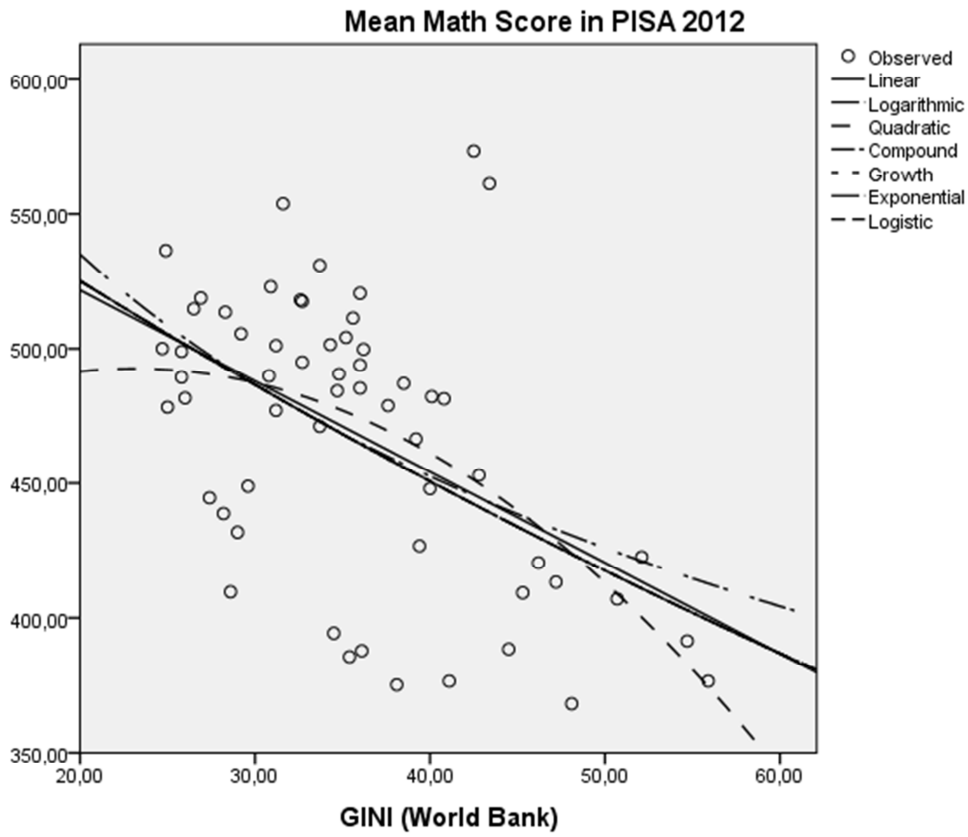


Figure A.4 Curve estimation for GDP per capita

Table A.5 Multilevel Models with different functional forms

Variable	mod3	mod33	mod34
PV1MATH			
female	-8.536***	-8.536***	-8.536***
escs	12.38*	12.38*	12.38*
preprim	2.354	2.354	2.354
native	18.47	18.47	18.47
native_lang	-7.339	-7.339	-7.339
school_escs	13.66**	13.66**	13.66**
gdp	.8881**		.905**
gini	-2.141**	-1.955**	
ln_gdp		29.79***	
ln_gini			-72.12*
_cons	509.4***	439.4***	688.7***
lns1_1_1			
_cons	3.627***	3.568***	3.673***
lns2_1_1			
_cons	3.98***	3.98***	3.98***
lnsig_e			
_cons	4.096***	4.096***	4.096***
Statistics			
N	335156	335156	335156
ll	-1.01e+10	-1.01e+10	-1.01e+10
bic	2.03e+10	2.03e+10	2.03e+10

legend: \* p<0.05; \*\* p<0.01; \*\*\* p<0.001

Table A.6 Mean scores in PISA 2012

<b>Mean scores in PISA 2012</b>			
	<b>Mathematics</b>	<b>Reading</b>	<b>Science</b>
<b>Shanghai-China</b>	613	570	580
<b>Singapore</b>	573	542	551
<b>Hong Kong-China</b>	561	545	555
<b>Chinese Taipei</b>	560	523	523
<b>Korea</b>	554	536	538
<b>Macao-China</b>	538	509	521
<b>Japan</b>	536	538	547
<b>Liechtenstein</b>	535	516	525
<b>Switzerland</b>	531	509	515
<b>Netherlands</b>	523	511	522
<b>Estonia</b>	521	516	541
<b>Finland</b>	519	524	545
<b>Canada</b>	518	523	525
<b>Poland</b>	518	518	526
<b>Belgium</b>	515	509	505
<b>Germany</b>	514	508	524
<b>Viet Nam</b>	511	508	528
<b>Austria</b>	506	490	506
<b>Australia</b>	504	512	521
<b>Ireland</b>	501	523	522
<b>Slovenia</b>	501	481	514
<b>Denmark</b>	500	496	498
<b>New Zealand</b>	500	512	516
<b>Czech Republic</b>	499	493	508
<b>France</b>	495	505	499
<b>United Kingdom</b>	494	499	514
<b>Iceland</b>	493	483	478
<b>Latvia</b>	491	489	502
<b>Luxembourg</b>	490	488	491
<b>Norway</b>	489	504	495
<b>Portugal</b>	487	488	489
<b>Italy</b>	485	490	494
<b>Spain</b>	484	488	496
<b>Russian Federation</b>	482	475	486
<b>Slovak Republic</b>	482	463	471
<b>United States</b>	481	498	497
<b>Lithuania</b>	479	477	496



Table A.6 (continued)

<b>Sweden</b>	<b>478</b>	<b>483</b>	<b>485</b>
<b>Hungary</b>	477	488	494
<b>Croatia</b>	471	485	491
<b>Israel</b>	466	486	470
<b>Greece</b>	453	477	467
<b>Serbia</b>	449	446	445
<b>Turkey</b>	448	475	463
<b>Romania</b>	445	438	439
<b>Cyprus</b>	440	449	438
<b>Bulgaria</b>	439	436	446
<b>United Arab Emirates</b>	434	442	448
<b>Kazakhstan</b>	432	393	425
<b>Thailand</b>	427	441	444
<b>Chile</b>	423	441	445
<b>Malaysia</b>	421	398	420
<b>Mexico</b>	413	424	415
<b>Montenegro</b>	410	422	410
<b>Uruguay</b>	409	411	416
<b>Costa Rica</b>	407	441	429
<b>Albania</b>	394	394	397
<b>Brazil</b>	391	410	405
<b>Argentina</b>	388	396	406
<b>Tunisia</b>	388	404	398
<b>Jordan</b>	386	399	409
<b>Colombia</b>	376	403	399
<b>Qatar</b>	376	388	384
<b>Indonesia</b>	375	396	382
<b>Peru</b>	368	384	373

Source: (OECD, 2013c)

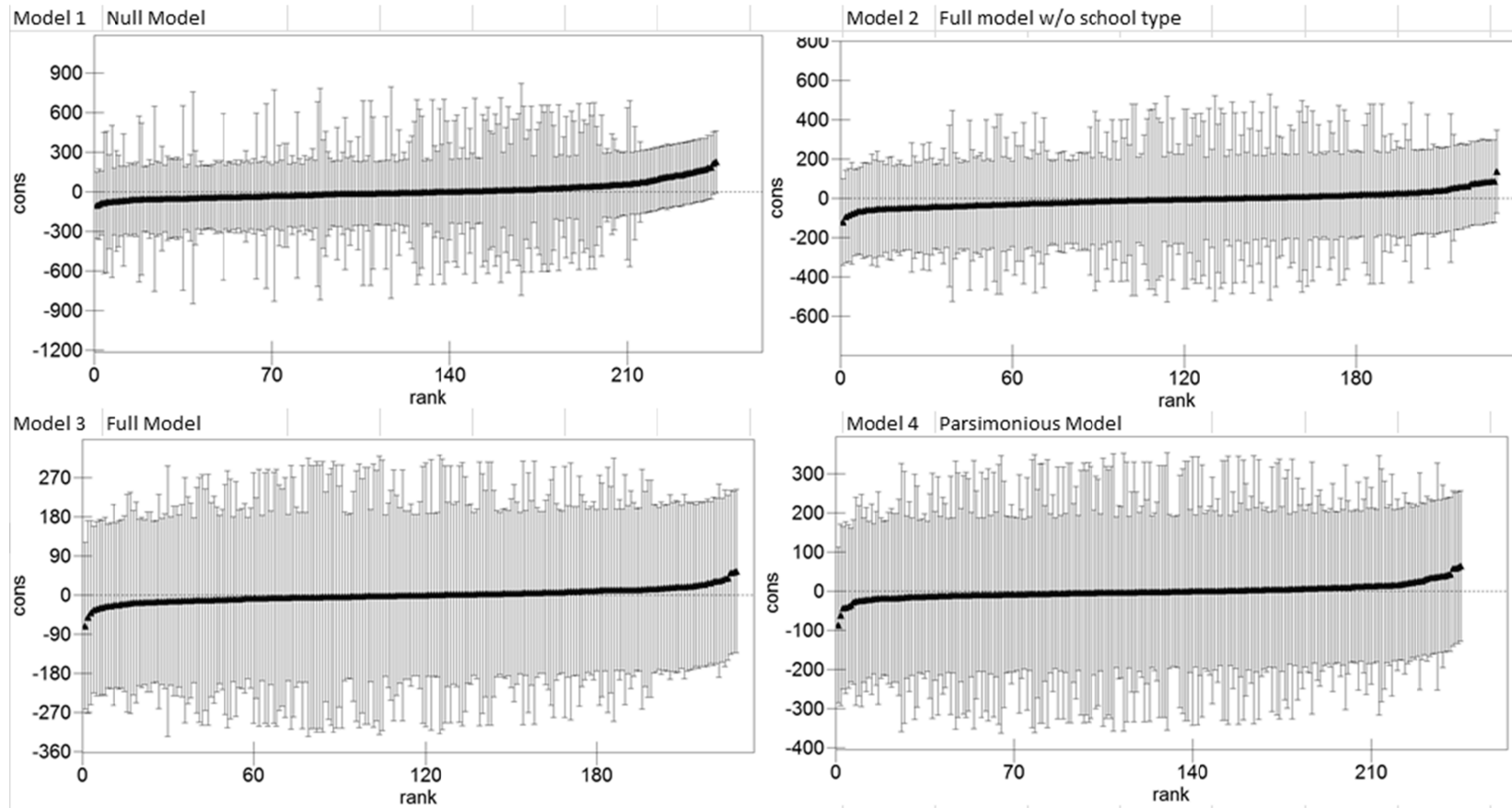


Figure A.5 Caterpillar plots for multilevel models (Model 1-4)

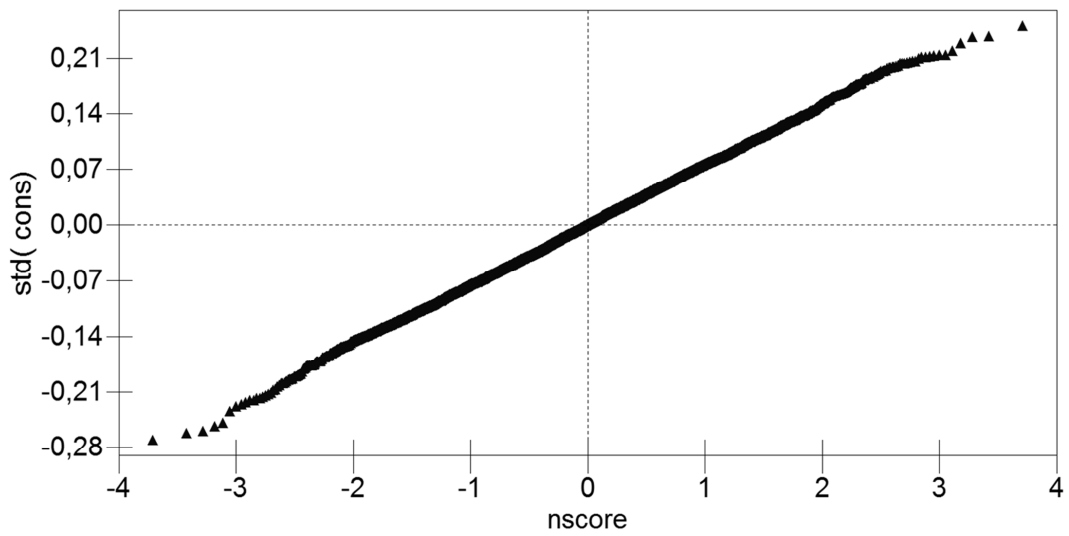


Figure A.6 Plot of standardised residuals (y-axis) and normal scores (x-axis) for normality test of student level residuals in Model 4.

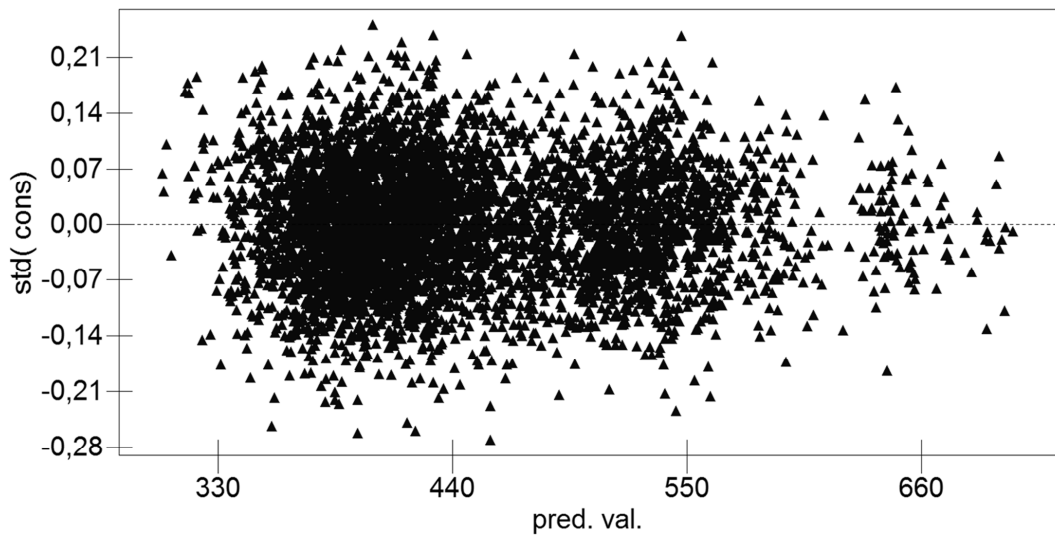


Figure A.7 Plot of standardised residuals (y-axis) and normal scores (x-axis) for normality test of student level residuals in Model 4

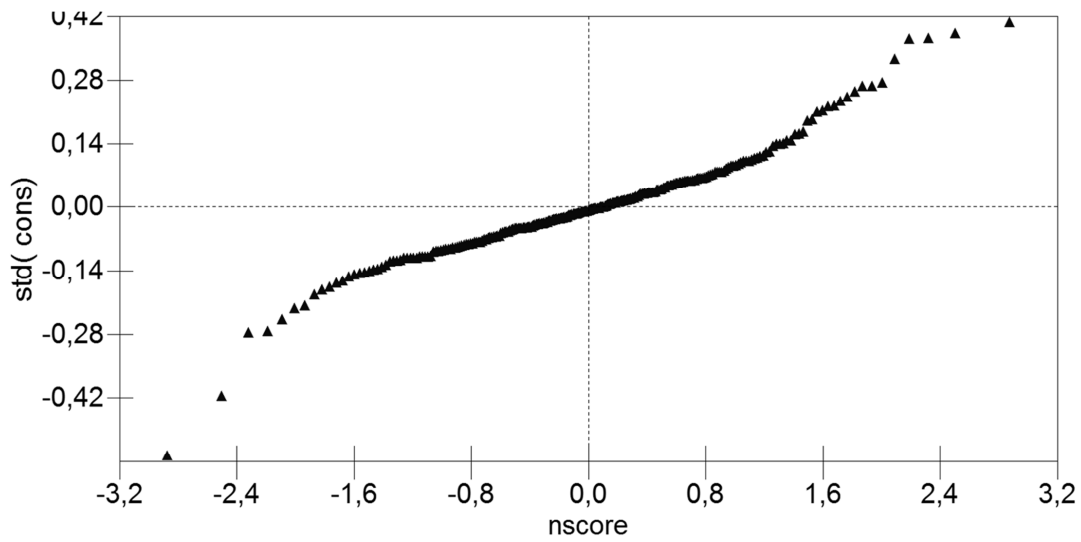


Figure A.8 Plot of standardised residuals (y-axis) and normal scores (x-axis) for normality test of school level residuals in Model 4.

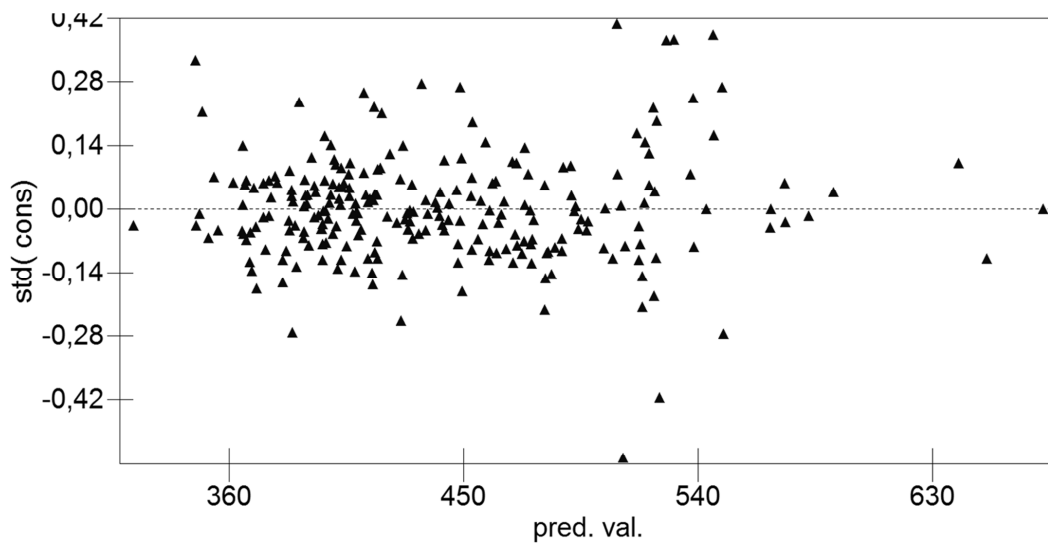


Figure A.9 Plot of standardised residuals (y-axis) and fixed part prediction (x-axis) for homoscedasticity test of school level residuals in Model 4

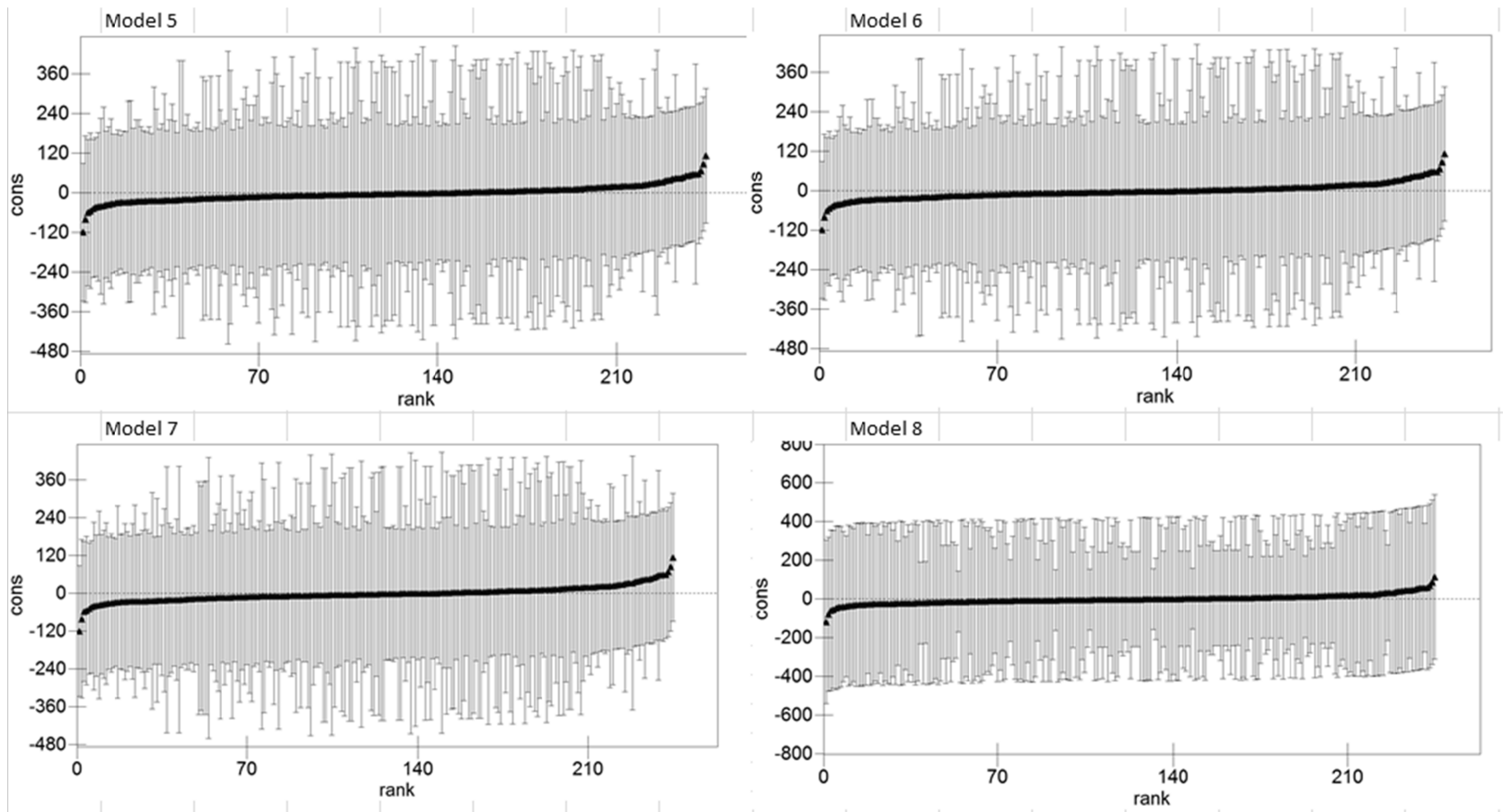


Figure A.10 Caterpillar plots for multilevel models (Model 5-8)

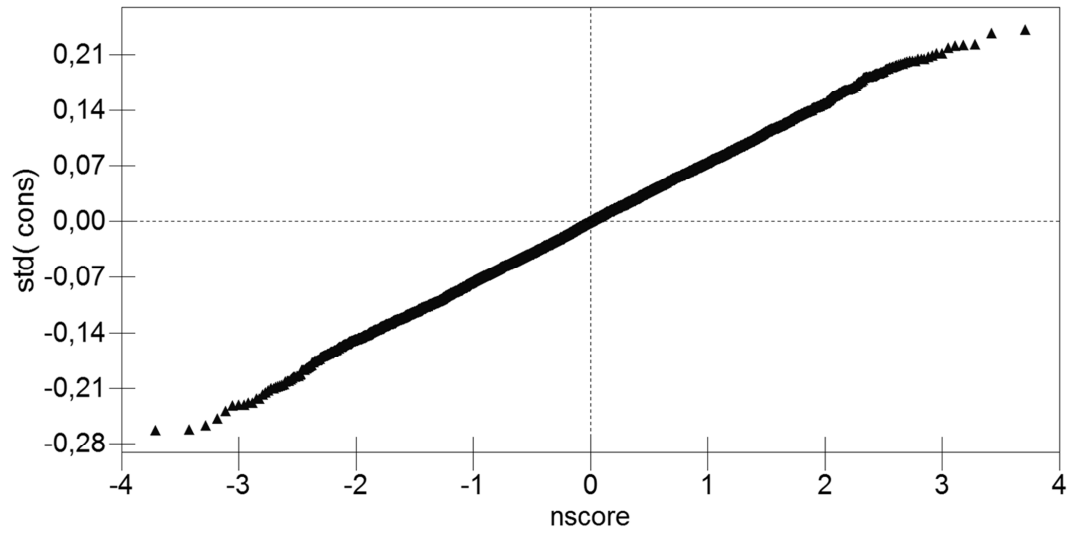


Figure A.11 Plot of standardised residuals (y-axis) and normal scores (x-axis) for normality test of student level residuals in Model 8.

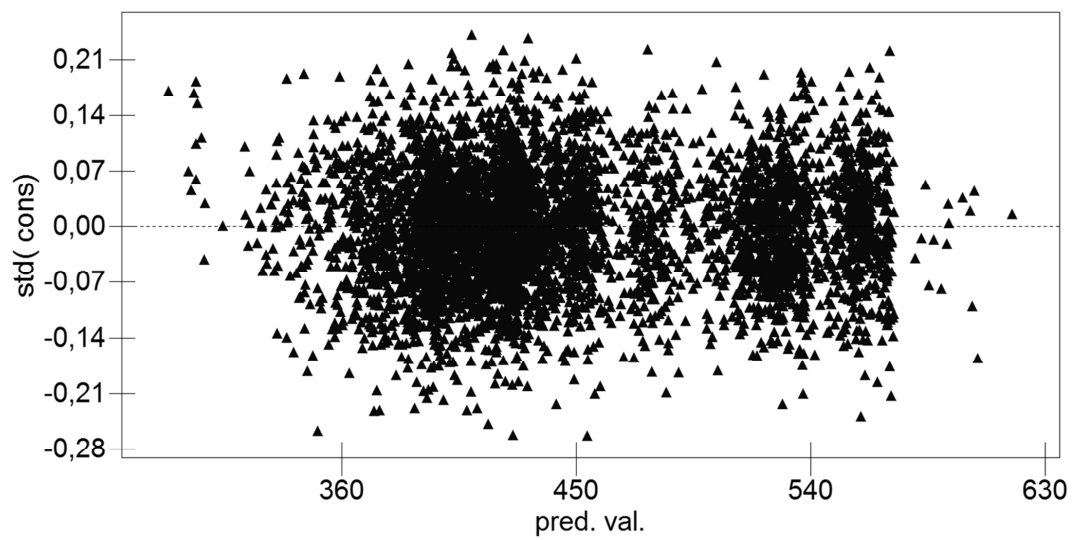


Figure A.12 Plot of standardised residuals (y-axis) and fixed part prediction (x-axis) for homoscedasticity test of student level residuals in Model 8.

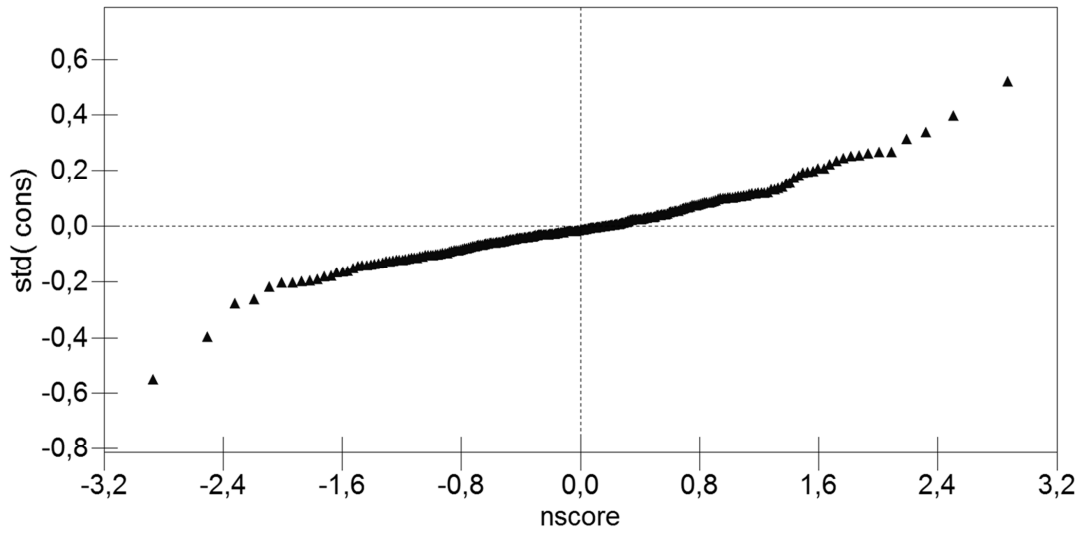


Figure A.13 Plot of standardised residuals (y-axis) and normal scores (x-axis) for normality test of school level residuals in Model 8.

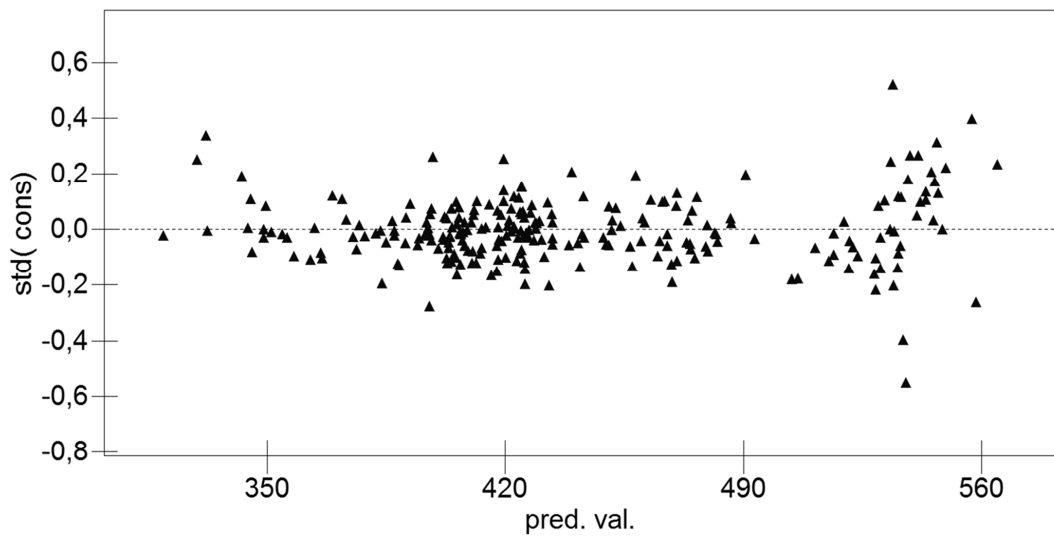


Figure A.14 Plot of standardised residuals (y-axis) and fixed part prediction (x-axis) for homoscedasticity test of school level residuals in Model 8.

Table A.7 VIF scores for models in Table 5.5

	Model 4	3 indices seperated	5 indices seperated	parsimonious model with hisei and HEDRES
aegean	1.57	1.58	1.57	1.57
ana_teac_t~s	1.2	1.22	1.22	1.22
ana techni~s	1.1	1.1	1.11	1.1
ana_vocati~s	1.17	1.17	1.17	1.17
anatolianhs	1.55	1.57	1.57	1.53
centanat	1.29	1.29	1.29	1.28
CULTPOS			1.36	
eastbsea	1.43	1.44	1.44	1.43
eastmarm	1.45	1.44	1.44	1.44
ESCS	1.23			
female	1.05	1.05	1.07	1.05
HEDRES			1.84	1.25
hisei		1.61	1.61	1.19
HOMEPOS		1.59		
mediter	1.63	1.62	1.61	1.61
middleeast	1.26	1.25	1.25	1.24
multiprogr~s	1.13	1.13	1.13	1.13
northeast	1.16	1.17	1.17	1.16
PARED		1.74	1.75	
policehs	1	1	1	1
primarys	1.12	1.1	1.1	1.09
sciencehs	1.08	1.08	1.08	1.08
soc_scienc~s	1.26	1.28	1.29	1.28
southeast	1.52	1.5	1.5	1.5
technicalhs	1.06	1.06	1.06	1.06
vocationalhs	1.43	1.44	1.44	1.43
WEALTH			2	
westanat	1.44	1.44	1.44	1.44
westbsea	1.27	1.25	1.25	1.25
westmarm	1.23	1.23	1.23	1.23
mean VIF	1.28	1.32	1.36	1.27



Table A.8 Selection models

	Selective schools	Selection models for selective schools	General Academic schools	Selection model for general academic schools	Vocational schools	Selection Model for Vocational schools
Intercept	652.1 (32.4)	674.4 (34.5)	406.7 (19.7)	574.1 (114.3)	500.9 (33.7)	493.6 (33.1)
Female	<b>-30.2 (2.4)**</b>	<b>-26.3 (3.4)**</b>	<b>-16.0 (2.7)**</b>	<b>-16.2 (2.7)**</b>	<b>-20.5 (3.6)**</b>	<b>-14.7 (4.4)**</b>
ESCS	<b>3.2 (1.2)**</b>	10.3 (5.6)	<b>7.5 (1.6)**</b>	-16.8 (16.4)	<b>4.1 (2.1)*</b>	<b>8.6 (2.5)**</b>
turkish	-1.2 (6.3)	1.1 (6.8)	3.7 (5.4)	-67.4 (49.0)	<b>15.9 (7.3)*</b>	2.4 (9.7)
preprim	-3.9 (2.7)	2.0 (4.7)	<b>7.4 (3.3)**</b>	-13.1 (13.7)	2.0 (3.6)	7.8 (4.1)
school_ESCS	6.0 (3.7)	5.5 (3.7)	1.3 (4.4)	1.0 (4.3)	<b>12.0 (3.8)**</b>	<b>12.9 (3.9)**</b>
TCSHORT	-11.7 (8.5)	-11.8 (8.5)	3.0 (2.2)	3.0 (2.2)	-0.8 (2.9)	-0.8 (2.9)
CLSIZE	<b>-1.3 (0.5)*</b>	<b>-1.3 (0.5)*</b>	0.2 (0.3)	0.2 (0.3)	-0.9 (0.5)	-0.9 (0.5)
SCHSIZE	<b>-0.0 (0.0)*</b>	<b>-0.0 (0.0)*</b>	<b>0.0 (0.0)*</b>	<b>0.0 (0.0)*</b>	<b>-0.0 (0.0)*</b>	<b>-0.0 (0.0)*</b>
SCMATEDU	<b>19.5 (10.0)*</b>	<b>19.5 (10.0)*</b>	3.4 (3.8)	3.7 (3.8)	5.7 (4.5)	5.9 (4.5)
SCMATBUI	-8.2 (8.6)	-8.1 (8.7)	-5.5 (3.4)	-5.7 (3.4)	<b>-11.1 (4.6)*</b>	<b>-11.3 (4.6)*</b>
Village	<b>62.5 (16.0)**</b>	<b>62.8 (16.0)**</b>	<b>-50.8 (10.5)**</b>	<b>-49.6 (10.5)**</b>	0	0
Small Town	<b>60.4 (21.8)**</b>	<b>60.7 (21.9)**</b>	<b>21.6 (10.0)*</b>	<b>21.8 (9.9)*</b>	-6.7 (15.5)	-5.7 (15.3)
City	13.7 (16.4)	13.8 (16.5)	-9.1 (10.6)	-9.2 (10.6)	6.0 (7.7)	6.1 (7.7)
Large City	0.1 (21.0)	0.5 (21.0)	-5.0 (9.7)	-5.1 (9.7)	2.7 (9.0)	2.4 (9.0)
West Marmara	-50.1 (30.2)	-49.7 (30.2)	<b>-28.4 (13.2)*</b>	<b>-28.2 (13.2)*</b>	-1.8 (15.3)	-1.4 (15.3)
Aegean	<b>-64.5 (24.5)**</b>	<b>-64.9 (24.5)**</b>	-7.5 (8.8)	-7.1 (8.8)	-6.3 (8.9)	-6.3 (8.9)
East Marmara	-43.7 (26.0)	-43.4 (26.0)	<b>50.6 (18.7)**</b>	<b>50.3 (18.8)**</b>	-5.0 (10.2)	-4.7 (10.1)
West Anatolia	-51.5 (28.4)	-51.5 (28.5)	11.3 (15.1)	10.6 (15.1)	-17.4 (10.1)	-16.4 (10.1)
Mediterranean Central	-50.3 (27.2)	-50.5 (27.3)	-9.9 (9.8)	-10.1 (9.7)	<b>-18.7 (9.6)*</b>	<b>-18.7 (9.5)*</b>
Anatolia	-9.9 (25.5)	-9.9 (25.5)	<b>46.1 (20.3)*</b>	<b>47.2 (20.7)*</b>	-14.7 (13.5)	-14.0 (13.4)
West Black Sea	<b>-92.1 (32.6)**</b>	<b>-92.3 (32.6)**</b>	3.1 (13.1)	2.8 (13.0)	-16.3 (16.9)	-16.5 (16.9)
East Black Sea	<b>-76.0 (25.4)**</b>	<b>-76.5 (25.5)**</b>	<b>26.9 (11.5)*</b>	<b>27.4 (11.5)*</b>	-16.4 (13.8)	-14.5 (13.8)
Northeast Anatolia	-42.6 (25.5)	-42.4 (25.5)	16.3 (11.2)	16.1 (10.9)	<b>-67.4 (17.6)**</b>	<b>-65.7 (14.5)**</b>
Middle East Anatolia	<b>-75.0 (35.3)*</b>	<b>-74.7 (35.4)*</b>	<b>-30.3 (12.7)*</b>	<b>-30.3 (12.6)**</b>	<b>-56.0 (13.7)**</b>	<b>-55.5 (13.7)**</b>
Southeast Anatolia	-49.6 (30.6)	-49.7 (30.6)	<b>-37.5 (8.6)**</b>	<b>-37.7 (8.6)**</b>	<b>-57.5 (14.4)**</b>	<b>-56.5 (14.3)**</b>
pred_sel		-49.8 (37.9)				
pred_acad				-354.5 (293.6)		
pred_voc						<b>85.8 (38.1)*</b>
-2*loglikelihood:	19339.621	19338.373	18219.293	18217.629	19089.497	19084.416
ICC/VPC	18.1%	18.2%	1.7%	1.7%	4.6%	4.6%

Table A.9 Multilevel model with ICTSCH

	Model with ICTSCH
Intercept	125.4 (19.9)
Grade_year	33.8 (2.0)**
Female	-25.7 (1.7)**
ESCS	4.5 (0.8)**
West Marmara	-20.1 (16.6)
Aegean	-17.9 (8.9)*
East Marmara	-7.3 (13.9)
West Anatolia	-18.6 (12.6)
Mediterranean	-32.1 (8.3)**
Central Anatolia	-18.8 (8.4)*
West Black Sea	-26.0 (22.4)
East Black Sea	-34.7 (12.5)**
Northeast Anatolia	-28.1 (10.6)**
Middle East Anatolia	-49.1 (8.2)**
Southeast Anatolia	-39.0 (12.1)**
Primary S	33.5 (11.2)**
Anatolian HS	99.1 (10.3)**
Science HS	262.1 (7.1)**
Social Sciences HS	164.8 (12.2)**
Ana. Teacher Tra. HS	146.2 (7.3)**
Vocational HS	-22.4 (5.4)**
Ana. Vocational HS	39.8 (10.8)**
Technical HS	16.9 (7.9)*
Ana. Technical HS	38.5 (8.7)**
Multi Programme HS	-1.6 (15.6)
Police HS	195.9 (18.8)**
ICTSCH	1.2 (0.8)
Units (school/student)	245/4747
-2*loglikelihood:	51418.685

## B. SOFTWARE ALGORITHMS FOR ANALYSES

### Chapter 4. Curve estimation for inequity in SPSS:

```
* Curve Estimation.
TSET NEWVAR=NONE.
CURVEFIT
/VARIABLES=Math2012 WITH escsonmath
/CONSTANT
/MODEL=LINEAR LOGARITHMIC QUADRATIC EXPONENTIAL
/PLOT FIT.
```

### Chapter 4. Scatter plot of GINI and PISA scores in STATA:

```
rename PISA2000M pisa_math0
rename PISA2003M pisa_math3
rename PISA2006M pisa_math6
rename PISA2009M pisa_math9
rename Math2012 pisa_math12
gen id = _n
label define cnt 1 "alb" 2 "arg" 3 "aus" 4 "aut" 5 "bel" 6 "bra" 7 "bul" 8 "can" 9
"chi" 10 "tai" 11 "col" 12 "cos" 13 "cro" 14 "cyp" 15 "cze" 16 "den" 17 "est" 18
"fin" 19 "fra" 20 "ger" 21 "gre" 22 "hkg" 23 "hun" 24 "ice" 25 "ind" 26
"ire" 27 "isr" 28 "ita" 29 "jap" 30 "jor" 31 "kaz" 32 "kor" 33 "lat" 34 "lie" 35 "lit"
36 "lux" 37 "mac" 38 "mal" 39 "mex" 40 "mon" 41 "net" 42 "nze" 43 "nor" 44
"per" 45 "pol" 46 "por" 47 "qat" 48 "rom" 49 "rus" 50 "ser" 51 "sha" 52 "sin" 53
"svk" 54 "slv" 55 "spa" 56 "swe" 57 "swi" 58 "tha" 59 "tun" 60 "tur" 61 "uae" 62
"uk" 63 "usa" 64 "uru" 65 "vie"
label values id cnt
reshape long pisa_math, i(cnt) j(year)
drop if missing(pisa_math)
twoway (scatter pisa_math gdp if year==0, msymbol(smcircle) mcolor(gs13)
mlabel(id) mlabsz(tiny)) (scatter pisa_math gdp if year==3, msymbol(smcircle)
mcolor(gs11) mlabel(id) mlabsz(tiny)) (scatter pisa_math gdp if year==6,
msymbol(smcircle) mcolor(gs10) mlabel(id) mlabsz(tiny)) (scatter pisa_math
gdp if year==9, msymbol(smcircle) mcolor(gs8) mlabel(id) mlabsz(tiny))
(scatter pisa_math gdp if year==12, msymbol(smcircle) mcolor(gs6) mlabel(id)
mlabsz(tiny)) , scheme(s1mono) legend(order(1 2 3 4 5) label(1 "2000") label(2
"2003") label(3 "2006") label(4 "2009") label(5 "2012") cols(5) )
```

#### **Chapter 4. Multiple Linear Regression in SPSS:**

```
reg Math2012 grade_var repeat_var first_select salary scmatedu preprimary dedres
autonomy assessment stu_fback late skip
est store Model_1
reg inequity grade_var repeat_var first_select salary scmatedu preprimary dedres
autonomy assessment stu_fback late skip
est store Model_2
reg Math2012 scmatedu preprimary skip
est store Model_3
reg inequity first_select late
est store Model_4
est table Model_1 Model_2 Model_3 Model_4, b(%9.4g) star stats(N ll r2)
reg Math2012 grade_var repeat_var first_select salary scmatedu preprimary dedres
autonomy assessment stu_fback late skip gdp wb_gini
est store Model_5
reg Math2012 grade_var repeat_var first_select salary scmatedu preprimary dedres
autonomy assessment stu_fback late skip gdp wb_gini
est store Model_6
est table Model_5 Model_6, b(%9.4g) star stats(N ll r2)
```

#### **Chapter 4. Principal Components Analysis in SPSS:**

FACTOR

```
/VARIABLES assessment late skip stu_fback escsonmath wb_gini GDP
scmatedu preprimary salary dedres autonomy NumberofTracks first_select
repeat_var bwsch_var wtsch_var pub_spend HDI GII grade_var ab_group
/MISSING LISTWISE
/ANALYSIS assessment late skip stu_fback escsonmath wb_gini GDP scmatedu
preprimary salary dedres autonomy NumberofTracks first_select repeat_var
bwsch_var wtsch_var pub_spend HDI GII grade_var ab_group
/PRINT INITIAL EXTRACTION ROTATION
/PLOT EIGEN
/CRITERIA MINEIGEN(1) ITERATE(25)
/EXTRACTION PC
/CRITERIA ITERATE(25)
/ROTATION VARIMAX
/SAVE REG(ALL)
/METHOD=CORRELATION.
```

#### **Chapter 4. Multiple Regression Analysis with PCA components in SPSS:**

REGRESSION

```
/MISSING LISTWISE
```

```

/STATISTICS COEFF OUTS R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT Math2012
/METHOD=ENTER FAC1_14 FAC2_14 FAC3_14 FAC4_14 FAC5_14
FAC6_14 FAC7_14.

```

```

REGRESSION
/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT Reading2012
/METHOD=ENTER FAC1_14 FAC2_14 FAC3_14 FAC4_14 FAC5_14
FAC6_14 FAC7_14.

```

```

REGRESSION
/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA CHANGE
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT Science2012
/METHOD=ENTER FAC1_14 FAC2_14 FAC3_14 FAC4_14 FAC5_14
FAC6_14 FAC7_14.

```

#### **Chapter 4. Multiple Regression Analysis with PCA components in STATA:**

```

reg Math2012 component1 component2 component3 component4 component5
component6 component7
est store PISA_Math
reg Reading2012 component1 component2 component3 component4 component5
component6 component7
est store PISA_Reading
reg Science2012 component1 component2 component3 component4 component5
component6 component7
est store PISA_Science
reg Level56Math component1 component2 component3 component4 component5
component6 component7
est store PISA_top_m
reg TIMSS_M8 component1 component2 component3 component4 component5
component6 component7
est store TIMSS_Math
reg TIMSS_S8 component1 component2 component3 component4 component5
component6 component7
est store TIMSS_Scie

```

```

reg PIRLS_4 component1 component2 component3 component4 component5
component6 component7
est store PIRLS
est table PISA_Math PISA_Reading PISA_Science PISA_top_m, b(%9.4g) star
stats(N ll r2)
est table TIMSS_Math TIMSS_Scie PIRLS, b(%9.4g) star stats(N ll r2)

```

#### Chapter 4. Multilevel Models in STATA:

```

xtmixed PV1MATH female escs preprim native native_lang school_escs [pw =
W_FSTUWT] ||country:, ||SCHOOLID:, iter(6) pweight(W_FSCHWT)
est store mod1
xtmixed PV1MATH female escs preprim native native_lang school_escs
component2 component3 component4 component6 [pw = W_FSTUWT]
||country:, ||SCHOOLID:, iter(6) pweight(W_FSCHWT)
est store mod2
xtmixed PV1MATH female escs preprim native native_lang school_escs gdp gini
[pw = W_FSTUWT] ||country:, ||SCHOOLID:, iter(6) pweight(W_FSCHWT)
est store mod3
xtmixed PV1MATH female escs preprim native native_lang school_escs gdp
inequity [pw = W_FSTUWT] ||country:, ||SCHOOLID:, iter(6)
pweight(W_FSCHWT)
est store mod4
xtmixed PV1MATH female escs preprim native native_lang school_escs gdp
first_select [pw = W_FSTUWT] ||country:, ||SCHOOLID:, iter(6)
pweight(W_FSCHWT)
est store mod5
est table mod1 mod2 mod3 mod4 mod5, b(%9.4g) star stats(N ll bic)
xtmixed PV1MATH female escs preprim native native_lang school_escs gdp
tracks [pw = W_FSTUWT] ||country:, ||SCHOOLID:, iter(6)
pweight(W_FSCHWT)
est store mod6
xtmixed PV1MATH female escs preprim native native_lang school_escs gdp
dedres [pw = W_FSTUWT] ||country:, ||SCHOOLID:, iter(6)
pweight(W_FSCHWT)
est store mod7
xtmixed PV1MATH female escs preprim native native_lang school_escs spend
gini [pw = W_FSTUWT] ||country:, ||SCHOOLID:, iter(6) pweight(W_FSCHWT)
est store mod8
xtmixed PV1MATH female escs preprim native native_lang school_escs
SCMATEDU gini [pw = W_FSTUWT] ||country:, ||SCHOOLID:, iter(6)
pweight(W_FSCHWT)
est store mod9
xtmixed PV1MATH female escs preprim native native_lang school_escs gdp gini
SCMATEDU dedres SCHAUTON skip late [pw = W_FSTUWT] ||country:,
||SCHOOLID:, iter(6) pweight(W_FSCHWT)

```

```

est store mod10
xtmixed PV1MATH female escs preprim native native_lang school_escs gdp
ab_group [pw = W_FSTUWT] ||country:, ||SCHOOLID:, iter(6)
pweight(W_FSCHWT)
est store mod11
est table mod6 mod7 mod8 mod9 mod10, b(%9.4g) star stats(N ll bic)

```

#### **Chapter 4. Curve estimation for GINI and GDP per capita in SPSS:**

```

* Curve Estimation.
TSET NEWVAR=NONE.
CURVEFIT
/VARIABLES=Math2012 WITH wb_gini
/CONSTANT
/MODEL=LINEAR LOGARITHMIC QUADRATIC COMPOUND GROWTH
EXPONENTIAL LGSTIC
/PLOT FIT

```

```

* Curve Estimation.
TSET NEWVAR=NONE.
CURVEFIT
/VARIABLES=Math2012 WITH GDP
/CONSTANT
/MODEL=LINEAR LOGARITHMIC QUADRATIC COMPOUND GROWTH
EXPONENTIAL LGSTIC
/PLOT FIT.

```

#### **Chapter 4. Multilevel Models with different functional forms in STATA:**

```

xtmixed PV1MATH female escs preprim native native_lang school_escs gdp gini
[pw = W_FSTUWT] ||country:, ||SCHOOLID:, iter(6) pweight(W_FSCHWT)
est store mod3
xtmixed PV1MATH female escs preprim native native_lang school_escs ln_gdp
gini [pw = W_FSTUWT] ||country:, ||SCHOOLID:, iter(6) pweight(W_FSCHWT)
est store mod33
xtmixed PV1MATH female escs preprim native native_lang school_escs gdp
ln_gini [pw = W_FSTUWT] ||country:, ||SCHOOLID:, iter(6)
pweight(W_FSCHWT)
est store mod34
est table mod3 mod33 mod34, b(%9.4g) star stats(N ll bic)

```

## Chapter 5. VIF scores for ESCS partitioned models in STATA:

```
reg PV1MATH female ESCS westmarm aegean eastmarm westanat mediter ///
    centanat westbsea eastbsea northeast middleeast southeast ///
    primarys anatolianhs sciencehs soc_sciencehs ana_teac_trahs ///
    vocationalhs ana_vocationalhs technicalhs ana_technicalhs ///
    multiprogrammehs policehs[pweight=W_FSTUWT]
estat vif
reg PV1MATH female westmarm aegean eastmarm westanat mediter ///
    centanat westbsea eastbsea northeast middleeast southeast ///
    primarys anatolianhs sciencehs soc_sciencehs ana_teac_trahs ///
    vocationalhs ana_vocationalhs technicalhs ana_technicalhs ///
    multiprogrammehs policehs hisei PARED HOMEPOS
[pweight=W_FSTUWT]
estat vif
reg PV1MATH female westmarm aegean eastmarm westanat mediter ///
    centanat westbsea eastbsea northeast middleeast southeast ///
    primarys anatolianhs sciencehs soc_sciencehs ana_teac_trahs ///
    vocationalhs ana_vocationalhs technicalhs ana_technicalhs ///
    multiprogrammehs policehs hisei PARED HEDRES CULTPOS WEALTH
///
    [pweight=W_FSTUWT]
estat vif
reg PV1MATH female westmarm aegean eastmarm westanat mediter ///
    centanat westbsea eastbsea northeast middleeast southeast ///
    primarys anatolianhs sciencehs soc_sciencehs ana_teac_trahs ///
    vocationalhs ana_vocationalhs technicalhs ana_technicalhs ///
    multiprogrammehs policehs hisei HEDRES ///
    [pweight=W_FSTUWT]
estat vif
```



## C. TURKISH SUMMARY

### EĞİTİMDE EŞİTLİK VE NİTELİK İLİŞKİSİ: ULUSLARARASI ÖĞRENCİ DEĞERLENDİRME VERİLERİNİN TÜRKİYE ODAKLI ÇOK DÜZEYLİ ANALİZİ

#### 1.Giriş:

Yapısal işlevselci teoriler eğitimin yukarı sosyal hareketlilik için en uygun toplumsal araç olduğu iddiasındadırlar (Kretchmar, 2008). Bu sav, tüm vatandaşlara eğitim için eşit olanaklar sunulduğunu ve herkesin yeteneklerine göre toplumda en iyi rolü üstlenmek üzere bir eğitim aldığını varsayar. Öte yandan, çatışmacı teoriler ise eğitimin toplumsal eşitsizlikleri meşrulaştırma ve yeniden üretme aracı olduğunu söyler (Ballantine & Hammack, 2012). Bu tezin amacı bu iki görüşün iddialarını uluslararası öğrenci değerlendirme sınavları verilerini kullanarak test etmektir.

Eğitimde eşitlik tartışmalarının ana eksenini oluşturan bu görüşler eğitimin farklı düzeyleri için analiz edilmektedir. Bunlar; (i) erişim eşitliği, (ii) içerik ve nitelik eşitliği, (iii) eğitimi sürdürebilme/tamamlayabilmede eşitlik ve (iv) eğitimin çıktıları/iş piyasası öncesi eşitlik olarak sıralanabilir (Espinoza, 2007; Farrell, 2007).

Bu tez çalışmasının ana eksenini eğitimde içerik/nitelik açısından eşitlik tartışmaları oluşturmaktadır. Türkiye, son yıllarda eğitime erişime eşitlikte ciddi mesafe kaydetmiş olmasına rağmen, eğitimin niteliği konusunda yapılacak çalışmalara ciddi ihtiyaç duyulmaktadır. Bu nedenle bu tezin iki ana kavramı eğitimde eşitlik ve eğitimde niteliktir. Eğitimde eşitlik kavramı, girdilerden çok çıktıların eşitliğine odaklanılacak şekilde kavramsallaştırılmıştır (Gillborn &

Youdell, 2000). Eğitimde nitelik kavramı ise öğrencilerin yaşam becerilerini geliştirme düzeyi olarak kavramsallaştırılmıştır (Pfeffer, 2012).

Tezin temel hedefi eğitimde eşitlik nitelik ilişkisini belirleyip, eğitimin bu iki boyutunun Türkiye’de nasıl bir ilişki içerisinde olduğunu tespit etmektir. Bu nedenle, iki ana araştırma sorusu geliştirilmiştir. Birinci araştırma sorusu “Eğitimde eşitlik ve nitelik nasıl bir ilişki içerisinde?” şeklindedir. Bu sorunun yanıtlanması için başta uluslararası öğrenci değerlendirme araştırmaları olmak üzere ülkeler düzeyinde veriler analiz edilmiştir. İkinci araştırma sorusu ise “Türkiye’de eğitimde niteliği hangi sosyal ve eğitimsel değişkenler etkilemektedir?” şeklindedir. İlk soruyla bağlantılı olarak bu soruyu yanıtlamak Türkiye eğitim sisteminde eşitliğin ve niteliğin seviyesi ölçülmek istenmiştir. Üst soyutlama düzeyinde ise amaç Türkiye’de eğitimin eşitsizlikleri azaltmadaki rolünü tespit etmek, yukarıda değinilen eğitim sosyolojisinin iki ayrı teorik kanadının iddialarını test etmektir.

Birinci araştırma sorusunu yanıtlamak için uluslararası veriler kullanılmış, eşitlik ve niteliğin tek bir işlemsel tanımını kullanmak yerine iki kavram için de farklı işlemsel tanımlar / indikatörler istatistiksel analizlerde test edilmiştir. İkinci araştırma sorusu için ise daha spesifik bir yaklaşım belirlenerek PISA 2012 verilerinde tanımlandığı şekliyle öğrenci çıktuları eğitimde niteliğin göstergesi olarak işlemselleştirilmiştir.

## **2. Alanyazın taraması:**

Yukarıda değinildiği gibi, tezin ana teorik çerçevesini yapısal işlevselci teoriler ile çatışmacı teorilerin savlarının karşılaştırması oluşturmaktadır. Temel tezleri Durkheim’in tezlerine ve kavramlarına dayandırılan işlevselci teoriler toplumsal yapıları, parçaların toplumdaki uzlaşma durumunu sürdürmeye yönelik işlevlerini odağa alarak analiz etmeye çalışmaktadır. Eğitim sosyolojisi alanında çalışan işlevselciler eğitimin iki işlevine dikkat çekmişlerdir. Bunlardan birincisi toplumsal rollerin farklılaşması, ikincisi ise toplumsal dayanışmadır (Feinberg &

Soltis, 1992). Eğitim her iki amacın da gerçekleşmesi için kritik önemdedir. İşlevselcilere göre eğitimin açık hedeflerinin yanı sıra zımni hedefleri de bulunmaktadır. Öğrencilerin toplumun iktisadi, siyasi ve sosyal kurumlarına uyumu için eğitilmesi eğitimin açık amacı iken; aynı değerleri benimseyen bireyler yetiştirmek ise eğitimin zımni amacı olarak tanımlanabilir. İşlevselci teorinin öncülerinden Parsons (2000), eğitimin bireyleri beceri ve başarılarına göre doğru mesleklere yerleştirilmesi açısından önemini altını çizmiş, bu meritokratik düzen sayesinde olası toplumsal çatışmaların önüne geçildiğini savunmuştur. İşlevselci teorinin eşitsizliğe bakışı konusunda en temel savları ortaya koyan Davis ve Moore (1945) da toplumsal eşitsizliklerin toplumun devamı için gerekli olduğunu öne sürmüşlerdir. Bu ikiliye göre toplumdaki bazı pozisyonlar diğerlerine göre daha önemli olup çeşitli yetenekler gerektirmektedir. Bu pozisyonların adil bir şekilde doldurulması ve bireylerin bu pozisyonlara hazırlanması için eğitim önemli bir araçtır.

İşlevselci teoriler çeşitli noktalarda eleştiriler almıştır. Bunlardan birincisi, bu teorilerin toplumdaki güç dengelerini göz ardı ettiği yönündedir. İşlevselci teoriler toplumu mükemmel bir ahlaki düzende tasvir etseler de, bu düzenin egemen gruplarının ahlakları üzerine kurulu bir düzen olduğu yönünde eleştirilmiştir (Davies & Guppy, 2010). Başka bir eleştiri ise, işlevselci teorilerin eşitsizlik görüşü hakkındadır. Yapısal işlevselci görüşe, toplumsal şartlar başlangıçta eşitsiz olduğu için meritokratik bir yapıdan söz edilemeyeceği ve eşitsizliklerin sadece avantajlı gruplar için işlevsel olduğu yönünde itirazlar gelmiştir.

İşlevselci teoriler eğitim sosyolojisi alanında çeşitli yeni teorilere de öncülük etmiştir. Bunlardan en önemlisi Becker (1964) ve Schultz (1963) tarafından geliştirilen insani sermaye teorisidir. İktisadi temelli bir teori olan insani sermaye yaklaşımı eğitimi geleceğe yönelik bir yatırım olarak tanımlamaktadır. Bireyler, zaman, emek ve para harcayarak kendilerine eğitim yoluyla yatırım yapmakta ve iş piyasasında yatırımlarının karşılığını almaktadırlar. Davis ve Moore'un görüşlerine benzer olmakla birlikte insani sermaye teorisyenleri daha çok eğitimin

iktisadi çıktıklarına odaklanmaktadırlar. Ancak, bu teori kadınlar ve erkekler gibi aynı eğitimi almalarına rağmen aynı çalışma şartlarını edinemeyen farklı sosyal grupların varlığı nedeniyle eleştirilmiştir.

Eğitim sosyolojisinin bir başka ana akımı da çatışma teorileridir. Marx ve / veya Weber'in görüşlerine dayandırılan bu görüş toplumsal düzenin motoru olarak toplumdaki çatışmaları görmüş ve analizini bunun üzerine kurmuştur. Bu nedenle, çatışmacı teoriler toplumu ezen ve ezilen gruplar arasındaki ilişkiler açısından incelemektedir. İşlevselci teorilerin aksine, çatışmacı teoriler eğitimi her çocuğa eşit imkanlar sunan tarafsız bir yapı olarak görmez. Tersine, eğitim baskın grupların kendi değerlerini toplumun geri kalanına dayattıkları bir yapıdır.

Bu akımın önde gelen isimlerinden Bowles ve Gintis (1976) A.B.D.'de yaptıkları araştırmada okul ve iş yeri arasında paralellikler kurmuşlardır. İkili, işçi sınıfı çocuklarının okullarda uysal, itaatkar ve boyun eğen bir şekilde yetiştirildiğini; elit ailelerin çocuklarının ise özerk, yaratıcı bireyler olarak yetiştirildiğini tespit etmiştir. Böylelikle çocuklar, daha okul çağında önceden belirlenmiş bir şekilde gelecekteki potansiyel iş yerlerine hazırlanmaktadırlar. Bowles ve Gintis ayrıca, bireylerin ekonomik başarıları üzerindeki etkilere de bakmış ve zeka düzeyinin ekonomik başarıyla ilişkili olmadığını bulmuşlardır. Bu anlamda, Bowles ve Gintis eğitimin var olan toplumsal eşitsizlikleri meşrulaştırma ve sürdürmeden başka bir işlevi olmadığını savlamışlardır.

Bowles ve Gintis'in çalışmaları gibi yapısal Marxist çalışmaların yanı sıra eğitim sosyolojisi alanında kültürel Marxist çalışmalar da bulunmaktadır. Bunların en ünlüsünde, Paul Willis (1997) İngiltere'de işçi sınıfı bölgelerindeki lise öğrencilerinin hayatlarını etnografik metotlarla incelemiştir. Willis, işçi sınıfı çocuklarının neden işçi olarak kaldıklarını incelediği çalışmasında, bu öğrencilerin yarattıkları alt kültüre dikkat çekmiş ve bu kültürü ezilen sınıfların direniş aracı olarak tanımlamıştır.

Eđitim sosyolojisinde çatıřmacı akımın önde gelen isimlerinden biri de görüřlerini daha çok Weber'e dayandıran Randall Collins'tir. Collins (1979) eđitimin üst sınıfların toplumun alt kesiminden gelen insanları elemek için kurduđu bir yapı olduđunu savunmuřtur. Collins'e göre sınavlar, diplomalar ve sertifikalar yoluyla yüksek statüli işlere olan toplumsal talep üst sınıflar tarafından kontrol edilmekte ve düzenlenmektedir. Okullarda işlenen müfredatın piyasadaki işlerle doğrudan bir ilgisinin bulunmamasının yanı sıra, aynı iş için her geçen yıl daha fazla nitelik istenmesi, Collins'e göre eđitimin yüksek statüli pozisyonlar için bekçilik işlevi görüđünün kanıtıdır. Bu anlamda eđitim, statü rekabeti düzeninin bir aracı ve kültürel tabakalařma sisteminin bir parçasıdır.

Çatıřmacı teoriler de çeřitli açılardan eleřtirilmiřtir. Sarup (1978) ve Giroux (1983) gibi yazarlar çatıřmacı teorilerin mikro düzey ilişkileri ihmal ettiđini ve bireyleri pasif ve makro yapıların güdümünde özneler olarak tanımladıđını ileri sürmüřlerdir. Çatıřmacı teoriler ayrıca, sınıf çatıřması dıřındaki çatıřmaları görmezden gelmekle ve cinsiyet, ırk gibi deđiřkenlere bađlı eřitsizlikleri ihmal etmekle eleřtirilmiřtir.

Eđitim sosyolojisinin üçüncü ana akımı ise sembolik etkileřimci teorilerdir. Mikro düzey ilişkilere odaklanan etkileřimciler büyük toplumsal yapılardan ziyade bireyler arasındaki iletiřime ve alışveriře odaklanmıřlardır. Bu bađlamda, sembolik etkileřim teorileri eđitim alanında daha çok öđrenci ve öđretmenlerin okullarda ne yaptıđı ile ilgilenmiřtir. Bu alandaki ilk çalıřmalardan birinde Becker (1952a, 1952b, 1953) Chicago'daki okulların sınıflarında otoritenin nasıl kurulduđunu incelemiř; öđretmenlerin öđrenci, veli ve müdürlerle bař etme stratejilerini göstermiřtir.

Etkileřimci akımın bir bařka örneđi olan etiketleme teorisi, insanların kendilerine yapıřtırılan sosyal etiketleri içselleřtirdiđini ve benliklerini bu etiketlere göre biçimlendirdiklerini savlamaktadır. Ray Rist'in (1970) öđretmen beklentilerini analiz ettiđi çalıřması bu teoriye örnek olarak verilebilir. Rist, öđretmen

beklentilerinin öğrencilerin gerçek başarısını ve gelecekteki konumlarını doğrudan belirlediğini tespit etmiştir. Öğretmenlerin, öğrenci, sınıf, okul veya bölge düzeyinde geliştirdikleri bu beklentilerin değiştirilmesi güç sonuçlar yaratabildiğinin altı çizilmiştir.

Sembolik etkileşimci teorilere yönelik eleştirilerin en temeli, makro yapıların ihmal edildiği yönündedir (Haralambos & Holborn, 2004). Mikro düzey ilişkilere çok fazla odaklanıldığında, toplumsal yapıdaki önemli etkiler göz ardı edilebilmekte ve eksik bir resim ortaya konabilmektedir. Benzer başka bir eleştiri de etkileşimci teorilerin, sosyal güçlerin ve kurumların etkilerinin göz ardı edilmiş olmasıdır (Andersen & Taylor, 2013). Bu eleştiriye göre, ırka ve cinsiyete dayalı ayrımcılık gibi sistematik yapılar etkileşimci teoriler tarafından yeterince incelenememektedir.

Eğitim sosyolojisindeki bu üç klasik teorinin yanında bu teorileri bir arada kullanan ve geliştiren çağdaş teoriler de vardır. Bunlardan birincisi Bernstein tarafından geliştirilen kod teorisidir. Bernstein'a göre (1961, 1962, 1971a) sınırlı kod ve incelikli kod olmak üzere iki dil kodu vardır. Sınırlı kod kısıtlı bir dil bilgisi ve zayıf bir kelime dağarcığı üzerine kurulu iken; incelikli kod bağlamdan bağımsız ve evrensel bir kod olup geniş kelime dağarcığı ve zengin dil bilgisine dayalıdır. Okul sistemi ve müfredat orta sınıflara özgü incelikli koda uygun olarak düzenlendiği için, sınırlı koda sahip işçi sınıfı çocukları eğitim sisteminde dezavantajlı konumdadırlar.

Bourdieu'nun geliştirdiği kültürel sermaye teorisi de kod teorisine benzemektedir. Bourdieu'nun (1973, 1986) kitaplar, tablolar, diplomalar gibi maddi veya kurumsal kültürel varlıklara sahip olma durumuna göre tanımladığı kültürel sermaye, toplumsal tabakalaşmayı oluşturan boyutlardan biridir. Yüksek kültürel sermayeleri ile orta ve üst sınıf ailelerin çocukları eğitim sisteminde avantajlı konumdadırlar. Bourdieu ve Passeron'a (1990) göre okullarda öğretilenler üst sınıfların değerleri ve fikirleridir. Bu yolla toplumsal yapı yeniden üretilmektedir.

Eđitim sosyolojisi dıřındaki bařka bir teorik alan da eđitim politikasıdır. Eđitim politikaları konusunda üç ana akımdan söz etmek mümkündür. Bunlardan birincisi yukarıda da bahsedilen insani sermaye teorisidir. Eđitimi ve eđitim politikasını bireye yapılan ekonomik bir yatırım olarak gören insani sermaye teorisi uzun yıllardır popölerliğini korumakla birlikte eşit eđitime rađmen eşitsiz iş piyasası koşulları yařayan grupların varlığı nedeniyle eleřtirilmektedir. Eđitim politikaları konusunda ikinci görüř, özellikle uluslararası kuruluşlar tarafından kullanılan haklar yaklaşımıdır. Bu yaklaşım, insani sermaye yaklaşımının aksine eđitimi ekonomik getirilerinden bađımsız olarak herkes için bir insan hakkı olarak tanımlamaktadır. Ancak, bu yaklaşım da sadece eđitime eriřime ve resmi eşitsizliklere odaklandığı ve eđitimin içeriğini göz ardı ettiđi için eleřtirilmiřtir (Robeyns, 2006). Eđitim politikaları alanındaki son yaklaşım ise, Amartya Sen'in (1992, 1997, 1999) geliřtirdiđi yapabilirlikler yaklaşımıdır. Yeterlilikleri sađlıklı olma, yeterli beslenme, barınma olanaklarına sahip olma gibi işlevler olarak tanımlayan Sen için eđitim kritik önemdedir. Eđitim hem kendi için bir yapabilirlik olup hem de diđer yeterliliklere sahip olma yolunda önemli bir işlev görmektedir. Yapabilirlikler yaklaşımına yönelik en ciddi eleřtiri ise işlemselleřtirilmesinin ve deđerlendirilmesinin çok güç olması nedeniyle yapılmaktadır (Nussbaum, 1987; Qizilbash, 2009; Sugden, 1993).

Amaçları ve araştırma soruları kapsamında bu tez çalışmasının merkezinde çatışmacı teori bulunmaktadır. İşlevselci teori ile karşılaştırılan çatışmacı teorinin yanında yer yer kültürel sermaye teorisi ve yapabilirlikler teorisine de atıflar yapılmaktadır.

### **3. Yöntemler ve yöntembilimsel yaklaşım:**

Tez boyunca analizler yukarıda belirtilen iki ana araştırma sorusu etrafında örgütlenmiştir. Tezin, dördüncü bölümünde birinci araştırma sorusu olan eđitimde eşitlik ve niteliğin nasıl bir ilişki içerisinde olduđu sorusu uluslararası veri setleri kullanılarak yanıtlandırılmaya çalışılmıştır. Araştırmanın temel hipotezi eđitimde eşitlik ve nitelik arasında pozitif bir ilişki olduğudur. Bu hipotez test edilirken

farklı veri setlerinden alınan eğitimde nitelik ve eşitliğin farklı işlemsel tanımları sınanmıştır. İkinci araştırma sorusu olan Türkiye’de eğitimde niteliğin hangi sosyal ve eğitimsel değişkenlerden etkilendiği sorusu ise beşinci bölümde PISA 2012 Türkiye verisi analiz edilerek yanıtlanmıştır. Bu bölümde eğitimde nitelik tanımını daha özelleşmiş bir şekilde yapılmıştır. PISA 2012 sınavında öğrencilerin gösterdikleri performans eğitimde niteliğin bir göstergesi olarak kabul edilmiştir. Eğitimde eşitlik ise farklı sosyal gruplar arasındaki nitelik farklarının tespiti ile belirlenmeye çalışılmıştır. Bu bölümdeki ana hipotez Türkiye eğitim sisteminde gerçek bir eşitlik durumu var ise farklı sosyal gruplar arasında eğitimde nitelik bakımından fark olmadığı şeklindedir. Bu amaçla sosyo-ekonomik statü, cinsiyet, coğrafi bölge, okul türü gibi değişkenler aracılığıyla farklı gruplar arasında karşılaştırmalar yapılmıştır.

Tez boyunca metodolojik olarak eleştirel yaklaşım benimsenmiştir. Bu yaklaşımın benimsenmesinin temel nedeni çalışmanın amaçlarından birinin eğitimin toplumsal eşitsizlikleri kaldırma veya yeniden üretmedeki rolünün sınanmasıdır. Eğitimin toplumda meritokrasiyi sağlayan temel araç olduğu iddiasının aksine yukarıda da altı çizildiği gibi pek çok araştırma eğitimin tersi bir işlev üstlenebildiğini göstermiştir. Bu çalışma boyunca da eğitimin toplumsal eşitsizlikler üzerindeki etkisi izlenmeye çalışılmıştır.

Bu amaçlar doğrultusunda tez boyunca niceliksel yöntemlerle analizler yapılmıştır. Niceliksel metotlar genellikle pozitivist metodolojilerle eşlenmesine rağmen eleştirel metodoloji bağlamında kullanılması da mümkündür (Carroll, 2004).

Tezin dördüncü bölümünde farklı veri setlerinden eş zamanlı olarak yararlanılmıştır. PISA, TIMSS, PIRLS gibi uluslararası öğrenci değerlendirme sınavlarından sağlanan verilerin yanı sıra UNDP, Dünya Bankası, OECD, Eurydice gibi uluslararası kuruluşların sağladığı veri setleri de kullanılmıştır. Beşinci bölümde ise sadece PISA 2012 araştırmasının Türkiye örnekleme verileri kullanılmıştır.



Bu veri setleri ile araştırma soruları çeşitli istatistiksel yöntemlerle analiz edilmiştir. İki analiz bölümünde de yer yer betimsel istatistiklere başvurulmakla birlikte analizlerin çoğunluğunu yorumsayıcı istatistiksel teknikler oluşturmaktadır. Basit ve çoklu regresyon modellerinin, lojistik regresyon modelleri ve temel bileşenler analizlerinin yanında tez boyunca temel yöntem olarak çok düzeyli modelleme teknikleri kullanılmıştır. Çok düzeyli modelleme PISA verisi örneğinde olduğu gibi verinin öğrenci, okul ve ülke gibi farklı düzeyde örgütlendiği kümelerde farklı düzeyler arasındaki etkileşimi dikkate alması bakımından istatistiksel faydalar sağlamaktadır (Raudenbush & Bryk, 2002). İki analiz bölümünde de veriler çok düzeyli olarak örgütlendiğinden nihai analizlerde bu teknik benimsenmiştir.

Çok düzeyli analizler için MLwiN 2.30 yazılımı kullanılmıştır (Rashbash et al., 2009). Ayrıca, çeşitli farklı analizler için ve MLwiN'in yetersiz kaldığı durumlarda STATA 12 (StataCorp, 2011) ve SPSS 20 (IBM Corp., 2011) yazılımlarına da başvurulmuştur.

#### **4. Eğitimde eşitlik ve nitelik ilişkisi:**

Eğitimde eşitlik ve nitelik ilişkisini inceleyen çalışmalar uzun yıllar boyunca eğitimin bu iki boyutu arasında bir değiş tokuş ilişkisi olduğunu öne sürmüş ve bu yaklaşım eğitim politikaları üzerinde de etkili olmuştur (Valverde, 1988). Bu yaklaşıma göre eğitimde eşitlik ve nitelik arasında negatif bir ilişki olup bir eğitim sisteminin hem son derece eşitlikçi hem de yüksek nitelikli olması mümkün değildir. Bu yaklaşım işlevselci teorilerin eşitsizliklerin işlevsel olduğu yönündeki iddialarıyla örtüşmektedir. Ancak, son yıllarda uluslararası öğrenci değerlendirme sınavlarının sağladığı veriler sayesinde bu iddiaları daha detaylı bir şekilde incelemek mümkün olmuştur.

Yapılan çalışmalar eğitimde nitelik ve eşitlik ilişkisine dair farklı sonuçlar vermektedir (Van de Werfhorst & Mijs, 2010). Birbiriyle çelişen sonuçlar veren bu çalışmalara dair çeşitli metodolojik sorunlar tespit edilmiş ve tezin bu bölümünde

bu sorunlar aşılarak daha sağlıklı bir sonuç üretilmeye çalışılmıştır. Öncelikle, eğitimde eşitlik ve nitelik ilişkisini inceleyen araştırmalar değiş tokuş ilişkisini çürütmeye odaklanmışlardır. Ancak, bu iddianın tersine eğitimin iki boyutu arasında pozitif bir ilişki olabileceği göz ardı edilmiştir. Bu çalışmalar arasında en bilinenler OECD'nin PISA araştırmaları verileriyle yazdığı raporlardır (OECD, 2001, 2004, 2009, 2010, 2013b). Bu raporlarda ülkeler ortalamasının altında ve üstünde eşitlik derecesine sahip olan sistemler ve ortalamasının altında ve üstünde performans gösteren ülkeler olarak dörde ayrılmıştır. Hem yüksek eşitlik düzeyinde olup hem de yüksek performans gösteren ülkelerin varlığı eğitimin bu iki boyutu arasında bir değiş tokuş ilişkisi olamayacağına dair bir kanıt olarak öne sürülmüştür. Ancak, bu resimde ihmal edilen bir nokta hem yüksek eşitsizlik seviyesinde hem de ortalamasının üstü başarıya sahip olan ülke sayısının azlığıdır. Bu durum, eşitsizlik ve niteliğin bir arada olamayacağına dair bir ipucu barındırmaktadır. Son yıllarda yapılan bazı çalışmalar bu yönde bir ilişkiye dikkat çekmişlerse de istatistiksel olarak anlamlı sonuçlar ortaya koyamamışlardır (Condrón, 2011; Wilkinson & Pickett, 2009). Condrón yaptığı analizde gelişmiş ülkelerde uluslararası bir eşitsizlik endeksi olan GINI ile PISA performansı arasındaki ilişkiyi incelemiş, ancak gösterdiği pozitif ilişki istatistiksel olarak anlamlı bulunmamıştır. Ancak, bu tez kapsamında aynı analiz PISA araştırmasına katılan tüm ülkeler ve 2000 - 2012 yılları arasında yapılan tüm PISA sınavları için genişletildiğinde eşitsizlik ile PISA performansı arasında istatistiksel olarak anlamlı ve kuvvetli bir negatif ilişki olduğu ( $r^2: 0.49$ ) tespit edilmiştir.

Varolan araştırmalara dair bir başka problem de bu araştırmaların genellikle iki değişkenli analizlerle sınırlı kalmasıdır. İki'den fazla değişkenin dikkate alındığı analizler kullanılan pek çok değişkeninin birbiriyle ilişkili olduğunu göstermektedir. Bu durum, değişkenler arasındaki gerçek ilişkiyi görmeye engel olabilmektedir. Bu problemi aşmak için tezin dördüncü bölümünde aşamalı bir yöntem izlenmiştir. Yukarıda değinildiği gibi öncelikle GINI ile tanımlanan eşitsizlik ve nitelik arasındaki pozitif ilişki gösterilmiştir. Daha sonra, OECD raporlarında kullanılan eşitsizlik göstergesi test edilmiş ve bu değişkenin nitelik ile

doğrudan bir ilişki içinde olmadığı gösterilmiştir. Bir sonraki adım olarak, pek çok yakın dönem çalışmada kullanılan çeşitli eşitsizlik/eşitlik göstergeleri çoklu regresyon modellerinde sınanmış ve bağımsız değişkenlerin birbirleriyle olan yüksek ilişkisi nedeniyle oluşan tutarsız sonuçlar gösterilmiştir. Bu sorunu aşmak için temel bileşenler analizinden yararlanılarak çeşitli bileşenler oluşturulmuş ve bu bileşenlerin çoklu regresyon modellerinde nitelik üzerindeki etkisi incelenmiştir. Kesin sonuçlar elde edilememekle birlikte GINI, GDP gibi bazı değişkenlerin nitelik üzerindeki etkileri not edilmiştir. Son aşama olarak, veriler çok düzeyli modeller ile incelenmiştir. OECD raporlarına göre ülkeler ve farklı modeller arasında tutarlı bir şekilde etkili bulunmuş olan çeşitli değişkenlerin yanı sıra yukarıda bahsedilen analizlerde kullanılan çeşitli eşitlik/eşitsizlik göstergeleri ayrı modellerde test edilmiştir. Modellemeler sonucunda özellikle GINI ile ölçülen eşitsizlik düzeyinin ortalama öğrenci performansı üzerinde istatistiksel olarak anlamlı bir etkisi olduğu gözlemlenmiştir.

Sonuç olarak, bu bölümde eğitimde niteliğin diğer tüm potansiyel değişkenler dikkate alındığında bile eşitsizlik ile negatif bir ilişki için de olduğu bulunmuştur. Başka bir deyişle, işlevselci iddiaların tersine eğitimde eşitlik ve niteliğin birbirini besleyen boyutlar olduğu ortaya konmuştur.

## **5. Türkiye eğitim sisteminde eşitlik ve nitelik:**

Beşinci bölümde yukarıdaki bulgular ışığında Türkiye’de eğitimde eşitlik ve nitelik ilişkisi incelenmektedir. PISA 2012 Türkiye verileri kullanılarak, 15 yaşındaki öğrencilerin matematik performansları üzerindeki etkiler çok düzeyli modeller ile test edilmiştir. Modellere cinsiyet, sosyo-ekonomik statü, coğrafi bölge, okul türleri gibi değişkenler dahil edilmiştir.

Modellerin ilk bulgularından biri okul türünün matematik performansı üzerindeki etkisinin çok büyük olduğudur. Okul türünün dahil edilmediği modellerde okul düzeyinde ortalama sosyo-ekonomik statü, okulun fiziksel alt yapısı, okulun eğitim materyalleri alt yapısı ve sınıf büyüklüğü gibi değişkenler anlamlı bulunurken okul

türü modele dahil edildiğinde bu değişkenler anlamlarını yitirmiştir. Bu durum, Türkiye’de okul türü değişkeninin ortalama sosyo-ekonomik düzey, okulların fiziksel ve eğitsel alt yapısı gibi özellikleri de temsil ettiğini göstermektedir. Okul türleri karşılaştırıldığında az sayıda öğrencinin devam ettiği Anadolu Lisesi, Fen Lisesi, Sosyal Bilimler Lisesi, Anadolu Öğretmen Lisesi, Polis Koleji gibi okullarda öğrenim gören öğrencilerin genel liselere ve meslek liselerindeki öğrencilere göre çok üst düzeyde performans gösterdikleri gözlemlenmektedir. Örnek vermek gerekirse, Anadolu lisesine giden bir öğrenci ile okul türü dışında aynı özelliklere sahip ama genel liseye devam eden bir öğrenci arasındaki puan farkı yaklaşık 100’dür. Aynı modellerde bir okul yılının etkisinin yaklaşık 34 puan olduğu göz önüne alınırsa, Anadolu lisesi ve genel lise öğrencisi arasında yaklaşık 3 öğretim yılına denk gelen bir fark bulunmaktadır.

Modellerde bulunan başka bir etkili değişken de cinsiyettir. Kadın ve erkek öğrenciler karşılaştırıldığında kadın öğrencilerin PISA matematik performanslarının erkek öğrencilerden yaklaşık 25 puan düşük olduğu tespit edilmiştir. Kadın ve erkekler arasında Matematik alanındaki bu fark pek çok ülkede benzer olmakla birlikte Türkiye için TIMSS 2011 sonuçları ile birlikte değerlendirildiğinde ilginç bir örüntü görülmektedir. PISA ile aynı şeyi ölçmemekle birlikte TIMSS sınavında 4. ve 8. Sınıf öğrencilerine benzer bir test uygulanmaktadır. 2011 yılında yapılan TIMSS matematik testinde Türkiye’de kadınların erkeklerden az da olsa önde olduğu görülmektedir (Mullis et al., 2013). PISA 2012 örneğinin % 90’dan fazlasını 9. ve 10. sınıf öğrencilerinin oluşturduğu düşünüldüğünde 1-2 yıl içerisinde matematik başarısı açısından cinsiyet farklarının bu denli açılması dikkate değerdir.

Modellerin bir başka bulgusu da coğrafi bölge değişkeninin etkisidir. İstanbul ve İstanbul’a komşu bazı bölgeler dışında PISA matematik performansının çok düşük olduğu görülmektedir. Özellikle doğu bölgelerindeki öğrenciler, İstanbul’daki öğrencilerden 30 ila 50 puan geridedirler. Burada altı çizilmesi gereken nokta da

okul türü değişkeninde olduğu gibi bazı okul seviyesi değişkenlerin etkisinin bir kısmının bölge değişkeni tarafından da temsil ediliyor olabileceğidir.

Türkiye’de 15 yaşındaki öğrencilerin matematik başarıları üzerinde istatistiksel olarak anlamlı olan bir diğer değişken de sosyo-ekonomik statüdür. PISA araştırması için geliştirilen PISA ekonomik, sosyal ve kültürel statü endeksiyle (ESCS) ölçülen sosyo-ekonomik statünün öğrenci performansı üzerinde pozitif bir etkisi vardır. Bu endeks üç adet alt endeksten oluşmaktadır. Bunlar, eğitim seviyesi en yüksek ebeveynin eğitim seviyesi, ISEI kategorilerine göre meslek statüsü en yüksek olan ebeveynin meslek statüsü ve hane varlıkları endeksleridir. Hane varlıkları endeksi de yine üç ayrı alt endeksten oluşmaktadır. Bunlar da, hanedeki eğitimle ilgili bazı mülklerin varlığına göre hesaplanan hane eğitim varlıkları endeksi, hanedeki kitap sayısı, sanat eserleri gibi kültürel varlıklara göre hesaplanan kültürel varlıklar endeksi ve hanedeki bazı başka eşyaların varlığına göre hesaplanan hane servetleri endeksleridir. Bu alt endekslerin birbirleriyle yüksek derecede ilişkili olması sebebiyle temel bileşenler analizi kullanılarak oluşturulan ESCS değişkeni istatistiksel olarak en güvenilir sonuçları verecektir. Ancak, politika önerisi geliştirme sürecinde pek çok farklı boyutu olan bu değişkeninin etkisini yorumlamak zorlaşmaktadır. Bu nedenle, tezin beşinci bölümünde ESCS değişkeninin alt bileşenleri ayrı ayrı incelenmiştir. Oluşturulan modellerde ebeveyn eğitim durumu ve hanedeki eğitim kaynaklarının matematik performansı üzerindeki en etkili değişkenler olduğu görülmüştür.

Beşinci bölümde bir sonraki adım olarak çok düzeyli modeller, etkileşim terimleri eklenerek geliştirilmeye çalışılmıştır. Cinsiyet ve sosyo-ekonomik statü değişkenlerinin birbirleriyle ve bölge ve okul türü değişkenleri ile etkileşim terimlerinin yanı sıra sosyo-ekonomik statü değişkeninin farklı fonksiyonel formları da test edilmiştir. Yapılan analizlerde sosyo-ekonomik statü endeksinin logaritmik dönüşümünün matematik performansının daha iyi bir tahmin edicisi olduğu gösterilmiştir. Bu sonucun anlamı, sosyo-ekonomik statüdeki birim artışın alt sosyo-ekonomik gruplar için matematik performansını daha fazla arttırdığı,

sosyo-ekonomik statü endeksinde yukarılara çıkıldıkça bu etkinin azaldığı ve giderek kaybolduğu yönündedir. Böyle bir ilişki alt sosyo-ekonomik gruplara yapılacak yatırımların etkisinin çok daha fazla olacağına işaret etmektedir.

ESCS değişkeninin fonksiyonel formu belirlendikten sonra eklenen etkileşim terimleri arasında sadece cinsiyet ve okul türü arasındaki etkileşimin anlamlı bir etkisi olduğu bulunmuştur. Önceki modellerde kadınların matematik performanslarının erkeklere göre daha düşük olduğu bulunmuştu. Etkileşim modellerinde ise bu etki devam ederken, seçici tipteki okul türlerinde kadınlar aleyhine bir etkileşim etkisinin de olduğu gözlemlenmiştir. Başka bir deyişle, genele bakıldığında kadınlar matematik çıktıları açısından zaten dezavantajlı iken sınavla öğrenci alan okul türlerinde bu dezavantajın daha da büyüdüğünü söylemek mümkündür. Daha önce altı çizildiği gibi PISA matematik alanında erkeklerin daha yüksek performans göstermesi Türkiye'ye özgü bir durum değildir. Ancak, modellerde bağımsız değişkenler sabit tutulup bağımlı değişken olarak matematik performansı yerine Türkiye'de ve pek çok farklı ülkede kadınların daha başarılı olduğu okuma alanı veya cinsiyete göre başarı farkının çok düşük olduğu fen alanı performansları konulduğunda da bu etkileşim terimi varlığını sürdürmektedir. Bu durum, seçici okul türlerinde kadınlar aleyhine eşitsizlik yaratan yapıların ortaya konulması ve ıslah edilmesi gerekliliğini göstermektedir.

Beşinci bölümün son kısmında ise okul türü değişkeninin etkisinin daha derinlemesine ölçülmesi için seçim modellerine (Heckman, 1979) başvurulmuştur. Yukarıda değinildiği gibi Türkiye'de 15 yaşındaki öğrencilerin matematik performanslarının en büyük belirleyicisi devam ettikleri okul türleridir. Ancak, modeller karşılaştırmalı olarak incelendiğinde bu etkinin önemli bir kısmının okul türü değişkeninin diğer pek çok okul seviyesinde değişkeni temsil etmesiyle büyüdüğünü de söylemek mümkündür. Çok düzeyli modellerde anlamlı etkisi bulunmayan çeşitli okul seviyesinde değişkenin okul türüne göre dağılımlarına bakıldığında, sınavla öğrenci alan ve akademik müfredat uygulayan

seçici akademik okul türlerinin daha yüksek ortalama sosyo-ekonomik düzeyde öğrenci grubuna, daha az öğretmen sıkıntısına, daha iyi fiziksel ve eğitsel altyapı olanaklarına sahip oldukları görülmektedir. Aynı dağılım öğrenci seviyesinde değişkenler için uygulandığında da yine seçici akademik okulların daha yüksek sosyo-ekonomik statüden ve daha fazla oranda okul öncesi eğitim almış öğrencileri barındırdığı tespit edilebilmektedir. Bu sonuçlar halihazırda farklı okul türlerine yerleşme olasılığının, analiz edilen çok düzeyli modellerde kullanılan diğer bağımsız değişkenler tarafından belirleniyor olması olasılığını ortaya çıkarmaktadır. Böyle bir ilişki, seçim hatası denilen istatistiksel problemi ortaya çıkarabilmektedir. Bu nedenle, öncelikle farklı okul türlerine yerleşme olasılıklarını hesaplamak için örneklem üçe bölünmüştür. Birinci kategoriye sınavla öğrenci alan akademik ve mesleki müfredat uygulayan liseler alınmış, ikinci kategoriye düze lise ve ilköğretim okulları alınmış, üçüncü kategoriye ise mesleki ve teknik liseler alınarak büyüklükleri birbirine yakın üç alt küme oluşturulmuştur. Bu üç okul türü kategorisine yerleşme olasılığı PISA veri setindeki uygun değişkenler kullanılarak lojistik regresyon modelleriyle hesaplanmıştır. Farklı türdeki okullara yerleşme olasılığını etkileyen faktörlere bakıldığında, cinsiyet, okul öncesi eğitim, ailede konuşulan dil ve sosyo-ekonomik statü değişkenlerinin etkili olduğu görülmüştür.

Lojistik regresyon modellerinin sonuçları incelendiğinde, yukarıdaki sonuçların tersine kadınların daha yüksek olasılıkla seçici türdeki okullara yerleştiği, mesleki eğitim veren okullara ise daha düşük oranda yerleştikleri bulunmuştur. Daha önce de değinildiği gibi TIMSS sonuçları da Türkiye’de matematik alanında ilköğretim düzeyinde kadınların erkeklere göre daha başarılı olduğunu göstermektedir. Lojistik regresyon sonuçları bu sonucu doğrulamaktadır. Ancak, PISA verileriyle yapılan çok düzeyli modellemelerde kadınların daha başarısız olması ve özellikle sınavla öğrenci alan akademik türdeki liselerde daha da başarısız olmaları ortaöğretim düzeyinde kadınlar aleyhine işleyen bir yapıya işaret etmektedir.

Lojistik regresyon modellerinin bir başka bulgusu da sosyo-ekonomik statü değişkeninin yüksek etkisidir. Seçici türdeki okullara yerleşme oranı üzerinde, cinsiyet, okul öncesi eğitim ve ailede konuşulan dil değişkenleri de kontrol edildiği halde, sosyo-ekonomik statü endeksinin karesinin pozitif bir etkisi olduğu bulunmuştur. Sosyo-ekonomik statü teriminin etkisinin doğrusal değil de terimin karesi şeklinde olması ailenin sosyo-ekonomik düzeyi arttıkça çocuğun seçici türdeki bir liseye yerleşme olasılığının katlanarak arttığına delildir.

Bir sonraki adım olarak, lojistik regresyon modellerinde hesaplanan değerler kullanılarak her öğrenci için farklı okul türlerine yerleşme olasılıkları hesaplanmıştır. Daha sonra, oluşturulan üç okul türü kategorisi için çok düzeyli modeller tekrar hesaplanmıştır. Aynı modellere seçim olasılıkları da eklenerek oluşturulan seçim modelleri de bu modellerle karşılaştırılmıştır. Seçim modellerinin karşılaştırılması ile bulunan en çarpıcı sonuç, seçim olasılıklarının anlamlı bir etkisi bulunmasa da bu etkiler kontrol edildiğinde seçici okul türlerinde ve genel akademik okul türlerinde sosyo-ekonomik statünün etkisinin kaybolmasıdır. Yukarıdaki bulgularla birlikte düşünüldüğünde, ailenin sosyo-ekonomik statüsünün çocuğun performansı üzerindeki etkisinin ilköğretim 8. sınıfın sonunda uygulanan seçme sistemi ile okul türü değişkenine devredildiği söylenebilir.

## **6. Sonuç:**

Bu çalışmada eğitimde eşitlik ve nitelik ilişkisi ve bu ilişkinin Türkiye örneğinde nasıl işlediği incelenmiştir. Yapılan istatistiksel analizlerde eğitimde eşitlik ve nitelik arasında pozitif bir ilişki olduğu ortaya konulmuştur. Türkiye’de ise okul sisteminin ne eşitlikçi ne de nitelikli olduğu, dahası mevcut eğitim sisteminin var olan eşitsizlikleri arttırdığı bulunmuştur.

Tezin dördüncü bölümünde, ülke düzeyinde verilerle yapılan analizlerde eğitimde eşitlik ve niteliğin birbirini besleyen özellikler olduğu gösterilmiştir. Yapısal işlevselci teorilerin iddiasının aksine eşitsizliklerin işlevsel olmadığı, eşitlik ve



nitelik arasında bir deęiş tokuş ilişkisinden söz edilemeyeceęi farklı analizlerle ortaya konmuştur. Bu çalışmanın bulguları eğitimde eşitlik ve nitelik ilişkisini inceleyen gelecek araştırmalara çeşitli yönlerden katkılar sağlayacaktır. Bunlardan en önemlisi, eşitsizliğin işlemselleştirmesi konusundadır. OECD tarafından hazırlanan PISA raporlarında eşitsizlik, sosyo-ekonomik statünün sınav performansındaki deęişimi ne oranda açıkladığı ile ölçülmektedir. Ancak, bu tezin bulguları bu terimin çok iyi bir tahmin edici olamayabileceğini ortaya koymaktadır. Sosyo-ekonomik statünün PISA performansını belirleme oranı pek çok deęişkenin içine alındığı ülke, okul ve öğrenci düzeyinde tüm PISA örnekleminin dahil edildiği çok düzeyli modellerle hesaplanmaktadır. Ancak, bu çalışmanın bir başka bulgusu ülkeye özgü okul türü ve bölge gibi deęişkenlerin sosyo-ekonomik statü farklılıklarını yüksek oranda gizliyor olabileceğidir. Ülkeye özgü deęişkenler ülkeler arası modellere dahil edilmediğinden hesaplanan bu eşitsizlik terimleri yanıltıcı olabilmektedir. OECD'nin hazırladığı PISA 2012 sonuçlarına dayalı son raporlarda Türkiye'nin gösterdiği başarı için özel bölümler ayrılmıştır (Hanushek & Wößmann, 2015; OECD, 2013c). Bu iddianın dayanağı Türkiye'de PISA matematik başarısının ESCS tarafından belirlenme oranının PISA 2003 ve PISA 2012 sınavları arasında % 28'den % 14,5'e düşmesidir. Ancak, beşinci bölümde yapılan analizlerin bulguları bu sonuçların yanıltıcı olabileceğini göstermektedir. Bu anlamda, dięer eşitsizlik göstergelerinin yerine GINI deęişkeninin istikrarlı bir şekilde anlamlı etkisinin bulunması bu ölçeğin bağlamsal etkilerden arınmış olmasından kaynaklanıyor olabilir.

Tezin Türkiye verisinin analiz edildiği beşinci bölümünde, Türkiye'de PISA matematik perfomansı ile ölçüldüğü şekliyle eğitimde nitelik üzerinde en etkili deęişkenlerin cinsiyet, sosyo-ekonomik statü, okul türü ve bölge olduğu bulunmuştur. Özellikle farklı okul türleri arasında ciddi farklılıkların bulunduğu gözlemlenmiştir. Ancak, okul türü farklılıklarının da yine cinsiyet, sosyo-ekonomik statü ve bölgesel farklılıklar gibi pek çok deęişken tarafından belirlendiği tespit edilmiştir. Mevcut eğitim sisteminin bu anlamda sosyal eşitsizlikleri azaltıp meritokratik bir düzen sağladığını iddia etmek oldukça güçtür.

Aksine, çatışmacı teorilerin iddia ettiği gibi eğitim sisteminin Türkiye’de var olan sosyal eşitsizlikleri pekiştirdiğini söylemek mümkündür.

Türkiye örneğinde etkili bulunan bir başka değişken de cinsiyettir. Son yıllarda eğitim olanaklarına erişim açısından cinsiyet farklılıkları büyük oranda ortadan kaldırılmasına rağmen, eğitim çıktıları açısından cinsiyete dayalı eşitsizlikler devam etmektedir. PISA matematik performansına göre kadınların daha geride olduğu, özellikle seçici akademik türdeki en prestijli ve başarılı okullarda kadınların ekstra bir dezavantaja sahip olduğu bulunmuştur. Cinsiyete dayalı eşitsizlikleri eğitim sistemi içerisinde yeniden üreten bu yapının daha derinlemesine analizi ve bu eşitsizlikleri ortadan kaldıracak çözümler geliştirilmesi elzemdir.

Türkiye’de niteliğin belirleyenlerinden bir diğeri de sosyo-ekonomik düzey farklılıklarıdır. Yukarıda altı çizildiği gibi bu etkiler belli oranda okul türü ve bölge farklılıkları tarafından temsil edilmekle beraber yine de eğitim çıktıları üzerinde ciddi etkiye sahiptir. Özellikle sosyo-ekonomik dağılımın en alt kesimlerindeki aileler için küçük iyileşmelerin çocukların başarısı üzerinde daha büyük etkileri olacağı dikkate alınmalı ve politikalar bu yönde geliştirilmelidir.

Yapılan analizlerin en çarpıcı bulgularından biri de Türkiye’de ortaöğretim düzeyinde okul türlerinin öğrenci performansına olan çok büyük etkisidir. Türkiye eğitim sisteminde 8. sınıftan sonra öğrenciler başarı düzeylerine göre ayrılmakta ve gelecekteki akademik performansları bu aşamada büyük ölçüde belirlenmektedir. Yapılan analizler ortaöğretim düzeyindeki ayrımın sadece akademik başarıya değil aynı zamanda çeşitli sosyo-ekonomik ve eğitsel değişkenlere göre de belirlendiğini ortaya koymaktadır. Dahası, eşitlikçi bir perspektifle planlandığında dezavantajlı okulların daha çok kaynak alması gerekirken, Türkiye’de daha başarılı olan ve tüm lise düzeyindeki okulların sadece beşte birini oluşturan okul türlerinin aynı zamanda daha iyi fiziksel ve eğitsel altyapı olanaklarına sahip olması var olan eşitsizliklerin katlanmasına hizmet

etmektedir. Yakın zamanda yapılan okul türlerinin azaltılması politikası ve tüm genel liselerin Anadolu liselerine dönüştürülmesi uygulamasının ise bu sorunu ne ölçüde gidereceği tartışma konusudur. Bu dönüşümün sadece tabela değişikliği şeklinde kalması ihtimali ve öğrencilerin ortaöğretim öncesi hala merkezi sınav başarılarına (ve potansiyel olarak ailelerinin sosyo-ekonomik düzeylerine göre) ayrışıyor olması yapılan düzenlemenin eşitsizlikleri gidermeyeceği, yalnızca eşitsizliğin farklı değişkenler tarafından temsil edilebilecek şekilde üstünün örtüleceği endişesini uyandırmaktadır.

Türkiye’de eğitimde nitelik üzerindeki bir başka etki de bölgesel farklılıklardır. Okul türünde olduğu gibi pek çok okul seviyesinde değişkenin bölgelere göre eşitsiz dağıldığını, doğu bölgelerinin en kötü şartlarda okullara sahip olduğunu söylemek mümkündür. Okul türü dağılımlarına bakıldığında da en başarılı okul türlerinin doğu bölgelerinde daha az sayıda olduğu görülebilir. Bölgelerarası mevcut diğer eşitsizlikler de göz önüne alındığında (Akkoyunlu-Wigley & Wigley, 2009; World Bank, 2010), Türkiye’nin doğu bölgelerindeki öğrencilerin ve okulların eşitlikçi hedefler için daha fazla eğitim yatırımına ihtiyaç duyduğu bir gerçektir.

## D. CURRICULUM VITAE

CANER ÖZDEMİR

İncivez Mah. Üniversite Cad. No:69/31 67100 Zonguldak, Turkey  
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### EDUCATION

Middle East Technical University

Ph. D. in Sociology

2010-2015

Dissertation: Relationship Between Equity And Excellence In Education:  
Multilevel Analysis Of International Student Assessment Data With A Focus On  
Turkey

Supervisor: Prof. Dr. Ayşe Gündüz-Hoşgör

CGPA: 4.00/4.00

University of Stirling

Visiting Ph. D. researcher in Sociology and Social Policy

2013-2014

Supervisors: Dr. Marina Shapira, Prof. Dr. Paul Lambert

Middle East Technical University

M.Sc. in Sociology

2008-2010

Thesis: Social, Economic and Political Participation of the Youth in Urban South-  
eastern Anatolia

Supervisor: Dr. F. Umut Beşpınar, Co-supervisor: Prof. Dr. Sencer Ayata

CGPA: 3.79/4.00

Middle East Technical University

B. Sc. in Statistics

2002-2008

CGPA: 2.78/4.00

### AWARDS

Jean Monnet Scholarship Programme, Research Scholarship

2013 – 2014

### TEACHING EXPERIENCE

University of Stirling

Teaching Assistant- SPC9C6: Research Process II Conducted practical workshops in the SPSS computer lab	Spring 2014
Teaching Assistant- SOC 114: Statistical Methods and Computer Applications in Social Sciences I Conducted SPSS computer labs and recitations, prepared and evaluated research projects and exams	Spring 2011, 2012, 2013
Teaching Assistant- SOC 213: Statistical Methods and Computer Applications in Social Sciences II Conducted SPSS computer labs and recitations, prepared and evaluated research projects and exams	Fall 2011, 2012

#### WORK EXPERIENCE

University of Stirling, Stirling, United Kingdom Part-time Teaching Assistant Conducted practical workshops in the SPSS computer lab for SPC9C6: Research Process II	2014 – 2014
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Middle East Technical University, Ankara, Turkey Research Assistant Responsible for the administrative works of Social Policy Graduate Program. Assisting professors and responsible for various administrative processes at the Graduate School of Social Sciences. Teaching assistant for two sociology undergraduate statistics courses.	2009 – 2014
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DOKAY Engineering and Consultancy, Ankara, Turkey Statistician Conducted social impact assessment researches and social background reports for various power plant projects	2008 - 2008
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YADA Foundation, Ankara, Turkey Researcher Conducted various social research projects	2007 - 2008
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#### PUBLICATIONS AND PAPERS

2015. “Equity in the Turkish Education System: multilevel analysis of social background influences on mathematics performance of 15-year-old students”(Currently under review for European Educational Research Journal)

2014. “Determinants of Equity and Excellence in the Turkish Education System”Social Stratification Research Seminar, Edinburgh, United Kingdom

2014.“Determinants of Equity and Excellence in Education”. European Conference on Educational Research (ECER), Porto, Portugal

2014. “Determinants of Equity and Excellence in the Turkish Education System” METU Graduate School of Social Sciences 2nd Doctoral Students Workshop, Ankara, Turkey

2013. “Reproduction of the Reality through December 18 Middle East Technical University (METU) Riot”Research Turkey, May 23, 2013. <http://researchturkey.org/wp/wordpress/?p=3289>

2012. “Yükseköğretime Geçişte Okul Türü ve Coğrafi Bölge Değişkenlerinin Etkisi” (in Turkish) “Effects of School Type and Region on Transition to Tertiary Education” (with Şahin, Y. and Selvi, O.) Sakarya University Journal of Education Faculty, December 2012, Volume 24, pp.89-103

2012. “Mapping Voter Attitudes in Turkey through Correspondence Analysis” 1st International Interdisciplinary Social Inquiry Conference, Bursa, Turkey (with Uzar-Özdemir, F.)

2012. “The Role of Educational Institutions in Eliminating Social Inequalities: The Performance Levels of High Schools in University Entrance Exam”. 1st International Symposium on the Sociology of Education, Ankara, Turkey (with Şahin Y. and Selvi,O.)

2012. “Inequalities in Reaching Quality Education in Turkey” METU Graduate School of Social Sciences 1st Doctoral Students Workshop, Ankara, Turkey

2011. “Social Participation of the Youth in Urban South-eastern Anatolia” 10th Conference of European Sociological Association, Geneva, Switzerland

2010. "Participation of the Youth in Social Life" TÜSSİDE Disabled Youth Conference, Kocaeli, Turkey

2010. "Youth Political Participation in South-eastern Anatolia Region of Turkey" Social Policy Association Annual Conference, Lincoln, United Kingdom

#### PROJECT AND FIELD EXPERIENCE

Constructing a Future Map with Youth: Understanding the Youth in South-eastern Anatolia, METU	
Focus Group Interviews	2009
Assisted Professors in focus group meetings	
Problems of the Youth in South-eastern Anatolia, METU	
Quantitative Data Analysis	2009
Statistical Analysis of survey data	
Yedigöze Dam, Hydroelectric Power Plant and Quarries Project, DOKAY	
Statistician and reporter	2008
Conducted face-to-face interviews and surveys, prepared social baseline report	
Bandırma Natural Gas Combined Cycle Power Plant Project, DOKAY	
Statistician and reporter	2008
Conducted face-to-face interviews and surveys, prepared social baseline report	
Corporate reputation of Coca-Cola in Turkey, YADA Foundation	
Project Coordinator, Quantitative Data Analyst	2007-2008
Statistical Analysis of survey data	
State of the Youth Survey, YADA	
Quantitative Data Analyst	2007 - 2008
Statistical Analysis of survey data	

Demand and Service Correlation in Pharmacy, Turkish

Pharmacists Association  
Interviewer 2007  
Conducted face-to-face interviews

Development of Urban Crime Prediction Models and Crime  
Reduction Policies Based on Spatial Analyses, METU  
Interviewer 2007  
Conducted face-to-face interviews

Quality Of Life in Eurasia: The Examples of Azerbaijan and  
Kirghizstan, METU  
Quantitative Data Analyst 2007  
Statistical Analysis of survey data

Quality Of Life and Poverty Survey 2000-2005  
Quantitative Data Analyst 2007  
Statistical Analysis of survey data

#### ORGANIZATIONAL ACTIVITIES

IPSA METU Summer School for Social Science Research Methods 2013  
International Political Science Association and Middle East  
Technical University, Ankara, Turkey

METU Graduate School of Social Sciences 1st Doctoral Students  
Workshop  
METU Graduate School of Social Sciences, Ankara, Turkey 2012

1st National Demography Congress 2010  
Demography Association and METU Social Policy, Ankara, Turkey

Human Development Dialogue Seminar Series 2009-2011  
METU Social Policy with World Bank Turkey Country Office  
and United Nations Office in Turkey,  
Ankara, Turkey

4th Regional Development and Governance Symposium 2009  
METU Social Policy and TEPAV, Ankara, Turkey

#### LANGUAGES



English - Fluent  
German - Elementary  
Turkish - Native

#### MEMBERSHIPS

European Sociological Association  
UK Social Policy Association  
European Educational Research Association  
Radical Statistics Group

#### COMPUTER SKILLS

SPSS, R, MINITAB, STATA, MLWin, Joomla, Drupal, MS Office

## E. TEZ FOTOKOPİSİ İZİN FORMU

### ENSTİTÜ

Fen Bilimleri Enstitüsü	<input type="checkbox"/>
Sosyal Bilimler Enstitüsü	<input type="checkbox"/>
Uygulamalı Matematik Enstitüsü	<input type="checkbox"/>
Enformatik Enstitüsü	<input type="checkbox"/>
Deniz Bilimleri Enstitüsü	<input type="checkbox"/>

### YAZARIN

Soyadı :  
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