

Economic Policies in the Age of Globalization

Master's Dissertation

**Factors Affecting Learning Outcomes In Pakistan: An Analysis  
Of The Private School Premium**

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**Abstract**

This paper carries out an analysis to test for the existence of a private school premium in schooling outcomes among primary school children in Pakistan. In Pakistan, private schools are often preferred over public schools, due to their assumed higher quality of education, by almost every social class in the country. However, there is a lack of empirical evidence on whether a private school premium in learning outcomes exists using recent geographically representative data, and whether private school benefits accrue to children in every social class proportionally. Using the latest ASER (Annual Status of Education Report) data from 2015, the analysis confirms the existence of a private school premium. It also identifies some of the mechanisms that drive this premium. In particular, it appears that household-level characteristics account for a large part of why children in private schools do better than children in public schools. In addition, the findings suggest that private schools disproportionately affect the learning outcomes of the students belonging to different social backgrounds and in different areas, benefitting those at the upper end of the distribution and in urban areas more.

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## LIST OF ACRONYMS AND ABBREVIATIONS

<b>ASER</b>	Annual Status of Education Report
<b>IHDS</b>	India Human Development Survey
<b>LEAPS</b>	Learning and Educational Achievement in Pakistan Schools
<b>MDGs</b>	Millennium Development Goals
<b>NEC</b>	National Education Census
<b>NGO</b>	Non- Governmental Organization
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>PISA</b>	Programme for International Student Assessment
<b>SD</b>	Standard Deviation
<b>SDGs</b>	Sustainable Development Goals
<b>UN</b>	United Nations
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization

## **1. Introduction**

Over the past few decades, educators have increasingly realized the important role played by education in the economic development of a country. In this regards, Stiglitz considered education as ‘the core of development’ (Rose, 2003). The belief that education is important

for development led to the articulation of ‘Education for All’ and the ‘Millennium Development goals (MDGs)’ in 2000. Many international organizations, such as the World Bank and the UN (United Nations) agencies have committed themselves, along with national governments and development agencies, to achieve the MDGs that focus on education by 2015<sup>1</sup>.

Globally, there has been a significant increase in enrollment rates at the primary level. Developing countries also experienced a rise in enrollment rates at the primary level, with an increase of almost 5% (83% in 2000 to 88% in 2006) over the course of 6 years (United Nations, 2008). Moreover, a drastic fall was observed in the number of out-of-school primary children, with a decrease from 103 million in 1999 to 73 million in 2006 (United Nations, 2008). With such significant improvements in enrollment rates, the countries were on the right track towards achieving the MDG2 - universal primary education by 2015.

However, in 2013, out of the 250 million children in the developing world who have already spent four years in school, most have still not learnt the basics (UNESCO, 2013). This led to the recognition of a global learning crisis (UNESCO, 2013). It raised awareness that it is not only gaining access to schooling that one should be concerned about, but the quality of learning provided at schools that matters. With this, came a shift in the UN agenda, from not only ensuring universal primary education, but also ensuring all children acquire basic numeracy and literacy skills (United Nations, n.d). This led to SDG4, which considers equitable learning outcomes to be a key aspect of education and ensures that no one is left behind, especially disadvantaged children (United Nations, n.d).

To achieve this goal, policy-makers need to redefine how best to organize education systems to achieve effective learning outcomes. This question is of immense importance for South Asia, where more than 40% of the world’s poor reside (World Bank, 2017).

Pakistan lags far behind on schooling access compared to other South Asian countries (The News, 3 July, 2014). Pakistan also paints a dismal picture when it comes to the literacy rate (58%) and overall quality of the education system (Pakistan Economic Survey, 2015). Only around 2% of its GDP is contributed towards the education sector, which meant that Pakistan

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<sup>1</sup> MDG 2 - Achieving universal primary education.

failed to achieve its MDG and Education for all targets (Ibid.). Pakistan's failure to meet its MDG2 requirements has spurred international donors and organizations such as World bank to donate funds, in order to promote private education especially for the poor (Siddiqui, 2017).

Private schooling is considered as one of the options with which the SDG4 can be achieved. Over the past decade, private schools have proliferated in Pakistan. Where once, private schools were catering only to the elite society of Pakistan, it has now become a common practice amongst the poor to send their children to private schools as well (Alderman et al., 2001). The preference of fee-charging private schools over non-fee charging public school is mainly due to the impression that private schools provide quality education. As Tooley states:

'the poor have found a silver bullet or at least the makings of one. The route to the holy grail of the development experts—quality education for all—is there for all to see, if only they'll look. By themselves, the poor have found their own viable alternative. The solution is easy: send your children to a private school ...' (Tooley, 2013, p. 245)

This means that the poor households consider private schooling a silver bullet with which they can finally escape the realms of poverty. Thus, this optimistic perception regarding the private schools makes it crucial to understand whether private schooling can really act as a panacea in Pakistan.

### **Rationale for the study**

The majority of the studies conducted in Pakistan, analyzing the impact of private schooling on learning outcomes, suggest that a private school premium in learning exists, where children who attend private schools perform better. However, it is still ambiguous as to how much of this performance is attributable to the school type itself. Prior quantitative studies have either used data with limited geographical scope or have not incorporated all the inputs that can affect the learning outcomes in the education production function.

In addition, because SDG goals aim for equitable learning outcomes, it is crucial to understand if everyone benefits from private schools proportionately. Research conducted in the United States suggests that the impact of private schooling may differ across children

coming from different socio-economic backgrounds (Chudgar and Quin, 2012). In the case of Pakistan, there has been limited research conducted on this issue, and further research is required to better understand this issue.

Lastly, in Pakistan there exists a huge variation in private primary schools in terms of curriculum and syllabus, depending on whether they are located in urban or rural regions (UNESCO, 2015). In the urban regions, most of the private schools follow the foreign syllabus and are English medium, whereas in the rural regions, most of the private schools follow the same syllabus as the public schools and are usually Urdu (national language)-medium (Shamim, 2008). Hence, substantial differences between the private schools in urban and rural regions makes it worthwhile to test whether children in rural schools also experience a private school premium or whether the premium in learning only accrues to children in urban areas.

This research study aims to contribute to the existing body of knowledge by using the latest educational data from the Annual Status of Education Report (ASER) 2015 to estimate the private school premium in learning outcomes (proxied by performance in Mathematics and English) using multivariate regression analysis. This thesis demonstrates an academic approach to explore the existence of private school premium with the latest data from ASER 2015, which has not yet been explored for academic research purposes.

In addition, ASER 2015 dataset allow investigation and analysis into the subject matter on a larger geographical scale than in previous studies. ASER dataset also allows me to estimate results with more accuracy due to the data availability of many important variables affecting learning outcomes which many previous studies have not taken into consideration (this will be discussed further in the methodology section).

More specifically, the research questions for this dissertation are as follows:

Main Research Question:

Do private students outperform their public counterparts in primary schools in Pakistan?

Sub-questions:

- What are some of the mechanisms that drive the private school premium? In other words, how does the private school premium change when controlling for individual, household, and school-level characteristics?
- Does the private school impact differ based on the students' social background?
- Is the private school premium in urban regions larger than in rural regions?

*Structure of the Dissertation:*

The content of this dissertation is structured as follows: Chapter One begins with an introduction to the subject matter and outlines key objectives, and motivation for this research work. Chapter Two begins with a background to the existing Pakistani education system, followed by a discussion of the theoretical framework and a review of the empirical literature. Chapter Three outlines the methodology used to conduct the study. Chapter Four presents the descriptive statistics, and Chapter Five reports on the findings of the regression analysis. Chapter Six discusses the study's main findings and conclusion.

## **2. Literature Review**

### **2.1 Overview of Pakistan's Educational System**

At the national level, institutions are usually disaggregated into two parallel streams - namely public and private sector. Both streams follow similar formal education structures which compromise Pre-school, Primary education (grades 1-5), Middle education (grades 6-8), Secondary education (grades 9-10), Inter colleges (grades 11-12), Degree colleges (Bachelors) and Universities (Masters and Ph.D.) (Pakistan Economic Survey, 2015). Apart from the formal education structure, Madrassahs have also become an educational medium where religious education is provided (NORRIC, 2006).

The NEC (National Educational Census) for the year 2005 shows that when considering only pre-school to secondary schools, there are 144,732 public schools (105,526 of which are primary schools) and 56,360 private schools (16,823 of which are primary schools) (National Education Census, 2005). Therefore, Private schools account for almost 30% of the total number of schools at the primary level, nationally.

Although following the same formal educational structure, these two streams differ greatly based on their administrative environments (Aslam, 2009). Public institutions are mainly run

by the government of Pakistan. The government mandates to provide free education at the primary level, with minimal fees at middle and secondary level (Aslam, 2009). Previously, administrative control of the public institutions was with the provincial governments, but in 2001, the Devolution Plan led to the decentralization of the education system (mainly primary and secondary education) (Watson, 2005). With this, the responsibility of the public schools shifted from the provincial-level government to the district-level government. These responsibilities include the adherence of educational standards, and implementation of policies and laws set by the federal government regarding educational resources (NORRIC, 2006). This indicates that the standard and quality of education may vary greatly across the provinces of Pakistan.

Although the public sector is the main provider of education in Pakistan, lately the government has faced challenges in providing quality education, due to, among others, the lack of essential facilities such as buildings and trained teachers in the remote areas (NORRIC, 2006). These challenges have resulted in a deterioration of the image of the public sector in education provision, deeming it incapable of providing quality education. This led to a boom in the private sector's role in education provision (Watson, 2005). The mushrooming of private institutions mainly occurred in the wealthiest and most populated province of Pakistan – Punjab (Watson, 2005). According to the NEC (2005), private institutions (at all educational levels) grew from 36,096 institutions in 1999-2000 to 81,103 institutions in 2005, thereby showing an annual average increase of 25 percent.

In case of the private institutions, most of the private schools are owned for-profit by individuals and NGO's etc. The fee structure followed by private schools is set by the federal government, however fees can vary greatly depending on the facilities and resources available at the school (Aslam, 2009). Unlike public schools, all private schools are not mandated to follow the curricula set by the provincial education board (Rahman, 2005). The majority of private schools, especially in the urban regions, follow the foreign education curricula and are English medium rather than Urdu (national language of Pakistan) medium. Moreover, the teachers appointed have higher qualification levels and the schools generally have better facilities, accounting for the higher fees. However, the private schools located in the rural areas usually have lower expenditure and the teachers' qualifications are often lower than in private urban schools, which is likely to have a negative effect on the quality of education offered in these rural schools (Shamim, 2008; Andrabi et al., 2002; I-SAPS, 2010)

Previously, there existed a general misconception that private schools mainly cater to the elite of society (Alderman et al., 2001). This misconception was discarded when Andrabi et al., (2002) reported that private schools are no longer catering only to the elite, but also catering to the lower and middle class children in both urban and rural regions in Pakistan.

The increasing preference given to private schools over public schools is because of the general perception that private schools have a substantial positive impact on the student's learning achievements compared to public schools (Tooley, 2013).

## **2.2. Theoretical Framework**

The debate regarding factors affecting learning outcomes ignited in the United States in the 1960's, when Coleman et al. (1966) cited in Desai et al. (2009) seminal study failed to establish a link between a child's academic performance and school characteristics, but instead found a link between the child's academic performance and household characteristics. Since then, many studies have been conducted to examine the factors affecting students' academic performance. In this regard, in 1989, an education production function was constructed to show how inputs can be transformed into learning outcomes (Monk, 1989 cited in French and Kingdon 2010). These inputs were considered at three levels, namely, child, household and school characteristics, each set discussed further below.

### *Child Characteristics:*

The child's demographic characteristics such as gender, age, health, and natural aptitude usually influence the child's learning achievements.

Concerning the child's gender, mixed evidence exists at the global level. Science and Mathematics are usually categorized as male domains, whereas females are expected to lack the ability to score well on these subjects. This belief was found to be shared by the teachers as well as the parents (Lindberg et al., 2010). Usually such stereotyping discourages women from persisting in careers in these fields. However, some studies proved such stereotyping to be untrue. For example, Lindberg et al. (2010) conducted a review of 242 studies of gender and Mathematics published during the years 1999 to 2007, and verified that no gender has superiority over the other in Mathematics. In the European countries, girls are considered to have better reading skills compared to boys (European Commission, 2009). In the case of

Mathematics and science, girls and boys perform almost the same at the primary level, but at the secondary level, boys are expected to outperform girls (European Commission, 2009).

However, the true effect of gender is only evident once the social background of the child is also considered. This is because when evaluating a child's performance, especially in countries where gender discrimination is high, male children could be enrolled in a better educational institute compared to female children (Aslam, 2009). Their parents are more willing to invest more resources in the child from whom they can expect higher returns in the future (Chudgar and Quin, 2012) In rural Pakistan, for example, more is invested in the human capital of boys, as they are considered to be the future breadwinners. Consequently, less is invested in the human capital of girls because of the high opportunity cost involved, as girls are expected to assist their mothers with the household chores (Alderman et al., 2001). This prioritization of male child education over female child education can lead to performance bias, with the male child outperforming the female child.

Regarding the age of the child, many studies found a positive association between the age and the learning achievements of the child. From a general viewpoint, this is no surprise as cognitive development and maturity significantly affect the learning outcomes, which are both associated with age (Sharp et al., 2009). However, each grade has its own certain age range, and if a child is below or above that, the performance might differ. On the one hand, if a child is very young, his brain is not developed enough to capture all that he is exposed too. On the other hand, the children who were reported to be over-age performed worse compared to the children whose age was considered appropriate for that particular grade (Sharp et al., 2009).

This is because a tutor's behavior towards older students is slightly more authoritative esp. when students need to be taught obedience and discipline in a class room or school environment. Such an attitude usually hinders the students' confidence and ability to outperform other students (Sharp et al., 2009).

#### *School Facilities:*

The effect of school facilities on the child's learning outcomes varies greatly across different studies. On the one hand, there are the surprising results of Coleman (1966) who found no relationship between school facilities and the child's learning achievement. Similar results were also report by Hanushek (1995) cited in Desai et al. (2009). He reviewed around 147

studies conducted in developed countries, focusing on the education production function. His conclusion was that the school-level inputs did not significantly affect the learning outcomes of children. Banerjee et al. (2007) also reported a weak relationship between school facilities and the child's learning outcomes from conducting research in developing countries. On the other hand, Fuller (1987) reported the opposite result. Fuller (1987) reviewed around 60 studies conducted in developing regions and found that school characteristics play a more important role than household characteristics do.

However, it may be that the presence of these resources is not what leads to better learning outcomes, but how these are made use of. So even if a school has all the facilities available, if they are not put to proper use e.g. students are not encouraged to use the library, there would be no positive impact of these facilities on the learning outcomes of children. Unfortunately, data on usage (as opposed to availability) is rarely available in surveys.

Apart from school facilities, teacher characteristics are also reported to significantly affect the students' performance. Among these characteristics, teachers' training, their educational levels as well as the student-teacher ratio are considered to be the most important ones (Amjad, 2013). In regards to the student-teacher ratio, the lower the number of students relative to teachers, the better the learning outcomes, as the teacher would be able to provide more attention to each of the students (Alderman et al., 2001). However, Amjad (2013) reports that although a lower student-teacher ratio does positively impact learning outcomes (using ASER 2013 data), the effect is often very small and other teacher characteristics such as education levels, training, teaching style etc. should be focused upon.

#### *Household Characteristics:*

At the household level, the inputs of the production function would be the people and the resources that the child gets to interact with. The substantial effect that the household characteristics have on a child's learning outcomes is evident in Bourdieu's cultural capital theory.

Bourdieu's theory focuses on the relationship between cultural capital and education. Generally, cultural capital consists of the most dominant conceptions inscribed in a particular culture. In other words, cultural capital entails the understanding of the dominant culture of

the society (Sullivan, 2002). Each social class has its own form of cultural capital which can be divided into economic capital (due to the economic resources), and social capital (due to the social networks and connections of the family) (Sullivan, 2002).

To be more specific, cultural capital comprises of embodied, objectified and institutionalized capital. Embodied capital is acquired over time by an individual through socialization within the family, consistent with the idea above that the household characteristics influence the child's development. Objectified capital is explained by Bourdieu as physical capital that would require special cultural ability to appreciate or to be used, e.g. machines to be used or a piece of art to be appreciated. Embodied cultural capital must be acquired initially, for the objectified capital to make an impact. The institutionalized capital refers to the educational qualifications, which are developed through the embodied cultural capital, and thus realized through the education system (Jæger, 2011).

#### *Cultural Capital and Educational Success:*

This theory hypothesizes that cultural capital effects the educational success of a child through the following ways:

First, through what Bourdieu refers to as 'habitus' (Jæger, 2011). Habitus is a set of values and attitudes that is transmitted within the household. It is what children inherit from their parents actively or passively. It is usually transmitted through the exposure a child has to his parents' cultural capital, which gets embedded in a child's knowledge, language and behavior (Jæger, 2011).

The set of values and attitudes, held by the dominant class of the society are known as the dominant habitus (Sullivan, 2002). A specialty of the dominant habitus is a positive attitude this class has towards education (Sullivan, 2002). It is also believed to give rise to competence in a child due to the better manners instilled as a result of the 'good breeding' (Sullivan, 2002). This means that children of the dominant class will be much more skilled (e.g. high innate ability) in acquiring education compared to other children in society, thus leading to educational success.

Furthermore, the education system is designed in such a way that it systematically rewards the cultural capital inherited in the students.

By doing away with giving explicitly to everyone what it implicitly demands of everyone, the education system demands of everyone alike that they have what it does not give. This consists mainly of linguistic and cultural competence and that relationship of familiarity with culture which can only be produced by family upbringing when it transmits the dominant culture. (Bourdieu, 1977, p. 494 cited in Sullivan, 2002).

According to Bourdieu, a prejudiced culture soft on students who belong to affluent families is prevalent (Sullivan, 2002). Students from wealthy backgrounds often receive special treatment and more attention from their tutors as well as classmates alike. The instructors systematically misinterpret the rich students' familiarity with the dominant class as a sign of academic brilliance. Students' performance no longer is evaluated based on the regular assessment procedures, but instead on procedures which are linked to the culture of the higher class (Jæger, 2011). Bourdieu suggests that the lower-class students are clearly disadvantaged in their cultural capital level (Sullivan, 2002), and this makes it much harder for them to succeed in the education system. Thus, Bourdieu considers that cultural capital assists the affluent classes to retain dominance (Jæger, 2011).

In addition to the socio-economic status of the household, literature on the determinants of learning outcomes also covers other household characteristics that can affect performance, such as the number of children in the household, the availability of private tutoring, parental education, and the location of the household.

Regarding the household size, there exists an inverse relation between learning outcomes and the number of children in the household. This claim is endorsed by the 'resource dilution effect' theory (Downey, 2001). It states that spreading the finite resources of a household e.g. household income or parental attention, amongst a higher number of children will lead to lower resources available per child. Children of a large household might not be able to enroll in good quality schools, which charge a higher fee, and may not be able to receive adequate attention from their parents regarding school tasks. Thus, this will eventually lead to poor performance of the child at school.

Recent studies report that receiving private tutoring is becoming common especially among private school students (Amjad and MacLeod, 2014). This is because of the positive impact

these tuitions have on the learning achievements of the students. However, the reason for the increase in private tutoring is still not so clear. According to Aslam (2009), poor quality teaching at schools could be one of the reasons. Moreover, receiving private tutoring also depends on household income, and the occupation and educational levels of the parents. If parents are illiterate or are highly engaged in their occupation, or they have a low level of education, they won't be able to assist their children with their school assignments. Thus, private tutoring may be the best solution in this case.

Income of the household significantly affects learning outcomes. This is because it reflects the household's ability to invest in a child's education. Households with lower income would be more concerned about the fees of a school rather than quality. In such a scenario, a child belonging to a poor household will likely be enrolled in public schools where education would be free but the quality of teaching is low. Whereas rich children would be able to afford highfee charging, good quality private schools.

Alderman et al., (2001) found that in Pakistan, household income levels impacted girls' schooling choice more than that of boys. A girl might be enrolled in private school only if the income level is high enough, else they might be enrolled in public schools or not enrolled at all. Moreover, the location of the household i.e. the region and province/state, also affects the child's performance. Alcott and Rose (2015) suggest that being located in urban regions with well-developed infrastructure, and more schooling options, would have a positive impact on the child's learning abilities. In the urban regions, schooling options might be many but in the rural regions there is a limited choice. The distance from school in the rural areas, also affects the school choice, especially in the case of girls due to cultural prohibitions such as girls being not allowed to go out alone (Alderman et al., 2001).

### **2.3. Empirical Literature Review**

A rigorous review of the recent literature shows that the majority of studies conducted regarding the existence of a private school premium are in South Asia. Thereby this literature review will consider some studies at the global level, but will focus primarily on the South Asian studies, particularly on India and Pakistan.

The quantitative studies conducted at the global level provide evidence of non-uniformity in the private school premium across different countries. For example, in some cases, the private school premium remained significant even after controlling for other variables, namely child, household and school characteristics. Ashley et al. (2013) reviewed the results of 59 studies reporting student performance in developing countries, targeting South Asia, Africa and Caribbean. This study attributed the better performance of private school students mainly to the better school facilities available in private schools. Another study conducted in Colombia, the Dominican Republic, the Philippines, Tanzania and Thailand reported similar results, with private school students outperforming public school students (Jimenez et al., 1991). Tooley and Dixon (2006) also confirmed that private school students outperform their public counterparts in numeracy and literacy tests conducted in Ghana, Nigeria, and India. The superior performance of the private school students was mainly attributed to the school-level indicators, especially better educational facilities and teachers' high level of commitment.

However, some studies cast doubt on the existence of the private school premium. For example, Sakellariou (2017) used PISA (Programme for International Student Assessment) 2012 data for 40 countries (34 OECD and 6 partner countries) to test grade 7 students for their numeracy skills. He used multi-level modeling techniques together with random effects to account for selection and peer effects. His results found the existence of the private school premium only for a few countries, whereas in the majority of the countries studied he did not find any difference in the performance of public and private school students. Lubienski et al. (2013) cited in Sakellariou (2017) in their book "The Public-School advantage" tests for the private school advantage by taking into account the Mathematics test scores of more than 300,000 students in more than 15,000 schools in the USA. This study confirmed that after controlling for child characteristics, household characteristics and school facilities, no evidence remains of the private school advantage. Similarly, McLoughlin (2013) drew similar conclusions after reviewing the available literature from developing countries. He concluded that the advantage private school students have is often marginal, after controlling for the socio-economic background of the children. In the case of Latin American countries, Somers et al. (2004) test for the private school premium using UNESCO data for 10 Latin American countries and found that after controlling for the social background of the child, and school characteristics such as the peer group variables, the private school advantage becomes negligible.

In the case of South Asia, the majority of the studies have been conducted in India. While many studies (Wadhwa, 2009; Goyal 2009; French and Kingdon 2010) confirmed the positive effect private schools have on the learning outcomes, more recent studies (Goyal and Pandey 2009; Chudgar and Quin, 2012; Singh, 2015; Muralidharan and Sundararaman, 2015) reported that private school either has only marginal or no positive effects on the learning outcomes.

The first set of studies listed above, reported that even after controlling for child, school and household characteristics, private school still had a positive impact on the learning outcomes. For example, French and Kingdon (2010) examined the existence of a private school premium by using the ASER data set for India from 2005-2007, at both the cross-sectional and longitudinal level. Even after controlling at all three levels, and employing a household, district and village fixed effects approach, the results still affirmed a private school advantage. This study reported that the learning outcomes of the private school students were higher than their public counterpart by 0.17 SD on basic literacy and numeracy tests. Wadhwa (2009) also used ASER data and reported a drastic fall in the private school advantage from 8.6% to 2.9% after applying the controls, showing that almost 2/3<sup>rd</sup>s of the difference in the performance of public and private school students is due to factors other than the school type. Goyal (2009), who examined the existence of a private school premium in the eastern part of Orissa (a state of India), reported similar results. She found that after controlling for child and household characteristics, private school grade 4 students scored around 15 – 16 points more in reading and arithmetic skills.

The second set of studies found marginal or no private school advantage. Desai et al. (2009) conducted a study using the IHDS (India Human Development Survey) of 2004-2005 to test the literacy and numeracy skills of students at primary level. After controlling for child, household characteristics, and employing household fixed effects, the results varied greatly across the Indian states. In some states the public school students did equally well as the private school students, while in other states public school students outperformed the private school students. The same data set was used by Chudgar and Quin (2012), who applied the propensity score matching (PSM) method and came to the same conclusion that private school pupils perform no better than their public counterparts. Goyal and Pandey (2009)

reported similar results when conducting a study in two Indian states of Uttar Pradesh and Madhya Pradesh. In the case of Madhya Pradesh, the private school advantage no longer existed after controlling for child and school characteristics whereas in case of Uttar Pradesh, the private school advantage did exist.

Apart from the variation of the private school advantage across states, this variation was also noticed across subjects. Muralidharan and Sundararaman (2015) carried out an experiment by randomly assigning vouchers to children for the primary schooling duration (grades 1-5) in the rural areas of Andhra Pradesh, India. The results showed that the private school students performed better in English and Hindi (on average 0.23 SD) than their public counterparts, but performed similarly in the cases of Telugu and Mathematics. His justification was that teachers at private schools give more importance to Hindi and English by spending more time teaching these subjects compared to Mathematics and Telegu.

Singh (2015) conducted a study by applying value-added models to the Young Lives longitudinal data (2002-2011) of primary school students in the Indian state of Andhra Pradesh. The results of this study varied significantly across subjects as well as region. After applying various controls, in the case of region, no positive private school impact was found in the urban regions for Mathematics and English, whereas in the rural regions private school students outperformed the public-school students in the case of Mathematics.

#### **2.4. Empirical Literature - Pakistan**

While much ink has been spilled over the Indian case, there is less empirical evidence available for Pakistan. A vast literature exists on schooling in Pakistan, but only a limited number of studies tackle the question of the effect of school type on learning outcomes. However, the little evidence accumulated up until now supports the hypothesis that private school students outperform public school students at the primary level (e.g. Alderman et al. 2001; Das et al., 2006; Aslam, 2009; Andrabi et al., 2008, 2011; Amjad 2012).

In the case of Pakistan<sup>2</sup>, the majority of the studies are conducted in Punjab. Punjab is the wealthiest province of Pakistan, where roughly 50 percent of Pakistan's population resides

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<sup>2</sup> Pakistan is divided into four provinces (Punjab, Sindh, Baluchistan and Khyber-Pakhtunkhwa), Federal capital territory (Islamabad), self-governing territory (Azad Jammu and Kashmir), and administered territory (Gilgit-Baltistan) and tribal regions (FATA).

(Aslam, 2009). Moreover, as already mentioned, with the mushrooming of private schools in this region, it became an attractive center for research. In this regard, quantitative studies mainly used the LEAPS (Learning and Educational Achievement in Punjab Schools) survey of learning in Pakistan. LEAPS is a four year (2003-2007) longitudinal survey covering 112 villages in the rural region of Punjab (Das et al., 2008). This dataset surveyed over 12,000 students of private and public schools for their learning outcomes in Urdu, English and Mathematics.

Das, Pandey and Zajonc (2008), used LEAPS data for the year 2005 to carry out a cross-sectional analysis to test grade 3 students from both public and private schools for their numeracy and literacy skills. They carried out multivariate regression analysis, controlling for variables at all the three levels, namely child, household and school. The results suggested that there exists a large gap in performance between the private and public school students, with much of the difference in performance being attributed to school type rather than the other variables.

A similar study was conducted by Andrabi et al. (2008) using LEAPS data from 2006. This study used the OLS (ordinary least square) multivariate regression technique and controlled for variables at the child and household levels. Even after controlling for the variables, the private school advantage persisted. To investigate further, village-level fixed effects were introduced but that too did not alter the results. The study concluded that on average private schools do better in English, Urdu and Mathematics by 0.82, 1.15 and 1.11 SD, respectively. Also, Andrabi et al. (2011) applied a dynamic panel approach to the same dataset only to arrive at the same conclusion that private school students outperform their public counterparts.

Another study conducted in Punjab was by Alderman et al. (2001) who instead of using LEAPS data, collected data specifically for their research. Primary data was collected in the low and middle-income rural regions of the city of Lahore. Children both within and out of school aged 6-11 years were part of the survey and data regarding child, household and school characteristics were collected. After applying logit regression and controlling for variables at all three levels, the results confirmed the existence of a private school advantage,

with much of the advantage being attributed to variables at the household level (particularly household income) and teacher level characteristics.

Finally, in 2003, a study was carried out that was not only restricted to Punjab, and included data from the other provinces of Pakistan as well. Arif and Saqib (2003) carried out the analysis using 1999 household survey data to compare the learning outcomes in 50 schools across six districts selected from all four provinces and Azad Jammu and Kashmir. The test scores in Urdu, Mathematics and the general knowledge of grade 4 students were studied. They used multivariate analysis techniques, controlling for child, household and teacher level variables. Their study confirmed the existence of a private school premium and the results contrasted with Das et al. (2006) results, as the difference in learning outcomes was mainly due to other variables mainly at the family level (household income, siblings, mother's education) and teacher level (pupil/teacher ratio and teacher qualifications) rather than the school type itself. However, this study is of great significance as this is the only study which provides the evidence of non-uniformity of the private school advantage across districts. It reported that in some districts, the public-school students outperformed their private counterparts, and in some cases they even reported a negative effect of private school on students' learning outcomes.

The above review shows that due to limited availability of data on learning outcomes, studies were mainly conducted on a small geographical scale. However, with the release of the nationwide ASER (Annual Status of Education Report) project, carrying out research on schooling impact on learning outcomes became possible for all regions in Pakistan. ASER collected data on a very large sample of households (50,000+), children (150,000+) and schools (3,500+) across Pakistan.

ASER was first released for the year 2010. Amjad, (2012) employed the Linear Probability Model technique using ASER 2010 data to study the literacy learning outcomes of students at the primary level. Even after controlling for child, household and school level characteristics, the raw difference in learning outcomes reduced from 16% to 4%, with the remaining 4% pointing towards existence of the private school premium. Moreover, the study also reports that 75% of the effective learning can be ascribed to factors other than school type. The most significant of these 'other' variables turned out to be private tutoring, household wealth and

parents' education. However, additional factors, such as child absenteeism and pre-schooling, were found to be insignificant and did not contribute to the private school advantage.

Javaid et al. (2012) used ASER data from 2010 and 2011 that enabled pooled cross-sectional analysis of around 85 districts to assess the performance in reading and arithmetic skills of students from both public and private schools. This study used various techniques such as the Oaxaca decomposition technique and fixed effects at the province, village and household levels, to analyze the impact of private schooling. While different techniques were applied compared to previous studies conducted in Pakistan, the results obtained were no different than that of previous studies. Even after applying fixed effects at the lowest level (household level), the private school advantage remained significant, with private school students outperforming public school students by 0.038 SD.

Another substantial study conducted in Pakistan to examine the private school advantage at primary level was by Amjad and MacLeod (2014) using ASER data from 2012. This study used the logistic regression technique and controlled for child, household and school level characteristics. Unsurprisingly, the existence of a private school premium was confirmed even after controlling for variables at all three levels. The success percentage for students having qualified from private schools relative to public schools in the subjects of English, Urdu and Mathematics were observed to be 86%, 21% and 50% respectively. In addition, this study also confirmed that private tutoring played a significant role in explaining the performance differences. It appears that children who go to private schools do better because they also belong to families who have the financial resources (and commitment to education) that results in them sending their children for extra lessons outside of school time. The significant role played by additional private tutoring in explaining the performance differences was also confirmed by Alcott and Rose (2015), who carried out a comparative analysis of the determinants of literacy skills in the rural regions of India and Pakistan. Furthermore, their study also confirmed that the socio-economic status of a child significantly affects the learning outcomes.

From the above literature, it is evident that all the studies (e.g. Arif and Saqib, 2003; Javaid et al., 2012; Amjad, 2012; Alcott and Rose, 2015) carried out in Pakistan, focusing on the private school premium at the primary school level, mainly targeted the rural regions. To the

best of my knowledge, there are not yet many equivalent inferential studies focusing on the urbanrural divide or using data on both area types.

Aslam (2003; 2009) did carry out the analysis regarding the private school impact on learning outcomes including both urban and rural regions, although once again only in Punjab and these studies were conducted only at the secondary school level. Aslam (2003; 2009) conducted the studies by employing the OLS regression technique using a purpose-built data sample of 40 private and 25 public schools in the urban and rural areas of Punjab province, Pakistan. The study conducted in 2003 mainly focused on whether household factors are more important than school variables, particularly student absenteeism and teachers' pay, in determining learning outcomes. Though, a variation in results is observed dependent upon the subject matter (English and Mathematics), but the overall conclusion was that a large number of household and school factors significantly affect learning outcomes. School resources and the pupil- teacher ratio were found to significantly affect learning outcomes, while teachers' pay proved to be insignificant. In the case of household level factors, child absenteeism was found to significantly affect the learning outcomes. The study conducted in 2009, was specifically to test the supposition that private school students outperform public school students. Aslam (2009) arrived at the same conclusion where private school students were found to outperform (by 0.36 to 0.40 SD) public school students even after controlling for child, household and teacher level variables, thus confirming the existence of a private school premium.

The above literature review shows that there still exists an apparent tension regarding the positive impact of private schooling on learning achievements. Although there exists support for the widely-held view that private schools have a positive impact on learning outcomes, this view is based on studies with some limitations. The majority of the studies conducted in Pakistan are either only in Punjab or on a very small scale, thus limiting the generalizability of the results. The studies that are conducted on a larger geographical scale, have focused only on either numeracy or literacy.

Apart from this, studies conducted in Pakistan provide mixed evidence as to how much of this private school advantage can be attributed to the school type alone. Some (Javaid et al., 2012) claim the private school advantage is due to the household characteristics whereas others

claim it be due to the school type alone (Das et al., 2006). Moreover, some studies have controlled for confounding variables at all three levels (Amjad and Macleod, 2014, Andrabi et al., 2002) whereas others only added controls at the child and household levels (Alcott and Rose, 2015). However, those studies focusing only on Pakistan that do control for school facilities, have reported that the school facilities do have a significant effect on the learning outcomes (e.g. Aslam, 2009; Amjad and Macleod, 2014). This makes it necessary to control for variables at all three levels. Thus, this study will take into account the various factors, influencing the learning outcomes at all three levels, along with additional variables regarding teachers' qualifications (e.g. number of graduate teachers), and school facilities (e.g. internet, computer lab, laboratory, electricity connection).

Despite the growing literature on the impact of private schooling on learning outcomes in Pakistan, there has been limited research conducted on whether the impact of private schooling differs based on the social background of the students. There exists ample literature that focus on the disparity in enrollment between children from different social backgrounds. Studies conducted in Africa and South Asia report that disadvantaged children are more likely to be enrolled in public school rather than private schools (Alcott and Rose, 2015; 2016). For example, in the case of Kenya, Tanzania and Uganda, children from wealthier backgrounds are almost three times more likely to be attending a private school than the children from poor social backgrounds (Alcott and Rose, 2016).

Moreover, focusing on the differential effect of the private school impact on learning outcomes by socio-economic background, research conducted in the US suggests that the students from less-advantaged households are not able to fully accrue the benefits of private schooling (Hoffer et al., 1985 cited in Desai et al., 2009). Alcott and Rose (2016) provide similar evidence from African countries namely, Kenya, Tanzania and Uganda, and state that it is only the students belonging to the higher social class that benefit from private schooling. Wadhwa (2009) reported similar findings from rural India where children from a lower socio-economic background performed worse in private school compared children from a higher socioeconomic background.

To the best of my knowledge, there are not many studies conducted in Pakistan which study the differential in the private school benefit with regards to the socio-economic background

of the child. However, Alcott and Rose (2015) focusing on literacy achievement only in the rural regions of India and Pakistan, stated that regardless of the school type, wealthier children are reported to perform better.

In addition to this, the differences in learning outcomes across different provinces have been accounted for in some studies, showing that the students residing in Punjab outperform the students of other provinces. However, it is evident that all the studies carried out on Pakistan, focusing on the private school premium at the primary level mainly targeted the rural regions. Moreover, there are a few studies that did consider the urban regions but these were either conducted only on a small geographical scale or the focus was on secondary rather than primary education (Aslam, 2009). There are not yet many equivalent inferential studies focusing on the urban-rural divide. The comparison between the two regions is likely to be instructive, given the growing number of private schools in the rural areas and at the same time the very different educational context in terms of the curriculum, facilities, management and medium of instruction. For this reason, this study will not be limited only to the rural regions but will also include the urban regions of Pakistan, and examine if children in urban private schools perform better than children in rural private schools. This paper investigates factors affecting learning outcomes in Pakistan, using the most recent data from ASER 2015, which has not yet been explored for academic research purposes according to my knowledge.

#### *Hypotheses:*

With reference to the existing literature review, the following hypotheses are formed (which correspond to the research questions outlined in the introduction):

- The main hypothesis is that there is a private school premium in primary schools in Pakistan.
- The sub-hypothesis are:
  - The private school premium is driven mostly by household characteristics.
  - Children belonging to wealthier households will perform better in private schools than children belonging to poorer households in private schools.
  - Children in urban private schools will perform better than children in rural private schools.

### **3. Methodology**

The key objective of this study is to explore the impact of private schooling on the student's learning outcomes by conducting quantitative analysis using secondary data – Pakistan's Annual Status of Education Report survey (ASER) 2015. The section begins by describing the data source to be used, its sampling procedure and instruments. Next the analysis technique employed, and the variables used will be explained. This section will be concluded by outlining the limitations of the study.

#### **3.1. About ASER**

ASER, a nationwide survey is conducted on an annual basis to present a snapshot of the educational achievements of more than 258,000 students (aged 5-16) at the primary and secondary education levels in Pakistan. The ASER survey is managed by Idara-e-Taleem-o-Aagahi (ITA), a non-governmental organization (NGO) in Pakistan, through partnership and alliances with various international and local NGOs (ASER, 2015). To conduct the survey, more than 10,000 volunteers were trained and mobilized to collect the data (ASER, 2015). The raw data collected is available online on the "ASER Pakistan" website ([www.aserpakistan.org](http://www.aserpakistan.org)).

The ASER survey consists of two major components:

- i. Household Survey: This survey is conducted through household visits. Information is collected on the child's enrolment status, after which structured tests are administered to collect data on the child's learning achievements (ASER, 2015). During this survey, data from respondents regarding the resources available in the household, the educational level of the child's parents, the number of children in the household as well as other child and household level variables are collected.
- ii. School Survey: A survey of both public and private schools is carried out in the same villages as the household survey. Information regarding the infrastructure of the school, teachers' qualifications and number of students enrolled is collected. No tests regarding the child's learning achievement are conducted at schools. (ASER, 2015).

An advantage of this approach of testing children at their households rather than at their schools, is that the bias associated with teachers recommending the most able students to take the tests, is eliminated.

*Sampling technique of ASER:*

A national survey was carried out in 21 urban and 146 rural districts all over Pakistan. To obtain a sufficiently large sample, in each district, 30 villages were surveyed. In each of these villages, 20 households were chosen to be surveyed, thus making it a total of 600 households per village (ASER, 2015). These villages were selected through the probability-proportional-to-size sampling technique, using data from the national census of Pakistan (ASER, 2015). To carry out the sampling procedure, first a village was divided into four sections. In each of these four sections, a central household was selected to be surveyed first (ASER, 2015). Then, every fifth household in a circular pattern was selected in that specific section for surveying purposes (ASER, 2015). This method was repeated for all the remaining sections. This way a total of 83,755 households and 258,021 children (aged 3-16) were surveyed (ASER, 2015). In the case of the school survey, in each village selected for the household survey, one government school (mandatory) and one private school was chosen to be surveyed (optional) (ASER, 2015).

*About the structured tests:*

ASER conducts tests for assessments in numeracy and literacy. The literacy assessments consist of reading tests in English (the official language of Pakistan), Urdu (the national language of Pakistan), Sindhi and Pushto (local languages of Pakistan). These tests record data at 5 levels ranging from 1 (lowest) to 5 (highest). Each child is assigned a level according to his performance in the literacy and numeracy tests (see Table 1). Level 1 is assigned to those children who know nothing. Level 2 is assigned to those children who can recognize capital alphabets of English/ Urdu or local languages, and numbers from 1- 9. Level 3 is assigned to those children who can read one syllable words of Urdu or the local languages, and can recognize small alphabetical letters of English, and numbers from 10-99. Level 4 is assigned to those children who can read words and solve addition and subtraction sums. Finally, level 5 is assigned to those children who can read sentences and can solve division sums. Children assigned level 5 are also tested for object recognition in pictures, if they can tell the time, and may also be asked to solve bonus questions (ASER, 2015)

**Table 1: Assessment Scoring levels**

Level	English	Mathematics
1 (Lowest)	Nothing	Nothing
2	Capital Alphabetical Letters	Can recognize 1-9
3	Small Alphabetical Letters	Can recognize 10-99
4	Words	Addition/Subtraction sums
5 (Highest)	Sentences	Double-Digit Division

### 3.2. Analysis Techniques

To address the aforementioned research questions, I employ two approaches, namely descriptive statistics and inferential analysis. In the section on the descriptive statistics, the raw correlations and tabulations will simply be commented upon. In the case of inferential analysis, multivariate regression analysis will be run on the ASER data using STATA 14.1 to estimate the following model:

$$LA = \beta_0 + \beta_1 \text{Private} + \beta_2 \text{Child} + \beta_3 \text{HH} + \beta_4 \text{School} + \varepsilon$$

The above model would be run as a series of regressions, where each of the variable sets are progressively controlled for, to see the effect of each on the private school premium. In other words:

- $LA = \beta_0 + \beta_1 \text{Private} + \varepsilon$
- $LA = \beta_0 + \beta_1 \text{Private} + \beta_2 \text{Child} + \varepsilon$
- $LA = \beta_0 + \beta_1 \text{Private} + \beta_2 \text{Child} + \beta_3 \text{HH} + \varepsilon$
- $LA = \beta_0 + \beta_1 \text{Private} + \beta_2 \text{Child} + \beta_3 \text{HH} + \beta_4 \text{School} + \varepsilon$

Where LA (Learning Achievement) denotes the dependent variable, a dichotomous variable showing whether a child passed or failed the basic learning test, with separate regressions estimated for English and Mathematics achievement.

Private denotes a dummy variable symbolizing the type of school attended by the child, and Child, HH and School are respectively vectors of child, household and school characteristics,

described in more detail below. It is usually advised to use a probit or logit model when the dependent variable is of this nature (Mood, 2010). However, some studies (Angrist and Pischke, 2008; Hellevik, 2009) suggest using OLS (Ordinary Least Squares), claiming that the results of the two are almost the same with only minor differences (Angrist and Pischke, 2008). Hence, multivariate OLS regression analysis is deemed appropriate for this study for ease of exposition.<sup>3</sup> OLS regressions allow researchers to quantify how much on average a dependent variable (the learning achievements) will change with a one unit change in the independent variables. In addition, the logit regression results are shown in the Appendix and any differences in results commented on in Section 5.

Apart from the above series of regressions, the next step would be to introduce the interaction terms to test whether children in private schools in urban areas perform better than children in private schools in rural areas (private\*urban) and whether it is only the wealthier children who benefit from private school (private\*wealth). Thus, the regression model takes the following form:

$LA = \beta_0 + \beta_1 \text{Private} + \beta_2 \text{Child} + \beta_3 \text{HH} + \beta_4 \text{School} + \text{Private} * \text{Wealth} + \text{Private} * \text{Urban} + \varepsilon$  where  
HH contains the variables Wealth and Urban.

*Sample for the study:*

This study will only focus on a total sample of 6,153 children (age 5-16), who are currently enrolled in primary educational institutions, both private and public.

ASER has collected a total of 258, 021 observations, which after being tailored for the current study comes down to 6, 153 observations. Firstly, as the study focuses only on private and public schools, other non-formal education institutions such as vocational training centers, and madrasas are excluded from the data set (170, 600). Secondly, only those children who are enrolled at the primary level (grade 1, 2, 3, 4, 5) are considered, with pre-school and secondary school children being excluded. In addition, to obtain accurate performance results of the two school types, only the currently enrolled children will be studied, with out of school and dropout children excluded from the study. These restrictions bring down the

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<sup>3</sup> French and Kingdon (2010) carried out their research with different models, but could not agree on which was the most appropriate and used OLS for their analysis.

sample size to 121, 657. As the study controls for variables at all three levels - child, household and school - the household data file (which consists of data about the child learning outcomes and child and household level details) was merged with the private school data file and the public school data file (70, 869). Fourthly, children of a very young age i.e. 3 and 4 are eliminated from the dataset as they are deemed too young to be assessed. (Students aged 12+ are reported to be enrolled at primary level and so have not been excluded from the sample). Lastly, limiting the data set only to the provinces where both urban and rural regions were surveyed (omitting Kashmir, FATA and Gilgit-Baltistan), and accounting for all the missing observations on the various dependent and independent variables (mother education has only 16,106 observations), brings down the sample size to 6, 153 observations.

### **3.3. Description of the Variables**

To create the dependent variable, LA, raw data from the ASER survey is used. The raw scores in ASER are represented as: English - Nothing (1), Letters (2), Words (3), Short sentences (4), Story (5). Mathematics - Nothing (1), 1-9 (2), 10-99 (3), +/- (4), division (5). A binary variable is created by coding the raw scores into: 0 or fail (1, 2) and 1 or pass (3, 4, 5). Instead of using the absolute scores, a dichotomic variable is created which is consistent with the Pakistani grading system, where 3 (short sentences, +/-) is considered as the average. Below 3 is considered a fail and above 3 is considered a pass (Chohan and Qadir 2013; Siddiqui, 2017).

The key independent variable of interest is 'Private'. Private is a dummy variable equal to 1 if the child attended a private school and 0 if a he/she attended a public school.

For each of the sets of characteristics (child, household, school), several variables that were identified in prior research as important factors affecting the child's learning outcomes, were selected to be included in the regressions. These are described below and summarized in Table

2.

Starting with the child characteristics, gender (Aslam, 2009) and age (Sharp et al., 2009) are considered vital for estimating the effect on the child's learning outcomes as discussed in the literature review. Gender in particular may be very important in this regard. Pakistan is seen as a male dominated society and literacy rate amongst boys (70%) is higher compared to

literacy rate amongst girls (47%) (Pakistan Economic Survey, 2015). Age is measured in years for this study, through a continuous variable. And gender will be accounted for, through Female, a dummy variable where 1 is a female child and 0 is a male child.

Regarding the household characteristics, the most important variables identified in the literature review are: whether the child is receiving private tutoring (Alcott and Rose, 2015; Aslam 2009; Amjad and Macleod, 2014), the number of siblings, parents' education (Härmä, 2011; Amjad and Macleod, 2014), and the wealth of the household (Alcott and Rose, 2016; Amjad and Macleod, 2014). To account for whether the child is receiving private tutoring, a dummy is constructed, where 1 is equal to child is receiving private tutoring and 0 is equal to child is not receiving private tutoring. The number of siblings is a continuous variable, which accounts for the assessed child's total number of siblings. To account for the wealth of the household, a wealth index is created through MCA (Multiple Correspondence Analysis). MCA is used instead of PCA (Principal Component Analysis) because of the nature of the variables i.e. dummy and categorical, used in this study. PCA is considered inappropriate in such cases, as it is more suitable when the variables are continuous (Howe et al., 2008). After using different variable groups, Electricity, Mobile, TV, and House-Ownership were chosen as the final set of variables to construct the wealth index with.

Furthermore, in the case of parent's education, a continuous variable accounting for mothers' and fathers' education is constructed for each, separately. This variable is consistent with Pakistan's education system. Pakistan's educational levels are divided into the following categories: Pre-primary (Nursery), Primary (grades 1-5), Middle (grades 6-8), Secondary (grades 9-10), Higher Secondary/Inter Colleges (grades 11-12), Degree colleges (2-4 years Bachelor's degree) and University education (Masters - 16 years of education/Ph.D. 20 years of education) (Pakistan Economic Survey, 2015)

Although region and province of residence are rarely taken in to account in the studies conducted in Pakistan. The vast differences in the urban and rural regions/provinces (Alcott and Rose, 2015), will be incorporated in this study. An Urban- dummy variable where 1 stands for urban regions and 0 stands for rural regions, and through dummy variables for each of the four provinces, with Punjab being considered as the bench-mark (omitted variable).

In the case of school characteristics, this variable vector comprises the school facilities and the number of graduate teachers. School facilities can be quantified based on factors such as: whether school has a library, playground, toilet facility, computer lab, internet facility, electricity connection, laboratory, drinking water and boundary wall, and is measured by MCA, as the data are once again available in binary form. The only information about a child's school derived from ASER is whether the child is in public or private school. As children were only asked if they attended any of the surveyed schools, but not directly matched to each particular school, the only common variable between the Household data file and the school file is the 'village id'. This allowed me to calculate the school index for public and private schools at the village level, following the method of Amjad and Macleod (2014). Teacher quality will be proxied through the number of graduate teachers (defined as teachers with a Bachelors' degree) appointed in the school and is measured through a continuous variable. However, similar to the school index, the information about the number of graduate teachers is also limited to the 'representative' private or a 'representative' public school in a particular village.

**Table 2: Variables Description**

<b>Learning Outcomes:</b>	<b>Description</b>
English/Mathematics	Binary variable: knows the basics, i.e. scores 3-5 (1), Doesn't know the basics i.e. scores 1 or 2 (0)
<b>Main independent variable of interest:</b>	
Private	A dummy variable for school type: Private (1), Public (0).
<b>Child level variables:</b>	
Age	A continuous variable (in years).
Female	A dummy variable male (0) and female (1).
<b>Household Characteristics:</b>	

Wealth Index	Electricity, Mobile, TV, and House-Ownership.
Father's Education Mother's Education	Continuous variables in years.
Province of residence	Dummy variables for Punjab, Baluchistan, Sindh and KPK. Punjab is considered the benchmark (omitted variable).
Urban	A dummy variable for region type: Urban (1), Rural (0).
Private Tutoring	Dummy variable: Yes (1) and No (0).
No. of Siblings	Continuous variable.
<b>School Facilities:</b>	
School index:	Library, Library has books, playground, toilet facility, computer lab, Laboratory, drinking water, boundary wall, internet facility, electricity connection.
No. of Graduate Teachers	Continuous variable
<b>Interaction variables:</b>	
Private* Wealth	Child is enrolled in a private school and belongs to a wealthy household.
Private* Urban	Child is enrolled in a private school and resides in an urban region.

### ***3.4. Limitations of the Study***

The following are limitations of this study. Starting with the weaknesses of the ASER data set, firstly, there exists the issue of omitted variables. Although ASER contains data on a rich set of variables, some variables which might be important in determining learning achievements are missing from the data set. One of the most important missing variables is the income of the household (French and Kingdon, 2010), which would have strengthened the accuracy of the estimations by further accounting for financial resources. Furthermore, the

caste and religion of the child can be a major source of discrimination (French and Kingdon, 2010); however, no information regarding these variables can be found in ASER data set.

Moreover, ASER examines only one government school (mandatory) and one private school (optional) in each village selected for the household survey. Such a survey negates linking individual students to specific private or public schools (only information available is whether they went to a private or a public school). This makes it impossible to account for the school level facilities of that particular child's school, but rather have to rely on a 'representative' private or a 'representative' public school in a particular village.

Another limitation of ASER, which applies to any large-scale survey, is that the data collected through the household survey is largely based on the information provided by the respondents (head of the household) and is not checked against any authentic documentation e.g. birth certificates, certificates etc., to verify its accuracy. Surveys conducted by schools gather information regarding school facilities and teaching quality. However, rather than an independent source, the principal responsible for the academic administration of the school answered on behalf of all teachers and attested their qualifications allowing room for a biased perspective.

The methods and data used in this study do not allow me to control for child characteristics such as the child's innate ability and motivation. Proxies for these characteristics are very rarely collected in surveys given measurement issues, and are often referred to as child-level 'unobservable' in the econometrics literature. There might also be household-level unobservable characteristics that cannot be account for, namely a parental 'preference' for education. These unobservable characteristics can lead to endogeneity, affecting the accuracy of the results obtained. Furthermore, it is also possible that there is a selection on ability that cannot be accounted for. In other words, good students might go to private schools and weaker students to public schools. This may be a conscious choice on the part of parents or private school scholarships may be aimed at good students.

In addition, although district level fixed effect was applied to control any bias in the results arising due to the differences amongst the districts, applying household and child/individual level fixed effects is not possible as there exists little variation within household on the predictor variables. To estimate the premium on private schooling at the household level

would require two children of primary school age in the same household but one going to a private school and one going to a private school. To account for this would require the use of panel data or instrumental variables, neither of which are available to me. This limits the extent to which one can claim causality in the findings.

#### 4. Descriptive Statistics

Table 3 provides descriptive statistics at the aggregate level, for the sample of 6,153 children enrolled in primary school used in this study.

**Table 3: Descriptive Statistics for Dependant and Independent variables**

Variable	Mean	Std. Dev.	Min	Max
<i>Dependent Variables</i>				
English	0.75	0.43	0	1
Mathematics	0.78	0.41	0	1
<i>Key Independent Variable:</i>				
Private	0.17	0.37	0	1
<i>Child level:</i>				
Female	0.42	0.49	0	1
Child Age	8.38	2.10	5	16
<i>Household Level:</i>				
Father's Education	10.24	3.56	0	20
Mother's Education	7.94	3.39	0	16
No. of Siblings	3.50	1.45	0	10
Urban	0.13	0.34	0	1
Punjab	0.28	0.45	0	1
Sindh	0.26	0.44	0	1
Baluchistan	0.12	0.33	0	1
KPK	0.33	0.47	0	1
Islamabad	0.01	0.08	0	1
Private tutoring	0.15	0.36	0	1
Mobile	0.92	0.27	0	1

TV	0.82	0.39	0	1
Electricity	0.94	0.24	0	1
House Owned	0.92	0.26	0	1
<i>School Facilities:</i>				
No. of Grad Teachers	2.31	1.80	0	16
Internet	0.08	0.21	0	1
Computer lab	0.07	0.26	0	1
Laboratory	0.08	0.27	0	1
Electricity	0.80	0.40	0	1
Drinking water	0.80	0.40	0	1
Play Ground	0.48	0.50	0	1
Library	0.17	0.38	0	1
Library has books	0.18	0.38	0	1
Toilet	0.72	0.45	0	1
Boundary wall	0.79	0.41	0	1

Notes: The sample size is 6,153 children as described in Section 3 above.

Although, on average, a 25% increase in private institutions is reported annually of which 30% are primary schools (National Education Census, 2005), and almost 83% of the sample of children in this study are enrolled in public schools at the primary level, with only 17% enrolled in private schools. As the majority of the sample is drawn from the rural areas, and public schools are much more widespread than private schools in rural areas, this higher proportion in public schools in the sample is expected.<sup>4</sup>

The age of the students enrolled in primary schools<sup>7</sup> ranges from 5 – 16. This shows that some students enrolled at the primary level are over-age. However, in Pakistan, over-age students at primary level are no surprise, as children especially in the rural regions of Pakistan, enrol in schools at a very late age. One of the reasons for this could be the lack of awareness about the importance of education in the rural areas, where the majority of parents are illiterate and education may not be a priority for them.

<sup>4</sup> One reason for this difference might be that it was considered mandatory during the ASER survey to collect information about public schools and only optional to collect information on private schools. In those villages where private schools were not surveyed, children of those private schools were dropped out of the data after merging the household file and the school file. This is another limitation of the ASER data.

From the parents' education statistics, fathers tend to be more education (10.24%) than mothers' (7.94%). This finding is in line with the gender disparity that exists in Pakistan. According to the Economic survey (2015) of Pakistan, in 2013-2014, the female literacy rate was 47%, with male literacy rate being 70%. This reflects the strong gender bias that exists in Pakistan where the male child's education is given priority over the female child's education. The sex ratio reported in the table, also points in the same direction, as only around 40% of the students are female.

Moreover, receiving additional private tutoring is becoming increasingly common amongst the student population, especially those enrolled in private schools (reference). The ASER (2015) report states that students in all primary grades are receiving additional tuition, and that the number of students increases with the advancement in grade level. However, the table reports that 16% of the children in this sample receive additional private tutoring.

The majority of the sample is from the provinces of KPK (33%) and Punjab (28%). This is because the primary enrolment rates are highest in Punjab (64%) followed by KPK (54%) (Economic survey of Pakistan, 2015). Moreover, Punjab, followed by Sindh are the largest provinces of Pakistan which justifies larger samples being drawn from these provinces. The literacy rate in Baluchistan (44%) is the lowest (Pakistan Economic Survey, 2015), thus it accounts for only 12% of the total sample size. Regarding the regions/area types, only 13% of the sample is being drawn from the urban areas. This is because ASER (2015) Pakistan covers only 21 urban districts as compared to 146 rural districts.

Regarding the household material wealth like electricity, mobile phone, and house ownership, the figures show that the general standard of living is favourable as the basic necessities available in more than 90% of the households.

Taking the school facilities in to account, the tables shows that more than 70% of the primary schools in the sample have the basic facilities such as electricity, toilet, and drinking water. Some of the other facilities, like a library, a laboratory and a computer lab are less common.

Also, the mean number of graduated teachers per school shows that the majority of these schools have a low number of graduate teachers appointed<sup>5</sup>.

Table 4 shows a comparison between the public and private schools, revealing the characteristics of the children who attend either public or private schools. In private schools, almost around 87% of children have learnt at least the basics as compared to around 70% in public schools. Private school students belong to wealthier backgrounds, are much more likely to live in urban areas, and their parents' education levels are higher compared to their public school peers. In addition, private tutoring is more common amongst the private school students compared to public school students.

Regarding the school facilities, more than 95% of the Private schools have access to basic facilities such as drinking water, electricity and toilet, whereas only 60 to 80% of the public schools have the basic facilities. As far as the technological facilities are concerned such as Internet and computer labs, around 20 – 27% private schools as compared to less than 5% public schools, have these facilities. The average number of graduate teachers per school is 3% for the private schools whereas only 2% for the public schools. Thus, overall Private schools have more resources as compared to public schools.

**Table 4: Descriptive Statistics disaggregated by School Type**

	Private School	Public School		
Variable	Mean	Mean	Difference	Level of Significance
<i>Dependent Variables:</i>				
English	0.88	0.73	0.15	***
Mathematics	0.86	0.76	0.10	***
<i>Child Level:</i>				
Child Age	8.11	8.44	-0.33	***
Female	0.43	0.41	0.02	-
<i>Household Level:</i>				
Father's Education	11.31	10.02	1.29	***
Mother's Education	9.70	7.58	2.12	***

<sup>5</sup> For the given sample, number of total appointed teachers in public and private primary schools are 5,125 and 1,028, respectively.

No. of Siblings	3.22	3.56	-0.34	***
Urban	0.39	0.08	0.31	***
Punjab	0.45	0.24	0.21	***
Sindh	0.23	0.27	-0.04	**
Baluchistan	0.03	0.14	-0.11	***
KPK	0.29	0.33	-0.04	***
Islamabad	0.00	0.01	-0.01	***
Private tutoring	0.41	0.10	0.31	***
Mobile	0.99	0.90	0.09	***
TV	0.92	0.80	0.12	***
Electricity	0.99	0.93	0.06	***
House Ownership	0.92	0.93	-0.01	-
<i>School Level:</i>				
No.Grad Teachers	3.45	2.08	1.37	***
Internet	0.20	0.02	0.18	***
Computer Lab	0.27	0.03	0.24	***
Laboratory	0.15	0.06	0.09	***
Electricity	0.96	0.77	0.22	***
Drinking Water	0.99	0.76	0.23	***
Playground	0.47	0.48	-0.01	-
Library	0.23	0.16	0.07	***
Library has books	0.31	0.15	0.16	***
Toilet	0.99	0.66	0.33	***
Boundary walls	0.98	0.75	0.23	***
No. of Observations	1,028	5,125	Total Observations: 6,153	

Table 5 shows the differences that exist between the two regions types, namely urban and rural. The sample consists of 5,317 students residing in rural areas, and only 836 students residing in urban areas. Performance in the urban private schools is higher by almost 10% than in the rural private schools.

**Table 5: Descriptive Statistics disaggregated by Region**

	Urban	Rural		
Variable	Mean	Mean	Difference	Level of Significance
English	0.85	0.74	0.11	***
Mathematics	0.82	0.77	0.05	***
Private	0.48	0.12	0.36	***
<i>Child level:</i>				
Female	0.47	0.41	0.06	***
Child Age	8.43	8.37	0.06	-
<i>Household level:</i>				
Father's Education	11.84	9.99	1.85	***
Mother's Education	9.96	7.62	2.34	***
No. of Siblings	3.43	3.52	-0.09	-
Sindh	0.41	0.24	0.17	***
Punjab	0.25	0.28	0.03	**
Baluchistan	0.06	0.13	-0.07	***
KPK	0.25	0.34	-0.09	***
Islamabad	0.02	0.00	0.02	***
Private tutoring	0.31	0.12	0.19	***
Mobile	0.98	0.91	0.07	***
TV	0.95	0.80	0.15	***
Electricity	01.00	0.93	0.07	***
House Owned	0.87	0.93	-0.06	***
<i>School Level:</i>				
No. Grad Teachers	3.35	2.15	1.20	***
Internet	0.18	0.03	0.15	***
Computer Lab	0.21	0.05	0.16	***
Laboratory	0.17	0.06	0.11	***

Electricity	0.92	0.79	0.13	***
Drinking Water	0.85	0.79	0.06	***
Playground	0.44	0.49	-0.05	**
Library	0.12	0.18	-0.06	-
Library has books	0.19	0.18	0.01	***
Toilet	0.92	0.68	0.24	***
Boundary wall	0.95	0.76	0.19	***
No. of Observations	836	5,317	Total Observations: 6,153	

Regarding their household characteristics, the children in urban households have relatively better living conditions than those in rural households. However, household ownership is 6% higher in the rural regions than in the urban regions. The household ownership being lower in the urban regions could be because of land prices being higher in the urban regions as compared to the rural regions. Almost half of the urban population (48%) is enrolled in private schools, and almost 31% of them are receiving additional private tutoring, whereas in the rural regions, it is more common to be enrolled in public schools (89%), and only around 12% of them are receiving additional private tutoring.

Moreover, parental education is higher in the urban regions, probably due to the high level of educational awareness in the urban areas and the availability of more schooling options as compared to the rural regions. As additional private tutoring is expected to have a significant positive effect on the child's learning achievements, this could be one of the reasons as to why urban children outperform rural children at schools. Furthermore, it is worth noting that the gender disparity is less prevalent in the urban regions than in the rural regions, as almost 50% of the urban sample comprises of female students. This is a big achievement towards the gender-gap reduction in literacy even if only experienced in the urban areas.

In the case of school facilities, the urban regions have better technological facilities compared to that of the rural regions where there are almost no technological facilities, and even some basic facilities are lower in rural regions (such as toilet, electricity connection and boundary wall of the schools).

## 5. Regression Analysis

This chapter presents the findings of the regression analysis. A multivariate ordinary leastsquares (OLS) regression model is estimated to examine the relationship between learning outcomes and the range of variables described above. A series of regressions are run, where each set of variables (child, household and school) are progressively controlled for. This allows us to see how the size of the effect of the private school premium on the child's learning achievements in Mathematics and English assessments changes.

The tables below summarize the findings of these regressions. In each table below, Model 1 displays the results of an OLS regression with only the Private school dummy variable, without any controls for potential confounding variables. Model 2 displays the results of an OLS regression with only child level controls. Model 3 displays the results of an OLS regression with child and household level controls. Model 4 displays the results of an OLS regression with controls at all three levels i.e. child, household and school level. Model 5 displays the results of an OLS regression where the interaction terms between private schooling and the wealth index and private schooling and the urban dummy are also accounted for.

### 5.1 Ordinary Least Squares Regression Analysis: Mathematics

**Table 6:** Multivariate OLS regression models - Mathematics

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
Private	0.101*** (0.014)	0.122*** (0.013)	0.065*** (0.015)	0.054*** (0.015)	0.046** (0.018)
Child Age		0.065*** (0.002)	0.069*** (0.002)	0.069*** (0.002)	0.069*** (0.002)
Gender		0.014 (0.010)	0.010 (0.010)	0.010 (0.010)	0.010 (0.010)
Father's Education			-0.000 (0.002)	-0.000 (0.002)	-0.000 (0.002)
Mother's Education			0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)
No. of Siblings			-0.013*** (0.003)	-0.013*** (0.003)	-0.013*** (0.003)

Urban			0.018 (0.015)	0.013 (0.016)	-0.009 (0.020)
Sindh			-0.170*** (0.014)	-0.177*** (0.014)	-0.182*** (0.014)
Baluchistan			-0.106*** (0.018)	-0.111*** (0.018)	-0.114*** (0.019)
KPK			0.056*** (0.014)	0.052*** (0.014)	0.049*** (0.014)
Islamabad			0.019 (0.065)	-0.039 (0.068)	-0.036 (0.068)
Private tutoring			0.055*** (0.015)	0.054*** (0.015)	0.055*** (0.015)
Wealth Index			0.008* (0.005)	0.008* (0.005)	0.006 (0.005)
No. Grad. Teachers				0.009*** (0.003)	0.010*** (0.003)
School Index				-0.001 (0.004)	-0.002 (0.004)
Private* Urban					0.061* (0.031)
Private* Wealth					0.043* (0.022)
Constant	0.762*** (0.006)	0.222*** (0.021)	0.195*** (0.029)	0.184*** (0.030)	0.188*** (0.030)
N	6153	6153	6153	6153	6153
Adj. R <sup>2</sup>	0.0082	0.1156	0.1781	0.1791	0.1797

Source: ASER, 2015.

Note: Standard errors reported beneath the coefficients (in parentheses).

\*, \*\*, \*\*\* indicates significance at the 10%, 5% and 1% level, respectively.

Table 6 shows the results of the series of regressions predicting learning achievement in Mathematics. Starting with the simple model (**Model 1**), with no controls for confounding

variables, shows that, private schooling has a positive and significant effect on the learning achievement of the students. A child attending a private school will, on average, have 10% better learning outcomes than a child enrolled in public school. Models 2, 3, and 4 display the results with controls added at the child, household, and school levels, respectively. Comparing these models to model 1, the impact of private schooling remains positive and significant, however it reduces in the case of models 3, 4 and 5.

In **Model 2**, when child characteristics are added, the estimated impact of private schooling increases, on average, from 10% to 12%. With reference to age, it is evident that with an increase in the age of the student, the chances of achieving at least a basic level of numeracy improve by 6.5% (significance at the 1% level). Turning to gender, the results show that being female has no significant impact on the learning outcomes of the student.

Controlling for the household characteristics (**Model 3**) reduces the estimated impact of private schooling by a substantial amount - from 12% to 6%. Amongst the household characteristics that are significantly associated with learning in Mathematics, are receiving private tutoring, the number of children in the household, the province the household is located in, and the mother's education. Receiving additional private tutoring has one of the largest impacts on learning among the household characteristics (other than the location variables). It increases the chances of obtaining at least a basic level of numeracy or above by 5.4%. The coefficient of the number of children per household (-1.3%) shows that the fewer the number of children in the household, the better will be the learning outcomes of the child.

It is also apparent that the province where the household is located also affects the learning outcomes. Students coming from Sindh and Baluchistan will on average perform 10.6% and 17% worse in Mathematics assessments, compared to Punjab (the wealthiest and most highly populated province). However, in the case of KPK, on average, the students will perform 5.6% better than the students of Punjab, although Punjab is more developed as compared to KPK. Moreover, the results show that the more educated the mother the higher the chances that the child will have achieved a basic level of learning, although the size of the effect is small at 0.9%. Surprisingly, the wealth effect of 0.8% is also small and only significant at the 10% level. The effect of father's education and living in an urban region are insignificant.

In the case of **Model 4**, the attribution of school facilities towards the positive impact of private schooling on learning is controlled for. Although it was expected that the school index would have a positive impact on the learning outcomes, as many studies conducted in Pakistan have found, the results show that the effect is not only small but insignificant as well. The effect of the number of graduate teachers present in the school is significant though, and on average, it contributes almost 1% towards the learning outcomes.

**Model 5** displays the findings of the regression with the interaction terms. While the private school dummy remains positive and significant, both private\*wealth and private\*urban are positive and significant (at the 10% and 5% levels respectively), thus confirming the hypothesis of this study. The private\*wealth interaction term shows that if a child belongs to a wealthier household and at the same time is attending a private school, his learning outcomes would be 4.3% better than the learning outcomes of a child who belongs to a poor household and attends a private school. The private\*urban interaction confirms the hypothesis that children in private schools which are located in the urban regions of Pakistan do better (6.1%) than students in private schools in rural areas. Overall, however, the adjusted R squared shows that only 18% of the variation in the learning outcomes is explained by the confounding variables.

## 5.2 Ordinary Least Squares Regression Analysis: English

This section summarizes the OLS regression results for the literacy test scores. The model specifications are identical to those used for the Mathematics regressions. Most of the results are consistent with the above displayed Mathematics estimations. In the case of English, the impact of private schooling also remains positive and significant, even after controlling for all the confounding variables.

**Table 7: Multivariate OLS regression models - English**

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
Private	0.150*** (0.015)	0.171*** (0.014)	0.080*** (0.015)	0.069*** (0.015)	0.056*** (0.019)
Child Age		0.068*** (0.002)	0.073*** (0.002)	0.073*** (0.002)	0.073*** (0.002)

Gender		0.005 (0.010)	0.006 (0.010)	0.006 (0.010)	0.006 (0.010)
Father's Education			0.000 (0.002)	0.000 (0.002)	0.000 (0.002)
Mother's Education			0.013*** (0.002)	0.012*** (0.002)	0.012*** (0.002)
No. of Siblings			-0.011*** (0.003)	-0.010*** (0.003)	-0.010*** (0.003)
Urban			0.067*** (0.016)	0.062*** (0.016)	0.033* (0.020)
Sindh			-0.220*** (0.014)	-0.225*** (0.014)	-0.231*** (0.014)
Baluchistan			-0.147*** (0.018)	-0.149*** (0.019)	-0.152*** (0.019)
KPK			0.056*** (0.014)	0.052*** (0.014)	0.049*** (0.014)
Islamabad			0.033 (0.066)	-0.028 (0.069)	-0.024 (0.069)
Private Tutoring			0.068*** (0.015)	0.066*** (0.015)	0.067*** (0.015)
Wealth Index			0.004 (0.005)	0.004 (0.005)	0.001 (0.005)
No. Grad Teachers				0.009*** (0.003)	0.010*** (0.003)
School Index				0.002 (0.004)	0.001 (0.004)
Private*Urban					0.079** (0.032)
Private*Wealth					0.048** (0.023)
Constant	0.726*** (0.006)	0.153*** (0.022)	0.096*** (0.030)	0.082*** (0.030)	0.087*** (0.030)

N	6153	6153	6153	6153	6153
Adj. R <sup>2</sup>	0.0165	0.1241	0.2178	0.2189	0.2199

**Source:** ASER, 2015.

**Note:** Standard errors reported beneath the coefficients (in parentheses).

\*, \*\*, \*\*\* indicates significance at the 10%, 5% and 1% level, respectively.

Table 7 shows the results of the OLS regression analysis for learning achievement in English. The results of **Model 1**, in which only the school type is specified without any control variables, show that private schooling, on average, has a 15% positive and significant effect on the learning achievement of the students.

In the case of **Model 2**, where the child characteristics are controlled for, the estimated impact of private schooling increases from 15% to 17%. The results of Model 2 are similar to that of the Mathematics Model 2 results. It can be seen that, on average, with an increase in age the students' literacy achievements improved by 6.8%. Like the Mathematics results, gender has no significant impact on the learning outcomes of the student.

In **Model 3** household characteristics are added, and this significantly reduces the estimated impact of private schooling from 17% to 8%. The only significant (at the 1% level) variables in this model are receiving additional private tutoring, the number of children in the household, the province the child resides in, and mother's education (similar to those for the Mathematics regression). However, unlike in the case of the Mathematics assessment, the variable Urban also turned out to be significant, positively influencing the learning outcomes. The results show that receiving private tutoring and residing in an urban region have the greatest impact on learning among the household characteristics included in the model (apart from the provincial variables). Both (receiving private tutoring and residing in an urban region) have, on average, around 6.7% and 6.8% positive impact on the learning outcomes of the students, respectively. Turning to the provinces, once again Sindh and Baluchistan performed worse by 14.7% and 22% compared to Punjab, respectively. And KPK performance is ahead of Punjab by 5.6%. Moreover, the coefficient on the number of children per household (-1.1%) shows that the fewer the number of children in the household, the better will be the learning outcomes of the child at school. Mother's education once again proved to be significant unlike father's education. The results show that the more educated

the mother the better will be the performance of the child at school (a 1.3% effect). The effect of wealth on learning turned out to be insignificant.

The results of **Model 4** show that the school index is again insignificant, but the effect of the number of graduate teachers present in the school is significant, with on average, an almost 1% positive contribution towards the English learning outcomes.

Lastly, **Model 5** displays the findings of the regressions with the interaction terms - private\*wealth and private\*urban, with all the controls included. Like the interaction terms for the Mathematics regression, the interaction terms in the case of English are also positive and significant. The results show that a child who belongs to a wealthy household and is enrolled in a private school would have a 4.8% (at the 1% level of significance) better learning outcomes than that of a child who belongs to a poor household and attends a private school. Moreover, a child who attends a private school located in an urban region of Pakistan will, on average, perform 8.8% (at the 5% level of significance) better than a child attending a private school in a rural region. However, the coefficient on the private school dummy remains significant, although it is smaller. Overall, the adjusted R squared shows that only 21% of the variation in the learning outcomes is explained by the independent variables.

From the above analysis, it is evident that private schooling has a positive impact on the overall performance of the primary school students. Even after controlling for all the confounding variables, the average increase in the learning achievement due to school type is still around 6%. However, much of the difference in performance between the public and private school students can be attributed to the household characteristics, with the school facilities accounting for a much smaller portion. The results across the English and Mathematics regressions were fairly similar, except that the urban dummy was positively associated with learning in English, but not with Mathematics. The significance of these findings is discussed further below in the discussion section.

#### *Robustness checks:*

In order to check the robustness of the results to the choice of estimation strategy, two additional sets of regressions were run: a series of logistic regressions, and OLS regressions

with district fixed effects. The full results are reported in the Appendix of this paper and summarized here.

Starting with the logistic regressions, odds ratios for mathematics and English learning outcomes are shown in Table 8 and Table 9, respectively. The tables show that the results obtained through logit regression are similar to those of OLS. The odds ratios calculated imply that the direction of change in the predictor variables remains the same as the OLS coefficients, however there is a difference in the level of significance in the case of some variables in **Model 5**. The major difference being - Urban is insignificant in the Logit model whereas it is significant at the 10% level in the OLS model<sup>6</sup>.

Fixed effects models are applied to help reduce endogeneity, by accounting for the unobservable omitted variables that might affect the results. Provincial differences are already accounted for in the main model by the inclusion of province dummies, therefore fixed effects are applied here at the district level. District level fixed effects would control for political and geographic differences across these areas. Controlling for the district characteristics is of immense importance due to the implementation of the Devolution Plan, which shifted the responsibility (mainly the allocation of resources to the education sector) for the public schools from the provincial-level government to the district-level government. The results of the district-level fixed effects are compared with the OLS model, and are reported in Table 10. The variation observed in the results of the two models, shows that the OLS results are biased due to variation in the characteristics of villages.

In the case of English, applying district-level fixed effects reduces the magnitude of the relationship between private schooling and learning outcomes by 1.6%, whereas in the case of mathematics, there is an increase in the magnitude of the relationship by almost 0.6%. Apart from these variations, the private school dummy remains significant. For English, the reduction in the private school premium could mean that the private schools' better

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<sup>6</sup> Taking the dependant variable as continuous (1 to 5) and estimating an ordered logit regression, the regression results obtained differ in terms of significance as compared to when the dependent variable is binary. In the case of Mathematics, some variables such as gender, father's education, urban, wealth and Islamabad turns out to be significant, whereas KPK is no longer a significant variable. In the case of English, KPK, Private\*Wealth and Private\*Urban lose their significance. However, the private school premium remains positive and significant.

performance for English results is more influenced by the district-level facilities/characteristics e.g. well-developed infrastructure or better management. For mathematics, the increase in the private school premium could mean that controlling for district-level effects accounts for issues like corruption or bureaucratic inefficiencies in district level administration, which could create hurdles for the smooth functioning of the private schools. The difference in the direction of the change for the private school premium could also be due to the very different nature of the subjects (English and Mathematics), which are differently influenced by the inter-district variation, which cannot be controlled with the current data set.

A further step would be to take into account the endogeneity caused by unobservable factors at the household and individual levels, however, the nature of the data-set precludes me from doing this. Household-level fixed effects would require variation within the household, or, in other words, that there are at least two children in the same household, but with one attending a private primary school and the other a public primary school. Accounting for individual-level fixed effects would require longitudinal data on individual children where variation is drawn from children switching between private and public primary schools.

## **6. Discussion and Conclusion**

With the advent of SDGs, the focus of educational goals (SDG 4) has been diverted towards the achievement of equitable learning outcomes. This has led to debate among education policy-makers on whether increasing access to private schooling is the key to achieving the educational goals. This study makes several contributions to this debate by: firstly, analysing the private school impact on learning outcomes by using the latest educational data for Pakistan - ASER 2015, which has not yet been explored for academic research purposes. Secondly, by studying the impact of the child's socio-economic status on the learning outcomes at private schools, I contribute to the evidence on equitable learning outcomes, which has not been extensively researched in the case of Pakistan. Thirdly, this analysis tests if urban private schools really are superior in their impact on learning outcomes due to the visible differences in their educational systems as compared to the private schools in the rural regions.

Starting with the impact of private schooling on learning achievements, the findings across English and Mathematics confirm the existence of a private school premium. The positive impact on a child's learning achievements is around 15% in the case of English and in the case of mathematics it is around 10%.

In order to examine the mechanisms that drive the private school premium, controls were added at three levels: child, household, and school level. This led to a fall in the private school premium, where most of the effect (6%) is absorbed once household characteristics are controlled for, followed by a much smaller reduction (1%) in the premium after controlling for school characteristics. However, it is worth mentioning that even after applying all the controls, the private school premium remained significant, with a coefficient value of around 5%. Thus, this means that all the mechanisms driving the private school premium have not been accounted for.

As far as the interaction terms are concerned, in both cases, English and mathematics, these turned out to be positive and significant. However, even after adding the interaction terms, the private school dummy remains positive and significant. This means that private school students in urban and wealthier households accrue an additional premium over and above the base private school premium coefficient. Thereby, the results of the interaction terms confirm the hypothesis that children belonging to wealthier households will perform better in private schools than children belonging to poorer households in private schools. This finding is consistent with Bourdieu's theory, where he states that the wealthy children are expected to do better than the poor (Sullivan, 2002). The poor might not be able to receive help from their parents and might not be able to attain additional private tutoring due to which their performance might not be as high as the rich, while being enrolled in the private schools. Similarly the hypothesis that the children in urban private schools will perform better than children in rural private schools is also supported. This is likely due to the foreign curriculum and better management system of the private schools in the urban areas (Shamim, 2008).

Moreover, among the child characteristics, age turned out to significantly affect the learning outcomes. In the case of household characteristics, receiving additional private tutoring turned out to have a significant effect on the learning outcomes. This finding is also in line with the previous studies conducted in Pakistan (Alcott and Rose, 2015; Aslam, 2009; Amjad

and Macleod, 2014). According to Aslam (2009), one of the reasons for this significant positive impact of private tutoring could be the poor-quality teaching at schools, especially in public schools. Those students who received private tutoring, have better learning skills as compared to those of their peers who do not receive any private tutoring.

Regarding parents' education, mother's education proved to significantly affect the learning outcomes, in contrast to father's education which proved to be insignificant. These results are consistent with the findings of Andrabi et al., (2012) which suggest that maternal education has a greater effect on the child's academic performance. Perhaps the weak effect of paternal education can be attributed to the fact that in Pakistani culture men are considered the breadwinners of the family whereas women are expected to take care of the household and the children. This way, women are more involved in the upbringing of the child rather than the father. So children's learning outcomes are more affected by the mother's education level than the father's education level.

Although wealth is expected to significantly affect learning outcomes, the results of this study were mixed (Alcott and Rose, 2015). Wealth turned out to be significant only in the case of mathematics while insignificant in the case of English. This difference in results as compared to previous literature might be due to the technique used and the different variables used in creating the wealth index or because other factors that are highly correlated with wealth are also included in the regressions. However, as noted above when wealth is interacted with private schooling, the interaction is significant.

With regards to the school characteristics, although school facilities turned out to be insignificant, the number of teachers with a degree turned out to positively affect the learning outcomes.

The overall findings of the study are consistent with the prior quantitative literature available in Pakistan. This study confirms the existence of the private school premium which was found by the majority of the studies conducted in Pakistan. Moreover, the results are also in line with studies (Amjad 2012; Alderman et al., 2001; Aslam, 2003) which found that household characteristics play a greater role in driving the private school premium than other controls. As far as the learning outcomes of the children belonging to different social backgrounds are concerned, the results confirm the findings of Alcott and Rose (2015) suggesting that wealthier children tend to have better learning outcomes in private schools

than poorer children. In addition, the performance of urban private schools being better than rural private schools is supported by the fact that in Pakistan the urban private schools are very different in their educational structure, resource levels, and management system than the rural private schools (ASER, 2015).

Lastly, it must be noted that the study only identified some of the mechanisms driving the private school premium, even though a wide range of variables were controlled for. In addition, the data set available and the econometric techniques applied could not control for endogeneity completely, due to which I cannot identify causality with any certainty. This is because some unobservable variables at the household and child levels (e.g. parental preferences for education, child motivation or innate ability) cannot be accounted for. These limitations of the study suggest directions for future inferential research on this topic, when richer longitudinal data become available.

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## Appendix

**Table 8: Logistic Regression – English**

English	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Odds Ratios</b>					
Private	2.658*** (0.265)	3.272*** (0.340)	1.957*** (0.235)	1.837*** (0.226)	1.647*** (0.259)
Child Age		1.560*** (0.028)	1.683*** (0.034)	1.682*** (0.034)	1.689*** (0.033)
Gender		0.978 (0.063)	0.966 (0.067)	0.964 (0.067)	0.968 (0.067)

Father Education			1.008 (0.024)	1.007 (0.013)	1.006 (0.012)
Mother Education			1.083*** (0.014)	1.081*** (0.014)	1.080*** (0.015)
No. of Siblings			0.932*** (0.022)	0.933*** (0.022)	0.934*** (0.022)
Urban			1.510*** (0.187)	1.461*** (0.182)	1.135 (0.163)
Sindh			0.273*** (0.026)	0.264*** (0.026)	0.247*** (0.025)
Baluchistan			0.411*** (0.048)	0.402*** (0.050)	0.383*** (0.048)
KPK			1.520*** (0.159)	1.498*** (0.156)	1.447*** (0.152)
Islamabad			1.490 (0.850)	1.095 (0.645)	1.159 (0.692)
Tuition			1.803*** (0.213)	1.782*** (0.210)	1.830*** (0.217)
Wealth Index			1.029 (0.032)	1.028 (0.032)	1.014 (0.032)
No. Grad Teachers				1.053** (0.024)	1.058** (0.024)
School Index				0.998 (0.032)	0.988 (0.032)
Private*Urban					2.358*** (0.698)
Private* Wealth					1.764** (0.450)
N	6153	6153	6153	6153	6153

**Table 9: Logistic Regression - Mathematics**

Odds Ratios	Model 1	Model 2	Model 3	Model 4	Model 5
Private	1.977*** (1.191)	2.387*** (0.241)	1.727*** (0.203)	1.617*** (0.195)	1.563*** (0.250)
Child Age		1.598*** (0.031)	1.686*** (0.035)	1.686*** (0.035)	1.690*** (0.035)
Gender		1.103 (0.073)	1.089 (0.076)	1.078 (0.076)	1.082 (0.076)
Father Education			1.005 (0.013)	1.004 (0.013)	1.003 (0.013)
Mother Education			1.060*** (0.014)	1.060*** (0.014)	1.059*** (0.014)
No. of Siblings			0.915*** (0.022)	0.916*** (0.022)	0.916*** (0.022)
Urban			1.027 (0.122)	0.995 (0.119)	0.845 (0.119)
Sindh			0.355*** (0.034)	.0337*** (0.033)	0.321*** (0.032)
Baluchistan			0.499*** (0.060)	0.473*** (0.060)	0.457*** (0.058)
KPK			1.527*** (0.161)	1.490*** (0.158)	1.459*** (0.155)
Islamabad			1.252 (0.663)	0.901 (0.495)	0.939 (0.519)
Tuition			1.619*** (0.188)	1.603*** (0.187)	1.631*** (0.191)
Wealth Index			1.059* (0.034)	1.058* (0.035)	1.044 (0.035)
No. Grad Teachers				1.058** (0.024)	1.061*** (0.024)
School Index				0.977 (0.032)	0.970 (0.032)

Private*Urban					1.702** (0.423)
Private*Wealth					1.746** (0.440)
N	6153	6153	6153	6153	6153

**Table 10: Fixed Effects – Mathematics and English**

	Mathematics		English	
	OLS-No FE	FE District	OLS-No FE	FE Distict
Private	0.046** (0.018)	0.053*** (0.019)	0.056*** (0.019)	0.043** (0.020)
Child Age	0.069*** (0.002)	0.071*** (0.002)	0.073*** (0.002)	0.074*** (0.002)
Gender	0.010 (0.010)	0.004 (0.010)	0.006 (0.010)	0.009 (0.010)
Father's Education	-0.000 (0.002)	0.000 (0.002)	0.000 (0.002)	0.002 (0.002)
Mother's Education	0.009*** (0.002)	0.003* (0.002)	0.012*** (0.002)	0.006*** (0.002)
No. of Siblings	-0.013*** (0.003)	-0.002 (0.004)	-0.010*** (0.003)	-0.001 (0.004)
Urban	-0.009 (0.020)	-0.114 (0.115)	0.033* (0.020)	-0.248** (0.381)
Sindh	-0.182*** (0.014)	0.120** (0.063)	-0.231*** (0.014)	0.176** (0.370)
Baluchistan	-0.114*** (0.019)	-0.050 (0.212)	-0.152*** (0.019)	-0.246 (0.256)
KPK	0.049*** (0.014)	-0.182 (0.314)	0.049*** (0.014)	-0.143 (0.266)

Islamabad	-0.036 (0.068)	-0.071 (0.110)	-0.024 (0.069)	-0.022 (0.103)
Private Tutoring	0.055*** (0.015)	0.049*** (0.014)	0.067*** (0.015)	0.045*** (0.014)
Wealth Index	0.006 (0.005)	0.000 (0.006)	0.001 (0.005)	0.002 (0.006)
No. Grad Teachers	0.010*** (0.003)	0.007** (0.003)	0.010*** (0.003)	0.011*** (0.003)
School Index	-0.002 (0.004)	0.005 (0.034)	0.001 (0.004)	0.001 (0.006)
Private*Urban	0.061* (0.031)	-0.008 (0.035)	0.079** (0.032)	0.024 (0.032)
Private*Wealth	0.043* (0.022)	0.038** (0.017)	0.048** (0.023)	0.033* (0.018)