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Research Article

Determinants of the Quality of Primary Education in Tunisia: A Micro-Econometric Analysis Applied to the TIMSS 2011 Study

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Abstract

Empirical estimates of education production are very few in the case of Tunisia due to non availability of data. Fortunately, trends in international mathematics and science study starts to fill this gap by providing data on students' achievement. TIMSS 2011 revealed that the average performance of Tunisia student is at the lower end of the distribution of the average score of all participating countries Tunis took the 47th in mathematics over 50 countries. Despite the abundant resources and reforms undertaken by the educational community Tunisia student suffer from a very low primary quality of education as measured by mathematics test score. This article attempts to find out the impact of the home environment, school resources and teacher quality on the students' educational achievement at fourth grade in mathematics., we estimate educational production functions using OLS and then repeat the exercise estimating quantile regressions at different part of the score distribution in order to analyze if there are differences in the variables affecting test scores along the scores distribution and not just at the mean of the distribution. The results show that the home environment, school resources and teacher resource are key determinants of primary education performance. In order to to improve primary education performance, it is recommended that policymakers and educational authorities focus on strengthening all three key determinants: enhancing support for families to create a conducive learning environment at home, investing in better school resources and infrastructure, and providing ongoing professional development and support for teachers. By addressing these areas comprehensively, educational institutions can create a more effective and supportive framework that promotes better learning outcomes for all students.

Keywords

TIMSS 2011, Primary Education, Quality, Mathematics Achievement, Family Background, School Resources, Ordinary Least Square, Quantile Regression, Tunisia

1. Introduction

In the last decades, Tunisia has deployed important efforts in consolidating the goal of education for all. The government has conducted successive reforms of the education system to provide basic education for both genders to all children in the country.

Tunisia devoted a large share of its budget to the education (in 2014, nearly 15% of the state budget and more than 5% of the GDP). Important resources have been mobilized for

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the development of education. For example, between 1983 to 2012, a large number of primary schools has been established (3 066 to 4523); classrooms increased from 36 160 to 46320 and new teacher recruitment has increased from 33 026 to 58335 teachers. Class sizes and staff ratios are also important indicators of the resources mobilized in the education sector. In 2012, there were 17.2 students per teacher and at least 22 students per class in 2012 (compared to 22 students / teacher and 28.3 students / class in 2002).

Consequently to this rise of education investment and as a result of various reforms of the education system, access to primary education has increased significantly over the last decades to reach universal enrollment for both boys and girls. In fact, the Primary education enrollment ratio for six-year old has increased from 99.4% in 2013 to 90% in the 2001/2002 academic year. Also, It should be noted that girls' enrollment rate has jumped up to reach 98.9% as compared to 97.2% in the 2001-2002 school year.

However, despite achieving high rates of enrollment, Tunisia's primary education sector is failing to provide a good outcome. The increase in enrollment is not matched by a corresponding increase in quality. School dropout rates have increased by 30% in recent years, reaching 100,000 pupils that left school in 2012.

Moreover TIMSS 2011 revealed that the average performance of Tunisia student is at the lower end of the distribution of the average score of all participating countries Tunis took the 47th in mathematics over 50 countries.

In post-revolution Tunisia, despite the multiple challenges (economic, political, social and religious), improving access to quality education is still a priority for the Tunisian government.

Due to the international assessment (TIMSS) this study attempt to identify determinants of primary education outcomes. The following section presents the concept of education quality the second review some of previous determinants of school quality. The successive section outlines our regression model and data.

2. Literature Review

There is a range of factors that affect on the quality of performance of students (Waters and Marzano [43]).

According to Hanushek [18] family background and socioeconomic factors are important determinants of student achievement than school resources. The following section reviews the literature of the impact of the home environment, school resources, and teacher resources on academic achievement.

The term "Home environment" refers to all the objects, forces and conditions in the home, which influence the child physically, intellectually, and emotionally (Muola [37]).

The home environment is related to many different aspects such as Parents' education, Parents' occupation, Parental structure, Number of children's books in the home and Economic status, and Family size.

There have been some challenges to which input indicators influence the students' outcomes. Marjoribanks, [34]; Walberg [24]; Kellaghan [25], detect a link between home environment and pupils' academic achievement. Parent education and family SES level have positive correlations with the student's quality of achievement (Caldas, Bankston, [4]; Jeynes [23]; Parelius, D., and Parelias, A., [40]; Mitchell and Collom, [36]; Ma and Klinger, [33]).

Lockheed et al [32] (1991, p. 73) prove that family background affects not only the probability that children enroll in, attend, and complete school, but also the learning of children in school. In the same line, Brunello and checchi [2] make a point that family's education is an important and strong element in the determination of student achievement. Fuller [15] provided a study review that shows a positive relationship between pupil's achievement and the availability of textbooks and other instructional materials. Mayer [35] concluded that family socioeconomic status is positively correlated with student learning.

Spiegel [41] emphasizes that parents play a crucial role in the literacy development of their children; what parents do in their homes significantly affects the development of literacy skills and abilities. According to Spiegel, home literacy environment have several components, two of which are artifacts of reading (books, newspapers, pencils, paper, letters, junk mail and another print –related material especially children's materials) and events (reading to and with children). Spiegel concludes that parents of successful readers impact a love of reading and a sense of the value of reading to their children through creating rich literacy environments.

The achievement of students is negatively correlated with the low SES level of parents because it hinders the individual in gaining access to sources and resources of learning (Lopez, [31]).

Krashen [29] concludes that students whose parents are educated score higher on standardized tests than those parents were not educated. Similarly Willms [45] shows that children whose parents had primary school education or less were more than three times as likely to have low test scores or grade repetition than children whose parents had at least some secondary schooling.

Chiu [9] studies the effect of the family socioeconomic status on 15 year- old students' academic achievement in science based on data from 41 countries. He finds that the socioeconomic status of the family and the educational sources (cultural composition of the family, level of education of the parents, educational situation of sibling) have an important effect on the student academic achievement in science.

Parental education, especially for the mother when she has a high level education and knowledge is considered a fortune for their child. According to Duplooy [12] mother's education is most influential on the child's intellectual development. Similarly, in a survey of literature Kellaghan [26] find

that if the mother was herself successful at school and achieve a higher level of formal education, the transmission of knowledge can be possible. Jubber [25] examine the effect of the level of mothers' education on academic achievement in South Africa. Their results suggest that over 60% of the children rated as good performers came from graduate mothers. In the same line Farooq, Chaudhry, shafiq and Berhanu [13] in their study using standard t-test and ANOVA to investigate the effect of different factors on students' achievement, show a significant effect of parents' education on students' overall academic achievement as well as achievement in the subject of Mathematics and English. In addition, when parents are educated they can be a good supervisor for their children to enhance academic performance. Cassidy and Lynn [7] stress the importance of parental supervisor and assistance of the child's reading in his study he finds that reading and parental supervision are positively correlated with academic achievement.

Using the ex-post facto correlation method Muola [38] studies the effect of home environment factors on academic achievement motivation. His study is carried out on 235 Standard eight Kenyan pupils from six urban and rural primary school. Taking six measures of home environment which are parental encouragement, parents' occupation, mothers' education, fathers' education, family size and learning facilities at home, their results show a significant effect for all factors on academic achievement motivation except parental encouragement.

Dahl & Lochen [10] find that family income have been shown to have a powerful influence on student's in reading, also Chevalier and Lanot [8] point out that student academic achievement is closely related to family income but that family's education is the most important factors. De brouecker and Underwood [11] point out that those parents with higher education provide the most conducive environment for their children to study, thus providing the necessary motivation for them to proceed to higher education.

Concerning the school resources, Hanushek [18] conclude that there is no systematic relationship between student performance and commonly measured attributes of schools and teachers. In 1997, Hanushek's review of 400 studies of student achievement found no stronger relationship between student performance and school resources. In contrast Card and Krueger [6], Altonji and Dunn [1] argue from U.S data that there is a strong positive relation between school resources and student outcomes. Similarly Heyneman, Layne- Farrar [23] conclude that unobserved variables that affect student learning may lead to underestimates of school resource effects.

Hanushek's [17] note that 71% of the estimated effects of school spending on student test scores are statically insignificant or negative and conclude that there is no strong or systematic relationship between spending and student performance. Dissimilarly Hedges and Greenwald [21]; Hedges, Laine & Greenwald [22], believe that the same research literature provides support for the idea that additional spending will, on average increase student test scores. Tiebout [42] assume that omitted variable will produce an upward bias in the estimated effects of school resources on student outcomes because more affluent families are likely to choose higher spending districts.

Besides that, another indicator which is strongly related to educational outcome is the geographic location of school (i.e urban, rural, city, town, etc.). The definition of school location is based upon the size and density of the population in the area. TIMSS 2011 describes three different population size of the city, town or area in which their schools were located: cities of more than 100.000, cities or town of 15.001 to 100.000 medium and small towns, villages or rural areas of 15.000 or fewer people.

According to an analysis made by the National Assessment of education Progress in 1992, the average proficiency of student from extreme rural communities at ages 9, 13, and 17 in writing, mathematics, and science was above that of student from disadvantaged urban area.

Mullis et al [37] showed that the student in extreme rural areas outperformed students in disadvantaged urban areas in reading in grades 4, 8, and 11.

Lippman et al [30] proved two different results. They show that grade 8 achievement of rural students enrolled in high-poverty schools was higher than that of their urban counterparts. However, before two years, in grade 10 the performance of rural students became similar to the performance of urban students.

Campbell, Donahue, Reese, Phillips [5] revealed that fourth graders in rural areas and small towns exhibited higher reading proficiency than did students in urban and large town areas outperformed their counterparts in both areas.

Greenberg and Teixeira [16] found that 17 years old student in central cities and in rural communities adjacent to metropolitan areas have performed on the National Assessment of Education Progress at level lower than the national average, since 1975.

To sum up, there is no clear evidence about the effects of school location on educational outcomes.

The literature on teacher resources and student outcomes can be categorized into many areas of research like teacher experience. The importance of these teachers characteristics highlights the need to understand whether it contributes to teacher effectiveness and improving student achievement.

During the last two decades, a body of research of conflicting findings has emerged from the literature on teacher experience and student outcomes. Coleman and al (1966) find that teacher resources are not consistently or positively linked to student achievement. Hanushek [20] review several studies using teacher experience in production function models common to economic research, which examine the connection between educational input and student outputs. The review proved that teacher experience is not an important indicator of teacher quality, so an unlikely contributor to student achievement. In other words, Murname and Phillips' [39] prove that,

early years of teaching (up to 7 years) may be associated with a gradual increase in student outcomes, middle years of 8 to 14 correspond to a weak negative effect and then a positive effect on achievement among teachers with 15 or more years. Moreover, using Alabama data Ferguson and Ladd [14] examine the combination between teacher experience of 5 or more years and student achievement in the third, fourth, eighth and ninth grades. They find that teacher experience between beginning and up 5 years had a statically significant positive effect on math and reading attainment, while teachers' experience of 5 more years is associated with no significant influence on reading and math scores.

3. Regression Models and Data

Using the education production function model proposed by Hanushek [19] to evaluate the relationship between pupils' outcomes (test score) and the home environment, school resources and teacher quality, conceptually the model is defined as the cumulative influence of input given by:

$$Y_i = \beta_0 + \sum_{j=1}^{m} \beta_j X_{ij} + \mu_i$$

where Yi is a test score of student (i = 1,….. N), X_{ij} are the score determinants which influence students' educational achievements, β_j are the estimated coefficients and μ_i is the residual term.

The education production function was estimated by the OLS technique at the first step, however this estimation method does not inform about the heterogeneity of educational determinants effects a long score distribution. Koenker and Basset [27] have extended the OLS estimation to a robust regression technique notably the Quantile regression. Contrary to the OLS estimation which evaluates the impact of explanatory variables on the mean of the outcome variable, the Quantile regression technique allows to estimate the impact of explanatory variables on educational attainment at different parts of the conditional distribution of output variable.

Quantile regression seeks to evaluate if a given explanatory variable affects more or less student at the rth quantile of conditional score distribution than student at (1-r)th quantile.

Instead the quantile regression provides some robustness to heteroscedastic problem since estimated marginal effects of exogenous variables differ across the different parts of conditional outcome distribution. Moreover the quantile regression is more efficient than the OLS technique in the case when the error terms are not normally distributed.

Conceptually the quantile regression model is defined as a linear function of covariates given by:

$$y_i = x'_i\beta_\theta + \mu_{\theta i}$$

$$Quant_\theta\,(y_i \mid xi) = x'_i\beta_\theta\,, i = 1, \ldots\ldots, n, \theta \in (0,1)$$

Where $Quant_\theta\,(\frac{yi}{xi})$ is a given quantile θ of the dependent variable y_i conditional on the explanatory vector x_i. For the distribution of the error term$\mu_{\theta i}$, it is only assumed satisfying the follows restriction $Quant_\theta\,(\mu_{\theta i} \mid xi)$. Similarly to the OLS estimation where the sample mean is defined as the solution to the minimization of the sum of squared residuals, the median is defined as the solution of this minimization of the sum of absolute residual for the quantile (Koenker and Hallak [28]. Buchinsky [3] have proposed the following optimization problem to be solved to obtain coefficient vectorβ_θ .

$$\min_\beta \frac{1}{n} = \{\sum_{i:y_i \geq x'_i\beta} \theta|y_i - x'_i\beta\,| + \sum_{i:y_i < x'_i\beta}(1-\theta)|y_i - x'_i\beta\,|\}$$

By varying weights among residuals the EPF is estimated at different quantiles (θ= 10%, 25%, 50%, 75%, 90%) of achievement distribution. It follows that for estimating the 25th percentile positive residuals are weight by 25% and the negative residuals are weighted by 75%. Where all residuals receive the same weight, we obtain the median of the score distribution.

The sample design of the TIMSS is based on two stage random sample design, with a sample of school is chosen as a first stage and one or more intact classes of students from each of the sampled schools as a second stage.

TIMSS (2011) is a survey data and in survey data there are three features that must be taken into account when doing regressions: the sampling weights, the cluster sampling and stratification[1].

Sampling weights: in sample surveys, the observation is random. However, different observations may have different probabilities of selection.

The sampling weights are equal to or proportional to the inverse of the probability of being sampled. Using weights in the analysis leads to obtaining the right point estimates jointly with the right standard errors (Wooldridge 2001). In TIMSS sampling weights are used to accommodate the fact that some units such as teacher, school and students are selected with differing probabilities.

Clustering: Individuals are first sampled as a group known as cluster. The clusters at the first level of sampling are called primary sampling units. In TIMSS the primary sampling units are the school and not the students.

Stratification: in surveys, the clusters are grouped in small units. These units are called strata or groups. Sampling is done independently across and the stratum divisions are fixed in advance. TIMSS employed stratification in order to improve the efficiency of the sample design, apply different sample designs and ensure proportional representation of specific groups of school in the sample3. However, it should

[1] Marc Joncas and Pierre Foy. Sample Design in TIMSS and PIRLS, p 9: TIMSS & PIRLS International StudyCenter, lynch School of Education, Boston College.

be noted that even without any stratification, the TIMSS sample represented the different groups found in the population on average (TIMSS 2011, 84).

Table 1. *Sample from TIMSS 2011.*

Countries	Average age at time of testing	Total number of school that participated	Student participation	Number of student assessed	Coverage
Tunis	10	222	99%	4912	100%

Source: TIMSS 2011 International results in math

TIMSS (2011) survey various factors that contribute to the quality of academic performance of student at fourth grade. Table 2 below displays factors that home environment which are Possessing computer, Possessing study desk, Possessing books, possessing own room, possessing internet connection, amount of books at home, parent check homework and parent ask for learning. For school resources Index of School resources math and Index of school resources science and concerning teacher quality: Teachers' formal education and teachers' years of experience.

All this qualitative variables are considered as dummy variable in the regression model. The average mean of the 5 plausible values Mathematics and average mean of the 5 plausible values science were used as dependent variables. For both Parents ask for learning and parents check homework the last category was considered as a residual category.

School resources correspond to seven school resources (instructional materials exemple text book, supplies (paper), school building and ground, heating cooling and lighting systems, instructional space, technologically competent stuff, computer for instruction) and five classroom resources (teacher a specialization in mathematics, computer software for mathematics instruction, library materials relevant to math instruction, audio visual resources for math instruction, calculators for math instruction). For school resources the medium category indices were considered as a reference.

Lastly, for Teacher years of experience and mathematics teachers ‘formal education the categories less than 5 years and No further than upper secondary education was considered as reference categories respectively.

Table 2. *Descriptive statistics.*

Variables	Type of variable	Description
Age	continuous	
Sex of student	Binary	2 categories: 1 female 0 male
Possessing computer	Binary	2 categories: 1 yes, 0 otherwise
Possessing own rooms	Binary	2 categories: 1 yes, 0 otherwise
Possessing internet connection	Binary	2 categories: 1 yes, 0 otherwise
Possessing study desk	Binary	2 categories: 1 yes, 0 otherwise
Amount of books at home	Ordinal	5 categories: 1 none or very few (0-10 books), 2: one shelf (11-25 books), 3: one bookcases (26-100 books), 4: two bookcases (101-200 BOOKS), 5: three or more bookcases (over 200 books)
Possessing book	Binary	2 categories: 1 yes, 0 otherwise
Parents check homework	Ordinal	5 categories: 1 every day, 2: once or twice a week, 3: once or twice a month, 4: never
Parent ask learning	Ordinal	5 categories: 1 every day, 2: once or twice a week, 3: once or twice a month, 4: never
Index of School resources math	Ordinal	3 categories: 1 well, 2 medium, 3 bad
School location	Ordinal	6 categories: 1: more than 500000 people, 2: 100.001 to 500.000 people, 3: 50.001 to 100.000 people, 4: 15.001 to 50.000 people, 5: 3001 to 15000 people, 6: 300 people or fewer

Variables	Type of variable	Description
teachers' years of experience	Ordinal	4 categories: 1: 20 years or more, 2: At least 10 but less than 20 years, 3: At least 5 but less than 10 years, 4: Less than 5 years
Average mean plausible value in mathematics	continuous	

4. Empirical Results

In this section we present OLS and quantile regression estimate of the impact of home environment, school resource and teacher quality inputs on the mathematics achievement. In table 3 we report coefficient of OLS estimations (column 1). The estimation of different coefficients at 10th, 25th, 50th, 75th, and at 90th quantiles are presented in next columns.

Table 3. *OLS and QR estimates of the determinants of Mathematics Achievement in Tunisian primary schools—fourth grade.*

Variables	OLS	q10	q25	q50	q75	q90
Individual characteristics						
Gender 1	-5.147	0.137	-3.698	-7.795**	-14.68***	-14.04***
	(3.661)	(4.488)	(4.660)	(3.489)	(3.749)	(5.345)
Age	-33.67***	-32.38***	-34.40***	-34.37***	-33.46***	-34.77***
	(3.026)	(3.557)	(4.062)	(4.162)	(3.566)	(6.554)
Home educational resource						
Possess computer 1	28.53***	23.11***	27.32***	32.10***	37.00***	22.96***
	(4.746)	(7.531)	(4.625)	(5.371)	(5.435)	(8.879)
Possess study desk 1	20.83***	23.82***	25.39***	23.41***	22.53***	26.52***
	(5.347)	(7.669)	(5.089)	(4.926)	(4.555)	(7.790)
Possess books 1	8.588	6.409	7.221	6.918	12.60**	9.429
	(5.476)	(4.353)	(4.404)	(4.863)	(6.129)	(6.928)
Possess own room 1	-4.435	0.123	3.711	-4.422	-8.602*	-9.063
	(4.238)	(5.151)	(4.177)	(4.743)	(5.073)	(6.623)
Internet connection 1	-3.096	1.164	-2.416	-1.485	-5.155	3.665
	(5.158)	(8.863)	(6.078)	(5.515)	(5.691)	(6.145)
Amount of book 2	16.17***	-0.171	10.04	18.12***	17.44***	12.32***
	(5.924)	(6.869)	(6.551)	(5.810)	(5.915)	(4.744)
Amount of book 3	31.68***	28.44***	40.25***	43.31***	39.89***	31.77***
	(6.650)	(6.155)	(7.396)	(5.979)	(5.168)	(8.851)
Amount of book 4	28.74***	35.89***	42.18***	46.93***	33.18***	31.32***
	(7.990)	(10.16)	(10.15)	(7.127)	(7.373)	(11.33)
Amount of book 5	4.202	7.400	14.12	23.83*	25.84***	24.36*
	(9.236)	(15.70)	(12.68)	(12.60)	(9.832)	(13.19)
Parent ask learning 1	-18.08**	-15.16	-18.92	-27.22*	-25.62**	-26.24***
	(8.810)	(17.10)	(15.21)	(14.08)	(12.51)	(9.928)

Variables	OLS	q10	q25	q50	q75	q90
Parent ask learning 2	3.613	0.666	-6.385	-4.958	-6.104	-9.960
	(10.79)	(17.84)	(13.18)	(12.66)	(12.80)	(8.372)
Parent ask learning 3	-13.07	-16.80	-20.79	-19.25	-18.67	1.109
	(16.35)	(32.40)	(21.96)	(17.10)	(19.67)	(16.50)
Check homework 1	9.323	11.28	0.0286	-1.486	5.590	0.817
	(8.656)	(8.995)	(8.879)	(4.656)	(5.809)	(12.26)
Check homework 2	2.915	4.316	-4.408	-9.175	-6.214	-11.78
	(8.512)	(10.81)	(8.801)	(6.898)	(6.610)	(14.94)
Check homework 3	-12.04	-11.77	-28.71***	-16.95	-2.804	-8.307
	(13.70)	(8.122)	(11.09)	(12.44)	(12.18)	(23.29)
school resources						
Math school resource 1	12.81	24.17***	22.00**	19.50***	15.50**	14.81
	(9.943)	(7.470)	(9.629)	(4.623)	(6.928)	(9.425)
Math school resource 3	19.90	28.61**	15.17	18.76**	8.871	2.806
	(30.36)	(12.57)	(13.44)	(8.545)	(7.137)	(12.97)
School location 2	21.16	6.729	17.19	19.42**	32.64***	11.36
	(17.14)	(9.110)	(10.69)	(9.878)	(11.36)	(7.397)
School location 3	10.90	-12.26	-2.421	3.400	11.84	21.19*
	(20.77)	(9.438)	(7.693)	(8.918)	(12.71)	(11.51)
School location 4	4.777	-25.00**	-4.884	3.411	8.775	4.249
	(14.46)	(10.28)	(10.19)	(5.782)	(8.575)	(6.528)
School location 5	12.90	-21.25**	-3.838	1.366	10.70	4.591
	(15.34)	(10.35)	(9.341)	(7.223)	(10.63)	(8.635)
School location 6	4.143	-31.07***	-21.22**	-17.42**	-0.0320	3.541
	(15.79)	(11.61)	(10.29)	(7.887)	(13.95)	(8.835)
teachers' formal education						
Teacher experience 1	4.966	-2.519	-3.180	-2.956	2.119	10.51
	(14.25)	(10.86)	(7.119)	(5.913)	(7.927)	(9.522)
Teacher experience 2	-5.607	0.233	-6.398	-5.286	1.302	9.829
	(13.97)	(9.055)	(6.582)	(7.218)	(8.558)	(9.266)
Teacher experience 3	11.65	18.97**	16.54**	12.55*	14.86	19.18*
	(17.54)	(8.670)	(6.461)	(6.719)	(9.268)	(9.800)
Constant	664.6***	581.9***	642.2***	698.6***	721.8***	786.7***
	(36.15)	(36.41)	(43.52)	(40.83)	(39.69)	(69.85)

Dependent variable: average mean of the 5 plausible values in Mathematics. Standard errors in parentheses. Significant levels *1%; **5%; ***10%.

Regarding student's individual characteristics gender and age, the estimation of different coefficients at results from OLS estimation suggest that there is no statically difference between performance of boy and girl in mathematics as re-

vealed in table A and it is estimated at (-4.919) suggest by OLS, however boys do better than girl this differences is only observed among medium student, at 75% and at level 90%.

In addition, a negative relationship exists between performance and student's age in mathematics, so as students get older the performance drops off (White [44]).

The results for the impact of the determinants of mathematics performance was varied.

Regarding the amount of books in students' home and according the OLS regression, all categories are statistically significant and have the expected signs in mathematics. Children who have between 26 and 100 books at home have a score as indicated by the coefficient estimated at 33.15 in mathematics.

However, regarding mathematics owning internet connection was significant only at the 10% quantile regression and possessing room has significant impact only at 75% quantile with a negative sign.

According to the OLS regression, all categories of parents checking homework are not statistically significant in mathematics outcomes. In other hand, the factor 's parents checking homework, the dummy with the level 3 is significant at only 25% quantile in mathematics and it was correspond to student whose parents check their home work once or twice, but with a negative sing, this result might be explained by the low education level of their parents.

Another variable which has been quite intensively treated in the literature is the parent supervisor as approached by parents to ask for learning. In our case when parents emphasize their interest in asking children to learn and checking their homework every day, the dummy for full parent ask learning is not significant determinant of school performance toward mathematics. While at the median of the distribution for students whose parents ask for learning every day or once or twice a week are significant witch negative sign.

Turning now to the effects of school resources Tunisian student is performing better in mathematics at a higher level of the index than at the low level. Results show well school resources strongly related to mathematics achievement at level 10%, 25%, 75%, and 90% and in science results the higher level school resources were positively related at level 50%, 75% and 90%.

According to the school location, TIMSS 2011 asked principals to describe the population size of the city, town, or area in which their schools were located. OLS regression suggests no significant result in mathematics, while in quantile regression there is a different result. In mathematics student attending school in largest or medium cities had the higher achievement than student in a small town or rural areas. This result may be explained by the easy access to important additional resources in large cities than a small city when the school is relatively isolated.

Focusing on teacher quality which is measured by the teacher years' experience. The impact of teacher experience the results were contradictory, in mathematics there is no significant relation to achievement in both regression, except at 10% and 25% quantile regression, it is a significant determinant of achievement when teacher experience has 20 years or more and has at least 5 but less than 10 years.

5. Conclusion

This paper analyzed the effects of the home environment, school and teacher resources on the educational performance of Tunisian student.

The econometric approach proposed in this paper at first is OLS regression which is not appropriate contrary to the quantile regression approach which estimates multiple rates of change from different points on the test score conditional distribution in order to provide more complete picture of the relationship between variables missed by linear regression.

These findings are useful for educational policy makers since school resources which appear to have no effect for the average test score gains may indeed matter at other points of the conditional distribution of test score gain.

School Resources are crucial for improving achievement, but Home environment ((as approached by the number of books, possessing computer, parental involvement) seems to present the largest effect on pupils 'performance in Tunisia. The fact is suggestive of the idea that childhood education is important for ultimate academic achievement.

Children with a socially disadvantaged background and from rural areas are most vulnerable. School resources and school location have more impact on children from disadvantaged groups than on children from better-off families.

Considerable progress has been made by the Tunisian government to improve access to Education during this decade. However, a lot still needs to be done to address the issue of quality of education, In order to achieve the quality education in Tunisia, the learner, teacher, content and materials, the learning styles, or study habits of the learners must be considered in the choice of educational strategies and materials.

Notes

1. Marc Joncas and Pierre Foy. Sample Design in TIMSS and PIRLS, p 9: TIMSS & PIRLS International Study Center, lynch School of Education, Boston College.
2. TIMSS 2011: The International Results in Mathematics, p 206-207.
3. Marc Joncas and Pierre Foy. Sample Design in TIMSS and PIRLS, p 9: TIMSS & PIRLS International StudyCenter, lynch School of Education, Boston College.

Abbreviations

EPF	Education Production Function
GDP	Gross Domestic Product
OLS	Ordinary Least Square

SES	Socioeconomic Statut
TIMSS	Trends in International Mathematics and Science Study

Author Contributions

Kaouther Soudani is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

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