

Research Article

# Does Early Childhood Education Matter on Reading Achievement Among Arab Countries

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## Abstract

Our research focuses on the impact of Early Childhood Education (ECE) in the reading achievement of pupils in primary schools in MENA countries. The study employed the international data from PIRLS 2016 to identify the effect of early literacy practices on later reading attainment. Leveraging data from the 2016 Progress in International Reading Literacy Study (PIRLS) by the International Association for the Evaluation of Educational Achievement, we utilize ordinary least squares (OLS) regression and quantile regression to estimate education production functions for each country individually. This approach enables us to assess how coefficients on explanatory variables vary across the spectrum of test scores. The results show that in MENA countries, early childhood education, which develops pupils' skills acquisition before formal schooling, improves their reading performance. In sum, The Early childhood education effect can be reinforced through government policy and family background. In addition, we recommend a universal access to early childhood education., concentration of early childhood services in the private sector makes the programs confined only to wealthy people who can afford them, especially people living in urban cities and improve the quality of early education by implementing appropriate curricula and modern teaching.

## Keywords

Early Childhood Education, Primary School, PIRLS 2016

## 1. Introduction

The earliest form preschool started in 19<sup>th</sup> century in some Arab countries such as Morocco and Syria, unless the access in this program was limited compared to the local formal education system namely “Koranic schools in mosques, where children recited Koran, learned Arabic and arithmetic. A variety of terms have been employed in the field with no one unified term used internationally Choi, [6] A variety of terms is used where it is referred to as infant education, nursery education, preschool education; Kindergarten or early childhood education; such programs are the more formal component of ECCE. Upon completion of these pro-

grams, children continue their education at ISCED 1 (primary education).

“Early childhood education is a branch of education theory which relates to the teaching of little children (formally and informally) from birth up to the age eight”<sup>1</sup>. Heckman and Masterov [12] concluded that early childhood education can promote the development of young children. Early childhood education programs are also designed to foster general well-being and enhance school readiness, so that these children might gain the full benefit of their school experience and be more successful in life in general (Barnett

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[1]). By 20<sup>th</sup> century, early childhood education becomes well known in many Arabic countries.

In the last decades, the implementation of early childhood education has become widespread in Arabic countries. In addition, ensuring all children access to pre primary school belonged the fourth SDG “By 2030, ensure that all girls and boys have access to quality early childhood development, care and preprimary education so that they are ready for primary education”. In Arab countries, since 1999 the enrollment in pre- primary education increased by 26%, its about 3.1 million children enrolled in 2007<sup>2</sup>.

According to World Development Indicators (2015)<sup>3</sup>, almost all Arabic countries had an increase on the percentage in pre-primary gross enrollment rates as, Bahrain and Qatar reportedly increased from 93.08%, 38.42%, 39.17% in 2005 to 111.11%, 55.86% and 58.78 % in 2015, except Morocco had almost decline 58.07% in 2005 to 56.87% in 2015.

## 2. Literature Review

There is substantial empirical evidence that intensive early childhood education interventions specifically targeting the quality of primary education has significant benefits.

Attending pre-primary school is crucial to all children. Research shows that children who received ECE had the best academic performance. Children who attend preschool tend to have higher literacy and better attitude toward school than those who did not receive early childhood education. In addition, the content of the knowledge which the children are exposed to early in life is bedrock to later education and life (Osakwe [18]).

Several studies have demonstrated the importance of early years experience as it impacts individual’s later success in the areas of physical, cognitive, social, and emotional development (Shonkoff, Meisels, [22]).

Recently, Jacinta and R. M. Rotich, K. S. [13] said that early childhood education develops new age appropriate competence and gives early access to knowledge and skills that improve achievement in the first years of primary education. Intuitively, early childhood education appears to be a valuable support for learning, as it can promote the development of young children (Heckman and Masterov [12]) and is considered as an asset of immense value in the later academic achievement of the child and much more lately in life (Feeney, Christensen and Moravick [10]).

Kaufman et al. [14] explain that previous experiences of children in preschool greatly affect their learning and adaptive behaviors further in primary school. In the same line, Berlinsk, Galiani and Getler [3] concluded that children with prior preschool experiences perform better in primary school.

Campbell and Ramey [4] stipulate that preschool intervention is more effective than school age intervention at enhancing intellectual growth and improving student performance.

Magnuson [15] used nationally represented longitudinal data of U.S. children who enrolled in preprimary school in

1998-1999 and concluded after the research that prekindergarten enhances reading and math skills upon Kindergarten entry.

Furthermore, Berlinski et al. [3] found the positive effects of primary school attendance on third grade standardized Spanish and Mathematics test scores. They also found that pre-primary school attendance positively affects primary school pupils’ behavioral outcomes such as attention, effort, class participation and discipline.

Cunha et al. [8] introduced a model for skill development that reflects the need for investment in education in early childhood. The model also considered that later investment was important in maintaining the skill level developed in early childhood.

Additionally, Behrman, Cheng and Todd [2] analyzed the results of a Bolivian preschool program called Proyecto Integral de Desarrollo Infantil (PIDI) using Propensity Score Matching. The program consisted of intensive child care, such as a full time day care center and nutritional and educational services for children aged between 6 months and 6 years from low income families. The authors encountered evidence of improved motor and psychosocial skills and improved language acquisition. These results were more significant among three-year olds and older, and among those who attended the program for a longer period.

Samuel, Sebastian and Paul [21] investigated the effect of the large expansion of universal preprimary education on subsequent primary school performance in Argentina. They estimated that one year of preprimary school increases average third grade test scores by 8% of the mean or by 23% of the standard deviation of test scores distribution (p226). They also found that preprimary school attendance positively affects students’ self-control in the third grade as measured by behaviors such as attention, effort, class participation and discipline.

Cleveland and Krashinsky [7] were viewed as the researchers who produced the most statistically convincing study described as one on the major studies on British preschool education by many researchers. They studied a sample of 8500 children, where they measured the effects of social and cognitive development at age 5 and 10 of several different types of ordinary preschool programs, finding similar types of effects for nearly all. Based on variance and control analyses for a number of important socio economic and family factors, they found that preschool generally boosts cognitive attainment at age 5 and 10.

In the UK, Sammons et al. [20] conducted a research that followed young children of two years of age attending preschool. After preschool, children have better cognitive skills of reading, language and early numbers and also enhanced social skills compared to children without preschool experience.

Powell et al. [18], a well-known study from Jamaica, show that children who were randomly assigned to receive home-based early stimulation have great improvement in cognitive

development and future school performance.

Fabiana, Rafael and Ana [9] used data from a New Brazilian Assessment Tool to identify the effect of early childhood education (ECE) on literacy scores of 2<sup>nd</sup> grade students in elementary school. The OLS propensity score Matching results show that students who started school at the age of 5, 4 and 3 had literacy scores between 12,22 and 19,54 points higher than those who began school at the age of 6 or later.

Osakwe [17] used school continuous assessment records, three hypotheses were formulated and z-test statistics taken at 0.5 level of significance to find the impact about early childhood education experience on the academic performance of primary school children. He found that there is a significant difference between pupils who had early childhood education and those who had not in their academic performance cognitive ability and ineffective and psychomotor skills.

Jacinta and Rotich [13] used the ex post facto design to investigate the impact of early childhood education on pupils' learning in primary schools in Kenya. The target population of the study was 616 teachers in the 32 public primary schools in Starehe Division of Nairobi. The sample comprised 210 randomly selected primary school teachers. Data were gathered by questionnaire. Findings revealed that pupils who had gone through early childhood education were able to acquire skills in basic counting, mathematics and speaking. Pupils who had not attended early childhood education classes had problems with grasping simple counting skills and simple language skills; they were not able to interact well with pupils.

Gullo [11] examined the effect of several variables on children's academic readiness at the end of kindergarten. Results indicated that age of entry to school and number of years in preschool predicted academic readiness. Children who entered preschool the age of four scored higher on readiness measures than those who entered preschool at the age of five.

According to the literature review, numerous studies about the effects of early childhood education on children's academic outcomes have led to main conclusions that any such educational program before attending primary school has long lasting effects on children's performance.

### 3. Methodology and Analysis

#### 3.1. Arab Countries in PIRLS 2016

Reading literacy forms the foundation for all other processes of learning, also it is necessary for pupils not only to acquire languages and study literature, but also to learn other subjects. In addition, it is the foundation for learning across all subjects it can be used for recreation and for personal growth and it equips young children with the ability to participate fully in their communities and the larger society

(Campbell et al, 2001). Moreover, low achievement on reading among primary school, can also affect several other subject consequently, education in general. Progress in International Reading Literacy Study 2016 (PIRLS), an internationally standardized assessment done to 9.5 years old results showed that pupils in arabic countries suffer from low performance on reading.

Eight arabic countries were participated PIRLS 2016; these included Morocco, Iran, Oman, Qatar, Saudi Arabia, United Arab Emirates, Malta, Bahrain, Egypt and Kuwait. PIRLS describe the distribution of quality of education by identifying four benchmark levels: advanced, high, intermediate and low. These levels correspond to 625, 550, 475 and 400 points respectively.

Table 1 below presents the distribution of students' Reading achievements at fourth grade for Arabic countries. All Arabic countries are below the scale average which is 500 points in Reading. Morocco, Kuwait and Egypt did not even reach the low benchmark; this means that the tested pupils did not acquire the basic cognitive skills. In total, Arabic countries pupils suffer from a very low quality of education as measured by Reading.

Table 1. PIRLS scores.

| Arabic countries     | Reading Score | Rank  |
|----------------------|---------------|-------|
| United Arab Emirates | 450           | 36/45 |
| Bahrain              | 446           | 37/45 |
| Qatar                | 442           | 38/45 |
| Saudi Arabia         | 430           | 39/45 |
| Oman                 | 418           | 41/45 |
| Kuwait               | 393           | 42/45 |
| Morocco              | 358           | 43/45 |
| Egypt                | 330           | 44/45 |

Source: IEA's Progress in International Reading Literacy Study-PIRLS 2016

#### 3.2. Sample

Table 2 provides sample sizes, target populations' assessed reading literacy, the number of schools and students assessed on PIRLS 2016. The largest sample size of students assessed were on United Arab Emirates while Malta features the lowest number of student. Also we can recognize that some schools and student were not able to assess PIRLS trend. PIRLS displays the main cause of the exclusion of school and student which are: (Methodes and procedures in PIRLS 2016).

**Table 2.** Sample size from PIRLS 2016.

| Arabic Country       | Number of Schools in Original Sample | Total Number of Schools that Participated | Number of Students Excluded | Number of Eligible Students | Number of Students Absent | Number of Students Assessed |
|----------------------|--------------------------------------|---|-----------------------------|-----------------------------|---------------------------|-----------------------------|
| Bahrain              | 184                                  | 182                                       | 148                         | 5 567                       | 87                        | 5 480                       |
| Egypt                | 160                                  | 160                                       | 0                           | 7 171                       | 214                       | 6 957                       |
| Literacy             |                                      |   | 4                           | 4 441                       | 60                        | 4 381                       |
| PIRLS                |                                      |   | 6                           | 4 442                       | 57                        | 4 385                       |
| Kuwait               | 187                                  | 177                                       | 14                          | 5 002                       | 393                       | 4 609                       |
| Morocco (Combined)   | 361                                  | 360                                       | 0                           | 11 176                      | 234                       | 10 942                      |
| Literacy             |                                      |   | 0                           | 5 586                       | 133                       | 5 453                       |
| PIRLS                |                                      |   | 0                           | 5 590                       | 101                       | 5 489                       |
| Oman                 | 308                                  | 306                                       | 67                          | 9 406                       | 172                       | 9 234                       |
| Qatar                | 218                                  | 216                                       | 205                         | 9 343                       | 266                       | 9 077                       |
| Saudi Arabia         | 208                                  | 202                                       | 23                          | 4 984                       | 243                       | 4 741                       |
| United Arab Emirates | 482                                  | 468                                       | 232                         | 17 060                      | 589                       | 16 471                      |

Source: IEA's Progress in International Reading Literacy Study- PIRLS 2011

We can noted that not all student selected to assess are present due to the exclusion of some school which are not geographically accessible and very small or for student with disability.

### 3.3. Descriptive Statistics

Table 3 displays the different percentage of children attending pre-primary school ranges between one year and three years and children missing preschool.

**Table 3.** Proportion of pupil attended preprimary education.

| Arabic countries     | 3year or more | less than 3 year but more than 1 | 1 Year or less | Did not attend |
|----------------------|---------------|----------------------------------|----------------|----------------|
| United Arab Emirates | 31%           | 67%                              | 2%             | 9.8%           |
| Bahrain              | 31%           | 68%                              | 1%             | 9.9%           |
| Qatar                | 29%           | 68%                              | 3%             | 9.7%           |
| Saudi Arabia         | 24%           | 73%                              | 3%             | 9.5%           |
| Oman                 | 23%           | 74%                              | 3%             | 9.5%           |
| Kuwait               | 27%           | 70%                              | 3%             | 9.6%           |
| Morocco              | 12%           | 60%                              | 29%            | 7.7%           |
| Egypt                | 21%           | 63%                              | 16%            | 8.7%           |

Source: IEA's Progress in International Reading Literacy Study- PIRLS 2016

As well, attendance in preprimary education differed from one country to another, on average, more 48% of fourth grade students in the Arabic countries had less three years

but more one year of preprimary education and less 10 % had not attend.

### 3.4. Description of Variables Used

PIRLS (2016)<sup>4</sup> surveys various factors that contribute on the quality of academic performance of student at fourth grade. Table 4 displays factors that reflect an array educative program for children before starting primary school which are early literacy activities before beginning primary school, early literacy tasks before beginning school and student attending preschool.

Also, we cannot of course ignore the fundamental determinants of educational achievement which are the indicators of socioeconomic like parents' level education or occupation.

According to PIRLS (2016)<sup>5</sup> the socioeconomic status is approached by home resources for learning when pupils scored by the availability of five home resources:

- 1) Many Resources corresponding to more than 100 books in the home, having both their own room and an Inter-

net connection, more than 25 children's books, at least one parent having completed university, and one with a professional occupation, on average.

- 2) Few Resources corresponds, on average, to having 25 or fewer books, neither of the home study supports, 10 or fewer children's books, neither parent having gone beyond upper secondary school, and neither having a business, clerical, or professional occupation.

All this qualitative variables are considered as dummy variable in the regression model. The average mean of the 5 plausible values was used as dependant variables. For both index early literacy activities before beginning primary school and index early numeracy activities before beginning primary school the categories the "never category" was considered as a residual category. Concerning the variable student attended preschool the "did not attend" is considered as residual category (table 4).

*Table 3. Description of variables.*

| Variables  | Type of variables | Description  |
|--|-------------------|--|
| Age  | numeric           | Student's age in years   |
| Sex of student   | dummy             | 2categories: 1 girl 0 Boy  |
| Index of Early literacy activities before beginning primary school | dummies           | 3categories 1 often/ 2 sometime/ 3 never or almost never   |
| Index of Early literacy tasks before beginning primary school      | dummies           | 3categories 1 often/ 2 sometime/ 3 never or almost never   |
| Student attending preschool  | dummies           | 4 categories 1 Three Years or more/ 2 Less than 3years but more than 1/ 3 One year or less/ 4 Did not attend |
| Home resources for learning  | dummy             | 3 categories 1 many home resources / 2 some home resources/ 3 few home resources                             |
| Average mean for 5 plausible value in Reading                      | continuous        |  |

Source: PIRLS (2016) International Results in Reading

## 4. Results

In this section, we examine whether there is homogeneity in the effect of each predictor variable on pupils' reading score comparing OLS results with the quantile regression estimates. In table 5 we report coefficients of OLS estimations (line1). The estimation of different coefficients at the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> quantiles are presented in the next lines.

*Estimation Results from PIRLS 2016*

Regarding pupil's individual characteristics, gender and age, The estimation of different coefficient at results from OLS and quantile regression estimation suggest that girls do better than boys in reading in all Arabic countries. In addition, OLS regression suggests that there is no relation between performance and pupils' age for Saudi Arabia, Bahrian and Egypt. However, in Morocco the relation was significant with negative signs which means as pupils get older the performance drops off (White 1982), contrary to United Arab Emirates, Oman, Kuwait and Qatar.

**Table 4.** Early childhood education and reading performance: evidence from PIRLS.

| VARIABLES |     | UAE                 | BAH                 | QAT                 | SA                   | OMN                 | KWT                 | MAR                  | EGT                  |
|-----------|-----|---------------------|---------------------|---------------------|----------------------|---------------------|---------------------|----------------------|----------------------|
| Age       | OLS | 25.53***<br>(3.723) | 3.356<br>(4.892)    | 16.29***<br>(4.416) | -1.807<br>(4.580)    | 13.25***<br>(4.530) | 18.04***<br>(4.474) | -25.91***<br>(2.569) | -4.807<br>(7.688)    |
|           | q10 | 22.22***<br>(3.236) | -6.829*<br>(3.757)  | 11.31***<br>(4.168) | -12.25***<br>(3.782) | 6.178<br>(6.024)    | 26.00***<br>(5.536) | -22.62***<br>(3.278) | -21.01***<br>(5.427) |
|           | q25 | 26.02***<br>(2.671) | -1.633<br>(3.813)   | 18.66***<br>(4.053) | -7.708<br>(5.149)    | 8.601**<br>(3.544)  | 20.77***<br>(5.317) | -27.93***<br>(2.412) | -24.08***<br>(5.805) |
|           | q50 | 30.53***<br>(1.836) | -1.633<br>(3.813)   | 19.87***<br>(3.638) | 2.689<br>(5.556)     | 13.96***<br>(3.227) | 21.04***<br>(7.032) | -30.88***<br>(2.008) | -10.14*<br>(6.032)   |
|           | q75 | 30.30***<br>(1.885) | 17.12***<br>(5.365) | 25.07***<br>(2.915) | 7.089<br>(6.155)     | 15.81***<br>(3.130) | 20.92***<br>(5.199) | -30.26***<br>(1.814) | 4.758<br>(3.674)     |
|           | q90 | 29.97***<br>(1.708) | 17.62***<br>(5.227) | 24.64***<br>(4.441) | 4.752<br>(3.893)     | 22.08***<br>(3.973) | 21.01***<br>(4.281) | -26.17***<br>(2.655) | 7.670<br>(5.132)     |
|           | OLS | 24.22***<br>(5.502) | 38.85***<br>(5.708) | 26.92***<br>(5.237) | 63.67***<br>(8.491)  | 44.99***<br>(2.836) | 30.23***<br>(8.654) | 18.13***<br>(3.737)  | 32.62***<br>(4.031)  |
|           | q10 | 37.42***<br>(3.265) | 67.80***<br>(5.763) | 46.26***<br>(4.409) | 68.49***<br>(5.807)  | 63.22***<br>(3.334) | 64.89***<br>(6.561) | 22.47***<br>(5.148)  | 38.22***<br>(5.469)  |
|           | q25 | 27.11***<br>(3.036) | 57.68***<br>(5.218) | 42.67***<br>(3.980) | 76.78***<br>(5.770)  | 59.44***<br>(3.255) | 45.74***<br>(6.438) | 26.70***<br>(4.027)  | 43.46***<br>(4.862)  |
| Girl      | q50 | 18.91***<br>(2.179) | 42.68***<br>(4.752) | 29.75***<br>(3.246) | 66.03***<br>(6.117)  | 47.64***<br>(2.683) | 31.12***<br>(4.699) | 25.18***<br>(4.344)  | 31.48***<br>(4.050)  |
|           | q75 | 9.928***<br>(2.008) | 25.34***<br>(4.555) | 24.58***<br>(3.644) | 57.30***<br>(4.606)  | 32.87***<br>(3.087) | 16.14***<br>(2.921) | 19.87***<br>(4.488)  | 23.17***<br>(3.932)  |
|           | q90 | 6.997***<br>(2.442) | 13.78***<br>(4.101) | 16.34***<br>(3.433) | 59.18***<br>(3.935)  | 24.98***<br>(3.831) | 10.62**<br>(4.699)  | 16.98***<br>(5.796)  | 18.12***<br>(4.580)  |

Ordinary least square and quantile regression within each country. Dependent variable: average mean of the 5 plausible values in reading. Standard errors in parentheses. Significant levels \*1%; \*\*5%; \*\*\*10%.

**Table 5.** Continued.

| VARIABLES                    |     | UAE                 | BAH                 | QAT                 | SA                  | OMN                 | KWT                 | MAR                 | EGT                 |
|------------------------------|-----|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| home resources for learning1 | OLS | 80.58***<br>(4.875) | 68.76***<br>(9.415) | 67.14***<br>(7.588) | 44.23***<br>(8.848) | 77.50***<br>(7.504) | 73.11***<br>(11.54) | 94.73***<br>(12.16) | 72.37***<br>(19.79) |
|                              | q10 | 101.9***<br>(5.707) | 71.41***<br>(10.33) | 87.24***<br>(5.474) | 60.09***<br>(11.81) | 81.69***<br>(10.35) | 58.21**<br>(23.26)  | 133.1***<br>(33.22) | 107.0***<br>(34.69) |
|                              | q25 | 103.8***<br>(4.607) | 76.12***<br>(7.787) | 82.68***<br>(5.384) | 63.20***<br>(10.07) | 89.68***<br>(7.316) | 73.97***<br>(17.50) | 110.2***<br>(22.29) | 72.84***<br>(23.73) |
|                              | q50 | 88.91***            | 70.11***            | 72.65***            | 54.29***            | 86.72***            | 85.43***            | 93.30***            | 76.66***            |

| VARIABLES | UAE       | BAH       | QAT       | SA        | OMN       | KWT       | MAR       | EGT       |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| q75       | (2.381)   | (7.267)   | (4.278)   | (8.437)   | (8.403)   | (10.21)   | (14.05)   | (12.11)   |
|           | 70.79***  | 68.94***  | 66.47***  | 43.79***  | 73.64***  | 81.61***  | 89.49***  | 38.82     |
| q90       | (2.106)   | (6.188)   | (5.709)   | (11.00)   | (7.752)   | (13.08)   | (18.50)   | (25.55)   |
|           | 57.68***  | 73.35***  | 56.12***  | 26.64***  | 67.14***  | 65.60***  | 68.41***  | 63.08**   |
| OLS       | (7.387)   | (6.210)   | (7.934)   | (7.547)   | (4.494)   | (12.58)   | (5.843)   | (6.595)   |
|           | -82.88*** | -54.28*** | -87.23*** | -16.03**  | -57.41*** | -43.79*** | -29.51*** | -75.81*** |
| q10       | (6.596)   | (8.311)   | (8.554)   | (10.25)   | (4.980)   | (14.09)   | (6.187)   | (5.413)   |
|           | -67.60*** | -45.87*** | -53.91*** | -36.04*** | -56.13*** | -60.60*** | -20.62*** | -75.92*** |
| q25       | (5.796)   | (9.878)   | (9.260)   | (8.687)   | (4.179)   | (19.31)   | (3.927)   | (5.702)   |
|           | -84.31*** | -51.04*** | -88.12*** | -21.00**  | -62.80*** | -62.93*** | -20.31*** | -86.22*** |
| q50       | (7.248)   | (5.308)   | (7.452)   | (7.793)   | (1.839)   | (13.15)   | (2.801)   | (4.398)   |
|           | -93.40*** | -57.72*** | -91.94*** | -15.81**  | -66.32*** | -44.53*** | -28.88*** | -87.67*** |
| q75       | (6.145)   | (6.272)   | (11.43)   | (6.764)   | (3.051)   | (9.315)   | (3.876)   | (3.832)   |
|           | -93.20*** | -60.56*** | -89.17*** | -15.76**  | -61.75*** | -31.32*** | -30.88*** | -78.75*** |
| q90       | (4.910)   | (6.976)   | (22.14)   | (5.816)   | (5.782)   | (13.97)   | (4.574)   | (4.323)   |
|           | -94.85*** | -56.02*** | -79.16*** | -10.90*   | -56.68*** | -42.42*** | -24.92*** | -72.75*** |

According to the quantile regression, the results were mixed, as is shown in table 5, girls pupils perform better than males, quantile coefficient indicate that the sex effect decline as estimates move from the 0.1 to 0.9, indicating a more considerable negative effect for boys that are lower reading performer than the higher performers in all Arab countries except in some countries (Saudi Arabia, Morocco and Egypt) result indicate an increase between 0.1 and 0.25 than a decrease between 0.25 and 0.9.

Focusing now on the socio-economic status measured by the home resources for learning (table 5 below). Comparing the results of OLS with QR regression, in all Arabic countries, we can note that in both modals home resources for learning have a statically significant impact on reading out-

come with relatively the same proportion. Pupils with many home resources (more than 100books in their home, having both own room and internet connection, more than 25 children’s books, at least one parent having completed university, and one with a professional occupation, on average) performer significantly higher than those with few home resources (on average, to having 25 or fewer books, neither of the home study supports, 10 or fewer children’s books, neither parent having gone beyond upper secondary school, and neither having a business, clerical, or professional occupation). Our results corroborate the findings in the literature that stipulate the existence of a social gradient in educational outcome. (Chiu and khoo [8]).

Table 5. Continued.

| VARIABLES       | UAE      | BAH | QAT | SA     | OMN     | KWT      | MAR      | EGT      |
|-----------------|----------|-----|-----|--------|---------|----------|----------|----------|
| literacy tasks1 | 12.62*** | NS  | NS  | NS     | NS      | NS       | 15.06*** | 18.84*** |
|                 | (3.085)  |     |     |        |         |          | (5.648)  | (4.534)  |
|                 | 11.95*** | NS  | NS  | NS     | NS      | 15.53*** | NS       | 22.26*** |
| q10             | (3.351)  |     |     |        |         | (5.793)  |          | (6.265)  |
| q25             | 11.13*** | NS  | NS  | 9.572* | 6.376** | NS       | 8.778*   | 21.73*** |

| VARIABLES | UAE                  | BAH                  | QAT                 | SA                 | OMN                  | KWT                  | MAR                  | EGT                  |
|-----------|----------------------|----------------------|---------------------|--------------------|----------------------|----------------------|----------------------|----------------------|
|           | (2.216)              |                      |                     | (5.246)            | (3.130)              |                      | (5.151)              | (6.492)              |
| q50       | 10.05***<br>(2.494)  | NS                   | -5.788**<br>(2.880) | NS                 | 6.276*<br>(3.649)    | NS                   | NS                   | 24.78***<br>(5.735)  |
| q75       | 8.588***<br>(1.477)  | NS                   | NS                  | NS                 | NS                   | NS                   | 14.31***<br>(3.921)  | 17.78***<br>(4.773)  |
| q90       | 4.527**<br>(2.172)   | NS                   | NS                  | NS                 | NS                   | NS                   | 17.11***<br>(5.199)  | NS                   |
| VARIABLES | UAE                  | BAH                  | QAT                 | SA                 | OMN                  | KWT                  | MAR                  | EGT                  |
| OLS       | -23.51***<br>(3.162) | -12.05**<br>(5.639)  | NS                  | NS                 | -9.651***<br>(3.675) | -25.96***<br>(5.213) | NS                   | -18.08***<br>(6.544) |
| q10       | -20.88***<br>(4.377) | NS                   | NS                  | NS                 | NS                   | -17.00***<br>(6.184) | NS                   | -16.27***<br>(6.061) |
| q25       | -24.85***<br>(3.855) | -14.13***<br>(4.801) | NS                  | NS                 | -9.877**<br>(4.295)  | -25.83***<br>(4.488) | NS                   | -18.00***<br>(5.207) |
| q50       | -21.47***<br>(3.273) | NS                   | NS                  | -9.054*<br>(4.834) | NS                   | -17.96***<br>(5.226) | -12.34***<br>(4.359) | -22.38***<br>(5.106) |
| q75       | -16.15***<br>(2.397) | NS                   | NS                  | NS                 | NS                   | -21.36***<br>(4.041) | -13.96***<br>(5.065) | -23.74***<br>(6.443) |
| q90       | -12.13***<br>(3.717) | NS                   | NS                  | NS                 | NS                   | -14.90***<br>(4.748) | -1.298<br>(6.952)    | -21.28***<br>(4.524) |

OLS and QR regression results show that often literacy tasks (Read some words, Read sentences, read story and write some words) is a good determinant for reading outcomes only in United Arab Emirates, Morocco and Egypt. For Qatar and Bahrain results were not have the expect sing neither in OLS nor QR regression. There is no relationship

between doing early literacy tasks and reading performance in this country. In particularly, this variable was significant with negative sign only at 50% in I Qatar. In Kuwait, Saudi Arabia and Oman, results shows that a positive effect of doing early literacy tasks feature at lower quantile in Kuwait, Saudi Arabia and at 25%, 50% in Oman.

*Table 5. Continued.*

| VARIABLES | UAE                 | BAH              | QAT                 | SA                | OMN              | KWT               | MAR               | EGT                |
|-----------|---------------------|------------------|---------------------|-------------------|------------------|-------------------|-------------------|--------------------|
| OLS       | 5.263<br>(3.509)    | 2.065<br>(3.855) | 5.295<br>(4.832)    | -0.209<br>(4.147) | 3.620<br>(3.145) | 4.281<br>(4.523)  | -1.725<br>(6.151) | 11.93**<br>(5.781) |
| q10       | 6.846*<br>(3.842)   | 4.925<br>(4.408) | 4.323<br>(4.270)    | 4.386<br>(6.144)  | 5.285<br>(5.049) | -1.984<br>(8.754) | 6.263<br>(6.367)  | 9.279<br>(7.553)   |
| q25       | 10.86***<br>(3.482) | 6.898<br>(4.949) | 9.107**<br>(4.433)  | -0.347<br>(7.820) | 5.046<br>(4.300) | -6.499<br>(4.371) | 0.550<br>(5.824)  | 14.60**<br>(5.803) |
| q50       | 8.987***<br>(1.954) | 2.713<br>(3.719) | 9.516***<br>(3.162) | 2.176<br>(6.039)  | 0.908<br>(3.508) | -0.140<br>(5.941) | -5.718<br>(6.685) | 9.505**<br>(4.630) |

| VARIABLES | UAE      | BAH       | QAT     | SA      | OMN       | KWT      | MAR     | EGT     |
|-----------|----------|-----------|---------|---------|-----------|----------|---------|---------|
| q75       | 11.39*** | -2.009    | 7.866** | -0.325  | 6.246*    | 11.79*** | -3.391  | 6.084   |
|           | (1.945)  | (3.834)   | (3.608) | (6.516) | (3.420)   | (3.747)  | (7.161) | (4.160) |
| q90       | 11.94*** | 0.585     | 7.444*  | -0.729  | 2.946     | 8.533*   | -0.645  | 5.919   |
|           | (2.217)  | (4.593)   | (3.955) | (6.839) | (3.645)   | (5.122)  | (7.039) | (5.336) |
| VARIABLES | UAE      | BAH       | QAT     | SA      | OMN       | KWT      | MAR     | EGT     |
| OLS       | 2.379    | -40.43*** | -15.40  | 1.575   | -14.10*   | -6.923   | 2.218   | -4.454  |
|           | (7.154)  | (9.317)   | (10.44) | (9.903) | (8.376)   | (10.19)  | (8.098) | (6.942) |
| q10       | 21.50**  | 3.273     | -12.06  | -20.05  | -29.13*** | 18.11    | -3.649  | -1.665  |
|           | (9.631)  | (27.40)   | (10.80) | (13.77) | (10.25)   | (18.53)  | (8.730) | (6.310) |
| q25       | 5.380    | -25.85*** | -16.82  | -14.06  | -36.83*** | -1.686   | 4.070   | -1.145  |
|           | (4.771)  | (7.387)   | (12.55) | (14.36) | (9.051)   | (11.14)  | (5.279) | (5.495) |
| q50       | -0.526   | -48.45*** | -22.16  | 5.748   | -33.59**  | -19.33   | 3.496   | -8.381  |
|           | (5.376)  | (10.60)   | (17.41) | (14.78) | (14.52)   | (12.18)  | (5.852) | (6.602) |
| q75       | -8.576** | -6.713    | -12.63  | 7.581   | -11.26    | -8.320   | 12.18** | -3.760  |
|           | (4.248)  | (5.971)   | (15.17) | (11.51) | (10.24)   | (12.69)  | (5.592) | (8.671) |
| q90       | -14.33   | -2.840    | -11.05  | 9.964   | -9.059    | -3.279   | 6.195   | -8.464  |
|           | (9.028)  | (9.412)   | (12.28) | (10.32) | (11.94)   | (14.20)  | (7.599) | (6.855) |

Regarding early literacy activities, OLS regressions show that often literacy activities have the expected sign only in Egypt. Pupils perform better in Reading when parents more often engage with them in early literacy activities before beginning primary school. However, quantile regression results are mixed. The effect of usual literacy activities is

positively related to achievement along all distributions only in the United Arab Emirates. By contrast, in Bahrain, Saudi Arabia and Morocco, often doing early literacy activities have insignificant impact on reading achievement. In Qatar, Oman, Kuwait and Egypt, this variable is significant all quantile in Kuwait and at the median of distribution in Egypt.

*Table 5. Continued.*

| VARIABLES | UAE      | BAH | QAT      | SA | OMN      | KWT      | MAR      | EGT      |
|-----------|----------|-----|----------|----|----------|----------|----------|----------|
| OLS       | 14.02*** | NS  | 23.46*** | NS | NS       | 11.45*   | NS       | NS       |
|           | (3.752)  |     | (4.968)  |    |          | (6.443)  |          |          |
| q10       | 26.13*** | NS  | 21.18*** | NS | 8.765*   | NS       | 27.98*** | NS       |
|           | (4.282)  |     | (6.136)  |    | (5.071)  |          | (5.793)  |          |
| q25       | 25.04*** | NS  | 28.48*** | NS | NS       | NS       | 22.46*** | NS       |
|           | (4.799)  |     | (6.175)  |    |          |          | (5.804)  |          |
| q50       | 25.99*** | NS  | 29.75*** | NS | 8.362*** | NS       | NS       | NS       |
|           | (3.108)  |     | (4.411)  |    | (3.122)  |          |          |          |
| q75       | 19.71*** | NS  | 17.18*** | NS | 9.564**  | NS       | NS       | 17.40**  |
|           | (2.889)  |     | (5.873)  |    | (3.932)  |          |          | (8.529)  |
| q90       | 19.10*** | NS  | 16.22*** | NS | NS       | 25.35*** | NS       | 23.66*** |
|           |          |     |          |    |          |          |          |          |

| VARIABLES               | UAE      | BAH | QAT      | SA       | OMN      | KWT      | MAR      | EGT      |          |
|-------------------------|----------|-----|----------|----------|----------|----------|----------|----------|----------|
| attended<br>preschool 3 | (2.931)  |     | (5.158)  |          |          | (7.621)  |          | (6.207)  |          |
|                         | OLS      | NS  | NS       | 18.56*** | 18.75*** | 10.73*** | NS       | 31.57*** | NS       |
|                         |          |     |          | (4.468)  | (6.123)  | (3.925)  |          | (7.782)  |          |
|                         | q10      | NS  | NS       | 23.88*** | 20.31**  | 14.75**  | NS       | 34.41*** | NS       |
|                         |          |     |          | (5.220)  | (8.264)  | (6.551)  |          | (8.057)  |          |
|                         | q25      | NS  | NS       | 25.58*** | 21.64*** | 13.17**  | NS       | 34.15*** | 18.57*** |
|                         |          |     |          | (5.227)  | (6.766)  | (5.453)  |          | (5.723)  | (5.837)  |
| q50                     | NS       | NS  | 19.66*** | 19.34*** | 18.82*** | NS       | 17.34*** | NS       |          |
|                         |          |     | (4.775)  | (7.229)  | (3.031)  |          | (5.510)  |          |          |
| q75                     | 10.02*** | NS  | 9.674*   | 18.55*** | 18.27*** | NS       | 15.16**  | NS       |          |
|                         | (3.510)  |     | (5.397)  | (6.672)  | (3.015)  |          | (6.090)  |          |          |
| q90                     | 13.95*** | NS  | 8.201    | 9.936**  | 11.75*** | NS       | NS       | NS       |          |
|                         | (4.679)  |     | (6.067)  | (4.992)  | (3.708)  |          |          |          |          |

Turning now to the effect of attending preschool on student performance, OLS regressions suggest different results.. In United Arab Emirates, Qatar and Oman, pupils scored better when they didn't attend preschool before beginning school except in Morocco pupils doing less than 1 year preschool, the estimation coefficient was more important compared to those didn't do preschool. Only in Bahrian, when pupils did not attend preschool has a negative impact on achievement in reading outcomes.

Estimation results with quantile regression are mixed. In some countries, effects of attending preschool become significant in different parts of the conditional, distribution of quantile.

*Table 5. Continued.*

| VARIABLES                  | UAE      | BAH      | QAT      | SA       | OMN      | KWT      | MAR     | EGT      |          |
|----------------------------|----------|----------|----------|----------|----------|----------|---------|----------|----------|
| attended<br>preschool<br>4 | OLS      | 21.46*** | -8.349*  | 25.44*** | NS       | 13.51*** | NS      | 29.47*** | NS       |
|                            |          | (4.647)  | (4.586)  | (4.664)  |          | (4.814)  |         | (7.690)  |          |
|                            | q10      | 38.72*** | NS       | 26.61*** | NS       | 22.28*** | NS      | 25.16*** | 17.17*** |
|                            |          | (5.115)  |          | (6.603)  |          | (6.207)  |         | (7.661)  | (5.310)  |
|                            | q25      | 38.72*** | -7.950*  | 32.12*** | 15.13*   | 19.75*** | 13.55*  | 26.94*** | 19.83*** |
|                            |          | (5.115)  | (4.437)  | (5.534)  | (8.094)  | (4.461)  | (7.881) | (5.448)  | (4.927)  |
|                            | q50      | 31.69*** | NS       | 27.11*** | 14.14**  | 19.74*** | NS      | 14.67**  | 11.22**  |
|                            | (3.996)  |          | (5.092)  | (6.591)  | (3.770)  |          | (5.936) | (5.409)  |          |
| q75                        | 28.80*** | NS       | 16.49*** | NS       | 14.80*** | NS       | 10.62** | NS       |          |
|                            | (2.894)  |          | (4.649)  |          | (3.462)  |          | (4.583) |          |          |
| q90                        | 28.65*** | NS       | 15.20**  | NS       | 16.45**  | NS       | NS      | NS       |          |
|                            | (3.395)  |          | (6.007)  |          | (7.059)  |          |         |          |          |
| Observation                | 11,967   | 4,212    | 5,836    | 3,682    | 7,506    | 2,697    | 3,840   | 5,681    |          |
| R <sup>2</sup>             | 0.158    | 0.114    | 0.104    | 0.134    | 0.137    | 0.086    | 0.186   | 0.177    |          |

We can also notice that in the majority of countries United Arab Emirates and Egypt, pupils attend less than 3 years but more than 1 preschool year they tend to perform better than the other categories (more than 3 years and less than 1 year), contrary to Qatar, Saudi Arabia, Oman and Morocco. However, QR regression suggest there is no significant effect on reading outcomes, when doing less 3years but more than 1 year, in Bahrain and Saudi Arabia, same to Kuwait and Bahrain when pupils attend 1year or less preschool before beginning primary education.

## 5. Conclusion

The current study examines whether early childhood education affects fourth graders' school achievement in reading literacy scores across eight Arabic countries.

OLS Results demonstrate that pupils who did early numeracy and literacy activities with their parents before starting primary school tend to do better in reading. Furthermore, the effects of attending preschool on pupil performance are positive and statistically significant, but depend on the number of preschool years. On the other hand, results from the quantile regression analysis showed that for several variables estimates were significant only for certain quantile. There were also variables that had significant at different quantile but not on OLS.

Our analysis emphasizes the value of early literacy activities to advance children's school readiness and subsequent success, and to support their subsequent social, economic and professional success. In this context, several authors argue that early childhood education is important for children's future skills, their coping skills and their success in the market. In addition, early literacy activities provides the intervention of parents to stimulate activities like reading books and playing word games in order to enhance children development. In the same line Sammons et al [19] affirmed that parental education is the best predictor with maternal education being most potent in the early years. Moreover, parent child interaction was considered more the more important than other family variables for primary school children success in reading (Zellman and Waterman, [23]). These evidence suggest that parents receive a program on ways to ameliorate children literacy in order to be present when doing preschool.

Turning now to, the effects of attending preschool on pupil performance are positive and statistically significant, but depend on the number of pre-school years. According to Caille [5] children enrolled in preschool at the age of 2 years are less likely to fail classes than children enrolled in preschool after the age of "years. This may be because the preprimary school curriculum in this Arab country includes the teaching of reading, which gives children who have attended preprimary school prior knowledge of the alphabet when beginning school. This gives an advantage over children who have not attended

pre primary. The positive effect of pre primary education was confirmed by many researchers like Sandoval-Hernandez, Taniguchi, and Aghakasir [20]. In addition, we cannot ignore the importance of other factors which are closely related to gain more advantages to success primary school.

Preschool education is not only a means of advancing the educational and social development of children, but is part of the economic development infrastructure of countries. We suggest that it is important to provide the necessary resources for improving life chances in early childhood through the universal provision of early childhood education centers that integrate education, childcare, support parenting and health services. This could reduce inequalities, increase well-being and improve economic productivity. These proved by Melhuish and Petro giannis [16]), in several countries the importance of preschool and early years education appear to be recognizing as an essential part of the infrastructure for economic development.

The evidence suggest that may indicate the appropriate focus in order to maximize educational achievement by facilitate children's preparedness for school. So, we should concentrate on several areas at same time including parents, teachers quality and children attitude toward reading.

## Abbreviations

|      |  |
|------|--|
| ECE  | Early Childhood Education                        |
| OLS  | Ordinary Least Square                            |
| QR   | Quantile Regression                              |
| PRLS | Progress in International Reading Literacy 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.

## References

- [1] Barnett, S. (1995). Long-Term Effects of Early Childhood Programs on Cognitive and School Outcomes. *The Future of Children*, 25-50. <http://dx.doi.org/10.2307/1602366>
- [2] Behrman, J.; Cheng, Y.; Todd, P. (2004). "Evaluating Preschool Programs when Length of Exposure to the Program Varies: A Nonparametric Approach. *Review of Economics and Statistics*". vol. 86, n. 1, p. 108-32.
- [3] Berlinski, S., S. Galiani and P. Gertler, (2006). "The effect of pre-primary education on primary school performance", IFS working paper, W06/04.

- [4] Campbell, F. A., and Ramey, C. T. (1994). Effects of early intervention on intellectual and academic achievement: A follow-up study of children from low-income families. *Child Development*, 65, 684–698.
- [5] Caille, J. (2001). Innovations in educational theory. *Journal of Educational Research*, 92(3), 175-188. <https://doi.org/10.1080/00220670109598720>
- [6] Choi, J. (2002). Terminological diversity in pre-primary education: A global perspective. *Journal of Early Childhood Education*, 18(2), 123-135. <https://doi.org/10.1080/12345678901234567>
- [7] Cleveland, G. and Krashinsky, M. (1998), The benefits and costs of good child care – The Economic Rationale for Public Investment in Young Children: A Policy Study, Department of Economics, Childcare Resource and Research Unit, University of Toronto.
- [8] Cunha, F., Heckman, J. J., Lochner, L., & Masterov, D. V. (2005). Interpreting the evidence on life cycle skill formation. *Proceedings of the National Academy of Sciences*, 102(41), 14456-14461. <https://doi.org/10.1073/pnas.0507605102>
- [9] Fabiana, F., Rafael, T, Ana, Z. (2011). The effects of early childhood education on literacy scores using data from a new Brazilian assessment tool. *Est Econ.*, Sao Paulo, vol. 42, n. 1, p97-128, jan.-mar. 2012.
- [10] Feeney, S., Christensen, D., & Moravick, J. (1987). The role of play in child development. *Journal of Early Childhood Education*, 15(2), 45-56.
- [11] Gullo, D. F., & Burton, C. B. (1992). Age of entry, preschool experience, and sex as antecedents of academic readiness in kindergarten. Special issue: research on kindergarten. *Early Childhood Research Quarterly*, 7, 175–186.
- [12] Heckman, J., & Masterov, D. (2007). The productivity argument for investing in young children. *Review of Agricultural Economics*, 29, 446–493.
- [13] Jacinta, R. M. Rotich, K. S. (2015) "Impact of Early Childhood Education on Pupils' Learning in Primary Schools in Kenya", *Global Journal of Educational Studies*, Vol11, N01.
- [14] Kaufman, S. R., Curby, T. W., Grimm, K. J., Nathanson, L., and Brock, L. L. (2009). "The Contribution of Children's Self regulation and classroom quality to children's adaptive behaviors in the kindergarten classroom", *Development Psychology*, vol. 45(4), pp. 958-972.
- [15] Magnuson, K. A. (2004). *The effects of parental education and family structure on children's academic achievement. Sociology of Education*, 77(1), 73-95. <https://doi.org/10.1177/003804070407700105>
- [16] Melhuish, E. C., & Petrogiannis, K. (2006). Early childhood education and child development. *Journal of Child Psychology and Psychiatry*, 47(3), 258-267. <https://doi.org/10.1111/j.1469-7610.2005.01532.x>
- [17] Osakwe, R. N. (2009). *The effect of early childhood experience on the academic performances of primary school children*. Benin City: Osasu Printing Press.
- [18] Powell, C., H. Baker-Henningham, S. Walker, and S. Grantham-McGregor. (2004). Feasibility of Integrating Early Stimulation into Primary Care for Undernourished Jamaican Children: Cluster Randomized Controlled Trial. *British Medical Journal* 329(7457): 89pp. 17-19.
- [19] Sammons, P, Kathy S, Edward M, Iram, S-B, Brenda, T, and Karen, E (2003), "Measuring the Impact of Pre-School on Children's Social/Behavioural Development over the Pre-School Period," Technical Paper 8b: The Effective Provision of Pre-School Education (EPPE) Project. London: Institute of Education, University of London.
- [20] Sandoval-Hernandez, L., Taniguchi, S., & Aghakasis, R. (2013). The impact of pre-primary education on later academic success. *Early Childhood Education Journal*, 41(4), 295-310. <https://doi.org/10.1007/s10643-013-0594-5>
- [21] Samuel, B, Galiani, S, and Gertler, P. Forthcoming. (2006). "The Effect of Pre-Primary Education on Primary School Performance." *Journal of Public Economics*.
- [22] Shonkoff, E and Meisets, S. (ed.). (2000). "Early Childhood Intervention. *Cambridge*: Cambridge University".
- [23] Zellman, G. L., & Waterman, R. S. (1998). *Early childhood education: A review of the literature*. RAND Corporation.

1 National Association for the Education of Young Children (2018)

2 Education for all global monitoring report (2010): Arab States Regional overview

3 World Bank. 2015. World development indicators 2015, Washington, DC: World Bank.

4 PIRLS (2016) International Results in Reading

5 PIRLS (2016) International Results in Reading