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DOES PUBLIC PRESCHOOLING IMPROVE CHILD DEVELOPMENT IN ALGERIA?

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1. Abstract

Algeria has made remarkable progress in increasing the enrollment rate of preschool in recent years. As recently as 2005, the gross enrollment rate in preschool was only 6 percent. Starting in 2008 with the reforms of the National Education System, where Algeria implemented a universal preschool program for children aged 3 to 4, enrollments rapidly increased (70%-2016). We use this policy change to estimate the impact of the preschool program on child development. We analyze the effect on children's development by measuring, on the one hand, the effect on the cognitive development of the child and, on the other hand, on the quality of parent-child interactions. Our identification strategy exploits geographical differences in terms of exposure to the program controlling the period where the program is implemented across Algerian municipalities as an instrument for individual early childcare attendance. We estimate Two-Stage least squares (2SLS) regression analysis and exploit a difference-in-differences strategy. We use two Multiple Indicator Cluster Surveys (MICS) conducted in 2006 and 2012 by UNICEF. The results show a positive effect of preschool on the cognitive development of children. In contrast, the effect is significantly negative on the interaction between mother and children, which means that there is a substitution effect; mothers use this time to do something else instead of interacting with the child doing some activities. A more in-depth analysis could be done to explore whether parents, especially mothers, use this time to look for a job.

2. Introduction

Early childhood development is the most crucial phase for human development. Experiences in early childhood strongly influence learning, education, health, employment, and social engagement throughout life. However, countries tend to under-invest in this stage of development, particularly in the Middle East and North Africa (MENA). Touhami, Berenger and Lassassi (2019) analyze inequality of opportunity in early childhood development in selecting Mediterranean countries (Algeria, Morocco, Tunisia,

Bosnia, Serbia and Ukraine), and the findings demonstrate that there is substantial inequality of opportunity starting early in life. A variety of circumstances impact early inequality, with wealth, mother's education, and geographic differences all contributing substantially.

An increasing number of studies estimate the effects of a universal childcare program on cognitive outcomes. Berlinski, Galiani, and Gertler (2009) and Felfe and Lalive (2018) estimate the effects on children's behavioural outcomes in Argentina and Germany, respectively, and find that childcare enrolment improves children's behaviour. There is striking evidence that extending preschool access to the poorest and most vulnerable children can boost their education and livelihood opportunities later in life.

The positive effect of early childhood education (ECE) is well documented in the literature. ECE attendance improves health, cognitive, and psychosocial development of children (Behrman, Chen, & Todd, 2004, Mustard 2007, Waldfogel 2006). Early childhood education plays the role of an equalizer between the poor and the wealthy since children from more disadvantaged households benefit more from attendance of ECE (Irwin, Siddiqi, & Hertzman, 2007). Early childhood education is also important for sustainable economic development since it considerably improves the future productivity of children (Grunewald & Rolnick, 2007; Magnuson, Meyers, & Waldfogel, 2007). Moreover, evidence from empirical studies shows that participation in the program improves not only the cognitive skills but also the socio-emotional skills of children. Heckman, Pinto, and Savelyev (2013) conclude that the program leads to less crime, lower receipt of welfare, and higher voter turnout through improving socio-emotional skills. Overall, their findings suggest that the preschool program has positive externalities and thereby benefits the whole of society.

At the same time, the positive effects of parent-child interactions have been demonstrated through the research literature. High quality parent-child interaction is associated with secure attachments between children and parents, which in turn lead to better psychosocial well-being and resilience (Dallaire & Weinraub, 2007). It is also associated with improvement in problem-solving skills and overall cognitive outcomes, which in turn lead to higher academic achievement (Maulik & Darmstadt, 2009). Parent-child interaction, through the form of telling stories and singing together, are predictors of enhanced language development (Smith & Gibbard, 2011). Higher levels of parent-child interactions are also a predictor of improved non-cognitive skills, for instance, motivation and enthusiasm (Carneiro & Heckman, 2003).

The focus on early education traces back to the findings of Heckman, suggesting that ability gaps between individuals and socioeconomic groups open up at early ages for both cognitive and non-cognitive skills. Through this study, we attempt to fill an important gap in the literature regarding the effect of childcare enrolment on the cognitive development of a child in the MENA region.

3. Identification strategy and Methodology

In this research we compare in the case of Algeria the development of children who were involved in preschool to the counterfactual- development for the same child if they were not involved in preschool. Two principal research questions: 1) Does early childhood education improve children's cognitive development? 2) What are the effects of preschool on the quality of parent-child interactions in Algeria? Are they substitution effects or complementary effects?

We use data from Multiple Indicator Cluster Surveys (MICS) conducted in 2006 and 2012 by UNICEF. The children's questionnaire contains a question about early childhood education (ECE) attendance, which is asked for every child of preschool age (3-4 years). For the survey conducted in 2006 (MICS3), the sample size is around 29,000 households. More than 15,000 children under five years old were interviewed. For the survey conducted in 2012 (MICS4), the sample size is around 27,000 households. More than 14,700 children under five years old were interviewed. In addition to the MICS survey, we used administrative data from the Ministry of Education (distribution of primary school and preschool classes at governorate and municipality level between 2006 and 2016).

4. Outcome variables

a. Cognitive development

For the first research question the outcome variable is “**cognitive development**” and we estimate 2SLS regression equation. We exploit the variation introduced by the program’s expansion in Algeria over time that generated differences in exposure by municipality as an instrumental variable. Preschool classes are physically and administratively attached to primary schools. Six questions related to the child's cognitive development are asked but only in the survey of 2012: 1) Child knows or can recite at least ten letters of the alphabet, 2) Child can read some words, 3) Child is able to follow simple instructions to do something, 4) Child is able to do something independently, 5) Child gets along well with other children, and 6) Child is easily distracted. In the first step we sum up six dichotomous questions to develop a cognitive development index. In the second step we construct a cognitive development index using principal component analysis (PCA).

b. Quality index of parent–child interaction

For the second research question the outcome variable is the “**quality of parent–child interactions**”. The MICS contains a set of six dichotomous questions about the quality of parent–child interactions: 1) spends time with the child by naming, counting, or drawing things, 2) plays with the child, 3) tells stories to the child, 4) takes the child outside the home, compound, yard, or enclosure, 5) sings songs with the child, and 6) reads books or looks at pictures with the child. The questions related to development activities are asked in both the 2006 and 2012 MICS and in the same way. The mother, father, and any other family member older than 15 years are asked if they had been involved in the six activities with the child within the past three days. First, we sum up six dichotomous questions to develop a quality index of parent–child interaction. We calculate different indexes depending on who the child interacts with in the family. We also construct a quality index of parent-child interaction using PCA. We exploit variation across geographical areas over time in the provision of preschool services and apply a difference-in difference identification strategy.

5. Results

5.1. *Preschool enrolment and cognitive development*

The descriptive analysis shows that children enrolled in preschool have higher scores in cognitive indicators compared to children not enrolled in preschool. Thus, the proportions of children enrolled in preschool who know at least ten letters of the alphabet, can read a few sentences, can count, can follow simple instructions, and do things independently of adults, are more important compared to children not enrolled in preschool. Also, children enrolled in preschool are less violent and less distracted compared to children not enrolled in preschool. The descriptive analysis allows us to say that the preschool program has a positive effect on the cognitive development of a child, but we should control for the different selection biases to confirm this result.

To analyse the effect of enrolment in preschool on child cognitive development empirically, we first estimate OLS regression. In the second step, we estimate the reduced form and the 2SLS regression equation. We exploit the variation introduced by the program’s expansion over time (that generated differences in exposure) by municipality as an instrumental variable.

From OLS regression¹ we find that enrolment in preschool has a positive effect on the cognitive development of the child. The effect is positive for both boys and girls. As expected, several other variables affect positively the cognitive development of the child, such as the education of mothers and living in a wealthy family. When we separately estimate the effect of preschool enrollment on each child’s developmental factors, we find

¹ We find similar results regardless of the index used.

that enrollment in a preschool program has a larger effect on children's reading - "child is able to read some words", counting - "child is able to count", and learning - "child know or can cite at least ten letters of the alphabet". The effect is positive but less important for the factors "child is able to follow simple instructions to do something", "child is able to do something independently" and "child can catch a small object from the floor with two fingers".

The results of the 2SLS model show a significant positive effect of strata of residence (urban vs. rural) on preschool enrolment for those living in an urban area. We observe some differences according to the region of residence; the effect on preschool enrolments is significant with positive effects for those living in the North East and the South of Algeria compared to Nord-Cent. However, the effect is negative for those living in Higher Plateau. The probability of a child's enrolment in preschool increases with the level of education of their mother. The more educated a mother is, the more likely a child is to be enrolled in a preschool program. The results show a positive relationship between enrolment in preschool and household wealth. That means that a child living in a wealthy family has more opportunities to be enrolled in a preschool program compared to child living in a poor family. The instrument "number of preschool class per child age 0-4 at municipality level" is significant with positive effects on enrolment in preschool programs. The results from the main stage regression equation show that enrolment in preschool programs increases the cognitive development of children.

5.2. Do preschool enrollments influence the behavior of parents towards children?

We estimated several equations, difference-in-difference estimation, according to the nature of the interaction: interaction of mother with children, the interaction of father, the interaction of parents (mother and father), the interaction of all members, and finally if at least one member of the household interacts with children doing some development activities. We use as control variables: education of mother, strata of residence (urban vs. rural), region, and household wealth. In addition to these variables, we introduce the time trend, treatment variable, and the interaction term between time and treatment group dummy variables.

The most important variable in this model is the interaction term. The results show that this variable is not significant in terms of who the child interacts with, except the interaction between mother and child- the effect is significant but with a negative effect. This result means that enrolment of children in preschool has a negative effect on the quality of interactions between mother and child. In this case, we can talk about the substitution effect between preschool programs and households.

6. Political implications and recommendations

Improving the quality of education has been a major preoccupation of policymakers throughout the world. In this research, we present evidence that shows that investing in universal preschool education could be an important part of a productive strategy to achieve this goal. Specifically, we examined the impact of preschool education expansion in Algeria. Through this study, we attempt to fill an important gap in the literature regarding the effect of childcare enrollment on the cognitive development and quality of parent-child interactions in MENA countries.

This study is particularly important for understanding the impact of attending early childcare on the children's cognitive outcomes to raise the awareness of policy makers about the importance to extending preschool access especially to the poorest households, most vulnerable children and in remote areas. To achieve this goal, a set of measures is needed:

- Providing cash transfers to ensure inclusive preschool services for all eligible children and increasing enrolment especially for child issue from poor households.
- Facilitate children's access to preschool, particularly in rural areas by providing free transportation.

- More effort to inform parents about the importance of preschool education for the development of children especially in households with less educated parents.

The results show that enrolling the children in pre-schooling is evidently beneficiary for their development. At the same time, mothers can benefit from this by seeking to find a job and increasing the household income, which can also have a positive effect on the child's development. This result is very important, especially in MENA countries, where women's participation in the labour force is very low, amongst the lowest in the world.

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FEMISE is coordinated by the Economic Research Forum (Cairo, Egypt) and the Institut de la Méditerranée (Marseille, France) and gathers more than 100 members of economic research institutes, representing the 37 partners of the Barcelona Process.

Its main objectives are:

- to contribute to the reinforcement of dialogue on economic and financial issues in the Euro- Mediterranean partnership, within the framework of the European Neighbourhood Policy and the Union for the Mediterranean,*
- to improve the understanding of priority stakes in the economic and social spheres, and their repercussions on Mediterranean partners in the framework of implementation of EU Association Agreements and Action Plans,*
- to consolidate the partners of the network of research institutes capable of North-South and South-South interactions, while it sets into motion a transfer of know-how and knowledge between members.*

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