Pre-school duration and adult outcomes: Evidence form the expansion of École Maternelle in France *

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Abstract

The literature on targeted pre-primary (age 2-6) education has highlighted the potential beneficial role of early education on earnings and employment opportunities, both in terms of rising average outcomes and reducing inequalities related to the background of origins. The little available evidence about the long-run effects of attending universally provided pre-school educational programs shows a more complex picture, with positive and negative effects clustered at the bottom and top of child outcomes distribution and varying substantially by parental background. Understanding whether these effects come from participation or from duration (years spent in pre-school) of the program is key for policy design. This paper contributes by estimating the long-term effects of years spent into the French *École Maternelle* (EM), one of the oldest and largest highly subsidized pre-primary universal educational programs worldwide. We exploit variations across places and cohorts in new EM facilities in France created after the institution of a large subsidization plan phased in on the late 1960s, to identify exogenous increments in the duration (up to three years) of EM program offered locally. Our results show that attending one additional year of EM has a positive effect (about 9%) on adult earnings, the effect being clustered at the middle and top of the child distribution. Furthermore, effects of EM duration are larger for children from middle-class parents, displaying ambiguous effects for opportunity equalization. Interestingly, EM duration has insignificant effects on educational outcomes.

Keywords: École Maternelle, pre-school, income distribution, education return, instrumental variable.
JEL codes: I26, J24, D63.

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1 Introduction

During the last decades, the influence of early childhood on long-term children outcomes has been the focus of much research. Growing attention has been devoted to the role of early education programs to raise average outcomes and compensate initial disadvantages related to the background of origin. Cunha and Heckman (2007) and Heckman (2008) put forward the idea that the process of human capital accumulation rests on dynamic complementarities, with skills that beget skills. Therefore, as learning is easier in early childhood (when skills are still malleable) than later in life, early education can help children raised in unfavorable conditions to change their development trajectory and compensate for the detrimental influence of initial disadvantage. In other words, reducing early inequalities cumulates into higher and less unevenly distributed skills later in life, which are then reflected by the earnings and employment opportunities.

In this spirit, there has been an increasing commitment worldwide to give children a better start through high-quality and universal pre-school programs. At the same time, however, the literature is far from a clear and unambiguous conclusion about the long-term effect of these programs. Indeed, evidence of the effects of early childhood education reforms is not uniform across countries, times and types of intervention.[1] Regarding this last aspect, several targeted interventions in the US seem to produce significant gains for treated children from disadvantaged backgrounds. [2] As to universal programs, little evidence exists on their impact, since causal identification of these effects can seldom rely on sharp discontinuities in the programs' implementation. Most of what has been learned deals with short-term outcomes. For example, Felfe, Nollenberger and Rodriguez-Planas (2015), Berlinski, Galiani and Manacorda (2008), Berlinski, Galiani and Gertler (2009) Caille (2001) find that preschool attendance has a positive effect on children's cognitive development in Spain, Uruguay, Argentina and France respectively. Baker, Gruber and Milligan (2008) and Baker, Gruber and Milligan (2019) find negative effects

[1] See Ruhm and Waldfogel (2012) for a review.

[2] Examples are the Carolina Abecedarian Program (Garcia, Heckman, Leaf and Prados 2020), the Head Start project (Currie and Almond 2011), the Perry Preschool program (Heckman, Moon, Pinto, Savelyev and Yavitz 2010), WIC and SNAPS projects (Hoynes and Schanzenbach 2009), EITC program (Bastian and Michelmore 2018) and the Moving to Opportunity (Chetty, Hendren and Katz 2016).

for Canada, while Datta Gupta and Simonsen (2010) and Goux and Maurin (2010) report zero effect for Denmark and France respectively. Evidence on the long-run distributional effects of universal pre-school programs remains more limited.There are only a few works dealing with the long-run distributive impact of universal pre-school programs. Andreoli, Havnes and Lefranc (2019) exploit the exogenous timing of a universal kindergarten (3-6 years old) expansion taking place in Norway to conclude that gains are clustered at the bottom of the earnings distributions, while returns at the top seem to be negative for more well-off children (who have access to other expensive forms of care). Within the same context, Havnes and Mogstad (2015) report small negative effects of this expansion for children at the upper end of the income distribution, while Havnes and Mogstad (2011) find a positive effect on children's educational outcome and their labor market participation. Dumas and Lefranc (2010) analyze the effect of the pre-school enrollment expansion that occurred in France during the 1960s and 1970. They find a positive impact of this expansion on children schooling outcomes and their labor market outcome when adults. Remarkably, these effects are larger for children from worse-off or intermediate socioeconomic backgrounds than for children from better-off social groups. The goal of this paper is to provide causal evidence on the long-run impact of universally provided pre-primary education program. As Dumas and Lefranc (2010) we look at the French experience of École Maternelle (EM hereafter) which represents one of the largest, universal, highly subsidized pre-primary education programs worldwide. In 1960s and 1970s, France experienced a sharp increase in the pre-school enrollment which led to the current situation of universal access (2-5 years old). We use time and geographic variation in EM supply as a source of identification and investigate the impact of pre-school duration on schooling outcomes, as well as adult wages, of cohorts born between the 1960s and 1970s. We find that pre-school opening increases the probability to spend more time in EM. In addition, longer exposure to EM has a positive impact on adult wages (about 9%). Interestingly, this effect is heterogeneous within the income distribution and between social groups defined according the circumstances of origins. We also find zero impact of EM on long-run schooling outcomes (i.e. probability to get the university degree). This last result appears in line with Cornelissen and Dustmann (2019) showing that the effect of pre-

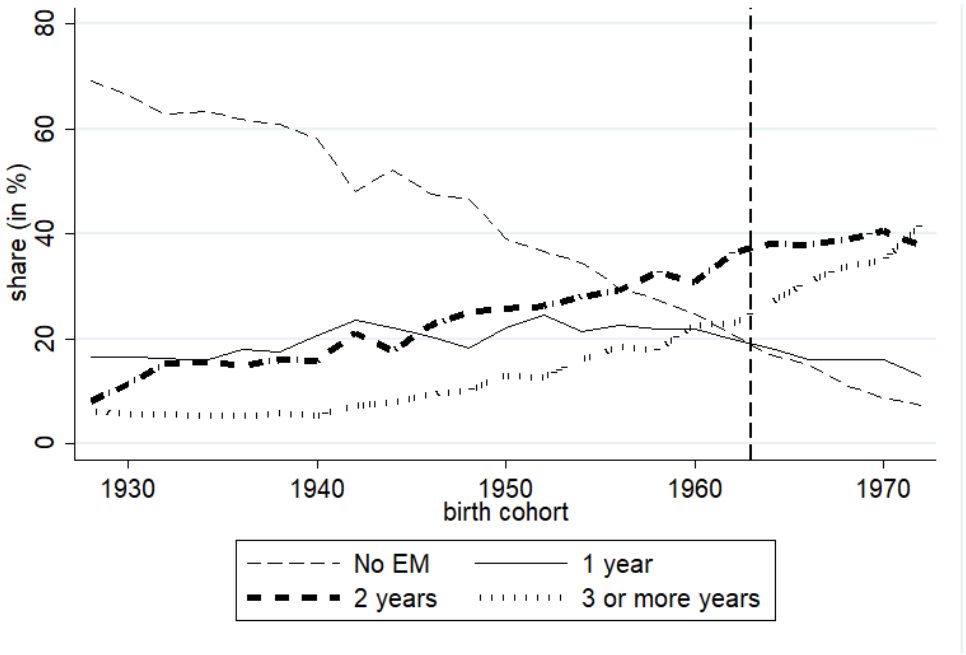
school on cognitive outcomes tends to fade over as children grow up. What persists, however, is the effect on non-cognitive abilities which in turn is reflected by the wages earned when adults. The rest of the paper is organized as follows. Section 2 introduces the institutional background, by describing the trends in pre-school participation in France. Section 3 describes data and empirical strategy. Results are presented in Section 4, while Section 5 concludes.

2 Background

The universal access to EM experienced today in France is the result of a "revolution" occurred in the 1960s, that recognized the importance of school for children's development. The inclusion of a plan for the universal access to EM in the V^e *Plans de Dévelopement économique et sociale* (1966-1970) confirmed the political commitment and awareness of the importance of pre-primary school programs. As response, new pre-schools were opened throughout the French territory. However, the V^e *Plans de Dévelopement économique et sociale* set a rather ambitious goal (i.e. enrollment of 95% of 4-years old children and 80% of children aged 3) given the constraints in the EM expansion and the high level of demand for pre-school access. That target was achieved in the late 1970s (i.e. 1975-1976) with the fall of the birth rate. [3] Figure 1 illustrates the trend of pre-school enrollment by birth cohort and by duration of the EM attendance. Until the mid-1950s, most children either did not access to EM or only attended for a year. The incidence of children attending EM only for one year (solid line) remains quite constant between mid-1950s and early 1960s, before the new EM openings, when maybe the policy-maker decided to guarantee to several children at least one year of EM rather than a longer attendance to a few children. Then, following the implementation of the *Plans de Dévelopement économique et sociale* the share of children attending the full-cycle of pre-school (i.e. 3 years) exhibits a sharp increase which led to the current universal levels.

[3] See Prost (1981) for details.

Figure 1: Participation and duration of pre-school enrollment in France by birth cohort



Note: Data are from the *Formation, Qualification, Profession* (FQP) survey of 1993 and refer to 18332 individuals aged 20-64 (born between 1929-1973), covering nearly 0.1% of the French population.

3 Methodology

3.1 Data

The analysis of this paper relies on three datasets. First, we use the 1993 wave of the FQP (*Formation, Qualification, Profession*) survey, collected by the French national statistical agency. The survey includes 18332 individuals aged 20-64 (i.e. born between 1929-1973), which represent nearly 0.1% of the French population. We focus on cohorts born between mid-1960s early-1970s, which corresponds to the period of the expansion of pre-school enrollment. For these cohorts we have information on the duration of pre-school attendance and the family background (including the department of birth). Panel (a) of Figure 2 shows that the incidence of children attending the full-cycle of pre-school (3 years) doubled from 1963 to 1973. The other panels in Figure 2 show a gradient in the EM exposure by circumstances of origin, that are defined according to the father's socio-professional status. Overall, the incidence of children attending the full-cycle of EM is larger for children from high social-classes (white collar father, panel (d)) rather then

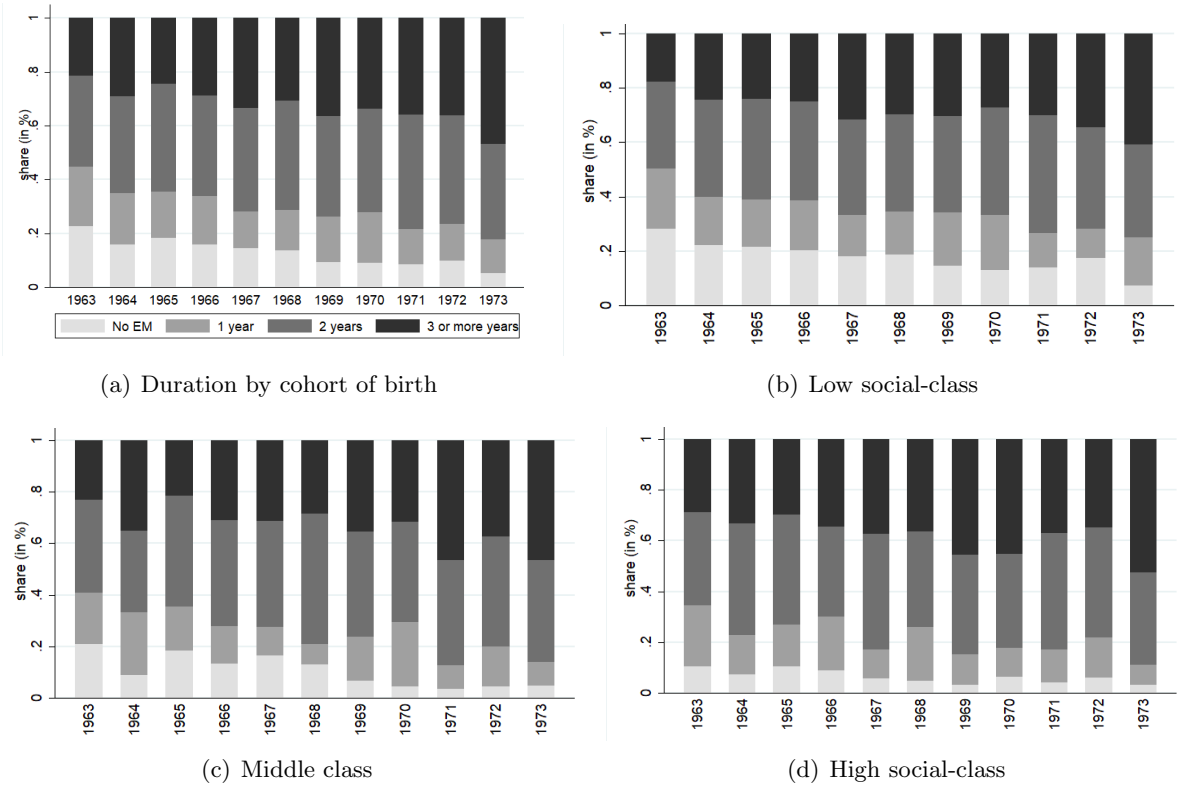
children with intermediate (artisan or non-manual worker father, panel (c)) or low social group (manual worker or farmer father, panel (b)). However, since we are interested in the long-run impact of the exposure to EM, the selected cohorts appears too young in 1993 when the survey is collected.

To gather information on adult outcomes of cohorts born between 1963 and 1973, we use a second data source: the Labor Force Survey (LFS, *Enquête Emploi*) collected by the French national statistical agency for the years 2004, 2006, 2008 and 2010. The LFS is a large representative sample of the French population of age 15 and above, reporting for each individual information on i) monthly earnings after taxes, ii) educational achievements (i.e. years of education and highest degree obtained) and iii) family background (i.e. the socio-professional status of the father at the end of the respondent's mandatory education).[4] We restrict the sample to French male employees with full time jobs. Table 1 reports summary statistics of the two trimmed samples.

The third data source contains a crucial ingredient of our analysis: the number of pre-school operating each year in a given department, which represents the instrumental variable of our empirical strategy. More specifically, we associate to each individual of the FQP and LFS samples the number of pre-schools operating in his department of birth when he was aged 3. By exploiting administrative data, we gather information on the number of EM in each department since 1954. However, Figure 3 shows that we have reliable information only from 1967, when about two-third of departments reported data on the number of operating EM. Therefore, we face the trade-off between cohorts and geography. We decide to focus our analysis on cohorts born from 1964 to 1973, which are associated with the EM supply from 1967 to 1976. This choice represents a good compromise as it allows us to exploit geographic and time variations in the EM supply. In addition, from Figure 4 it is interesting to note that the trend in the EM supply flatten after 1980, therefore the period considered in our analysis corresponds to the most evident and fastest expansion in the EM supply.

[4]LFS sample is a rotating panel, whose rotation frequency is one year and a half (that is after each trimester one-sixth of the sample is replaced), therefore considering the years 2004, 2006, 2008, and 2010 allows dealing in each of these years with a renewed sample.

Figure 2: Pre-school duration by cohort and family background



(a) Duration by cohort of birth

(b) Low social-class

(c) Middle class

(d) High social-class

Note: Author's elaborations based on FQP 1993 data. Social classes are defined according to father socio-professional status. That is, low social class includes manual worker or farmer fathers. Middle class refers to artisan and non-manual workers, while high social class includes white collars.

3.2 Identification strategy

Our identification strategy rests on the temporal and geographical variability in the increase in EM availability to identify the effect of the intensive margins of EM attendance on long term outcomes of treated children.

We combine data on supply of EM at province level to FQP data. EM data report the number of new school opening in year t that children of a given cohort c observe upon entrance to EM, set for convenience at entry age of three, that is when $t = c + 3$. We cluster openings by department of birth of kid, which is the finest scale at which information about place of birth of FQP respondents is provided. We use cohorts 1963-1973 to capture the full period of expansion in EM supply, and exploit geographic variability in openings across departments of residence and cohorts to identify the effects of interest. The forcing variable here is the number

Table 1: Summary statistics: cohorts of birth by survey and family background

Cohort	Sample FQP	Sample LFS
1963	9.98	8.98
1964	9.15	9.22
1965	10.18	9.08
1966	8.76	9.22
1967	7.49	8.63
1968	7.39	8.63
1969	8.71	8.97
1970	8.51	8.84
1971	9.20	9.31
1972	9.34	9.54
1973	11.30	9.57
Total	100.00	100.00
Circumstances		
artisan	47.24	49.81
blue collar	22.39	22.94
white collar	30.37	27.25
Total	100.00	100.00

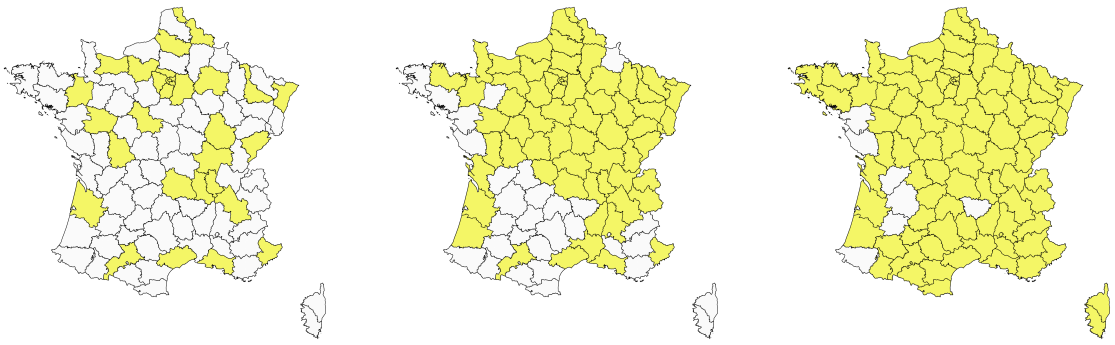
Notes: FQP sample refers to the wave 1993, while the LFS sample includes the waves 2004, 2006, 2008 and 2010. Both samples are restricted to French male employees with full time jobs.

of openings of new facilities which offer EM services. The opening of new public facilities is predominant, which is a consequence of the large budget dedicated to public EM openings by the Vth Plan, passed on early 1960'.

Our focus in on the intensive margin (i.e., years spent in EM) of childcare use. About 90% of children attends EM across the cohorts we consider. A quasi-totality of these attend only one year, at about age 3. Many classes were offered as pre-primary services by primary and secondary educational institutions. Relaxing capacity constraint implies that more institutes start offering a complete EM services, so that more slots are made available for children enterign EM before age 5. As we observe in the data, this leads to a sharp increment in the attendance for the full EM program (three years).

There are three aspects that allow us to conclude that the EM expansion leads to exogenous changes in the intensive margin of EM use. First, the opening of new public facilities is predominant, which is a consequence of the large budget dedicated to public EM openings by

Figure 3: Information on pre-school opening by department



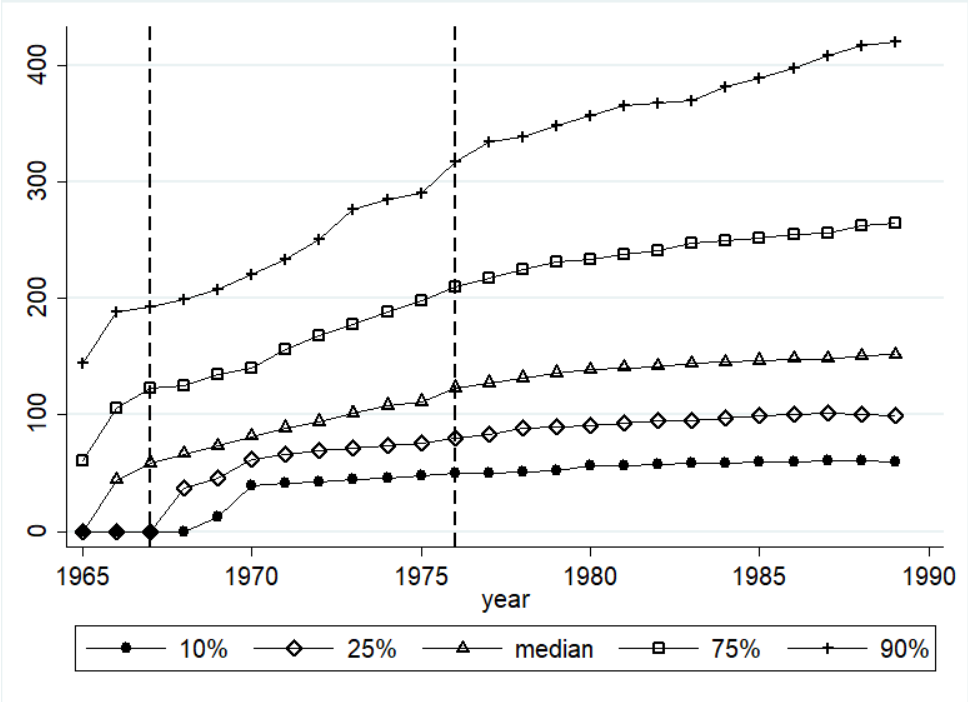
(a) 1965 (b) 1967 (c) 1969

Note: Author's elaborations based on administrative data. White areas correspond to departments with missing information on the number of active EM.

the Vth Plan, passed on early 1960'. The rules of the plan gave priority to place which were in high demand of child-care services in the pre-expansion period. The effects of opening new facilities hence represent a slackening of the supply constraints rather than reflecting a rise in local demand. Furthemore, pre-treatment characteristics of fast expanding muncipalities which may be correlated with excess-demand (such as female employment rates) should be controlled for. Second, the large majority of new openings are from public providers of EM. These providers are heavily regulated by the Ministry of Education and bounded to provide a uniform level of quality across the country. As such, we expect that new EM facilities openings produce effects in terms of EM slots available without affecting the average quality of supplied EM services. Third, the number of new EM facilities openings reflects features of the demographic structure of educational districts they are associated to. As such, each opening increments discontinuously the number of places, the discontinuity being proportional to the demographic size of the treated place.

We rely on a two-sample two-Stages procedure (Angrist 1990, Angrist and Krueger 1992, Björklund and Jäntti 1997) that combines first stage estimates of the effects of EM openings

Figure 4: Pre-school supply



Note: Author's elaborations based on administrative data.

on EM intensive margins estimated on FQP93 for selcted cohorts on the long term educational and earning outcomes of comparable individuals when old, that we gather from repeated waves of the Frence LFS.

We use a 2S2SLS estimator with bootstrapped errors based on joint first and second stage resampling. Our preferred model is specified as follows. First stage estimates are based on the following equation,

$$EM_{icd} = \alpha_0 + \alpha_1 IV_{d,c+3} + \boldsymbol{\alpha}_2 \cdot \mathbf{G}_i + \boldsymbol{\alpha}_3 \cdot \mathbf{x}_{icd} + \delta_c + \sum_{j=1}^{4} \mu_j c^j + \delta_d + \sum_d \gamma_d c + \varepsilon_{icd}, \qquad (1)$$

for an individual i of cohort c and born in department d. The response variable, EM, can either be an indicator taking value 1 if i takes on at least three years of EM, 0 otherwise; or it captures the years of EM attained by individual i, with $EM_{icd} \in \{0, 1, 2, 3\}$. We use the aggregate supply of EM facilities at department level offered in year $c + 3$ as an instrumental variable, denoted $IV_{d,c+3}$. The model also control for parental background characteristics, defining three groups

G1 for low social class (farmer or manual worker), G2 middle social class (blue collar), G3 high social class (white collar). We construct an indicator variable for each of these categories, which we collect in the vector $\mathbf{G}_i$. Additional control for individual characteristics and pre-treament characteristics at cohort and municipality level are collected in vector $\mathbf{x}_{icd}$. The model is expanded with cohort and department of birth fixed effects, so that identifying variation measures effects within cohort and place of birth. We also control for aggregate trends in EM take-up across cohorts and places with a fourth degree polynomial expansion of cohort trends (c^j) and department specific cohort trends.

We use first stage estimates to predict EM attendance for a comparable set of individuals in the French LFS sample. Notice that EM participation is assessed using FQP93 gathers adult individuals in 1993, whereas LFS gathers information on comparable individuals since 2004. Let denote these predictions $\hat{EM}_{icdt}$, which depend on the same regressors, trend and fixed effects identified in the first stage and are controlled for in the second stage. Furthermore, predictions are independently obtained for each LFS year, since LFS is a repeated cross-section of independently drawn individuals from the relevant cohort groups. Cohorts trends and survey period trends, indexed by t, are useful for controlling for cohort compositional changes.

The second stage equation allows to identify the effect of rising intensive margins of EM attendance on a variety of long-term outcomes by the following model:

$$Y_{icdt} = \beta_0 + \beta_1 \hat{EM}_{icdt} + \boldsymbol{\beta}_2 \cdot \mathbf{G}_i + \boldsymbol{\beta}_3 \cdot \mathbf{x}_{icdt} + \theta_c + \sum_{j=1}^{4} \pi_j c^j + \theta_d + \sum_{d} \rho_d c + \theta_t + \theta_{tc} + \sum_{j=1}^{4} \sigma_j t^j + \ni_{icdt}, \quad (2)$$

where Y is an outcome among LFS annual earnings (in ln, trimmed at top-bottom 1%), the quantiles of earnings, years of education, dummies for level of education. Model (2) extend the first stage by considering survey year t fixed effects (also by cohort of birth) and polynomial trends.

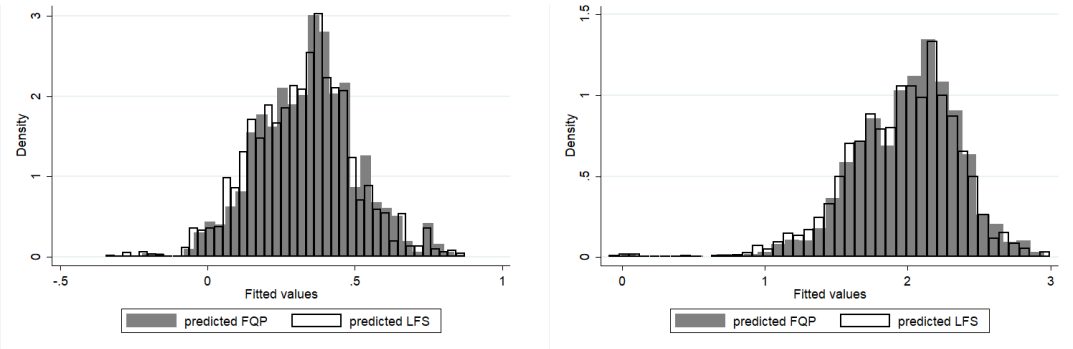
Our effects of interest are β_1, which we estimate for each outcome Y separately and for various specifications of the estimating equations.

4 Results

Table 2 report first stage coefficients of model 1, using the number of working EM in the department as instrument. Our identification relies on the geographic and temporal variation in the expansion of EM across department over the period 1967-1976. Controlling for father socio-economic status, cohort of birth and temporal (cohort) and geographical (department) fixed effects, we find that more pre-school opening (i.e. increase in the number of working EM) raise the duration of EM attendance, both in terms of probability to attend the full-cycle (i.e. three years vs less, columns 1-4 in Table 2) or in terms of years of preschool (i.e. from 0 to 3 years, columns 5-8 in Table 2). We present different variants on model 1, reflecting the trade-off between cohorts and geography due to the quality of administrative data on pre-schools. Our preferred estimates correspond to columns 2 and 6 of Table 2 and consider the information on the department number of pre-schools since 1967, when about two-third of the mainland French departments report reliable information. We then use data on the LFS to produce estimates of EM attendance based on coefficients of models 2 and 6 of Table 2. Figure 5 shows that projections of estimated EM participation on FQP and LFS samples match closely. The second stage coefficients of model 2 are reported in Tables 3, 4, 5. More specifically, Tables 3 shows the effect of EM on adult wages. Obtained results reveal that pre-school more exposure to EM has a positive effect on adult wages. On average, the effect is larger when pre-school participation is defined as a dummy (column 1) than as years of preschool (column 6). In addition, we find that the effect is heterogeneous within the wages distribution, with the upper tail (top 20 percentiles) experiencing a significant improvement. Table 4 presents evidence of the effect of pre-school duration on adult wages, taking into account the interaction between EM participation and family background. On average the positive effect on adult wages is confirmed when the endogenous variable is defined as years of pre-school (column 6), but it is interesting to note that children with blue collar fathers (circumstance 2, G2) benefit more than children from other backgrounds of origin. Lastly, we do not find any significant effect of EM participation on education outcome. This evidence seems to support the idea that the impact of pre-school on cognitive abilities disappear as children grow up. However, the effect on non-cognitive skills is

more persistent and materialize when children enter the labor market when adults.

Figure 5: Projections of first stage estimated EM



(a) Full-cycle of EM

(b) Duration (years) of EM

Note: Predictions are based on estimated coefficients of models 2 and 6 of Table 2, where the endogenous variable is defined respectively as a dummy for full-cycle of EM (panel a) or the number of years of pre-school (panel b).

5 Conclusion

TO BE COMPLETED

In this paper we analyze the impact of pre-school participation on adults outcome. We look at the French experience of the *École Maternelle*, one of the largest, universal, highly subsidized pre-primary education programs worldwide, and exploit time and geographic variation in the EM supply as source of identification. We find evidence that a longer exposure to EM (i.e. full-cycle attendance or number of years) has a positive impact on adult wages. On average this effect is around 9%, however we find that the effect is heterogeneous both within the income distribution and between social groups. In particular, the impact of EM duration seems to be concentrated in the upper tail (top 20 percentiles) of the income distribution and to benefit children from intermediate family background (i.e. blue collar father). We do not find effect of EM on schooling outcomes. This evidence suggests that pre-participation has only a short-run effect on cognitive skills, which disappear as children grow up. The effect on adult wages, indeed, seems to reflect an impact of pre-school on non-cognitive skills. Overall, obtained results tend to confirm the equalizing role of pre-school. Although external validity of results is problematic,

this paper could be useful in driving widespread investment in early care programs in other context where child potential is often neglected.

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Dependent Variable	3 years of pre-school or less(0-2)				Duration of pre-school (0-3 years)			
	1966	**1967**	1968	1969	1966	**1967**	1968	1969
	(1)	**(2)**	(3)	(4)	(5)	**(6)**	(7)	(8)
N. of EM (IV)	0.001*	**0.001***	0.001**	0.002**	0.001	**0.002****	0.003**	0.003*
	(0.00)	**(0.00)**	(0.00)	(0.00)	(0.00)	**(0.00)**	(0.00)	(0.00)
Circ.2 (G2)	-0.016	**0.003**	0.000	0.007	0.013	**0.064**	0.078	0.127*
	(0.04)	**(0.04)**	(0.03)	(0.04)	(0.07)	**(0.06)**	(0.07)	(0.07)
Circ.3 (G3)	0.072**	**0.087****	0.087**	0.103**	0.165**	**0.212****	0.232**	0.255**
	(0.03)	**(0.03)**	(0.03)	(0.03)	(0.05)	**(0.05)**	(0.06)	(0.06)
Cohort controls	y	**y**	y	y	y	**y**	y	y
Department (birth) fe	y	**y**	y	y	y	**y**	y	y
Cohort fe	y	**y**	y	y	y	**y**	y	y
Interactions controls	y	**y**	y	y	y	**y**	y	y
N. of obs.	1456	**1496**	1430	1322	1456	**1496**	1430	1322
R-squared	0.121	**0.123**	0.130	0.152	0.130	**0.148**	0.158	0.176
Root MSE	0.460	**0.460**	0.462	0.461	0.879	**0.887**	0.883	0.875

Table 2: **First stage: Endogenous var. = full cycle pre-school vs less; duration of pre-school. IV = n. of pre-schools.**
Note: Endogenous variable is: (i) a dummy indicating the attendance of the full cycle of pre-school (i.e.3 years vs less). This dummy is equal to one with three years of pre-school and zero otherwise (models 1-4). (ii) The duration of the pre-school attendance (i.e. from 0 to 3 years, models 5-8). The instrument is the department number of pre-schools in a given year. The observations of each model are from FQP 1993 and refer to french male born in mainland french department between 1963-73. We exclude departments with zero pre-schools. The year associated with each model corresponds to the year of pre-school supply, (i.e. when respondents were aged 3.) Circumstances are defined according to father's SES: *Circ. 1* (omitted category) if father was a farmer or a manual worker; *Circ. 2* if the father was an artisan or non-manual worker; *Circ. 3* if the father was executive or professional. Standard errors, clustered on departments of birth, in parenthesis. Cohort controls include cohort of birth up to order four, while interactions refer to cohort of birth and birth region.
Significance levels: * = 10% and ** = 5%.

Dependent Variable	3 years of pre-school or less(0-2)					Duration of pre-school (0-3 years)				
	Wage (log)	D20	D40	D60	D80	Wage (log)	D20	D40	D60	D80
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fitted (dummy)	0.152*	0.085	0.097	0.173	0.225**					
	(0.08)	(0.08)	(0.09)	(0.12)	(0.09)					
Fitted (years)						0.093**	0.041	0.081*	0.084	0.118**
						(0.04)	(0.04)	(0.05)	(0.05)	(0.04)
Circ.2 (G2)	0.106**	0.062**	0.113**	0.133**	0.085**	0.100**	0.060**	0.109**	0.128**	0.078**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Circ.3 (G3)	0.234**	0.122**	0.242**	0.268**	0.188**	0.227**	0.120**	0.233**	0.265**	0.182**
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)
Cohort controls	y	y	y	y	y	y	y	y	y	y
Department (birth) fe	y	y	y	y	y	y	y	y	y	y
Region (residence) fe	y	y	y	y	y	y	y	y	y	y
Cohort fe	y	y	y	y	y	y	y	y	y	y
Survey fe	y	y	y	y	y	y	y	y	y	y
Interactions controls	y	y	y	y	y	y	y	y	y	y
N. of obs.	11862	11862	11862	11862	11862	11862	11862	11862	11862	11862
R-squared	0.194	0.061	0.102	0.122	0.119	0.194	0.061	0.102	0.122	0.119
Root MSE	0.350	0.387	0.467	0.463	0.376	0.350	0.387	0.467	0.463	0.376

Table 3: **Second stage: Effect of pre-school on adult wages.**

Note: Endogenous variable is: (i) a dummy indicating the attendance of the full cycle of pre-school (i.e.3 years vs less). This dummy is equal to one with three years of pre-school and zero otherwise. (ii) The duration of the pre-school attendance. The instrument is the number of department pre-schools when respondent was aged 3. The observations of each model are from LFS 2004, 2006, 2008, 2010 and refer to french male born in mainland french department between **1964-73**. We exclude departments with zero pre-schools and respondents with monthly wage in the top(bottom) percentile. Circumstances are defined according to father's SES: *Circ. 1* (omitted category) if father was a farmer or a manual worker; *Circ. 2* if the father was an artisan or non-manual worker; *Circ. 3* if the father was executive or professional. Standard errors, clustered on departments of birth, in parenthesis. Cohort controls include cohort of birth up to order four. Interactions refers both to survey - regions and cohort - regions controls.
Significance levels: * = 10% and ** = 5%.

Dependent Variable	3 years of pre-school or less(0-2)					Duration of pre-school (0-3 years)				
	Wage (log)	D20	D40	D60	D80	Wage (log)	D20	D40	D60	D80
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fitted (dummy)	0.140	0.064	0.070	0.194	0.205**					
	(0.10)	(0.10)	(0.12)	(0.15)	(0.10)					
Fitted (dummyXcirc2)	0.163**	0.169**	0.217**	0.148*	0.173*					
	(0.08)	(0.08)	(0.09)	(0.08)	(0.10)					
Fitted (dummyXcirc3)	-0.045	-0.015	-0.062	-0.123	-0.052					
	(0.09)	(0.09)	(0.11)	(0.11)	(0.10)					
Fitted (years)						0.087*	0.017	0.098	0.113	0.101**
						(0.05)	(0.05)	(0.06)	(0.07)	(0.05)
Fitted (yearsXcirc2)						0.118**	0.108**	0.115**	0.110**	0.133**
						(0.04)	(0.03)	(0.04)	(0.04)	(0.06)
Fitted (yearsXcirc3)						-0.031	0.027	-0.089	-0.122	-0.005
						(0.11)	(0.11)	(0.14)	(0.14)	(0.12)
Circ.2 (G2)	0.055**	0.010	0.047	0.088**	0.031	-0.131	-0.151**	-0.119	-0.089	-0.182*
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.09)	(0.07)	(0.08)	(0.08)	(0.11)
Circ.3 (G3)	0.253**	0.129**	0.269**	0.316**	0.211**	0.296	0.068	0.424	0.524*	0.197
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.23)	(0.24)	(0.30)	(0.29)	(0.25)
Cohort controls	y	y	y	y	y	y	y	y	y	y
Department (birth) fe	y	y	y	y	y	y	y	y	y	y
Region (residence) fe	y	y	y	y	y	y	y	y	y	y
Cohort fe	y	y	y	y	y	y	y	y	y	y
Survey fe	y	y	y	y	y	y	y	y	y	y
Interactions controls	y	y	y	y	y	y	y	y	y	y
N. of obs.	11862	11862	11862	11862	11862	11862	11862	11862	11862	11862
R-squared	0.194	0.062	0.102	0.122	0.120	0.195	0.062	0.102	0.122	0.120
Root MSE	0.350	0.387	0.467	0.463	0.375	0.350	0.387	0.467	0.463	0.375

Table 4: **Second stage: Effect of pre-school on adult wages.**

Note: Endogenous variable is: (i) a dummy indicating the attendance of the full cycle of pre-school (i.e.3 years vs less). This dummy is equal to one with three years of pre-school and zero otherwise. (ii) The duration of the pre-school attendance. The instrument is the number of department pre-schools when respondent was aged 3. The observations of each model are from LFS 2004, 2006, 2008, 2010 and refer to french male born in mainland french department between **1964-73**. We exclude departments with zero pre-schools and respondents with monthly wage in the top(bottom) percentile. Circumstances are defined according to father's SES: *Circ. 1* (omitted category) if father was a farmer or a manual worker; *Circ. 2* if the father was an artisan or non-manual worker; *Circ. 3* if the father was executive or professional. Standard errors, clustered on departments of birth, in parenthesis. Cohort controls include cohort of birth up to order four. Interactions refers both to survey - regions and cohort - regions controls.
Significance levels: * = 10% and ** = 5%.

Dependent Variable	3 years of pre-school or less(0-2)					Duration of pre-school (0-3 years)				
	Edu. (yrs)	Less BAC	BAC	BAC+2	BAC+5	Edu. (yrs)	Less BAC	BAC	BAC+2	BAC+5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fitted (dummy)	-0.609	-0.037	0.040	-0.020	0.038					
	(0.61)	(0.09)	(0.05)	(0.06)	(0.07)					
Fitted (years)						-0.114	-0.022	0.009	-0.014	0.049
						(0.28)	(0.04)	(0.03)	(0.03)	(0.03)
Circ.2 (G2)	1.060**	-0.194**	0.033**	0.059**	0.039**	1.065**	-0.193**	0.033**	0.060**	0.036**
	(0.07)	(0.01)	(0.01)	(0.01)	(0.01)	(0.06)	(0.01)	(0.01)	(0.01)	(0.01)
Circ.3 (G3)	2.622**	-0.400**	0.010	0.102**	0.140**	2.593**	-0.398**	0.012	0.103**	0.133**
	(0.07)	(0.01)	(0.01)	(0.01)	(0.01)	(0.07)	(0.01)	(0.01)	(0.01)	(0.01)
Cohort controls	y	y	y	y	y	y	y	y	y	y
Department (birth) fe	y	y	y	y	y	y	y	y	y	y
Region (residence) fe	y	y	y	y	y	y	y	y	y	y
Cohort fe	y	y	y	y	y	y	y	y	y	y
Survey fe	y	y	y	y	y	y	y	y	y	y
Interactions controls	y	y	y	y	y	y	y	y	y	y
N. of obs.	20652	20689	20689	20689	20689	20652	20689	20689	20689	20689
R-squared	0.175	0.181	0.018	0.031	0.083	0.175	0.181	0.018	0.031	0.084
Root MSE	3.022	0.455	0.339	0.347	0.273	3.022	0.455	0.339	0.347	0.273

Table 5: **Second stage: Effect of pre-school on schooling outcomes.**

Note: Endogenous variable is: (i) a dummy indicating the attendance of the full cycle of pre-school (i.e.3 years vs less). This dummy is equal to one with three years of pre-school and zero otherwise. (ii) The duration of the pre-school attendance. The instrument is the number of department pre-schools when respondent was aged 3. The observations of each model are from LFS 2004, 2006, 2008, 2010 and refer to french male born in mainland french department between **1964-73**. We exclude departments with zero pre-schools and respondents with monthly wage in the top(bottom) percentile. Circumstances are defined according to father's SES: *Circ. 1* (omitted category) if father was a farmer or a manual worker; *Circ. 2* if the father was an artisan or non-manual worker; *Circ. 3* if the father was executive or professional. Standard errors, clustered on departments of birth, in parenthesis. Cohort controls include cohort of birth up to order four. Interactions refers both to survey - regions and cohort - regions controls.
Significance levels: * = 10% and ** = 5%.