

The Impact of Early Childhood Care and Education on Maternal Employment in Jordan

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Abstract

Globally, women's employment rates decline with family formation, due to their disproportionate unpaid care responsibilities. Policies and services such as early childhood care and education (ECCE) can potentially reduce care responsibilities for mothers, increasing their employment rates. This paper examines the impact of ECCE on mothers' employment outcomes in Jordan, a context with very low rates of female employment. Analyses rely on a regression discontinuity design, namely age cutoffs that drive eligibility for the first grade of kindergarten (age 4), the second grade of kindergarten (age 5), and basic schooling (age 6). The results reveal no significant changes in mothers' employment or other labor-market outcomes across age groups, and no heterogeneous effects by mothers' or fathers' education, region, or travel time to school. The results remain robust under a range of alternative specifications. Our findings suggest that ECCE is not guaranteed to increase women's employment rates in low employment rate contexts.

Keywords: Early childhood care and education, employment, gender, Jordan

JEL Classifications: J21, J16, I25

ملخص

تنخفض معدلات تشغيل المرأة على الصعيد العالمي، مع تكوين الأسرة، بسبب مسؤولياتها غير المتناسبة في مجال الرعاية غير مدفوعة الأجر. ومن المحتمل أن تؤدي السياسات والخدمات مثل رعاية الطفولة المبكرة والتعليم (ECCE) إلى تقليل مسؤوليات الرعاية للأمهات، مما يزيد من معدلات تشغيلهن. تبحث هذه الورقة في تأثير رعاية الطفولة المبكرة على نتائج تشغيل الأمهات في الأردن، وهو سياق يتميز بمعدلات منخفضة للغاية من تشغيل الإناث. تعتمد التحليلات على تصميم انقطاع الانحدار، أي الحدود العمرية التي تحدد الأهلية للصف الأول من رياض الأطفال (4 سنوات)، والصف الثاني من رياض الأطفال (5 سنوات)، والتعليم الأساسي (6 سنوات). وتكشف النتائج عن عدم وجود تغييرات كبيرة في تشغيل الأمهات أو نتائج سوق العمل الأخرى عبر الفئات العمرية، وعدم وجود تأثيرات غير متجانسة من حيث تعليم الأمهات أو الآباء، أو المنطقة، أو وقت السفر إلى المدرسة. وتظل النتائج قوية في ظل مجموعة من المواصفات البديلة. تشير النتائج التي توصلنا إليها إلى أنه ليس من المضمون أن تؤدي رعاية الطفولة المبكرة والتعليم إلى زيادة معدلات تشغيل المرأة في سياقات معدلات التشغيل المنخفضة.

1. Introduction

Globally, there are strong, gendered life cycle patterns to employment, with women experiencing drops in employment at marriage and with childbearing (Kleven et al. 2025). Achieving gender parity in employment will require policies and practices that eliminate this motherhood employment penalty. One such potential policy is early childhood care and education (ECCE), which marketizes childcare responsibilities. In a review of ECCE impact evaluations using rigorous methods in low- and middle-income countries, 21 of the 22 studies reviewed found positive impacts on maternal labor market outcomes (Halim et al. 2023). The one study that did not show a positive impact was the context with the lowest baseline employment (Medrano 2009). Subsequent studies from other low employment contexts in the Middle East and North Africa (MENA), including Egypt and Algeria, have demonstrated that the increased availability of ECCE services does not improve women's labor market outcomes in the region (Krafft and Li 2024; Krafft and Lassassi 2024; Caria et al. 2025).

The MENA region has the lowest female labor force participation (FLFP) rates in the world, despite rising female educational attainment (Assaad et al. 2020; Gatti et al. 2025). Jordan exemplifies this pattern, with a FLFP rate that is the second lowest in the world (ILOSTAT 2025), estimated in 2025 at 15% (Krafft, Assaad, and Abushehab 2026). While 20% of single women in Jordan are employed, only 9% of those with a child aged 3-5 are employed (Krafft, Assaad, and Abushehab 2026). Jordanian women often exit the labor market at or in anticipation of marriage (Assaad et al. 2022; Selwaness and Krafft 2021). Policymakers view ECCE as a potential solution to these challenges. For instance, Jordan began substantially expanding Kindergarten 2 (KG2) in 2021, with a goal for it to become universal by 2025 (Ministry of Education 2018).

Our research question is whether ECCE relaxes childcare constraints for Jordanian mothers, allowing them to work. The 2025 Jordan Labor Market Panel Survey (JLMPS) gives us the opportunity to answer this question, focusing on KG1 (age 4), KG2 (age 5), and the start of basic schooling (age 6). Using the age eligibility cutoff for each grade, we apply a fuzzy regression discontinuity design (FRDD) to study the effects of children's ECCE enrollment on their mother's employment.

Our results show no impact of ECCE on maternal employment at age 4 (KG 1), age 5 (KG2), or age 6 (basic schooling). The effects are robust across specifications. Therefore, increasing the availability of ECCE services may not be sufficient to guarantee increases in women's employment rates in low employment contexts. Previous research suggests that increased access to ECCE services has increased mother's employment in other developing countries (Halim et al. 2023). However, MENA evidence is otherwise, with ECCE expansions showing no effect, or even negative effects on mother's employment (Krafft and Li 2024; Krafft and Lassassi 2024; Caria et al. 2025). To our knowledge, this study performs the first causal test of the effect of ECCE

enrollment on mother's employment in Jordan, contributing to the regional literature and informing policymakers on the effect of ECCE on female labor force participation.

2 Background

2.1. Women's labor force participation in Jordan

Jordan, as of 2025, had a 15% FLFP rate (Krafft, Assaad, and Abushehab 2026). This low rate is despite Jordanian women being on average more educated than men. The female employment rate is around 10%, and the female unemployment rate is 37% (Krafft, Assaad, and Abushehab 2026). Due to gendered occupational segregation, women are concentrated in the education and health sectors (Assaad and Khraise 2026). In addition, childcare constraints and gender norms continue to limit women's private-sector work options, especially for mothers of young children, who face high caregiving burdens (Assaad et al. 2022; Economic Research Forum and UN Women 2020; Gauri et al. 2019).

2.2. ECCE in Jordan

The term ECCE covers ages 0-8 globally (UNESCO 2025). In Jordan, ECCE for children under four is provided through nurseries (Ghawi et al. 2018; World Bank 2024a). Pre-primary education that is part of the school system in Jordan covers KG1 (offered only through private Kindergartens) and KG2 (offered through the private and public system), targeting children aged 4–5 (UNICEF and Ministry of Education (Jordan) 2020). Since 2021, Jordan has also been investing substantially in expanding KG2, with a push to achieve compulsory, universal enrollment in KG2 by 2025 (Ministry of Education 2018). Enrollments in KG2 are expanding but still far from universal, having increased from 57% in 2018 to 65% in 2025 (World Bank 2024b). Assessing whether these ECCE policies increase FLFP is critically important to understanding their impact and value.

3. Data

3.1. Jordan Labor Market Panel Survey 2025

The JLMPS 2025 is the third wave of a nationally-representative panel survey, with 2010 and 2016 as the two preceding waves (Krafft, Assaad, and Ragab 2026; OAMDI 2026). In each wave, the survey tracks households interviewed in the previous wave, any split households that emerged from them, and adds a nationally representative refresher sample. Weights account for the sample design, non-response, and attrition and are used throughout our analyses.⁵ The household survey collects data on all household members and includes individual interviews for those aged six and

⁵ See Krafft, Assaad, and Ragab (2026) for the construction of the weights.

older. A variety of topics were covered in the individual questionnaires, but for the purpose of this study we focus on the employment and education modules. Given the age restriction on the individual questionnaires, the household roster covers children's education for individuals aged younger than six. This study uses the 2025 JLMPS, as it was the first wave to collect data on ECCE. The full 2025 JLMPS sample includes 42,012 individuals spread across 9,884 households, although, as mentioned below, we use subsets of the sample in specific analyses. The key population of interest is the universe of mothers in Jordan with children eligible to attend ECCE.

3.2. Outcomes

The key outcome of interest is a binary variable for whether the child's mother is employed or not. The employment module refers to the individual's market work within the three months preceding the interview. As secondary outcomes, we explore whether the mother is unemployed (wanting to work, available to start within two weeks, and searching for work, versus all else⁶) and whether the mother is in the labor force (employed or unemployed, versus out of the labor force). We also explore wage work (versus all other states, including non-wage work and non-employment), non-wage work, private sector work, public sector work, working inside the house, and working outside the house (each versus all other states). Because ECCE may be particularly reconcilable with working as a teacher, we examine whether the primary job is in the education sector (versus all else) as well as whether the primary occupation is a teacher (versus all else). To assess whether women are entering new jobs, we measure whether the mother started her current job in 2024 or 2025 (versus all else). We examine outcomes of hours of work per week (zero if not employed) and log monthly as well as log hourly wages from all jobs (primary and secondary jobs, wages set to 0.001 if not employed). We draw on the 24-hour diary time use module of the JLMPS, which gives time spent in 15-minute increments for primary and secondary activities, to estimate time spent in indirect care, direct care, and total care hours,⁷ as well as employment hours from the time use module (all in hours per day).

3.3. Key covariate: early childhood care and education

ECCE is generally defined to cover a broad age range (from birth to age eight (UNESCO 2025)). There are not, however, clear cutoffs for eligibility for all ages, such as for nursery care, in the context of Jordan. Therefore, to be able to identify the impact of ECCE in an RDD framework, this work focuses on the impact of children's pre-primary enrollment (KG1, KG2) and basic school enrollment (grade 1) on their mother's employment. The education of children aged six or older is

⁶ We compare outcomes such as unemployment to "all else" in order to avoid conflating compositional changes with outcome changes. For example, if we restricted unemployment to those in the labor force, if there was no change in unemployment relative to the population, but a change in employment, unemployment would shift as a share of the labor force due to changes in employment – not unemployment.

⁷ Total care hours are not always the sum of direct and indirect, since with secondary activities the two can overlap.

covered in the individual questionnaire, which inquires whether an individual has ever been to school, and if so, the highest level entered. Within the response options, pre-primary/kindergarten or basic schooling⁸ are coded as ECCE (versus all other states). The education of children under six is covered by a question in the roster as to whether they attend a school, nursery, childcare, or kindergarten, and if yes, the type, where responses include public and private KG2, or private KG1, or school, all of which are coded as ECCE (for consistency with the individual questionnaire, nursery or no care are not coded as ECCE). Analyses focus on the binary key covariate of ECCE (either pre-primary/kindergarten or basic schooling, based on the roster or individual questionnaire). In a sensitivity analysis we look at “all” ECCE, including other types of ECCE in the roster for children under six. Children aged six and older are only asked about school, so their status remains unchanged in the “all” ECCE analyses.

3.4. Control variables

Control variables are included only in a sensitivity analysis, since balance tests indicate limited differences between the treatment and control groups around the RDD cutoff (balance shown in Table 5, Table 6, and Table 7 in the appendix). The variables we test for balance and use as controls in sensitivity analyses are household location (region) and the mother’s characteristics: her education level, age group, being ever married, and whether her husband is present in the household. We also control for characteristics of the mother’s spouse (typically the child’s father), specifically his education level and age group (with categories for spouse absent so that the sample is not reduced). Furthermore, we control for whether the mother was working in 2023 as well as the travel time to the nearest basic school, in minutes. All of these variables could potentially impact both women’s employment and use of ECCE.

4. Methods

4.1. Regression discontinuity design

This paper employs an RDD, using age cutoffs that allow children to be eligible for KG or basic school entry (Ghaith 2021; Reynolds et al. 2024). According to government regulations, children are eligible to begin KG1 in the academic year in which they turn four by December 31. For example, children who turn four by December 31, 2025, are eligible to begin KG1 in the 2025-2026 school year (fall of 2025).⁹ Likewise, children are eligible to begin KG2 in the academic year in which they turn five by December 31. Similarly, children are eligible for grade 1 of basic school

⁸ Although Jordan historically had separate primary, preparatory (lower secondary), and (upper) secondary the system during our study period was basic (grades 1-10) and (upper) secondary (grades 11-12).

⁹ These children are not necessarily yet four at the start of the school year, e.g., if the school year starts September 1, they could be 3 years and 8 months at that time and still be eligible.

if they turn six by December 31 of the academic year.¹⁰ The JLMPS 2025 questionnaire asks the month and year of birth but not the exact day. Because the policy cutoff is December 31, this limitation does not affect the identification strategy’s validity; the cutoff is defined based on birth year. Analyzing all three thresholds allows us to compare the effects of KG1 enrollment, KG2 enrollment, and entry into basic school on maternal employment.

The empirical design focuses on children whose age falls within six months (the bandwidth) on either side of each grade’s cutoff. Children are thus in at most only one analysis sample, which we refer to as the age four group, the age five group, or the age six group, based on which cutoff bandwidth they fall within given their birthdate. Note that this “age” group is not necessarily their age at time of fielding. The assignment variable is defined as age in years relative to the cutoff, normalized to zero at the threshold, with nonnegative values for children who meet the cutoff and negative values for those who do not. Using household roster information on the line numbers of their mothers, children’s enrollment status is linked to their mothers, yielding analysis samples of 939 mothers around the KG1 cutoff, 1,101 mothers around the KG2 cutoff, and 760 mothers around the basic school cutoff.¹¹

In practice, not all families comply exactly with the enrollment rules—some children start earlier or later than their assigned year or do not attend ECCE at all. This imperfect compliance motivates the use of a fuzzy regression discontinuity design (FRDD) (Lee and Lemieux 2010; Imbens and Lemieux 2008), which uses the ratio of the change in an outcome to the change in the probability of ECCE to calculate the impact of ECCE. Specifically, let X_i denote the child’s age relative to the cutoff c , $D_i=1[X_i\geq c]$ the eligibility indicator for being above the cutoff, T_i the observed ECCE (treatment) status, and Y_i the outcome (e.g., mother’s employment).¹² The probability of ECCE is modeled in a first stage of estimation as a function of age with a discrete shift at the cutoff:

$$T_i = \alpha + f(X_i - c) + \beta D_i + \varepsilon_i$$

Here, $f(\cdot)$ is a polynomial functional form, one allowing differential trends by child age on either side of the threshold. The discontinuity in predicted enrollment at the cutoff is captured by β , giving the magnitude of the jump at the cutoff. If β is not statistically significant, the identification strategy does not work.

The second stage estimating the causal effect of enrollment on maternal employment is:

¹⁰ Since the JLMPS 2025 was fielded during the 2024-2025 school year, children born in 2020 were eligible for KG1, those born in 2019 were eligible for KG2, and those born in 2018 were eligible for basic school.

¹¹ If a mother has more than one child in an age group (e.g., twins), the youngest or lowest ranked in the roster is used to define the ECCE variable for the mother.

¹² Notation here is similar to Krafft and Li (2024).

$$Y_i = \gamma + g(X_i - c) + \tau T_i + v_i$$

where $g(\cdot)$ is a polynomial functional form, which can vary on each side of the cutoff, and τ captures the local average treatment effect after instrumenting for T_i using the first stage.¹³

To avoid overfitting near the threshold, only constant, linear, or quadratic specifications are considered (Gelman and Imbens 2019). The preferred functional form is selected based on the model with the smallest Akaike Information Criterion (AIC) from the reduced form model (Lee and Lemieux 2010):

$$Y_i = \gamma + g(X_i - c) + \tau D_i + v_i$$

Here, τ represents the intent-to-treat effect of eligibility on maternal outcomes.

The analysis effectively compares outcomes for children just above and just below the threshold, who are assumed to be otherwise similar. For the design to yield credible causal estimates, two identifying assumptions should hold. First, households should not be able to precisely manipulate a child's reported age relative to the December 31 cutoff. This assumption can be tested using density checks of children's ages around the cutoff for the relevant groups (ages four, five, and six). Second, families immediately above and below the threshold should be otherwise comparable in their background characteristics. This assumption is evaluated through balance tests on pre-determined attributes of mothers and their spouses—such as age and education.

4.2. Heterogeneity analyses

The impact of ECCE enrollment on maternal labor market outcomes may vary across households. In this study, we examine heterogeneity along four dimensions that are particularly relevant in the Jordanian context: maternal education, spousal education, geographic location, and travel time to the nearest public basic school. Maternal and spousal education (higher education versus other levels) capture differences in employment opportunities, household income, and preferences that may shape maternal labor supply responses to childcare access. Geographic location (the capital Amman versus elsewhere) reflects regional disparities in labor market conditions and service availability, while travel time (above or below the median) to the nearest school proxies for the effective accessibility of childcare. We conduct subgroup analyses along these dimensions to assess whether the effects of ECCE enrollment differ across households within the FRDD framework.

¹³ Local non-parametric estimates using a rectangular kernel (recommended (Imbens and Lemieux 2008; Lee and Lemieux 2010)) are equivalent to two-stage least squares instrumental variables approaches when using the same bandwidth.

4.3. Sensitivity analyses for FRDD

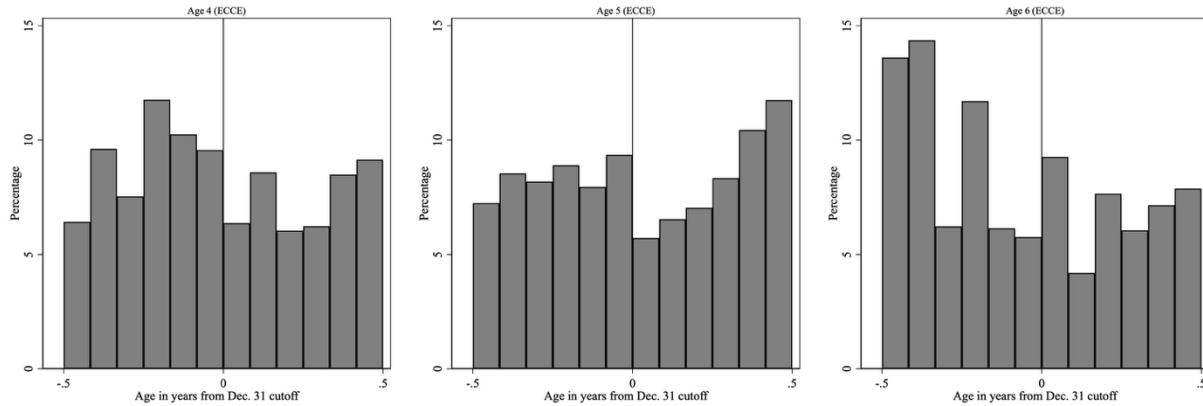
Several robustness checks are conducted to assess the validity of the findings. First, the reduced-form estimates are presented. Second, the bandwidth is narrowed from six to three months to examine the robustness of estimates to different bandwidths. Third, although covariates are not required for identification when they are balanced, models including covariates are also estimated to assess whether their inclusion improves precision. Fourth, we limit the sample to mothers whose youngest child is the one in the specific age group, due to potentially differential impacts in such a case (Berlinski et al. 2011; Cascio 2009; Gelbach 2002; Ryu 2020). Fifth, we re-estimate the effects of ECCE enrollment on maternal employment using a 2SLS framework, which allows for alternative standard errors. Sixth, we broaden the treatment definition to include all forms of ECCE, including nursery as well as kindergarten or basic school, in order to assess whether more comprehensive childcare coverage affects maternal labor outcomes. Finally, we conduct placebo tests using outcomes that are not plausibly affected by ECCE enrollment in 2025, specifically for whether the mother worked in 2023 and travel time to basic school.

5. Results

5.1. Regression discontinuity design assumptions

It is important to establish that households are not manipulating children's ages around the school entry cutoff, and that families just above and just below the threshold are otherwise comparable. Figure 1 presents density checks of children's ages relative to the December 31 cutoff for the groups of interest (ages four, five, and six). It would be difficult but not impossible for families to manipulate birth timing several years in advance of school start age. In the data, there are slightly more children whose age places them just below the December 31 cutoff at ages four and five, though the opposite is the case for age six. Differences around the cutoff are also similar to those at other months throughout the distribution. Density tests confirm statistically significant but modest differences for all three age groups. However, these differences are unlikely to reflect intentional parental manipulation. First, misreporting or selective timing of births to influence enrollment eligibility would require foresight and coordination years earlier, which is unlikely. Second, there is no evidence of bunching in the months immediately surrounding the cutoff, which would be expected if families were strategically reporting ages. Third, small differences in density are more plausibly attributed to random variation, seasonality in births, or reporting error by enumerators rather than deliberate household behavior. Thus, while we observe uneven distributions around the cutoff, there is no indication that this reflects systematic manipulation around the enrollment threshold.

Figure 1. Histogram of the percentage of observations by month of age around the age-four, age-five, and age-six cutoffs



Source: Authors' calculations based on JLMPS 2025

Notes: Showing the distribution of children around the age four, age five, and age six cutoffs for the sample of their mothers.

We also test balance in observable characteristics for mothers and their spouses across the cutoff. Table 5, Table 6 and Table 7 (in the Appendix) report pairwise t-tests for a range of maternal and household variables. Out of 123 comparisons across the three tables, only 10 show statistically significant differences (three at age four, two at age five, five at age six) not substantially different than the number expected by chance. The differences are also usually small and not systematic across all age groups. For example, in the age five sample, there are significant parental age differences, but no significant regional or parental education differences, while in the age six sample, there are no significant parental age differences, but there are significant regional and parental education differences. Joint F-tests for each age group are significant but have low F-statistics (4.26-13.53). Taken together, the density checks and balance tests suggest assignment around the cutoff is nearly as-good-as random, with no evidence of manipulation or meaningful differences in family background.

5.2. Regression discontinuity design estimates

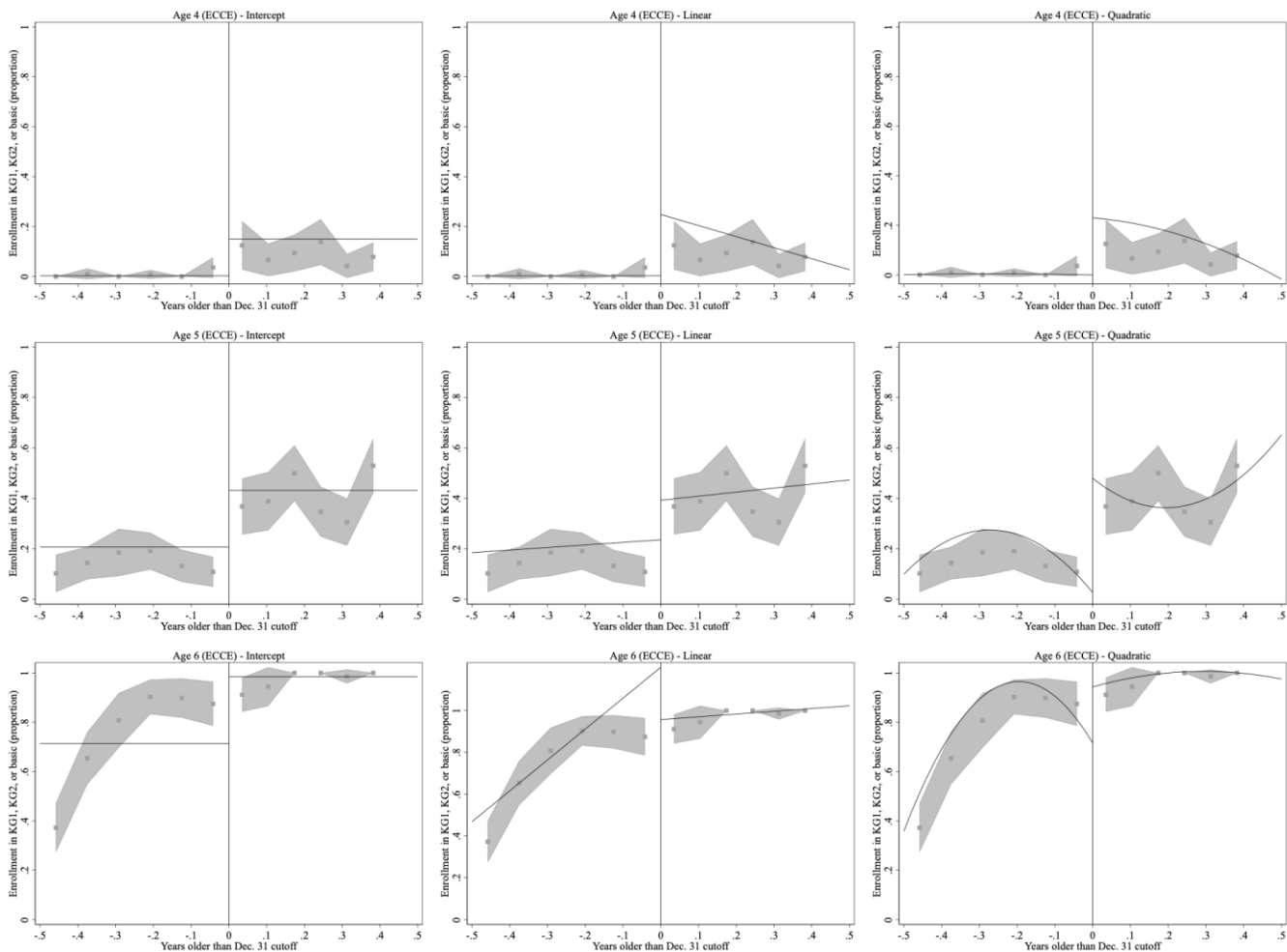
Figure 2 examines whether there are discontinuities in ECCE enrollment at the school entry cutoffs, the vital first stage of our estimation strategy. Each panel plots monthly bin means of enrollment, with 95% confidence intervals, along with intercept-only, linear, and quadratic fits estimated separately on either side of the cutoff. Table 20 shows that the intercept model is the best fit per the AIC for ages five and six, but the linear model is the best fit for age four. The intercept is therefore our preferred model, but we present all three specifications here and discuss them in turn. For age four, enrollment below the cutoff is essentially zero across all specifications.

Immediately above the cutoff, enrollment rises sharply, reflecting eligibility for KG1. This discontinuity is evident regardless of functional form.

At age five, ECCE enrollment is higher overall. Below the cutoff, there is a modest upward trend with child age, while the quadratic specification exhibits an increase followed by a decline below the cutoff. Again, there is a visible jump at the cutoff. After the cutoff, the linear fit shows a steeper upward slope, whereas the quadratic fit declines and then increases.

By age six, ECCE enrollment is nearly universal among children above the cutoff. Under the linear specification, enrollment appears to decline at the cutoff; however, this reflects a steep increase before the cutoff and a flatter trajectory afterward. This is because prior to turning six, most are enrolled in KG2, and once they reach the eligibility age, they transition into basic school. Since both KG2 and basic school fall within the ECCE definition, enrollment remains almost identical and universal across the cutoff. The quadratic specification shows an increase followed by a decrease before the cutoff, which mechanically generates an upward jump at the cutoff. Overall, these patterns provide strong evidence that school entry rules generate sharp increases in children's enrollment at the relevant ages, validating the regression discontinuity approach.

Figure 2. Children’s enrollment in ECCE (proportion) by child’s age in years from the December 31 cutoff, for mothers of children in the age-four, age-five, and age-six groups, intercept, linear, and quadratic specifications

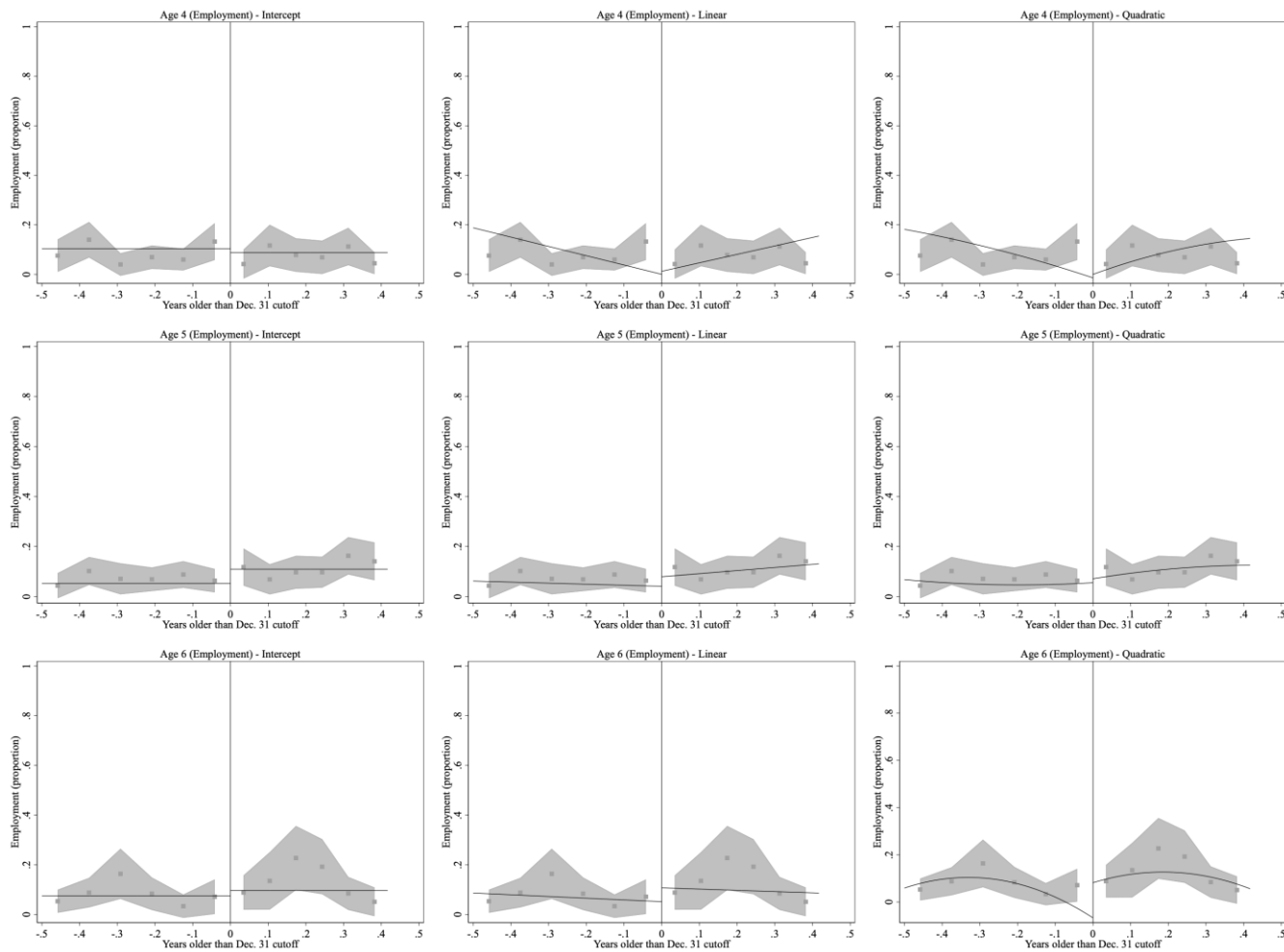


Source: Authors’ calculations based on JLMPS 2025

Notes: Points are bin means (months). Gray band is confidence interval around bin means. The line is an intercept-only, linear, or quadratic fit at each side of the cutoff.

Figure 3 turns to our maternal employment outcome, measured as whether mothers are employed at all. The figure presents the reduced form, intent-to-treat estimates graphically. In sharp contrast to the large and consistent jumps observed in ECCE enrollment, evidence for discontinuities in employment is weak overall. At age four, employment rates exhibit little systematic change at the cutoff. At age five, there is some indication of a modest increase in employment immediately above the cutoff, with fitted values and post-cutoff bin means slightly higher than those just below across all specifications. At age six, there is also some evidence of a slight increase in employment at the cutoff across all specifications. However, the confidence intervals suggest the jumps at age five and six are unlikely to be statistically significant.

Figure 3. Maternal employment (proportion) by child's age in years from the December 31 cutoff, for mothers of children in the age-four, age-five, and age-six groups, intercept, linear, and quadratic specifications



Source: Authors' calculations based on JLMPS 2025

Notes: Points are bin means (months). Gray band is confidence interval around bin means. The line is an intercept-only, linear, or quadratic fit at each side of the cutoff.

In order to formally test for the impact of ECCE on maternal employment, Table 1 presents the FRDD estimates of the effect of ECCE on maternal employment outcomes with intercept, linear, and quadratic specifications for mothers with children in the age four, five, and six groups. As shown in Table 20 in the Appendix, the intercept-only specification provides the best AIC fit for ages five and six, but linear for age four. The intercept-only is thus our preferred model, but we present all three specifications. Although the first stage of the linear specification is significant only for the age four and six groups and the quadratic specification only for the age five group, the preferred intercept-only model has a statistically significant first stage across all age groups. Turning to the effects of ECCE enrollment on maternal employment, we find no statistically significant impacts for any age group under any specification. This pattern suggests that in Jordan, where female employment is rare, ECCE provision alone may be insufficient to meaningfully relax constraints on women’s labor supply.

Table 1. FRDD estimates of effects of ECCE on maternal employment using intercept, linear, and quadratic specifications by child’s age from the December 31 cutoff, for age-four, age-five, and age-six groups

	Age 4	Age 5	Age 6
<i>Enrollment in ECCE</i>			
Intercept	-0.106 (0.247)	0.251 (0.148)	0.074 (0.129)
Linear	0.049 (0.212)	0.244 (0.391)	-0.235 (0.268)
Quadratic	0.060 (0.378)	0.035 (0.206)	0.733 (0.581)
<i>First Stage</i>			
Intercept	0.147*** (0.041)	0.225*** (0.064)	0.271*** (0.044)
Linear	0.245** (0.092)	0.156 (0.112)	-0.250** (0.090)
Quadratic	0.230 (0.128)	0.452* (0.208)	0.227 (0.133)
Control mean	0.104	0.053	0.075
N (Obs.)	939	1097	738
N right	390	505	324
N left	549	592	414

Source: Authors’ calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-four, age-five, or age-six group (+/- six months of age six on Dec. 31) who have non-missing outcome data.

“First Stage” denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Beyond the main maternal outcome of employment, we examine the effects of children’s ECCE enrollment on a broad set of additional maternal labor market and time-use outcomes. These include unemployment, labor force participation, employment type (wage or non-wage work), sector of wage employment (private or public), and earnings measures such as the log of monthly

and hourly wages from primary and secondary jobs. We also consider usual weekly hours of market work, time spent in direct and indirect care, total care hours, and employment hours. Further outcomes capture work location (outside versus in the home), occupational categories (primary job in education or primary job as a teacher), and whether the mother started her current job in 2024–2025. The binary outcomes are relative to all else, e.g., wage work versus both non-wage work and non-employment. Results for these outcomes for all three specifications (intercept, linear, and quadratic) are reported in Table 8-Table 19 in the Appendix, separately for children aged 4, 5, and 6.

Across this extensive set of outcomes, we find no systematic evidence that children’s ECCE enrollment affects maternal labor market behavior or time allocation. The only statistically significant effect appears for one outcome for mothers of four-year old children, where ECCE enrollment is associated with a significantly lower likelihood that the mother’s primary job is in education (as an economic activity), relative to all other occupations (including non-employment). This result is likely spurious given the number of tests being undertaken. All other estimated coefficients are statistically insignificant across age groups and outcomes. Overall, these results suggest that ECCE enrollment does not meaningfully influence maternal labor supply, employment characteristics, or caregiving time.

5.3. Heterogeneity analyses

Table 2, Table 3, and Table 4 present heterogeneous effects of ECCE on maternal employment for the age-four, age-five, and age-six groups. Heterogeneity is examined for subgroups divided across maternal and paternal education (each categorized as higher education vs. all other levels), household region of residence (Central vs. non-Central regions, i.e., North or South), and travel time to the nearest public basic school (above vs. below the median). It might be the case that, for example, ECCE only impacts highly educated women because very few less educated women ever work (Krafft, Assaad, and Abushehab 2026). However, across all subgroups and age groups, the estimated effects are statistically insignificant, indicating no evidence of heterogeneous effects on maternal employment.

Table 2. FRDD estimates of heterogeneous effects of ECCE on maternal employment for the age-four group

	High Edu.	Low Edu.	High Sp. Edu.	Low Sp. Edu.	Central	Non-Central	Long Travel	Short Travel
<i>Enrollment in ECCE</i>								
Intercept	0.416 (0.485)	-0.363 (0.266)	0.140 (0.311)	-0.295 (0.409)	-0.173 (0.162)	0.020 (0.665)	-0.342 (0.308)	0.348 (0.487)
Linear	0.021 (0.270)	0.037 (0.297)	-0.124 (0.312)	0.201 (0.322)	0.210 (0.248)	-0.149 (0.445)	0.036 (0.254)	-0.024 (0.441)
Quadratic	0.122 (0.325)	-0.194 (0.573)	-0.038 (0.494)	0.032 (0.499)	-0.110 (0.320)	0.278 (0.755)	-0.191 (0.444)	1.127 (4.086)
<i>First Stage</i>								
Intercept	0.092* (0.040)	0.269** (0.097)	0.132** (0.048)	0.211* (0.091)	0.215** (0.073)	0.092* (0.044)	0.154** (0.054)	0.138* (0.065)
Linear	0.141 (0.080)	0.496* (0.248)	0.187 (0.097)	0.493* (0.249)	0.294* (0.073)	0.187 (0.122)	0.262* (0.121)	0.203 (0.130)
Quadratic	0.139 (0.115)	0.471 (0.327)	0.183 (0.121)	0.472 (0.342)	0.259 (0.140)	0.197 (0.208)	0.271 (0.157)	0.059 (0.188)
Control mean	0.034	0.219	0.063	0.189	0.100	0.107	0.133	0.053
N (Obs.)	643	296	675	193	525	414	594	340
N right	271	119	276	81	196	194	245	141
N left	372	177	399	112	329	220	349	199

Source: Authors' calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-four group (+/- six months of age six on Dec. 31) who have non-missing outcome data.

"First Stage" denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Table 3. FRDD estimates of heterogeneous effects of ECCE on maternal employment for the age-five group

	High Edu.	Low Edu.	High Sp. Edu.	Low Sp. Edu.	Central	Non-Central	Long Travel	Short Travel
<i>Enrollment in ECCE</i>								
Intercept	0.126 (0.100)	0.734 (0.836)	0.183 (0.115)	0.432 (0.457)	0.223 (0.143)	0.294 (0.300)	0.364 (0.229)	0.021 (0.140)
Linear	-0.072 (0.219)	-1.516 (4.833)	1.305 (1.882)	1.575 (5.079)	0.449 (0.679)	0.125 (0.612)	0.296 (0.872)	0.205 (0.290)
Quadratic	-0.042 (0.228)	0.132 (1.103)	0.685 (0.907)	-0.115 (0.357)	0.109 (0.183)	-0.075 (0.355)	-0.153 (0.329)	0.320 (0.339)
<i>First Stage</i>								
Intercept	0.283*** (0.074)	0.136 (0.114)	0.285*** (0.077)	0.191 (0.140)	0.285*** (0.076)	0.174 (0.100)	0.215** (0.083)	0.273** (0.097)
Linear	0.241 (0.130)	-0.081 (0.251)	0.096 (0.127)	-0.084 (0.281)	0.132 (0.076)	0.150 (0.166)	0.093 (0.130)	0.324 (0.215)
Quadratic	0.426* (0.205)	0.225 (0.491)	0.202 (0.216)	0.600 (0.492)	0.496 (0.148)	0.432 (0.314)	0.389 (0.255)	0.518 (0.343)
Control mean	0.025	0.099	0.041	0.056	0.053	0.054	0.052	0.057
N (Obs.)	771	326	787	227	609	488	723	367
N right	350	155	354	109	260	245	341	161
N left	421	171	433	118	349	243	382	206

Source: Authors' calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-five group (+/- six months of age six on Dec. 31) who have non-missing outcome data.

"First Stage" denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Table 4. FRDD estimates of heterogeneous effects of ECCE on maternal employment for the age-six group

	High Edu.	Low Edu.	High Sp. Edu.	Low Sp. Edu.	Central	Non-Central	Long Travel	Short Travel
<i>Enrollment in ECCE</i>								
Intercept	-0.050 (0.059)	-0.233 (1.083)	0.011 (0.095)	-0.430 (1.211)	0.152 (0.167)	0.077 (0.180)	0.000 (0.177)	0.172 (0.219)
Linear	-0.088 (0.153)	-0.208 (0.757)	0.029 (0.327)	-0.755 (0.868)	-0.182 (0.188)	-0.252 (0.628)	-0.073 (0.279)	-0.981 (1.920)
Quadratic	-0.123 (0.283)	4.937 (6.356)	0.381 (0.327)	3.274 (6.543)	0.084 (0.349)	1.569 (1.984)	0.643 (1.221)	0.651 (0.476)
<i>First Stage</i>								
Intercept	0.337*** (0.056)	0.082 (0.046)	0.325*** (0.058)	0.096 (0.062)	0.198*** (0.038)	0.316*** (0.066)	0.243*** (0.046)	0.284** (0.095)
Linear	-0.251* (0.113)	-0.219* (0.092)	-0.228 (0.128)	-0.228* (0.113)	-0.348*** (0.038)	-0.173 (0.139)	-0.260*** (0.073)	-0.141 (0.254)
Quadratic	0.229 (0.164)	0.143 (0.178)	0.329 (0.170)	0.110 (0.226)	0.314 (0.088)	0.171 (0.211)	0.103 (0.121)	0.520 (0.296)
Control mean	0.031	0.190	0.048	0.200	0.043	0.093	0.085	0.059
N (Obs.)	517	221	537	145	394	344	464	271
N right	203	121	231	71	171	153	204	120
N left	314	100	306	74	223	191	260	151

Source: Authors' calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-six group (+/- six months of age six on Dec. 31) who have non-missing outcome data.

"First Stage" denotes the first-stage discontinuity in ECCE enrollment.

N_{right} denotes the number of observations to the right of the cutoff; N_{left} denotes the number of observations to the left of the cutoff, and $N_{Obs.}$ is the total number of observations (sum of N_{left} and N_{right}).

5.4. Sensitivity analyses

We conduct several sensitivity analyses to assess the robustness of the FRDD estimates. Table 20 in the Appendix presents reduced-form results for all age groups, capturing the direct effect of being above the cutoff for ECCE on maternal employment under alternative functional form specifications, rather than the treatment effect of ECCE implied by the enrollment discontinuity. Consistent with the main findings, we find no systematic evidence of an effect. The only statistically significant coefficient ($p < 0.05$) appears for the age-five group under the intercept specification. Consistent with the main results, there is no systematically significant effect.

Additional sensitivity checks provide further evidence on the stability of the findings. Table 21 presents estimates from models that vary the bandwidth,¹⁴ include additional covariates, and restrict the sample to households in which only the youngest child attends ECCE. The findings remain robust, with the only statistically significant coefficients ($p < 0.05$) observed for the age-4 group (a negative effect of ECCE) under the intercept and linear specifications with controls. Overall, there is no evidence of systematic significance across specifications.

We further assess robustness to using different standard errors using a 2SLS FRDD for our preferred intercept-only specification. Table 22 reports the results, consistent with the main FRDD findings. Across all age groups, the estimated effects of ECCE enrollment on maternal employment are statistically insignificant. The first-stage results show a strong and significant discontinuity at the cutoff, with F-statistics exceeding 10 in all specifications, indicating a sufficiently strong instrument.

In addition, we broaden the treatment definition to include all forms of ECCE, not only KG1, KG2, and basic school, but also nursery programs. Using the FRDD framework, we estimate the effects of any ECCE participation on maternal employment. The results (Table 23) show that attendance in any form of ECCE does not significantly increase mothers' employment. These findings further reinforce the robustness of our main results. We also conduct placebo tests to assess the validity of the FRDD specification using outcomes that should not be affected by children's ECCE enrollment (shown in Table 24). These outcomes include whether the mother worked in 2023 or earlier and travel time (in minutes) to the nearest public basic school, examined across all three age groups. As expected, the FRDD estimates show no statistically significant effects on these placebo outcomes. These null results provide further support for the credibility and appropriateness of the empirical specification.

¹⁴ Estimates for half the bandwidth and the quadratic functional form are not estimable, due to the finite number of months then included either side of the cutoff.

6. Conclusion

This paper examined whether the expansion of ECCE in Jordan has eased childcare constraints and increased maternal employment. Jordan has recently been expanding ECCE, particularly KG2, in a push to improve both learning and FLFP (Ministry of Education 2018). Using data from the 2025 JLMPS and a FRDD exploiting the age-eligibility cutoffs for ECCE enrollment, the study provides new causal evidence on the relationship between ECCE access and maternal employment in a context of persistently low FLFP.

Results indicate that children’s attendance in KG1 (age four), KG2 (age five), or basic school (age six) does not increase maternal employment in Jordan. These findings are robust across alternative functional forms, different subgroups, sensitivity analyses, and placebo tests. Although there is some age heaping by month, it is not systematic across ages. Balance tests also show little systematic differences between observations on either side of the cutoff.

This study has several limitations. First, the fuzzy RDD estimates reflect local effects near the cutoff and cannot be generalized to all mothers or to long-term labor outcomes. Some research suggests ECCE can have lifecycle or anticipatory effects (Erceg et al. 2024), although we would then expect these effects to show up in our placebo tests. One other key limitation of these analyses is they estimate the impact of ECCE on women’s employment only in terms of labor supply. ECCE staff are 87% female in Jordan (Economic Research Forum and UN Women 2020), such that expanding ECCE could increase women’s employment by driving labor demand, a dynamic the FRDD will not capture.

Overall, ECCE alone is unlikely to overcome the deep structural and normative barriers to women’s employment in Jordan. While research from outside MENA has generally found positive effects of ECCE on maternal labor market outcomes (Halim et al. 2023), there have not been improvements in low female employment contexts (Medrano 2009) and, particularly, in MENA (Krafft and Li 2024; Caria et al. 2025; Krafft and Lassassi 2024). Why is ECCE not effective in raising women’s employment rates in Jordan and MENA? One reason may be short days of ECCE – the mean duration is five hours (Avendano et al. 2026), precluding full time employment without additional care. Short days of care were identified as potential issues constraining ECCE’s impact in Egypt and Algeria (Krafft and Li 2024; Krafft and Lassassi 2024). Gender norms limit the acceptability of women working in the types of jobs that are readily available and may also discourage the use of ECCE (Avendano et al. 2026). Complementary measures—such as remote and flexible work arrangements (Ho et al. 2024; Jalota and Ho 2024)—may be needed to convert ECCE access into sustained labor market participation in Jordan.

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Appendix

Table 5. Means, differences, and t-tests for mother and spouse characteristics below versus above the age four cutoff

	Below cutoff Mean/(SE)	Above cutoff Mean/(SE)	Pairwise t-test Mean difference
Mother's age group			
<25	0.069 (0.020)	0.026 (0.009)	0.043*
25-29	0.281 (0.039)	0.217 (0.037)	0.064
30-34	0.279 (0.047)	0.364 (0.049)	-0.085
35-39	0.243 (0.037)	0.186 (0.038)	0.057
40-44	0.096 (0.028)	0.167 (0.043)	-0.071
45-49	0.019 (0.011)	0.037 (0.015)	-0.018
50+	0.013 (0.012)	0.003 (0.003)	0.010
Mother's education			
Illiterate	0.102 (0.047)	0.053 (0.014)	0.048
Read & Write	0.122 (0.026)	0.126 (0.040)	-0.004
Primary Education	0.045 (0.018)	0.017 (0.010)	0.028
Basic Education	0.248 (0.038)	0.256 (0.044)	-0.008
Vocational	0.000 (0.000)	0.000 (0.000)	.n
Secondary Educ	0.108 (0.021)	0.235 (0.043)	-0.127**
Post-Secondary	0.052 (0.015)	0.068 (0.025)	-0.016
University	0.319 (0.042)	0.235 (0.041)	0.084
Post-Graduate	0.005 (0.002)	0.010 (0.005)	-0.006
Currently married	0.912 (0.029)	0.966 (0.014)	-0.054
Spouse present	0.900 (0.029)	0.938 (0.025)	-0.038
Region			
Middle	0.533 (0.045)	0.548 (0.049)	-0.015
North	0.351 (0.040)	0.361 (0.047)	-0.010
South	0.116 (0.022)	0.091 (0.019)	0.026
Spouse education			
Spouse absent/education missing	0.109 (0.030)	0.070 (0.025)	0.039
Illiterate	0.067 (0.017)	0.076 (0.025)	-0.009
Read & Write	0.131 (0.047)	0.109 (0.037)	0.022
Primary Education	0.062	0.065	-0.003

	Below cutoff Mean/(SE)	Above cutoff Mean/(SE)	Pairwise t-test Mean difference
Basic Education	(0.024) 0.235 (0.034)	(0.026) 0.195 (0.035)	0.041
Vocational	0.026 (0.016)	0.000 (0.000)	0.026
Secondary Educ	0.129 (0.024)	0.213 (0.040)	-0.084
Post-Secondary	0.045 (0.014)	0.108 (0.034)	-0.064
University	0.192 (0.037)	0.150 (0.037)	0.043
Post-Graduate	0.004 (0.002)	0.015 (0.008)	-0.012
Spouse age group			
Spouse absent/age missing	0.100 (0.029)	0.062 (0.025)	0.038
<25	0.007 (0.003)	0.000 (0.000)	0.006*
25-29	0.076 (0.020)	0.042 (0.012)	0.035
30-34	0.263 (0.049)	0.158 (0.029)	0.104
35-39	0.231 (0.034)	0.340 (0.050)	-0.109
40-44	0.189 (0.033)	0.267 (0.046)	-0.078
45-49	0.081 (0.022)	0.092 (0.030)	-0.011
50+	0.054 (0.020)	0.039 (0.015)	0.014
Worked in 2023 or earlier	0.106 (0.024)	0.102 (0.029)	0.004
Travel time to closest public primary school (minutes)	11.327 (0.474)	11.513 (0.602)	-0.185
N (obs.)	549	390	939

Source: Authors' calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

For the variable "Travel time to the closest public primary school (minutes)," the number of observations is 549 for the below-cutoff group and 386 for the above-cutoff group.

.n denotes an inestimable test (when both groups are 0).

Table 6. Means, differences, and t-tests for mother and spouse characteristics below versus above the age five cutoff

	Below cutoff Mean/(SE)	Above cutoff Mean/(SE)	Pairwise t-test Mean difference
Mother's age group			
<25	0.038 (0.011)	0.034 (0.016)	0.003
25-29	0.217 (0.030)	0.244 (0.044)	-0.027
30-34	0.322 (0.040)	0.259 (0.038)	0.063
35-39	0.268 (0.042)	0.205 (0.032)	0.063
40-44	0.097 (0.024)	0.201 (0.043)	-0.104*
45-49	0.038 (0.019)	0.027 (0.017)	0.011
50+	0.020 (0.016)	0.029 (0.026)	-0.009
Mother's education			
Illiterate	0.071 (0.018)	0.111 (0.042)	-0.040
Read & Write	0.096 (0.017)	0.127 (0.032)	-0.031
Primary Education	0.009 (0.004)	0.035 (0.026)	-0.027
Basic Education	0.223 (0.034)	0.189 (0.035)	0.034
Vocational	0.001 (0.001)	0.000 (0.000)	0.001
Secondary Educ	0.222 (0.036)	0.184 (0.035)	0.038
Post-Secondary	0.072 (0.022)	0.068 (0.019)	0.004
University	0.293 (0.042)	0.271 (0.040)	0.022
Post-Graduate	0.014 (0.013)	0.015 (0.006)	-0.001
Currently married	0.966 (0.019)	0.931 (0.033)	0.035
Spouse present	0.924 (0.026)	0.895 (0.040)	0.029
Region			
Middle	0.527 (0.042)	0.575 (0.045)	-0.048
North	0.361 (0.040)	0.325 (0.041)	0.036
South	0.111 (0.019)	0.100 (0.019)	0.012
Spouse education			
Spouse absent/education missing	0.104 (0.031)	0.117 (0.040)	-0.013
Illiterate	0.098 (0.027)	0.095 (0.038)	0.003
Read & Write	0.082 (0.018)	0.079 (0.023)	0.003
Primary Education	0.028 (0.011)	0.012 (0.004)	0.016
Basic Education	0.276 (0.036)	0.220 (0.034)	0.056

	Below cutoff Mean/(SE)	Above cutoff Mean/(SE)	Pairwise t-test Mean difference
Vocational	0.001 (0.000)	0.000 (0.000)	0.001
Secondary Educ	0.163 (0.027)	0.196 (0.037)	-0.033
Post-Secondary	0.047 (0.018)	0.069 (0.021)	-0.022
University	0.178 (0.038)	0.190 (0.037)	-0.011
Post-Graduate	0.021 (0.016)	0.022 (0.010)	-0.001
Spouse age group			
Spouse absent/age missing	0.076 (0.026)	0.105 (0.040)	-0.029
<25	0.001 (0.001)	0.002 (0.002)	-0.001
25-29	0.088 (0.023)	0.048 (0.018)	0.040
30-34	0.165 (0.025)	0.184 (0.040)	-0.019
35-39	0.280 (0.037)	0.233 (0.035)	0.047
40-44	0.237 (0.041)	0.236 (0.041)	0.000
45-49	0.070 (0.017)	0.139 (0.031)	-0.070*
50+	0.083 (0.028)	0.052 (0.019)	0.031
Worked in 2023 or earlier	0.075 (0.020)	0.126 (0.026)	-0.051
Travel time to closest public primary school (minutes)	10.504 (0.401)	10.663 (0.524)	-0.159
N (obs.)	594	505	1099

Source: Authors' calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

For the variable "Travel time to the closest public primary school (minutes)," the number of observations is 592 for the below-cutoff group and 502 for the above-cutoff group.

Table 7. Means, differences, and t-tests for mother and spouse characteristics below versus above the age six cutoff

	Below cutoff Mean/(SE)	Above cutoff Mean/(SE)	Pairwise t-test Mean difference
Mother's age group			
<25	0.018 (0.008)	0.006 (0.003)	0.012
25-29	0.231 (0.050)	0.234 (0.041)	-0.003
30-34	0.285 (0.047)	0.222 (0.045)	0.063
35-39	0.257 (0.044)	0.256 (0.043)	0.001
40-44	0.118 (0.031)	0.221 (0.043)	-0.103
45-49	0.049 (0.018)	0.037 (0.014)	0.012
50+	0.041 (0.026)	0.024 (0.011)	0.017
Mother's education			
Illiterate	0.032 (0.008)	0.064 (0.018)	-0.032
Read & Write	0.173 (0.044)	0.060 (0.018)	0.112*
Primary Education	0.020 (0.011)	0.020 (0.010)	-0.000
Basic Education	0.302 (0.052)	0.214 (0.040)	0.088
Vocational	0.000 (0.000)	0.000 (0.000)	.n
Secondary Educ	0.198 (0.042)	0.175 (0.043)	0.023
Post-Secondary	0.070 (0.025)	0.129 (0.037)	-0.059
University	0.197 (0.037)	0.316 (0.047)	-0.119*
Post-Graduate	0.009 (0.007)	0.022 (0.010)	-0.013
Currently married	0.959 (0.024)	0.981 (0.009)	-0.022
Spouse present	0.902 (0.031)	0.948 (0.023)	-0.046
Region			
Middle	0.627 (0.051)	0.514 (0.050)	0.113
North	0.216 (0.037)	0.388 (0.048)	-0.172**
South	0.157 (0.044)	0.098 (0.021)	0.059
Spouse education			
Spouse absent/education missing	0.117 (0.034)	0.056 (0.023)	0.061
Illiterate	0.051 (0.014)	0.035 (0.012)	0.016
Read & Write	0.188 (0.049)	0.067 (0.015)	0.120*
Primary Education	0.054 (0.018)	0.055 (0.020)	-0.001
Basic Education	0.218 (0.049)	0.230 (0.040)	-0.012

	Below cutoff Mean/(SE)	Above cutoff Mean/(SE)	Pairwise t-test Mean difference
Vocational	0.020 (0.016)	0.005 (0.005)	0.015
Secondary Educ	0.145 (0.032)	0.268 (0.050)	-0.123*
Post-Secondary	0.045 (0.019)	0.041 (0.013)	0.005
University	0.138 (0.032)	0.203 (0.043)	-0.065
Post-Graduate	0.023 (0.010)	0.040 (0.015)	-0.017
Spouse age group			
Spouse absent/age missing	0.098 (0.031)	0.052 (0.023)	0.046
<25	0.002 (0.001)	0.000 (0.000)	0.002
25-29	0.013 (0.004)	0.048 (0.027)	-0.035
30-34	0.184 (0.047)	0.178 (0.033)	0.005
35-39	0.298 (0.047)	0.195 (0.037)	0.103
40-44	0.225 (0.045)	0.280 (0.049)	-0.055
45-49	0.078 (0.020)	0.157 (0.037)	-0.078
50+	0.102 (0.032)	0.089 (0.023)	0.013
Worked in 2023 or earlier	0.097 (0.028)	0.096 (0.023)	0.000
Travel time to closest public primary school (minutes)	11.503 (0.515)	11.812 (0.673)	-0.309
N (obs.)	428	332	760

Source: Authors' calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

For the variable "Travel time to the closest public primary school (minutes)," the number of observations is 425 for the below-cutoff group and 332 for the above-cutoff group.

.n denotes an inestimable test (when both groups are 0).

Table 8. FRDD estimates of effects of ECCE maternal labor force participation, employment status, and job type using intercept, linear, and quadratic specifications by child's age from the December 31 cutoff, for age-four groups

	Unemployed	LF Participation	Wage worker	Non-Wage	Private Wage	Public Wage
<i>Enrollment in ECCE</i>						
Intercept	-0.025 (0.094)	-0.131 (0.261)	-0.140 (0.244)	0.034 (0.047)	-0.105 (0.160)	-0.007 (0.194)
Linear	0.092 (0.125)	0.141 (0.268)	-0.014 (0.203)	0.063 (0.056)	0.101 (0.115)	-0.060 (0.159)
Quadratic	0.203 (0.230)	0.262 (0.497)	0.095 (0.370)	-0.035 (0.068)	-0.016 (0.225)	0.068 (0.231)
<i>First Stage</i>						
Intercept	0.147*** (0.041)	0.147*** (0.041)	0.147*** (0.041)	0.147*** (0.041)	0.147*** (0.041)	0.147*** (0.041)
Linear	0.245** (0.092)	0.245** (0.092)	0.245** (0.092)	0.245** (0.092)	0.245** (0.092)	0.245** (0.092)
Quadratic	0.230 (0.128)	0.230 (0.128)	0.230 (0.128)	0.230 (0.128)	0.230 (0.128)	0.230 (0.128)
Control mean	0.032	0.136	0.101	0.003	0.048	0.056
N (Obs.)	939	939	939	939	939	939
N right	390	390	390	390	390	390
N left	549	549	549	549	549	549

Source: Authors' calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-four group (+/- six months of age four on Dec. 31) who have non-missing outcome data.

"First Stage" denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Table 9. FRDD estimates of effects of ECCE on maternal earnings using intercept, linear, and quadratic specifications by child’s age from the December 31 cutoff, for age-four group

	ln(Monthly wage)	ln(Hourly wage)
<i>Enrollment in ECCE</i>		
Intercept	-2.932 (2.630)	-1.563 (1.550)
Linear	0.822 (2.332)	0.366 (1.395)
Quadratic	0.643 (4.488)	0.204 (2.720)
<i>First Stage</i>		
Intercept	0.151*** (0.042)	0.151*** (0.042)
Linear	0.244** (0.093)	0.244** (0.093)
Quadratic	0.231 (0.128)	0.231 (0.128)
Control mean	-5.660	-6.179
N (Obs.)	937	937
N right	389	389
N left	548	548

Source: Authors’ calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-four group (+/- six months of age four on Dec. 31) who have non-missing outcome data.

“First Stage” denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Table 10. FRDD estimates of effects of ECCE on maternal time use using intercept, linear, and quadratic specifications by child's age from the December 31 cutoff, for age-four group

	Emp. hours/week	Direct care hrs./day	Ind. care hrs./day	Any care hrs./day	Employment hrs./day
<i>Enrollment in ECCE</i>					
Intercept	-7.953 (12.201)	2.010 (1.893)	2.752 (2.004)	4.567 (2.855)	-3.647 (2.261)
Linear	3.947 (9.459)	-0.840 (2.135)	2.743 (2.707)	2.235 (3.596)	-3.143 (2.661)
Quadratic	5.793 (16.339)	-6.482 (5.385)	1.176 (4.326)	-5.296 (7.092)	-3.018 (5.069)
<i>First Stage</i>					
Intercept	0.147*** (0.041)	0.147*** (0.041)	0.147*** (0.041)	0.147*** (0.041)	0.147*** (0.041)
Linear	0.245** (0.092)	0.245** (0.092)	0.245** (0.092)	0.245** (0.092)	0.245** (0.092)
Quadratic	0.230 (0.128)	0.230 (0.128)	0.230 (0.128)	0.230 (0.128)	0.230 (0.128)
Control mean	4.757	1.570	3.995	5.482	1.132
N (Obs.)	939	939	939	939	939
N right	390	390	390	390	390
N left	549	549	549	549	549

Source: Authors' calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-four group (+/- six months of age four on Dec. 31) who have non-missing outcome data.

"First Stage" denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Table 11. FRDD estimates of effects of ECCE on maternal employment characteristics using intercept, linear, and quadratic specifications by child’s age from the December 31 cutoff, for age-four group

	Work outside home	Work inside home	Educ. Sector	Teacher	Job Start 24–25
Enrollment in ECCE					
Intercept	-0.161 (0.246)	0.055 (0.043)	-0.320* (0.158)	-0.251 (0.146)	0.002 (0.123)
Linear	0.017 (0.206)	0.032 (0.038)	0.060 (0.119)	0.061 (0.108)	0.006 (0.072)
Quadratic	0.044 (0.375)	0.016 (0.037)	0.062 (0.190)	0.103 (0.158)	-0.092 (0.112)
First Stage					
Intercept	0.147*** (0.041)	0.147*** (0.041)	0.147*** (0.041)	0.147*** (0.041)	0.147*** (0.041)
Linear	0.245** (0.092)	0.245** (0.092)	0.245** (0.092)	0.245** (0.092)	0.245** (0.092)
Quadratic	0.230 (0.128)	0.230 (0.128)	0.230 (0.128)	0.230 (0.128)	0.230 (0.127)
Control mean	0.104	0.000	0.056	0.046	0.019
N (Obs.)	939	939	939	939	938
N right	390	390	390	390	389
N left	549	549	549	549	549

Source: Authors’ calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-four group (+/- six months of age four on Dec. 31) who have non-missing outcome data.

“First Stage” denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Table 12. FRDD estimates of effects of ECCE on maternal labor force participation, employment status, and job type using intercept, linear, and quadratic specifications by child’s age from the December 31 cutoff, for age-five groups

	Unemployed	LF Participation	Wage worker	Non-Wage	Private Wage	Public Wage
<i>Enrollment in ECCE</i>						
Intercept	-0.181 (0.141)	0.066 (0.174)	0.230 (0.143)	0.021 (0.018)	0.136 (0.073)	0.111 (0.114)
Linear	0.042 (0.194)	0.263 (0.444)	0.169 (0.357)	0.075 (0.099)	-0.042 (0.137)	0.263 (0.370)
Quadratic	0.383 (0.245)	0.404 (0.336)	-0.006 (0.197)	0.041 (0.052)	0.076 (0.070)	-0.054 (0.192)
<i>First Stage</i>						
Intercept	0.225*** (0.064)	0.225*** (0.064)	0.225*** (0.064)	0.225*** (0.064)	0.225*** (0.064)	0.225*** (0.064)
Linear	0.156 (0.112)	0.156 (0.112)	0.156 (0.112)	0.156 (0.112)	0.157 (0.112)	0.157 (0.112)
Quadratic	0.452* (0.208)	0.452* (0.208)	0.452* (0.208)	0.452* (0.208)	0.453* (0.207)	0.453* (0.207)
Control mean	0.066	0.119	0.053	0.000	0.008	0.045
N (Obs.)	1097	1097	1097	1097	1099	1099
N right	505	505	505	505	505	505
N left	592	592	592	592	594	594

Source: Authors’ calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-five group (+/- six months of age five on Dec. 31) who have non-missing outcome data.

“First Stage” denotes the first-stage discontinuity in ECCE enrollment.

N_{right} denotes the number of observations to the right of the cutoff; N_{left} denotes the number of observations to the left of the cutoff, and $N_{Obs.}$ is the total number of observations (sum of N_{left} and N_{right}).

Table 13. FRDD estimates of effects of ECCE on maternal earnings using intercept, linear, and quadratic specifications by child’s age from the December 31 cutoff, for age-five group

	ln(Monthly wage)	ln(Hourly wage)
<i>Enrollment in ECCE</i>		
Intercept	3.108 (1.808)	1.881 (1.081)
Linear	1.695 (4.487)	1.388 (2.781)
Quadratic	-0.320 (2.511)	0.096 (1.470)
<i>First Stage</i>		
Intercept	0.223*** (0.065)	0.223*** (0.065)
Linear	0.155 (0.112)	0.155 (0.112)
Quadratic	0.451* (0.208)	0.451* (0.208)
Control mean	-6.323	-6.559
N (Obs.)	1089	1089
N right	501	501
N left	588	588

Source: Authors’ calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-five group (+/- six months of age five on Dec. 31) who have non-missing outcome data.

“First Stage” denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Table 14. FRDD estimates of effects of ECCE on maternal time use using intercept, linear, and quadratic specifications by child's age from the December 31 cutoff, for age-five group

	Emp. hours/week	Direct care hrs./day	Ind. care hrs./day	Any care hrs./day	Employment hrs./day
<i>Enrollment in ECCE</i>					
Intercept	7.260 (6.477)	0.189 (1.089)	1.454 (1.048)	1.494 (1.466)	0.212 (1.240)
Linear	-4.556 (22.977)	-4.159 (4.039)	4.048 (3.614)	0.101 (3.846)	-1.513 (3.818)
Quadratic	-6.790 (16.074)	-1.355 (1.830)	0.566 (1.570)	-0.824 (2.447)	-1.265 (2.483)
<i>First Stage</i>					
Intercept	0.224*** (0.064)	0.225*** (0.064)	0.225*** (0.064)	0.225*** (0.064)	0.225*** (0.064)
Linear	0.156 (0.112)	0.157 (0.112)	0.157 (0.112)	0.157 (0.112)	0.157 (0.112)
Quadratic	0.453* (0.208)	0.453* (0.207)	0.453* (0.207)	0.453* (0.207)	0.453* (0.207)
Control mean	2.605	1.554	4.147	5.650	0.743
N (Obs.)	1096	1099	1099	1099	1099
N right	504	505	505	505	505
N left	592	594	594	594	594

Source: Authors' calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-five group (+/- six months of age five on Dec. 31) who have non-missing outcome data.

"First Stage" denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Table 15. FRDD estimates of effects of ECCE on maternal employment characteristics using intercept, linear, and quadratic specifications by child’s age from the December 31 cutoff, for age-five group

	Work outside home	Work inside home	Educ. Sector	Teacher	Job Start 24–25
<i>Enrollment in ECCE</i>					
Intercept	0.234 (0.144)	0.017 (0.012)	0.138 (0.099)	0.109 (0.092)	0.066 (0.082)
Linear	0.217 (0.380)	0.026 (0.034)	0.324 (0.337)	0.305 (0.322)	-0.127 (0.246)
Quadratic	0.030 (0.204)	0.005 (0.017)	0.108 (0.141)	0.083 (0.134)	-0.114 (0.155)
<i>First Stage</i>					
Intercept	0.225*** (0.064)	0.225*** (0.064)	0.225*** (0.064)	0.225*** (0.064)	0.223*** (0.064)
Linear	0.156 (0.112)	0.156 (0.112)	0.157 (0.112)	0.157 (0.112)	0.154 (0.112)
Quadratic	0.452* (0.208)	0.452* (0.208)	0.453* (0.207)	0.453* (0.207)	0.450* (0.208)
Control mean	0.053	0.000	0.026	0.024	0.017
N (Obs.)	1097	1097	1099	1099	1095
N right	505	505	505	505	503
N left	592	592	594	594	592

Source: Authors’ calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-five group (+/- six months of age five on Dec. 31) who have non-missing outcome data.

“First Stage” denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Table 16. FRDD estimates of effects of ECCE on maternal labor force participation, employment status, and job type using intercept, linear, and quadratic specifications by child’s age from the December 31 cutoff, for age-six groups

	Unemployed	LF Participation	Wage worker	Non-Wage	Private Wage	Public Wage
<i>Enrollment in ECCE</i>						
Intercept	-0.065 (0.093)	0.009 (0.157)	0.074 (0.129)	-0.001 (0.002)	-0.128 (0.088)	0.189 (0.100)
Linear	-0.044 (0.082)	-0.279 (0.295)	-0.238 (0.267)	0.003 (0.012)	0.172 (0.174)	-0.398 (0.243)
Quadratic	0.447 (0.340)	1.179 (0.798)	0.742 (0.572)	-0.009 (0.031)	0.462 (0.404)	0.277 (0.301)
<i>First Stage</i>						
Intercept	0.271*** (0.044)	0.271*** (0.044)	0.271*** (0.044)	0.271*** (0.044)	0.271*** (0.044)	0.271*** (0.044)
Linear	-0.250** (0.090)	-0.250** (0.090)	-0.250** (0.090)	-0.250** (0.090)	-0.250** (0.090)	-0.250** (0.090)
Quadratic	0.227 (0.133)	0.227 (0.133)	0.227 (0.133)	0.227 (0.133)	0.227 (0.133)	0.227 (0.133)
Control mean	0.041	0.116	0.075	0.000	0.047	0.028
N (Obs.)	738	738	738	738	739	739
N right	324	324	324	324	325	325
N left	414	414	414	414	414	414

Source: Authors’ calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-six group (+/- six months of age six on Dec. 31) who have non-missing outcome data.

“First Stage” denotes the first-stage discontinuity in ECCE enrollment.

N_{right} denotes the number of observations to the right of the cutoff; N_{left} denotes the number of observations to the left of the cutoff, and $N_{Obs.}$ is the total number of observations (sum of N_{left} and N_{right}).

Table 17. FRDD estimates of effects of ECCE on maternal earnings using intercept, linear, and quadratic specifications by child’s age from the December 31 cutoff, for age-six group

	ln(Monthly wage)	ln(Hourly wage)
<i>Enrollment in ECCE</i>		
Intercept	0.901 (1.499)	0.586 (0.926)
Linear	-1.601 (2.825)	-1.027 (1.734)
Quadratic	10.510 (7.151)	6.512 (4.418)
<i>First Stage</i>		
Intercept	0.275*** (0.044)	0.275*** (0.044)
Linear	-0.262** (0.090)	-0.262** (0.090)
Quadratic	0.249 (0.132)	0.249 (0.132)
Control mean	-6.096	-6.405
N (Obs.)	733	733
N right	321	321
N left	412	412

Source: Authors’ calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-six group (+/- six months of age six on Dec. 31) who have non-missing outcome data.

“First Stage” denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Table 18. FRDD estimates of effects of ECCE on maternal time use using intercept, linear, and quadratic specifications by child's age from the December 31 cutoff, for age-six group

	Emp. hours/week	Direct care hrs./day	Ind. care hrs./day	Any care hrs./day	Employment hrs./day
<i>Enrollment in ECCE</i>					
Intercept	2.602 (4.779)	-0.672 (1.026)	0.502 (0.920)	0.197 (1.453)	-1.156 (1.029)
Linear	-10.071 (9.771)	2.198 (2.395)	-0.913 (1.954)	0.822 (3.117)	-3.363 (2.252)
Quadratic	25.556 (20.477)	0.054 (3.860)	2.838 (4.268)	2.322 (6.805)	5.358 (4.450)
<i>First Stage</i>					
Intercept	0.271*** (0.044)	0.271*** (0.044)	0.271*** (0.044)	0.271*** (0.044)	0.271*** (0.044)
Linear	-0.250** (0.090)	-0.250** (0.090)	-0.250** (0.090)	-0.250** (0.090)	-0.250** (0.090)
Quadratic	0.227 (0.133)	0.227 (0.133)	0.227 (0.133)	0.227 (0.133)	0.227 (0.133)
Control mean	2.658	1.701	4.267	5.815	0.837
N (Obs.)	738	739	739	739	739
N right	324	325	325	325	325
N left	414	414	414	414	414

Source: Authors' calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-six group (+/- six months of age six on Dec. 31) who have non-missing outcome data.

"First Stage" denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Table 19. FRDD estimates of effects of ECCE on maternal employment characteristics using intercept, linear, and quadratic specifications by child’s age from the December 31 cutoff, for age-six group

	Work outside home	Work inside home	Educ. Sector	Teacher	Job Start 24–25
<i>Enrollment in ECCE</i>					
Intercept	0.074 (0.129)	-0.001 (0.002)	0.058 (0.089)	0.072 (0.086)	0.021 (0.081)
Linear	-0.238 (0.267)	0.003 (0.012)	0.087 (0.175)	0.088 (0.172)	0.045 (0.077)
Quadratic	0.742 (0.572)	-0.009 (0.031)	0.549 (0.384)	0.430 (0.319)	0.042 (0.217)
<i>First Stage</i>					
Intercept	0.271*** (0.044)	0.271*** (0.044)	0.271*** (0.044)	0.271*** (0.044)	0.271*** (0.044)
Linear	-0.250** (0.090)	-0.250** (0.090)	-0.250** (0.090)	-0.250** (0.090)	-0.250** (0.090)
Quadratic	0.227 (0.133)	0.227 (0.133)	0.227 (0.133)	0.227 (0.133)	0.227 (0.133)
Control mean	0.075	0.000	0.037	0.028	0.018
N (Obs.)	738	738	739	739	738
N right	324	324	325	325	324
N left	414	414	414	414	414

Source: Authors’ calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-six group (+/- six months of age six on Dec. 31) who have non-missing outcome data.

“First Stage” denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Table 20. Reduced form FRDD intercept, linear, and quadratic models for maternal employment, mothers with child in age-four, age-five, and age-six groups

	Age 4			Age 5			Age 6		
Above cutoff	-0.016 (0.036)	0.012 (0.042)	0.014 (0.059)	0.056* (0.027)	0.038 (0.052)	0.016 (0.091)	0.022 (0.034)	0.056 (0.060)	0.149 (0.083)
Age in years from cutoff		-0.375* (0.167)	-0.505 (0.485)		-0.042 (0.110)	0.090 (0.486)		-0.069 (0.141)	-1.035 (0.754)
Above cutoff # Age in years from cutoff		0.717** (0.259)	1.062 (0.712)		0.166 (0.198)	0.159 (0.820)		0.019 (0.204)	1.524 (0.945)
Age in years from cutoff # Age in years from cutoff			-0.226 (0.828)			0.230 (0.777)			-1.567 (1.334)
Above cutoff # Age in years from cutoff # Age in years from cutoff			-0.275			-0.513			0.248
Constant	0.104*** (0.024)	0.000 (0.033)	-0.014 (0.054)	0.053*** (0.013)	0.042 (0.034)	0.056 (0.070)	0.075** (0.025)	0.052 (0.047)	-0.067 (0.071)
Observations	939	939	939	1097	1097	1097	759	759	759
AIC	378.9	355.0	358.6	263.3	264.8	268.5	210.1	213.4	211.1

Source: Authors' calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-four, age-five, and age-six groups (+/- six months of age-four, age-five, and age-six on Dec. 31) who have non-missing outcome data.

Table 21. Sensitivity analysis of FRDD models for maternal employment for the age-four, age-five, and age-six groups — half bandwidth, with controls, and youngest sample specifications

		Age 4			Age 5			Age 6		
		Half BW	With Control	Youngest	Half BW	With Control	Youngest	Half BW	With Control	Youngest
<i>Enrollment in ECCE</i>	Intercept	-0.094 (0.124)	-0.129* (0.064)	-0.208 (0.302)	0.079 (0.125)	0.046 (0.052)	0.545 (0.741)	0.441 (0.655)	0.100 (0.052)	0.182 (0.253)
	Linear	-0.151 (0.313)	-0.158* (0.074)	0.128 (0.275)	0.177 (0.383)	-0.027 (0.107)	3.218 (11.851)	-0.891 (0.988)	-0.002 (0.075)	-0.050 (0.237)
	Quadratic		-0.158 (0.092)	0.590 (0.917)		-0.078 (0.074)	0.416 (0.403)		-0.497 (0.734)	0.113 (0.299)
<i>First Stage</i>	Intercept	0.212** (0.074)	0.134*** (0.033)	0.209** (0.071)	0.256** (0.080)	0.271*** (0.055)	0.117 (0.125)	0.087 (0.072)	0.209*** (0.038)	0.250*** (0.066)
	Linear	0.224 (0.131)	0.247*** (0.072)	0.341* (0.152)	0.243 (0.169)	0.157 (0.095)	0.040 (0.149)	-0.135 (0.123)	-0.283*** (0.073)	-0.368*** (0.095)
	Quadratic		0.240* (0.104)	0.205 (0.205)		0.433* (0.171)	0.467 (0.290)		0.114 (0.117)	0.543** (0.201)
Control mean		0.104	0.104	0.144	0.053	0.053	0.025	0.075	0.075	0.084
N (Obs.)		487	934	384	567	1090	348	332	735	209
N right		172	386	153	230	502	149	145	324	91
N left		315	548	231	337	588	199	187	411	118

Source: Authors' calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-four, age-five, and age-six groups (+/- six months of age-four, age-five, and age-six on Dec. 31) who have non-missing outcome data.

"First Stage" denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Half bandwidth not estimable for quadratic specification.

Table 22. 2SLS FRDD intercept models of maternal employment, mothers with a child in the age-four, age-five, and age-six groups

	Age 4	Age 5	Age 6
ECCE	-0.106 (0.246)	0.251 (0.142)	0.074 (0.125)
Constant	0.104*** (0.024)	0.001 (0.041)	0.022 (0.109)
First stage Above cutoff	0.147*** (0.040)	0.225*** (0.063)	0.271*** (0.051)
Constant	0.003 (0.002)	0.207*** (0.041)	0.714*** (0.050)
N (Obs.)	939.000	1097.000	738.000
R-sq.	.	.	0.013
p-val. for chi H0: exog.	0.602	0.002	0.897
p-val. for F-test H0: exog.	0.784	0.067	0.940
Partial r-sq.	0.084	0.058	0.125
F-stat (first stage)	13.833	12.771	28.150
p-val (F test)	0.000	0.000	0.000

Source: Authors' calculations based on JLMPS 2025

*Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.*

Sample consists of mothers with a child in the age-cutoff group (+/- six months of age four, five, or six on Dec. 31) who have non-missing outcome data.

Table 23. FRDD estimates of effects of any type of ECCE (including nursery) on maternal employment using intercept, linear, and quadratic specifications by child’s age from the December 31 cutoff

	Age 4	Age 5	Age 6
<i>Enrollment in ECCE</i>			
Intercept	-0.156 (0.371)	0.237 (0.136)	0.074 (0.129)
Linear	0.046 (0.198)	0.239 (0.379)	-0.235 (0.268)
Quadratic	0.046 (0.285)	0.033 (0.198)	0.733 (0.581)
<i>First Stage</i>			
Intercept	0.101* (0.046)	0.239*** (0.064)	0.271*** (0.044)
Linear	0.259** (0.093)	0.159 (0.111)	-0.250** (0.090)
Quadratic	0.300* (0.147)	0.470* (0.203)	0.227 (0.133)
Control mean	0.104	0.053	0.075
N (Obs.)	939	1097	738
N right	390	505	324
N left	549	592	414

Source: Authors’ calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-group (+/- six months of age four/five/six on Dec. 31) who have non-missing outcome data.

“First Stage” denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).

Table 24. Placebo tests of FRDD specifications with unrelated outcomes across age-four, age-five, and age-six groups

	Age 4 Worked in 2023 or earlier	Travel Time to School (min)	Age 5 Worked in 2023 or earlier	Travel Time to School (min)	Age 6 Worked in 2023 or earlier	Travel Time to School (min)
<i>Enrollment in ECCE</i>						
Intercept	-0.025 (0.253)	1.252 (5.138)	0.226 (0.164)	0.686 (3.010)	-0.011 (0.138)	0.711 (3.644)
Linear	0.162 (0.238)	-8.779 (5.489)	0.223 (0.393)	2.430 (6.895)	-0.148 (0.266)	-1.013 (7.680)
Quadratic	0.148 (0.407)	-22.845 (15.054)	0.188 (0.253)	-1.743 (4.453)	1.022 (0.761)	3.517 (14.509)
<i>First Stage</i>						
Intercept	0.147*** (0.041)	0.148*** (0.041)	0.225*** (0.064)	0.232*** (0.065)	0.271*** (0.044)	0.257*** (0.045)
Linear	0.245** (0.092)	0.246** (0.092)	0.157 (0.112)	0.156 (0.112)	-0.250** (0.090)	-0.231* (0.090)
Quadratic	0.230 (0.128)	0.230 (0.128)	0.453* (0.207)	0.447* (0.208)	0.227 (0.133)	0.206 (0.133)
Control mean	0.106	11.327	0.075	10.504	0.097	11.503
N (Obs.)	939	934	1099	1092	739	736
N right	390	386	505	502	325	325
N left	549	548	594	590	414	411

Source: Authors' calculations based on JLMPS 2025

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. Standard errors in parentheses.

Sample consists of mothers with a child in the age-group (+/- six months of age four/five/six on Dec. 31) who have non-missing outcome data.

"First Stage" denotes the first-stage discontinuity in ECCE enrollment.

N right denotes the number of observations to the right of the cutoff; N left denotes the number of observations to the left of the cutoff, and N (Obs.) is the total number of observations (sum of N left and N right).