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The Impact of Early Childhood Care and Education on Maternal Time Use in Egypt

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Abstract

Women spend a disproportionate amount of time in unpaid care work compared to men. There are particularly large gender disparities in care work in countries in the Middle East and North Africa, such as Egypt. This paper explores how policies might help shift care work into the market, specifically through the education system. The research examines the impact of early childhood care and education (ECCE) on mother's time use. The paper uses the school age cutoff (in a regression discontinuity design framework) for enrollment in primary school to assess the impact of children starting primary school on mother's time use. Primary school enrollment does not significantly change the time mothers spend in care work or employment. There is some evidence that children's primary school enrollment shifts when and possibly what types of care work mothers engage in. Policies increasing access to ECCE are not guaranteed to shift care work or employment for mothers.

Keywords: Early childhood care and education, time use, employment, gender, Egypt.
JEL Classifications: J22, J16, I25.

ملخص

تقضي النساء وقتًا غير متناسب في أعمال الرعاية غير مدفوعة الأجر مقارنة بالرجال. هناك تفاوتات كبيرة بين الجنسين بشكل خاص في أعمال الرعاية في دول الشرق الأوسط وشمال إفريقيا، مثل مصر. تستكشف هذه الورقة كيف يمكن للسياسات أن تساعد في تحويل أعمال الرعاية إلى السوق، وتحديداً من خلال نظام التعليم. نقوم في هذه الورقة بالبحث في تأثير رعاية الطفولة المبكرة والتعليم على استخدام الأم للوقت. ونتستخدم في هذه الورقة سن المدرسة (في إطار تصميم توقف الانحدار) للتسجيل في المدرسة الابتدائية لتقييم تأثير بدء الأطفال في المدرسة الابتدائية على استخدام الأم للوقت. لا يغير الالتحاق بالمدارس الابتدائية بشكل كبير الوقت الذي تقضيه الأمهات في أعمال الرعاية أو العمل. وهناك بعض الأدلة على أن التعليم الابتدائي للأطفال يؤدي إلى تحولات في أنواع عمل الرعاية التي تشارك فيها الأمهات وتوقيتاتها. والسياسات التي تزيد من فرص الحصول على خدمات الرعاية في مرحلة الطفولة المبكرة ليست مضمونة لنقل أعمال الرعاية أو التشغيل للأمهات.

1. Introduction

Women's disproportionate unpaid care work is a key driver of gender gaps in economic outcomes. Globally, women spend 3.2 hours in unpaid care work for every hour men spend in such work (International Labour Organization, 2018). This unpaid care work is a major constraint on women's participation in the labor market and contributes to a host of gender-unequal social and economic outcomes (Connelly & Kongar, 2017; Samtleben & Müller, 2022). Gender gaps in unpaid care work – and employment – are largest in the Middle East and North Africa (MENA) region (Gottlieb et al., 2024; International Labour Organization, 2018; Rubiano-Matulevich & Viollaz, 2019; Verick, 2018). For instance, the ratio of women's to men's unpaid care work is nearly five to one in Egypt (Atallah & Hesham, 2024). While 69% of men were employed in Egypt as of 2023, only 15% of women were employed (Krafft, Assaad, & McKillip, 2024).

Redistributing care responsibilities to the market through care services has been shown in a variety of contexts to reduce gender disparities in time use and promote women's employment (Gelbach, 2002; Halim et al., 2023). Early childhood care and education (ECCE) is one such service. Past research from low- and middle-income countries highlights that in almost all cases, ECCE improves maternal labor market outcomes – more women work, and/or the women who work often do so for longer hours (Halim et al., 2023). When other aspects of their time use are studied, research also often shows women spend less time in unpaid care work when they have ECCE for their children (Angeles et al., 2012; Calderón, 2014; Fang & Miao, 2024). Conversely, shocks, such as the COVID-19 pandemic, that shut down care services lead to additional time spent in care work for women (Adams-Prassl et al., 2020; Krafft, Selwaness, et al., 2024). ECCE can thus play a critical role in women's time use.

This paper tests the potential of ECCE to decrease women's unpaid care work and increase their employment in Egypt, a context with long hours of unpaid care work and low employment for women (Assaad et al., 2022; Atallah & Hesham, 2024; Krafft, Assaad, & McKillip, 2024). Using the Egypt Labor Market Panel Survey (ELMPS) 2023 and a regression discontinuity design (RDD) approach based on the cutoff age for starting primary school, analyses estimate the impact of ECCE on women's time use and employment. The findings show that in Egypt, ECCE does not reduce mothers overall time spent on unpaid care work, nor does it increase mothers' employment rates or hours spent in employment. ECCE may slightly shift the timing and types of care work mothers engage in but is no guarantee of decreases in care work and increases in employment.

These findings contrast with the majority of the literature finding ECCE decreases care work and increases maternal employment (Gelbach, 2002; Halim et al., 2023; Swart et al., 2019). This disparity may be in part due to relatively short days of primary school in Egypt; past research has demonstrated that short days of ECCE can lead to even reductions in employment and hours worked in other low-employment contexts (Krafft & Lassassi, 2024; Medrano, 2009). Primary

school also creates additional care responsibilities in preparing children for the school day, taking children to and from school, and helping with their learning and homework after school. Even during times when these direct care responsibilities are alleviated – when children are in school – mothers may substitute into indirect care work, undertaking household chores. Strong gender norms that emphasize a female homemaker and male breadwinner role in MENA and Egypt (El-Feki et al., 2017; National Council for Women et al., 2023) may also help explain why, even when ECCE is available, expanded or subsidized (Caria et al., 2022; Krafft & Lassassi, 2024), it does not increase women's employment.

2. Data

2.1. Egypt Labor Market Panel Survey 2023

The ELMPS 2023 is the fifth wave of a panel survey (1998, 2006, 2012, and 2018 waves preceded 2023), which has tracked split households and added a refresher sample every wave.[3] The survey is household-based, but collects data on every member within the household, with detailed individual interviews for those aged six and older. The individual module covers a variety of topics, including, pertinently for this study, child care, education, employment, and time use. This study uses the 2023 wave of the ELMPS, as it was the first wave to collect a time use diary (Assaad & Krafft, 2024; OAMDI, 2024). The full ELMPS sample in 2023 includes 70,636 individuals and 17,784 households (Assaad & Krafft, 2024), although, as discussed below, we use subsets of the sample in specific analyses.

2.2. Outcomes

The key outcome of interest is how women spend their time. The time use module is a 24-hour time diary, collecting data on when the individual woke up (or midnight if still awake) until midnight at the end of the day, for the day preceding the interview. What the individual did as a primary activity, whether they did any secondary activity, and if so, what activity are collected for each activity, along with the duration of the activity (in fifteen-minute increments; results present outcomes in units of hours but underlying quarter-hours go into calculations). Analyses are specifically interested in the time spent in *direct* caregiving, which includes time spent (in hours), as a primary or secondary activity, on any of the following:

- Childcare and instruction
- Care for dependent adults
- Help to non-dependent adult household and family members
- Travelling and accompanying goods or persons related to unpaid caregiving services for household and family members

[3] Key labor market statistics have been validated against other nationally representative, cross-sectional sources each wave (Assaad & Krafft, 2013, 2024; Krafft et al., 2021).

- Other activities related to unpaid caregiving services for household and family members

Analyses also examine *indirect* caregiving, which includes time spent (in hours), as a primary or secondary activity, on any of the following:

- Food and meals management and preparation*
- Cleaning and maintaining of own dwelling and surroundings*
- Do-it-yourself decoration, maintenance and repair
- Care and maintenance of textiles and footwear
- Household management for own final use
- Pet care
- Shopping for own household and family members*
- Travelling, moving, transporting or accompanying goods or persons related to unpaid domestic services for household and family members*
- Other unpaid domestic services for household and family members

In additional analyses, we break down the types of indirect caregiving denoted with an asterisk (*) above and a residual category of "other" indirect caregiving.

Total time spent in "any" caregiving is time spent in either of direct or indirect activities as a primary or secondary activity (which is not necessarily the sum of the two, as it could be that the primary activity is indirect care and the secondary activity direct care if, for example, a woman is cooking dinner while supervising children).

Another outcome analyses consider is time spent in employment, as a primary or secondary activity. Analyses measure this from the time-use module response category: Employment and related activities. Time spent on employment is the intensive margin of employment; as an alternate outcome, analyses also examine whether individuals are employed or not in the past seven days, based on employment detection questions in the individual module. In additional analyses, we also look at time spent in primary and secondary direct care, indirect care, any care, and employment, separating out primary versus secondary time.

2.3. Key covariate: early childhood care and education

Although ECCE by definition covers a broader age range, from birth to age eight, since this work focuses on the impact of pre-primary and primary education on familial time use, ECCE is defined more narrowly. For children under age six, there is a question in the roster as to whether they attend a nursery, child care, or kindergarten, and if yes, the type, where responses include public and private kindergartens, which are counted as pre-primary. Children who were age six or older at the

time of the survey are asked the full individual questionnaire, including the education section.[4] There, a question inquires whether an individual has ever been to school, and if so, the highest level entered, where response options include pre-primary/kindergarten or primary. Analyses focus on the key covariate of any ECCE (either pre-primary/kindergarten or primary).

2.4. Control variables

The analysis includes control variables to both check assumptions and in an additional sensitivity analysis. Household location is considered, by region (which incorporates urban versus rural). For women, the analysis controls for education level, age group, being ever married, and whether their husband is present in the household. For their spouses, it controls for their education level and age group (with categories for spouse absent so that the sample is not reduced).

3. Methods

3.1. Regression discontinuity design

This paper relies on a regression discontinuity design (RDD) approach, based on a cutoff for school eligibility. The cutoff is based on the child's age September 30 (IEA PIRLS, 2021). There are two grades of Kindergarten: children aged four by September 30 (around the start of the school year) can begin KG 1. Children aged five by September 30 can begin KG 2. Children aged six by September 30 can begin primary school. This paper analyzes children around the age six (primary start) cutoff, focusing on an analysis sample (bandwidth) that is six months above and below that cutoff on September 30 ("age six group"), which is not necessarily their age at the time of fielding. Because ECCE can only affect time use when it is in session, we restrict our RDD analyses to households with a first visit date of October 1 or later,[5] so the time diary would refer to September 30 or later.

The ELMPS 2023 data capture birth month and year but not day. Fortunately, with a cutoff of September 30, children born in September would all be six before the cutoff and October-born children six after, so the lack of day does not affect the identification strategy. The analyses transform the age to be an assignment variable in years relative to being age six on September 30,

[4] There is thus a small group of respondents who were not yet aged six when fielded (fielding started September 15, 2023) but turned six by September 30 for whom we do not know if they enrolled in primary school, since they were not asked those questions. Since the vast majority of children start school on time in Egypt, analyses assume these children did as well and are in primary. Likewise, there is a large group of children who were not age six on September 30, 2023, and were still under six when interviewed subsequently, so were not asked the enrollment questions. Analyses assume they were not enrolled in primary, as they would not have been eligible. Data are available on their pre-primary enrollment. Because we are interested in time use with ECCE, most analyses restrict to after the start of the school year, which was also September 30 in 2023 (Egypt Independent, 2023).

[5] Fieldwork began September 15, 2023 (Assaad & Krafft, 2024) and 75% of the sample was fielded in October or later.

so that those who were age six by September 30 have positive values and those who were not yet negative numbers, and the cutoff is set at zero using this metric. Based on a question about their mother's line number in the household, we can map children's characteristics, including their age and ECCE, onto their mothers.[6] Focusing on the age six group yields an analysis sample of 1,311 mothers.

The cutoff is not mandatory (there is not 100% compliance past the cutoff and children can be enrolled at younger ages), making it a fuzzy RDD (FRDD); there should be a jump in ECCE at the cutoff of September 30, but not from 0% to 100% enrollment.[7] In a FRDD framework, the estimator of the treatment effect of ECCE on outcomes is the ratio of the jump in an outcome (e.g., mother's time spent in direct care) to the jump in the probability of treatment (ECCE) (Imbens & Lemieux, 2008; Lee & Lemieux, 2010).

Formally, T_i is the treatment (ECCE), and Y_i is the outcome of interest (e.g., time spent on care work). c denotes the cutoff (age six on September 30th) and X_i the age in years from that cutoff. D_i is an indicator variable for being above the cutoff, i.e. D_i=1[X_i≥c]. Using this notation, the effect of the assignment variable and cutoff on treatment (first stage, jump in the probability of treatment) is:

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

Where *f()* is a polynomial functional form, which can have varying parameters on each side of the cutoff (a local linear regression). β is the parameter of interest in this first stage and must be statistically significant in order to have a valid identification strategy – there must be a jump in primary enrollment at the cutoff.

The second stage is estimated based on:

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

Where, as with *f*(), *g*() is some polynomial functional form, which can again have varying parameters on each side of the cutoff.[8]

In terms of selecting a polynomial functional form, research has shown higher-order polynomials tend to be problematic and the recommendation is to consider only order zero (intercept only), one (linear) or two (quadratic) options (Gelman & Imbens, 2019). The main model's polynomial

[6] In the rare instance a mother has more than one child in the age six group (aged 5.5-6.5), which was mostly twins with the same ECCE status, the youngest or lowest ranked in the roster was used when mapping.
[7] Initial analyses also explored whether there were discontinuities at age four or age five, but there were not.
[8] Estimated using rdrobust (Calonico et al., 2014).

functional form is selected based on the specification with the smallest Akaike information criterion (AIC) in the reduced form model (the recommended approach for model selection (Lee & Lemieux, 2010)). The reduced form model is:

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

In this reduced form model, τ is an intent-to-treat parameter, estimating the impact of having a child above the cutoff (and thus eligible for ECCE) on outcomes. To be able to use a consistent functional form across outcomes, model selection is based on the any care hours outcome for mothers.

3.2. Sensitivity analyses

To assess robustness, the analysis first explores alternative polynomial specifications. The main model uses the intercept form, which was selected based on the Akaike Information Criterion (AIC). In the sensitivity analysis, linear and quadratic functional forms are also tested. Furthermore, two-sage least squares (2SLS) versions of the main model are presented. Another critical decision in the RDD approach is the selection of bandwidth around the cut-off, within which the results are estimated. To test the sensitivity of the results to bandwidth choice, the analysis halves the six-month bandwidth used in the main model. Additionally, while covariates should be irrelevant to estimation if they are balanced and the assignment variable is effectively random, their inclusion can improve precision. Therefore, the sensitivity analyses also include estimates with covariates to enhance robustness.

3.3. Heterogeneity analyses

Given the differences in mothers' work schedules and children's school hours, ECCE may impact mothers differently on weekdays compared to weekends, as well as during school hours versus non-school hours. Therefore, additional analyses estimate the effects of ECCE on maternal time use separately for weekdays and weekends, and for school hours and non-school hours. In Egypt, weekdays are from Sunday to Thursday, and weekends are Friday and Saturday. School hours are specified from 8:00 am to 12:15 pm on weekdays,[9] while non-school hours are any time outside of this window on both weekdays and weekends. Past research on the effects of ECCE has emphasized effects may be differential when the youngest child in the household has access to ECCE (Berlinski et al., 2011; Cascio, 2009; Gelbach, 2002; Ryu, 2020), so in one set of analyses we estimate impacts of ECCE for only mothers whose youngest child, specifically, is in the age six group.

[9] School hour cutoffs based on when 75% of children are in school, using time use data on time children in primary spent in school, discussed and presented below.

4. Results

The results initially present descriptive patterns of care work and time use by gender and children's age to provide context on the substantial time spent on care work (for women) and how it varies by children's age (for women). We then, in the next sub-section, present checks of the FRDD assumptions, before turning to the main FRDD estimates and further contextualizing time use by the discontinuity. Sensitivity analyses to functional form assumptions, bandwidth, and controls follow in the next sub-section. The final sub-section of results presents heterogeneity analyses, for the youngest child specifically, for weekdays versus weekends, for school and non-school hours, for primary and secondary activities separately, and for different types of indirect care work.

4.1. Patterns of care work and time use

Figure 1 presents time use (average hours per day) in care work and employment, by sex and the age of their youngest child for ever married women aged 15+ – and their husbands.[10] The results show the gendered division of labor within households. Men engage in at most 0.2 hours per day of direct care and 1.0 hours of indirect care, regardless of whether or what age children are in the household. In contrast, women with youngest children aged 0-1 spend the most time in direct care, 3.1 hours per day, and 5.0 hours of indirect care. While direct care decreases as children get older, indirect care does not (e.g., 5.0 hours per day if youngest children are 0-1 or 12-17). Women engage in a full shift of care work when looking at any care work, as high as 7.5 hours per day for those with youngest children 0-1 and still 6.7 hours per day for women with youngest children aged 6-11 (primary age). This time spent on care is quite similar to the hours men with children spend in employment, which varies from 5.7-7.0 hours per day across youngest children's ages. Because few women are employed, their hours of employment are much lower, but do tend to increase with children's age, from an average of 0.5 hours for women with youngest children aged 0-1 to 1.5 for women with youngest children aged 12-17. These patterns suggest potential for ECCE alleviating women's long hours of care work and increasing their employment, a question we test in subsequent sections.

[10] Because the time use module is about the day preceding the current day, and surveys do not occur equally on all days of the week in fieldwork, particularly from employed individuals, these descriptives re-weight time use outcomes to ensure an equal distribution of days overall, by sex, and by whether the respondent is employed.

Figure 1. Time (average hours per day) in care work and employment, by sex and age of youngest child in the household, ever married respondents aged 15+

Source: Author's calculations based on ELMPS 2023

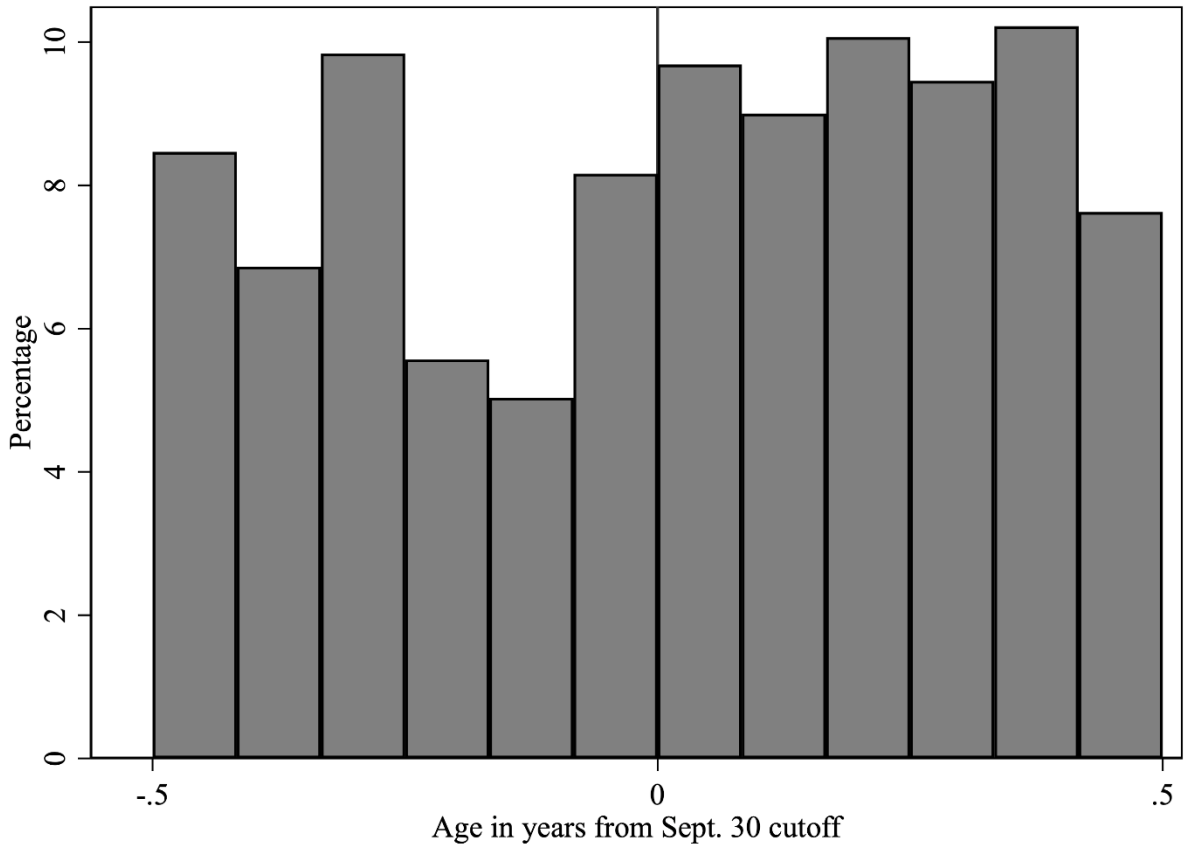
Notes: Based on the age of the youngest child of women based on their children present in the household. Mapped onto women's husbands (if in household) for men. No children could thus still mean the household has grandchildren or other relatives to care for.

4.2. Regression discontinuity design assumptions

Analyses hereafter focus on households visited in October or later, after school had started. Figure 2 checks an important assumption of the RDD strategy: that households are not manipulating the age of children to change their eligibility for school. This check focuses on our primary sample of mothers with children in the "age six group." Conceptually, it is fairly challenging to manipulate birth timing six years in advance of school start age. However, it is also possible that families or enumerators could be mis-reporting ages in order to avoid answering the individual questionnaire (asked of age six and above), as similar issues have been identified in the Sudan LMPS and other household surveys (Krafft, Assaad, & Cheung, 2024; Pullum & Staveteig, 2017). This displacement does not appear to be the case in the ELMPS 2023. If anything, there are slightly more individuals whose age makes them above age six on September 30. Tests for equivalent density do show significant but modest differences with slightly more children above the cutoff

overall.[11] There particularly does not appear to be any manipulation of the month right near the cutoff.

Figure 2. Histogram (percentage of observations in each month of age) around the age six cutoff



Source: Authors' calculations based on ELMPS 2023

Notes: Showing the distribution of children around the age six cutoff for the sample of their mothers.

A key assumption is that mothers are not otherwise different around the cutoff. Table 5, in the appendix, tests that assumption, undertaking t-tests comparing mothers above and below the age six cutoff in terms of variables for themselves and their spouses. There are only three characteristics (out of 40) where there are significant differences, similar to what one would expect by chance. Mothers below the cutoff are slightly more likely to be under age 25 (8.3% vs. 5.6%), but that is the only age difference. Those above the cutoff are more likely to be in urban Upper Egypt (18.1% vs. 13.4% below), and correspondingly less likely to be in rural Upper Egypt (40.3% above vs. 46.2% below). There are no significant education differences, differences in being married, or whether the spouse is present, or in any spouse characteristics. A regression testing

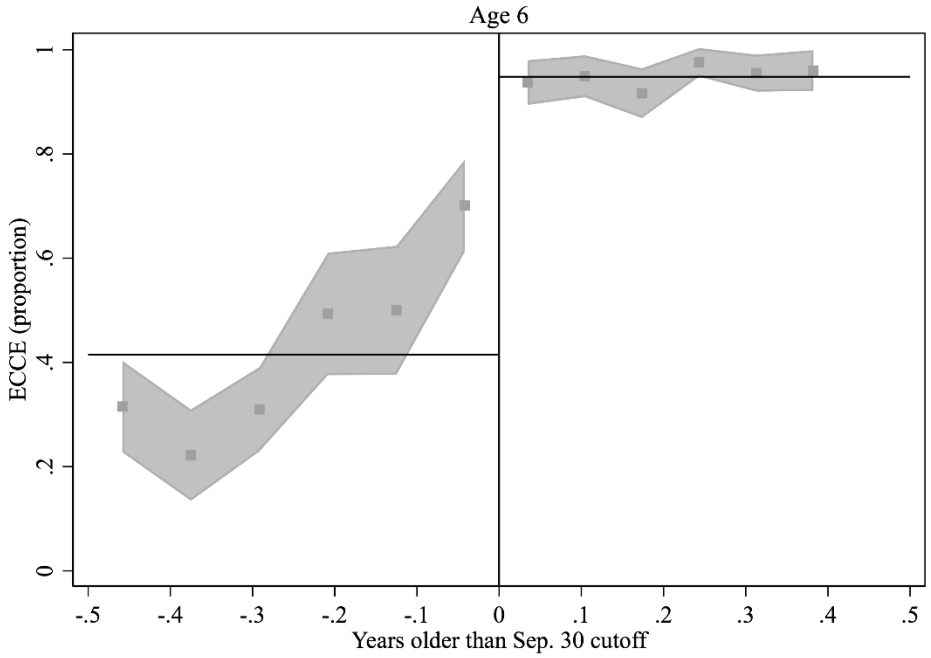
[11] Tests undertaken using rddensity version 2.3 (Cattaneo et al., 2018).

whether these controls predict being above the cutoff versus below has an F-statistic of 0.96 (p-value of 0.544). Characteristics are thus balanced across the cutoff.

4.3. Regression discontinuity design estimates

The main model specification is determined based on the smallest AIC for the mother's any care hours, shown in the appendix, in Table 6. The intercept-only specification has an AIC of 7016.1; the linear specification has an AIC of 7019.8; the quadratic specification has an AIC of 7017.3. The intercept specification, with the lowest AIC, is thus the main model and preferred specification. Figure 3 examines the crucial question of whether there is in fact a discontinuity in ECCE around the cutoff. [12] The figure presents bin (month) means for the proportion in ECCE, the confidence interval around those means, and an intercept fit on each side of the cutoff. There is a clear jump in ECCE above the cutoff, confirming a valid identification strategy. Although ECCE rises with age to the cutoff,[13] it is near universal past the cutoff, when children would be eligible for primary.

Figure 3. Children's ECCE (proportion), by child's age in years from September 30, mothers with child in age six group



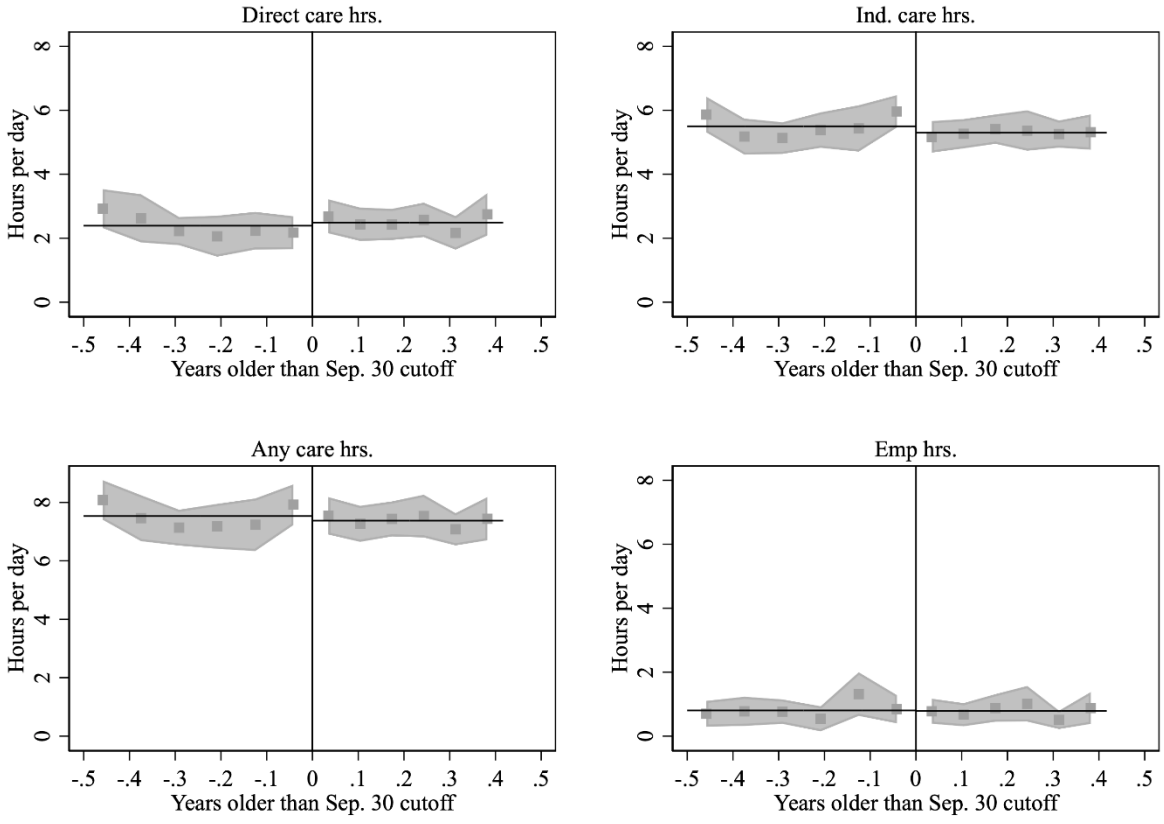
Source: Authors' calculations based on ELMPS 2023

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

[12] All FRDD plots estimated using rdplot (Calonico et al., 2014).
[13] The functional form of outcomes, not the treatment, is prioritized and the same functional form should be used for the treatment as well (Imbens & Lemieux, 2008; Lee & Lemieux, 2010).

Figure 4 explores maternal time use outcomes, in average hours per day, around the age six on September 30 discontinuity for primary, using the preferred intercept specification in the visual. Although reduced form visualizations and not formal tests of impact, these results are consistent with those subsequent tests. On both sides of the cutoff, direct care hours are slightly more than two per day. There are, if anything, slightly higher direct care hours above the cutoff, but the confidence intervals suggest differences are not significant. Women undertake more than five hours of indirect care work per day, on both sides of the cutoff. Indirect care hours are very slightly lower above the cutoff, but confidence intervals suggest these differences are unlikely to be significant. Any care hours average more than seven per day on both sides of the cutoff, and show a similar pattern, very slightly less but unlikely to be a significant difference. Average hours of employment are around one per day, and identical on both sides of the cutoff. These results suggest that having a child be able to access primary does not appreciably change either time spent on care work or time spent in employment for women with children near the primary age cutoff.

Figure 4. Maternal time use outcomes (average hours per day), by child's age in years from September 30, mothers with child in age six group

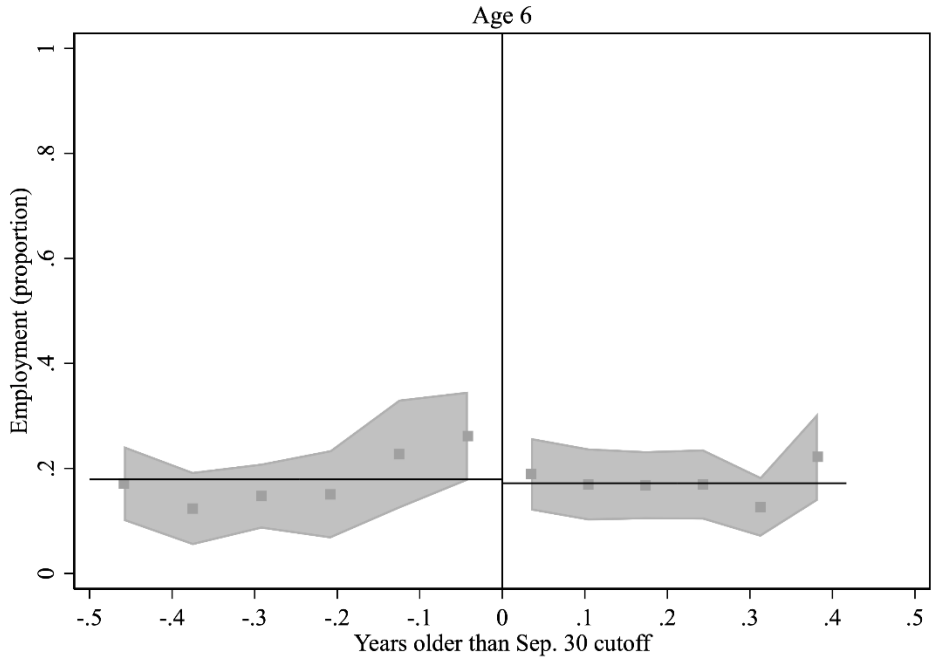


Source: Authors' calculations based on ELMPS 2023

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

Figure 5 explores employment on the extensive margin, whether women are employed at all around the cutoff. Unsurprisingly given the results above, the probability of being employed is below 20% on both sides of the cutoff and is, if anything, very slightly lower above the cutoff, when children would be eligible for primary, although confidence intervals suggest differences are not significant.

Figure 5. Maternal employment (proportion), by child's age in years from September 30, mothers with child in age six group



Source: Authors' calculations based on ELMPS 2023

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

Table 1 presents the FRDD intercept models of maternal outcomes for mothers with children in the age six group. Notably, with all estimation methods, the first stage is quite strong, a significant 53.1 percentage point increase in ECCE around the primary cutoff. The patterns in the treatment effect estimates are consistent with those presented in the figures above; slightly higher (0.19 hours per day) direct care hours, 0.39 fewer indirect care hours, 0.29 fewer any care hours, 0.04 fewer employment hours, and a 1.4 percentage point reduction in employment. None of these impacts is statistically significant. Thus, overall, ECCE is not reducing care work nor is it increasing employment on the extensive or intensive margins.

Table 1. FRDD intercept models of maternal outcomes, mothers with a child in age six group

	Direct care hrs.	Indirect care hrs.	Any care hrs.	Employment hrs.	Employed
ECCE	0.190	-0.386	-0.292	-0.037	-0.014
	(0.309)	(0.291)	(0.375)	(0.239)	(0.040)
First	0.531***	0.531***	0.531***	0.531***	0.533***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
N (Obs.)	1303	1303	1303	1303	1308
N right	730	730	730	730	733
N left	573	573	573	573	575

Source: Authors' calculations based on ELMPS 2023

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

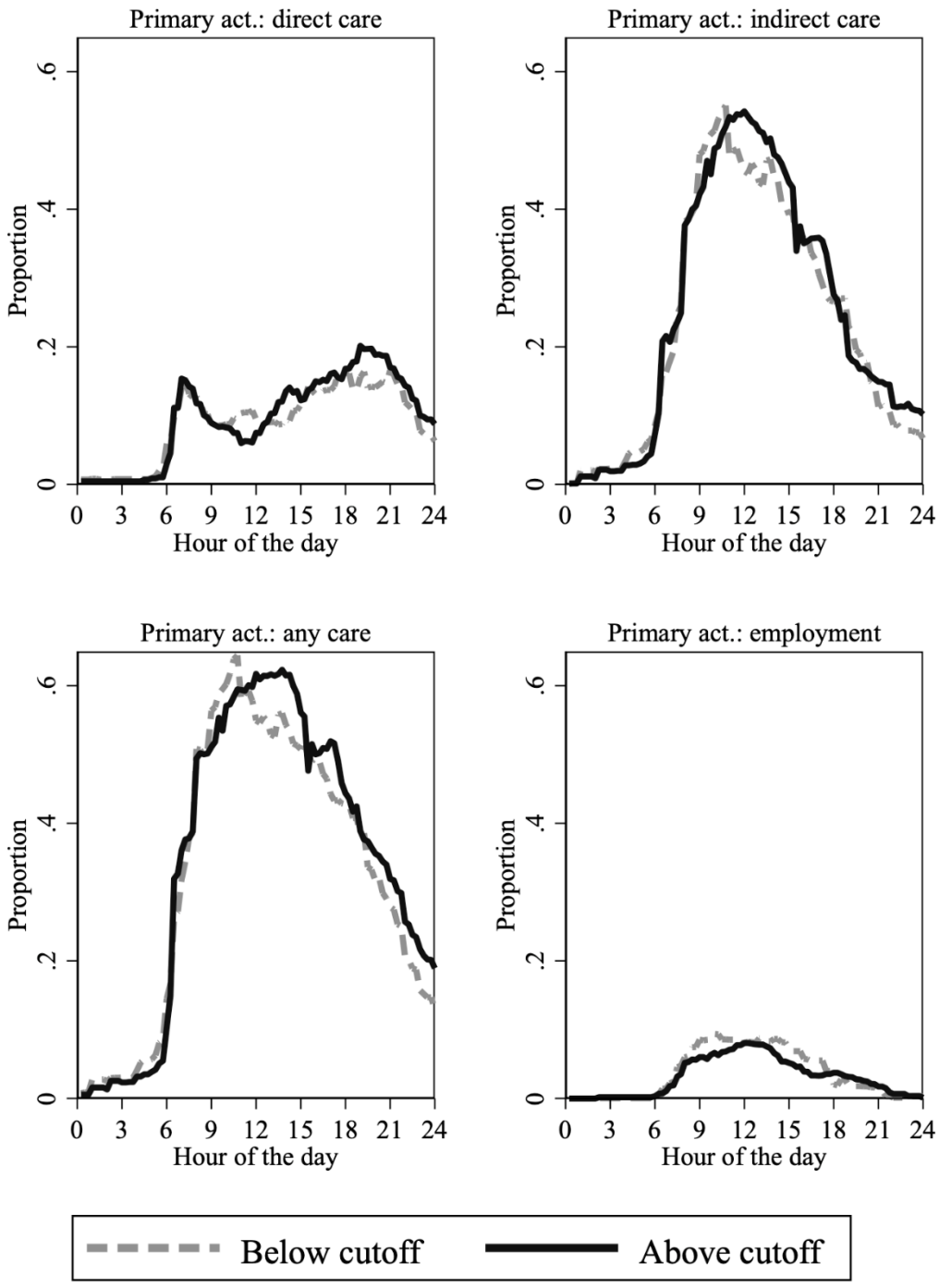
Sample consists of mothers with a child in the age six group (+/- six months of age six on Sept. 30) who have non-missing outcome data.

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

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).

How can mothers not have time freed up by sending children to ECCE? Figure 6 explores the time patterns, over the day, of mothers with children in the age six group by whether their child is above or below the cutoff. The proportion of mothers engaged in direct care, indirect care, any care, or employment is shown by quarter hour over the course of the day. Direct care rises starting around 6:00AM and is very slightly higher around 7:00AM-7:45AM for mothers whose children are primary eligible, possibly as they prepare their children for school. Direct care is then very similar into the 9:00AM hour, and then it is lower for those with children eligible for primary until around 12:30PM, when schedules converge again. Thereafter, direct care is either similar between the groups or higher for children eligible for primary, particularly right after school and in the evening when they might be doing homework. Figure 7, in the appendix, shows the school schedule for primary students aged 10+ (who answered the individual time use module). A majority are in school at 7:45AM and 75% by 8AM. At 12:15PM is the last time 75% are in school and 1:15PM the last time 50% are in school. The patterns observed for direct care are thus consistent with mothers taking young children to school (potentially increasing care work), having a slight reduction in direct care work for a few hours of school, and then picking children back up from school and having additional responsibilities after school.

Figure 6. Proportion of time spent on various primary activities each quarter hour by below/above age six September 30 cutoff, mothers with child in age six group



Source: Authors' calculations based on ELMPS 2023

Figure 6 also shows the proportion of time spent in indirect care work, any care work, and employment by hour of the day. Indirect care work is lower for mothers with children above the cutoff (eligible for primary) starting around 7:30AM, and remains so through around 8:15AM, likely through drop-off for school. Indirect care is then higher for mothers with ECCE eligible children during the school hours and into the afternoon. When they have time freed from direct care, women's time shifts into indirect care. Women do not substitute into employment during school hours; aside from briefly around noon, women with children eligible for primary are less likely to be spending time in employment during the school day and into the afternoon; they spend slightly more time employed in the evening.

4.4. Sensitivity analyses

We undertake a number of sensitivity analyses testing the specification. The results of the reduced form models are presented in Table 6, in the appendix, estimating the direct effect of being above the cutoff under different specifications (rather than the treatment effect of the ratio in the jump in treatment and jump in outcome from the FRDD). Recall that the intercept functional form was selected as the lowest AIC for the "any care hours" outcome. Unsurprisingly, none of the reduced form intercept models show a significant impact of being above the cutoff (eligible for primary) on any of the outcomes. In the linear reduced form model, there is a significant increase in direct care hours when eligible for ECCE, but this disappears in the quadratic specification. The quadratic specifications for indirect care hours show a significant decrease above the cutoff, but also a significant decrease in the probability of employment.

In Table 7 (in the appendix), halving the bandwidth showed all insignificant results, similar to the main estimates in Table 1. Table 8 (in the appendix) examines a linear functional form (polynomial degree one). Again, the estimates remained all insignificant. Table 9 (in the appendix) applies a quadratic functional form (polynomial degree two). The first stage is no longer significant, and the estimates are all implausibly large, but also insignificant. Table 10 presents the two-stage least squares (2SLS) results from the intercept FRDD estimation. The first stage, which uses the cut-off indicator as an instrument for ECCE, shows a strong and significant relationship. The instrument F-statistic is 572-578 across outcomes, with a p-value<0.001. In the second stage, the main results are necessarily mathematically identical to Table 1, but with different (robust) standard errors. All remain statistically insignificant. Table 11 presents the FRDD model results with controls. The findings remain consistent with those from the model without controls (Table 1), reinforcing the robustness of the estimates. Overall, all of these specification checks show – robustly – no significant effect of ECCE on maternal time use or employment. Almost all the different specifications are also well-powered in the first stage to detect effects.

4.5. Heterogeneity analyses

There may be differential effects of ECCE when the child attending ECCE is the youngest in the household. To check this, we conducted an analysis focusing on households where the child in the "age six group" is the youngest offspring of the mother. Since this is a different sample, we rechecked the distribution of children on both sides of the cutoff, and the tests for equivalent density do not show significant differences for this sample. The FRDD results, presented in Table 2, remain all insignificant (although the first stage remains significant). There is roughly a 0.4 hour reduction in direct care work, a 0.4 hour reduction in indirect care work, a 0.7 hour reduction in any care hours, a 0.4 hour reduction in employment hours, and a 4.6 percentage point drop in employment, but again, all these results are insignificant, suggesting there is not a sizeable differential impact when ECCE becomes available for the youngest child.

Table 2. FRDD intercept models of maternal outcomes, mothers with a child in the age six group, child in the age six group is her youngest child

	Direct care hrs.	Indirect care hrs.	Any care hrs.	Employment hrs.	Employed
ECCE	-0.436	-0.441	-0.670	-0.359	-0.046
	(0.356)	(0.421)	(0.525)	(0.386)	(0.060)
First	0.537***	0.537***	0.537***	0.537***	0.540***
	(0.031)	(0.031)	(0.031)	(0.031)	(0.030)
N (Obs.)	602	602	602	602	606
N right	317	317	317	317	319
N left	285	285	285	285	287

Source: Authors' calculations based on ELMPS 2023

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

Sample includes mothers with a child in the age six group (+/- six months of age six on Sept. 30), where the child in the age six group is the youngest in the household, with non-missing outcome data.

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

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).

Considering the differences in mothers' work schedules and children's school hours, ECCE may affect mothers differently on weekdays compared to weekends. Table 3 illustrates these differences for the time use outcomes. Although the first stage for all estimates is significant, only one estimated impact of ECCE is significant: an 0.7 hour per day reduction in indirect care on weekdays (versus an insignificant 0.3 hour per day increase on the weekend). ECCE may thus slightly shift when care work is being done.

Table 3. FRDD intercept models of maternal outcomes, mothers with a child in the age six group, weekday versus weekend time use

	Direct care hrs.		Indirect care hrs.		Any care hrs.		Employment hrs.	
	Weekday	**Weekend**	**Weekday**	**Weekend**	**Weekday**	**Weekend**	**Weekday**	**Weekend**
ECCE	0.611	-0.754	-0.707*	0.342	-0.294	-0.278	-0.231	0.417
	(0.369)	(0.571)	(0.353)	(0.516)	(0.451)	(0.684)	(0.300)	(0.389)
First	0.517***	0.565***	0.517***	0.565***	0.517***	0.565***	0.517***	0.565***
	(0.025)	(0.040)	(0.025)	(0.040)	(0.025)	(0.040)	(0.025)	(0.040)
N (Obs.)	928	375	928	375	928	375	928	375
N right	516	214	516	214	516	214	516	214
N left	412	161	412	161	412	161	412	161

Source: Authors' calculations based on ELMPS 2023

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

The "weekday" sample consists of mothers with a child in the age six group (+/- six months of age six on Sept. 30) who completed the time use diary for a weekday (Sunday–Thursday), with non-missing outcome data. The "weekend" sample includes mothers with a child in the age six group (+/- six months of age six on Sept. 30) who completed the time use diary for a weekend day (Friday–Saturday), also with non-missing outcome data.

"First" refers to the first-stage discontinuity in pre-primary education.

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).

Since the effects of ECCE on time use are likely to vary across school versus non-school hours (as shown in Figure 6), we explore the effects of ECCE on maternal outcomes during school hours and non-school hours separately, as shown in the appendix in Table 12. There are not significant differences during school hours or during non-school hours in any of the time use outcomes. Coefficients are also small, e.g. at most an 0.3 hour increase in direct care or any care in non-school hours from ECCE. Table 13 (in the appendix) illustrates the potentially varied effects of ECCE on maternal time use when distinguishing between primary and secondary activities. There are not any significant impacts of ECCE on either primary or secondary time use.

ECCE could differentially impact different types of indirect care hours. To explore this further, we analyze the effect of ECCE on specific types of indirect caregiving, as presented in Table 4. ECCE leads to a significant decrease in food preparation hours (0.4 hours per day), but no other differences are significant and are a mix of small decreases (cleaning and travel) and small increases (shopping and other indirect care). Overall, the heterogeneity analysis results do not show differential benefits when the youngest child reaches ECCE, but some suggestive evidence of shifts in care work between weekdays and weekends and between types of indirect care work.

Table 4. FRDD intercept models of maternal outcomes, mothers with a child in the age six group, different types of indirect care activities

	Food	Cleaning	Shopping	Travel	Other indirect
ECCE	-0.369*	-0.340	0.129	-0.054	0.113
	(0.176)	(0.199)	(0.104)	(0.041)	(0.149)
First	0.531***	0.531***	0.531***	0.531***	0.531***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
N (Obs.)	1303	1303	1303	1303	1303
N right	730	730	730	730	730
N left	573	573	573	573	573

Source: Authors' calculations based on ELMPS 2023

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

The sample consists of mothers with a child in the age six group (+/- six months of age six on Sept. 30) who have non-missing outcome data.

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

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. Discussion and conclusions

Global gender disparities in unpaid care work have prompted calls for policies to redistribute this care work, including onto the market with services such as ECCE (International Labour Organization, 2018). The expectation is that these services will reduce the time women spend in unpaid care work and allow for increases in women's employment as well. Past research has demonstrated that ECCE usually does, particularly in LMICs, increase women's employment rates and/or hours (Gelbach, 2002; Halim et al., 2023; Swart et al., 2019). Studies of ECCE's impact do not necessarily look at other impacts on women's time, such as whether time unpaid care work

actually decreases. However, some of the studies that do examine time use show ECCE decreasing unpaid care work (Angeles et al., 2012; Calderón, 2014; Fang & Miao, 2024). For instance, a study of the impact of ECCE in Mexico showed it reduced mothers' time in child care while doing something else by 1.4 hours per day and additionally time spent exclusively on child care by 0.3 hours, while increasing employment by 18 percentage points and hours per week of employment by 7 hours, consistent with the weekly reduction in time spent in child care (Angeles et al., 2012).

This paper tested the impact of ECCE on maternal time use and employment in Egypt, using a RDD for primary school. The RDD's ability to identify the causal effects of ECCE rests on a number of assumptions. There does not appear to be manipulation of birth dates right around the cutoff, but children's ages are also not uniformly distributed. Promisingly, there is a very clear jump in ECCE at the cutoff, such that the identification strategy's first stage is strong. Because RDD focuses on a local average treatment effect, impacts at other ages than age six could be different. The local nature of estimates, constrained to around the cutoff, can also limit statistical power. Although the first stage is strong, small impacts may not be detectable.

The results showed that in Egypt, ECCE, specifically children starting primary school, does not decrease time spent in unpaid care work, nor increase employment rates or hours of work.[14] There is some suggestive evidence that ECCE may slightly shift the timing or type of care work, but not care work or employment overall. The main results are robust to a variety of alternative specifications and robustness checks, such as focusing on the youngest child in the household.

Several factors may be driving the lack of effect from ECCE. First, primary school days are short, and short hours of care have been shown to have null or negative effects on women's employment outcomes in some low-employment contexts (Krafft & Lassassi, 2024; Medrano, 2009).[15] Lengthening the school day or providing after-school care could be beneficial for mother's employment, as suggested by studies in other contexts (Berthelon et al., 2020; Cannon et al., 2006; Dhuey et al., 2019; Martínez A. & Perticará, 2017). However, studies in other contexts with short days of care have still shown positive impacts (Berlinski & Galiani, 2007; Swart et al., 2019), so it may be particularly in contexts with low female employment rates that length of care matters (Krafft & Lassassi, 2024; Medrano, 2009), as with Egypt.

An important critique of research on early childhood development interventions in LMICs is that only 4% look at impacts on maternal labor market outcomes or time use, and furthermore that studies often value mother's time for such interventions at zero (Evans et al., 2021). Given current

[14] The paper looks at the impact of ECCE services on women's employment for women with ECCE-eligible children; it does not consider the impact of ECCE on women's employment via working in ECCE, and the care economy including ECCE is dominated by women (Economic Research Forum & UN Women, 2020; International Labour Organization, 2018; Krafft & Ehab, 2023).

[15] In contexts where employment rates are higher, even shorter hours of care may increase employment (Swart et al., 2019).

gender divisions of care work, in Egypt ECCE may create additional work for mothers – as the descriptive evidence on additional direct care around drop off/pick up and after school suggests.

While ECCE interventions seem to increase maternal employment and shift time use in LMICs outside MENA (Halim et al., 2023), results in MENA to date have been less promising. Child care subsidies did not improve mother's employment outcomes in Egypt, nor did subsidies combined with employment services (Caria et al., 2022). In Algeria, a pre-primary expansion did not increase and appears to have even reduced maternal employment (Krafft & Lassassi, 2024). Gender norms that identify women as homemakers and men as breadwinners (El-Feki et al., 2017; Hoodfar, 1997) may be underlying the ineffectiveness of ECCE interventions in improving maternal outcomes in MENA.

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Appendix: Additional Tables

Table 5. 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	0.083	0.056	0.028*
	(0.012)	(0.008)	
25-29	0.250	0.278	-0.028
	(0.018)	(0.017)	
30-34	0.335	0.322	0.013
	(0.020)	(0.017)	
35-39	0.200	0.214	-0.014
	(0.017)	(0.015)	
40-44	0.090	0.091	-0.001
	(0.012)	(0.011)	
45-49	0.036	0.034	0.002
	(0.008)	(0.007)	
50+	0.005	0.005	-0.000
	(0.003)	(0.003)	
Mother's education			
Illiterate	0.176	0.175	0.001
	(0.016)	(0.014)	
Reads & Writes	0.047	0.030	0.017
	(0.009)	(0.006)	
Primary	0.077	0.072	0.004
	(0.011)	(0.010)	
Preparatory	0.122	0.117	0.004
	(0.014)	(0.012)	
General secondary	0.038	0.044	-0.005
	(0.008)	(0.008)	
Vocational secondary	0.375	0.372	0.003
	(0.020)	(0.018)	
Post-secondary institute	0.030	0.025	0.005
	(0.007)	(0.006)	
University & above	0.136	0.165	-0.029
	(0.014)	(0.014)	
Region			
Greater Cairo	0.054	0.052	0.002
	(0.009)	(0.008)	
Alexandria & Suez Canal	0.038	0.053	-0.015
	(0.008)	(0.008)	
Urban Lower Egypt	0.076	0.091	-0.015
	(0.011)	(0.011)	
Urban Upper Egypt	0.134	0.181	-0.047*
	(0.014)	(0.014)	
Rural Lower Egypt	0.236	0.220	0.016
	(0.018)	(0.015)	
Rural Upper Egypt	0.462	0.403	0.059*
	(0.021)	(0.018)	
Ever married	0.955	0.962	-0.007
	(0.009)	(0.007)	
Spouse present	0.868	0.880	-0.012
	(0.014)	(0.012)	
Spouse education			
Spouse absent/education missing	0.146	0.129	0.017
	(0.015)	(0.012)	
Illiterate	0.109	0.133	-0.024
	(0.013)	(0.013)	

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

	Below cutoff Mean/(SE)	Above cutoff Mean/(SE)	Pairwise t-test Mean difference
Reads & Writes	0.033	0.042	-0.009
	(0.007)	(0.007)	
Primary	0.071	0.067	0.005
	(0.011)	(0.009)	
Preparatory	0.049	0.050	-0.002
	(0.009)	(0.008)	
General secondary	0.016	0.033	-0.017
	(0.005)	(0.007)	
Vocational secondary	0.415	0.370	0.045
	(0.021)	(0.018)	
Post-secondary institute	0.016	0.014	0.002
	(0.005)	(0.004)	
University & above	0.146	0.162	-0.016
	(0.015)	(0.014)	
Spouse age group			
Spouse absent/age missing	0.137	0.124	0.013
	(0.014)	(0.012)	
<25	0.005	0.007	-0.002
	(0.003)	(0.003)	
25-29	0.056	0.042	0.013
	(0.010)	(0.007)	
30-34	0.198	0.220	-0.022
	(0.017)	(0.015)	
35-39	0.271	0.265	0.006
	(0.019)	(0.016)	
40-44	0.168	0.173	-0.004
	(0.016)	(0.014)	
45-49	0.094	0.110	-0.016
	(0.012)	(0.012)	
50+	0.071	0.059	0.013
	(0.011)	(0.009)	
N (obs.)	576	735	1311

Source: Authors' calculations based on ELMPS 2023

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

Table 6. Reduced form FRDD intercept, linear, and quadratic models, mothers with child in age six group

	Direct care hrs.			Ind. care hrs.			Any care hrs.			Emp hrs.			Employed		
	Intercept	**Linear**	**Quadratic**	**Intercept**	**Linear**	**Quadratic**	**Intercept**	**Linear**	**Quadratic**	**Intercept**	**Linear**	**Quadratic**	**Intercept**	**Linear**	**Quadratic**
Above cutoff	0.101	0.678*	0.252	-0.205	-0.415	-1.575**	-0.155	0.044	-1.229	-0.020	-0.196	-0.263	-0.007	-0.083	-0.160*
	(0.165)	(0.343)	(0.566)	(0.155)	(0.324)	(0.532)	(0.199)	(0.416)	(0.684)	(0.128)	(0.267)	(0.440)	(0.021)	(0.044)	(0.073)
Age in years from cutoff		-1.740*	3.475		0.540	10.607**		-0.383	11.697*		0.592	0.891		0.257*	1.165*
		(0.845)	(4.032)		(0.797)	(3.795)		(1.024)	(4.879)		(0.657)	(3.139)		(0.109)	(0.518)
Above cutoff # Age in years from cutoff		1.485	-6.242		-0.310	-9.058*		-0.026	-12.712*		-0.602	-0.278		-0.265	-1.575*
		(1.155)	(4.871)		(1.089)	(4.585)		(1.399)	(5.895)		(0.898)	(3.793)		(0.148)	(0.625)
Age in years from cutoff # Age in years from cutoff			8.994			17.362**			20.833*			0.517			1.567
			(6.799)			(6.399)			(8.227)			(5.293)			(0.873)
Above cutoff # Age in years from cutoff # Age in years from cutoff			-2.829			-20.599*			-19.346			-2.047			-0.581
			(9.354)			(8.804)			(11.319)			(7.282)			(1.201)
Constant	2.391***	1.866***	2.429***	5.503***	5.666***	6.754***	7.533***	7.418***	8.723***	0.803***	0.982***	1.014*	0.179***	0.257***	0.355***
	(0.123)	(0.283)	(0.512)	(0.116)	(0.267)	(0.482)	(0.149)	(0.343)	(0.619)	(0.096)	(0.220)	(0.398)	(0.016)	(0.037)	(0.066)
N (obs.)	1303	1303	1303	1303	1303	1303	1303	1303	1303	1303	1303	1303	1308	1308	1308
AIC	6519.4	6519.1	6520.4	6362.8	6366.2	6362.6	7016.1	7019.8	7017.3	5860.9	5864.1	5868.0	1184.9	1183.3	1182.6

Source: Authors' calculations based on ELMPS 2023

*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 Sept. 30) who have non-missing outcome data.

Table 7. FRDD intercept models of maternal outcomes, mothers with a child in the age six group, half the bandwidth

	Direct care hrs.	Indirect care hrs.	Any care hrs.	Employment hrs.	Employed
ECCE	1.035	-1.049	-0.289	-0.285	-0.126
	(0.659)	(0.624)	(0.828)	(0.536)	(0.095)
First	0.348***	0.348***	0.348***	0.348***	0.348***
	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
N (Obs.)	619	619	619	619	622
N right	373	373	373	373	376
N left	246	246	246	246	246

Source: Authors' calculations based on ELMPS 2023

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

"First" denotes the first-stage discontinuity in pre-primary.

Sample consists of mothers with a child in the age six group (+/- six months of age six on Sept. 30) who have non-missing outcome data within three (rather than six) months of the cutoff.

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 8. FRDD linear models of maternal outcomes, mothers with a child in the age six group

	Direct care hrs.	Indirect care hrs.	Any care hrs.	Employment hrs.	Employed
ECCE	3.202	-1.959	0.206	-0.926	-0.389
	(1.737)	(1.525)	(1.972)	(1.293)	(0.238)
First	0.212***	0.212***	0.212***	0.212***	0.213***
	(0.048)	(0.048)	(0.048)	(0.048)	(0.048)
N (Obs.)	1303	1303	1303	1303	1308
N right	730	730	730	730	733
N left	573	573	573	573	575

Source: Authors' calculations based on ELMPS 2023

*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 Sept. 30) who have non-missing outcome data.

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

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 quadratic models of maternal outcomes, mothers with a child in the age six group

	Direct care hrs.	Indirect care hrs.	Any care hrs.	Employment hrs.	Employed
ECCE	15.926	-99.509	-77.620	-16.594	-11.772
	(92.052)	(518.618)	(405.215)	(93.783)	(71.756)
First	0.016	0.016	0.016	0.016	0.014
	(0.083)	(0.083)	(0.083)	(0.083)	(0.082)
N (Obs.)	1303	1303	1303	1303	1308
N right	730	730	730	730	733
N left	573	573	573	573	575

Source: Authors' calculations based on ELMPS 2023

*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 Sept. 30) who have non-missing outcome data.

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

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. 2SLS FRDD intercept models of maternal outcomes, mothers with a child in the age six group

	Direct care hrs.	Indirect care hrs.	Any care hrs.	Employment hrs.	Employed
ECCE	0.190	-0.386	-0.292	-0.037	-0.014
	(0.309)	(0.291)	(0.375)	(0.239)	(0.040)
Constant	2.312***	5.664***	7.655***	0.818***	0.185***
	(0.233)	(0.221)	(0.285)	(0.178)	(0.031)
First stage					
Above cutoff	0.531***	0.531***	0.531***	0.531***	0.533***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Constant	0.417***	0.417***	0.417***	0.417***	0.416***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
N (Obs.)	1303	1303	1303	1303	1308
p-val. for chi H0: exog.	0.338	0.590	0.703	0.334	0.426
p-val. for F-test H0: exog.	0.339	0.591	0.703	0.334	0.426
Partial r-sq.	0.340	0.340	0.340	0.340	0.342
F-stat. first	571.984	571.984	571.984	571.984	578.442
p-val F test	0.000	0.000	0.000	0.000	0.000

Source: Authors' calculations based on ELMPS 2023

*Notes: *p<0.05; **p<0.01; ***p<0.001. Robust standard errors in parentheses.*

Sample consists of mothers with a child in the age six group (+/- six months of age six on Sept. 30) who have non-missing outcome data.

Table 11. FRDD intercept models of maternal outcomes, mothers with a child in the age six group, including controls

	Direct care hrs.	Indirect care hrs.	Any care hrs.	Employment hrs.	Employed
ECCE	0.169	-0.373	-0.292	-0.097	-0.018
	(0.301)	(0.286)	(0.367)	(0.231)	(0.038)
First	0.526***	0.526***	0.526***	0.526***	0.527***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
N (Obs.)	1303	1303	1303	1303	1305
N right	730	730	730	730	731
N left	573	573	573	573	574

Source: Authors' calculations based on ELMPS 2023

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

The sample consists of mothers with a child in the age six group (+/- six months of age six on Sept. 30) who have non-missing outcome data.

"First" denotes the first-stage discontinuity in pre-primary.

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).

Controls are: age group, education level, ever married, spouse present, region, education of spouse, age group of spouse (see Table 5).

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Table 12. FRDD intercept models of maternal outcomes, mothers with a child in the age six group, school versus non-school hours

	Direct care hrs.		Indirect care hrs.		Any care hrs.		Employment hrs.	
	School	**Non-school**	**School**	**Non-school**	**School**	**Non-school**	**School**	**Non-school**
ECCE	0.121	0.338	0.008	0.005	0.130	0.344	-0.220	0.034
	(0.162)	(0.464)	(0.246)	(0.468)	(0.283)	(0.667)	(0.143)	(0.186)
First	0.520***	0.533***	0.520***	0.533***	0.520***	0.533***	0.520***	0.533***
	(0.025)	(0.021)	(0.025)	(0.021)	(0.025)	(0.021)	(0.025)	(0.021)
N (Obs.)	933	1311	933	1311	933	1311	933	1311
N right	518	735	518	735	518	735	518	735
N left	415	576	415	576	415	576	415	576

Source: Authors' calculations based on ELMPS 2023

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

The "School hours" columns include mothers with a child in the age six group (+/- six months of age six on Sept. 30) and their time during school hours (8:00 am–12:15 pm, Sunday–Thursday), with non-missing outcome data. The "Non-school hours" columns consist of the time use of mothers with a child in the age six group (+/- six months of age six on Sept. 30) outside of school hours, including Friday–Saturday and non-school hours on Sunday–Thursday.

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

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 intercept models of maternal outcomes, mothers with a child in the age six group, primary versus secondary activities

	Direct care hrs.		Indirect care hrs.		Any care hrs.		Employment hrs.	
	Primary	**Secondary**	**Primary**	**Secondary**	**Primary**	**Secondary**	**Primary**	**Secondary**
ECCE	-0.049	0.239	-0.252	-0.135	-0.301	0.009	-0.002	-0.035
	(0.223)	(0.208)	(0.281)	(0.098)	(0.341)	(0.173)	(0.237)	(0.020)
First	0.531***	0.531***	0.531***	0.531***	0.531***	0.531***	0.531***	0.531***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
N (Obs.)	1303	1303	1303	1303	1303	1303	1303	1303
N right	730	730	730	730	730	730	730	730
N left	573	573	573	573	573	573	573	573

Source: Authors' calculations based on ELMPS 2023

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

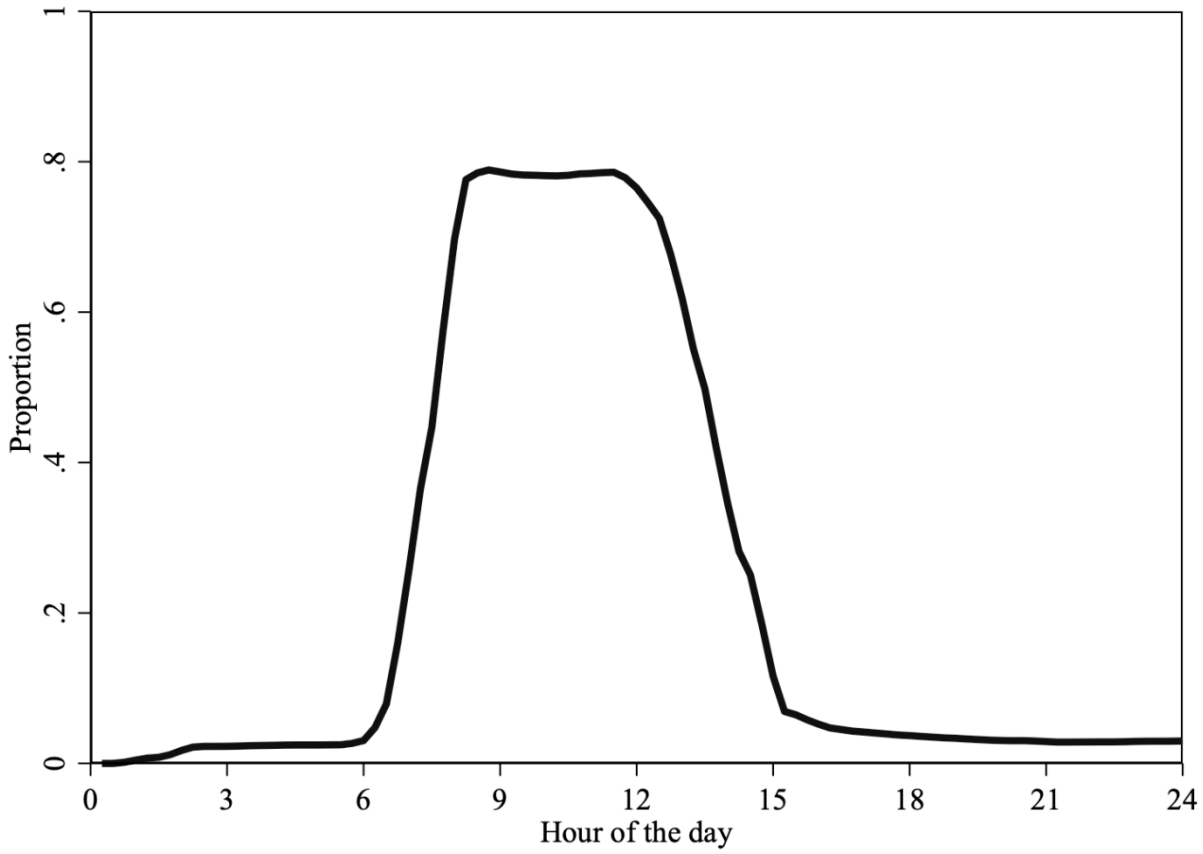
The sample consists of mothers with a child in the age six group (+/- six months of age six on Sept. 30) who have non-missing outcome data. The "primary" columns are their time use in primary activities, the "secondary" columns are their time use in secondary activities.

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

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).

Appendix: Additional Figures

Figure 7. Proportion of time spent on formal instruction in school, children aged 10+ currently enrolled in primary school



Source: Authors' calculations based on ELMPS 2023