Title: Drop-Off, Pick-Up, Repeat: The Hidden Labor Market Effects of School Timing

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Abstract

Policies such as subsidized child care, school starttime floors, and all-day kindergarten, can impact both student outcomes and parents' labor force participation decisions. Existing literature shows that timing of school days and lowered costs of childcare positively impacts mothers' labor force participation and attachment, especially for low-income mothers and mothers with infants or pre-k aged children (Berthelon et al, 2023; Gibbs, 2024; Dhuey et. al, 2021; Erceg et. al., 2023). We add to this research by investigating the effects of school start and stop times on mother's and father's labor force participation by using the American Time Use survey. Preliminary results indicate that mothers and fathers start work later when elementary schools start later and start work earlier when states implement all day kindergarten policies. Mothers start work earlier when middle and high schools start earlier, while fathers start work later for the same age groups. Understanding the impact of school timing and childcare demands can inform our understanding of gendered differences in labor force participation.

Introduction

While designed to impact children's outcomes, public schooling also functions as a large childcare subsidy allowing parents to spend less time on home production and more time in the labor force. For families to rely on public schooling as childcare, alignment of the school day and work day is a key, and understudied, consideration. Before and after school care can be costly and difficult to coordinate, forcing parents to adjust work schedules to accommodate drop off and pick up. School timing policies are especially important for mothers due to gendered norms. Research shows that fathers have increased work hours when their children are in half day programs compared to full day programs, whereas mothers spend fewer hours in paid work (Gibbs, 2024). We investigate the gendered relationship between paid work, home production and the timing of the school day using diary data from the American Time Use Survey (ATUS).

Much of the schoolday timing research focuses on younger children. Studies exploit state-level changes from half to full day kindergarten to causally identify increases in mothers' labor force participation. For example, in the US context, a 10 percentage point increase in full day kindergarten enrollment leads to a 0.43 percentage point increase in maternal employment (Gibbs, 2025) and full-day kindergarten increases the number of hours a mother works and decreases absenteeism in the workplace (Dhuey et. al 2021). Mothers of young children are impacted even in the years before their children are school eligible as families make work decisions in anticipation of school-based care (Erceg et al 2023). Studies conducted in Chile also find that extending kindergarten from half days to full days positively impacts mothers'

participation and attachment to the labor force, notably for lower income mothers (Berthelon et al, 2015; Berthelon et al, 2023).

We extend this literature in two major ways. First, we examine school-day timing for children beyond kindergarten, offering a broader view of how school schedules shape parental labor supply across childhood and adolescence. Second, we use time diary data from the American Time Use Survey (ATUS) not merely as supporting context, but as our primary outcome. This allows us to move beyond extensive- and intensive-margin measures of labor supply and directly observe how school start and end times shift *when* parents work and perform home production. Preliminary results show that mothers delay work start times in response to later school start times, particularly when children are younger, while fathers' work schedules adjust more noticeably when children reach middle and high school.

Data & Methodology

We use the American Time Use Survey (ATUS) spanning 2013-2023 (but excluding 2020) yielding a person level sample (n = 99,397) and an activity level sample (n = 1,891,538) (Flood et al., 2023). We use parental status, age of youngest & oldest child and gender as key demographics related to schoolday timing. During this 10 year span, many schools likely changed start and end times after the American Pediatric Association recommended high schoolers not start school before 8:30am (Au et al., 2014).

Preliminary estimates exclude the 2020 COVID period and currently rely on a cross section of school start times to minimize the impact of district start time changes in response to the APA report. Our initial analyses use 2017–18 start-time data from the AAA State of Play, which compiles information from the National Center for Education Statistics' National Teacher and Principal Survey and the Schools and Staffing Survey (AAA State of Play, 2024). Although start times are available at the school level, we use state-level averages for elementary, middle, and high schools because the ATUS does not report geographic detail below the state level. We also conduct robustness checks using state-level minimum, maximum, and modal start times. School-day end times will be coded from Unlocking Time, a nationally representative dataset covering 3,758 school districts surveyed between July 2018 and May 2019. Together, these sources serve as substitutes for more detailed restricted-use NCES data. When this project began in 2025, NCES announced it was no longer accepting applications for access to its non-public datasets.

First, we provide descriptive results from the ATUS that show the gendered aspect of childcare, particularly school drop off and pick up. Table 1 shows average start and stop times for various daily activities for mothers and fathers in the ATUS who have children under the age of 13. The table sample only includes interviews that happened on a weekday, with the assumption that an individual's weekend differs greatly from their typical weekday. The times

are based on the first time an individual cited doing the activity in their time diary log. On average, mothers start work later than fathers and end work earlier than fathers. Mothers begin primary childcare several hours earlier than fathers. Secondary childcare (where the parent was doing an activity with a child in the room) also happens much earlier and more often for mothers than fathers. Figure 1 depicts average daily activities for mothers and fathers in 2019. Fathers spend more time working (yellow) and on social activities (brown), mothers engage in more primary (green) and secondary childcare (black line). Table 2 shows descriptive statistics for labor force participation, weekly earnings, the age of their youngest child, for men and women in the sample. It also shows a binary indicator for if they indicated a drop off/pick up and how long they reported in that activity. Of the population that picked up or dropped off a child, women do so more than twice as often compared to men. Women also spend more time picking up or dropping off their children.

Table 1: Average start and stop times for daily activities during a weekday, ATUS

Panel A	**Weekdays**					
	Mothers (N=7,167)			**Fathers (N=5,418)**		
	Start	**Stop**	**Count**	**Start**	**Stop**	**Count**
Work	8:25 AM	4:51 PM	4,086	7:35 AM	5:13 PM	4,458
Social	2:08 PM	8:43 PM	17,171	2:18 PM	8:41 PM	12,630
Primary Childcare	8:53 AM	7:23 PM	48,089	11:48 AM	6:43 PM	17,159
Secondary Childcare	9:21 AM	8:23 PM	63,545	11:46 AM	8:03 PM	26,438
Pick up/Drop off	9:56 AM	2:16 PM	6,574	10:41 AM	1:28 PM	2,480
Household Activities	9:46 AM	6:31 PM	29,425	11:08 AM	5:20 PM	10,153
Personal Care	9:03 AM	4:28 PM	11,266	8:20 AM	3:26 PM	7,892
Sleeping	10:21 PM	6:23 AM	15,791	10:10 PM	6:30 AM	11,050

Figure 1: Distribution of mothers' and fathers' activities

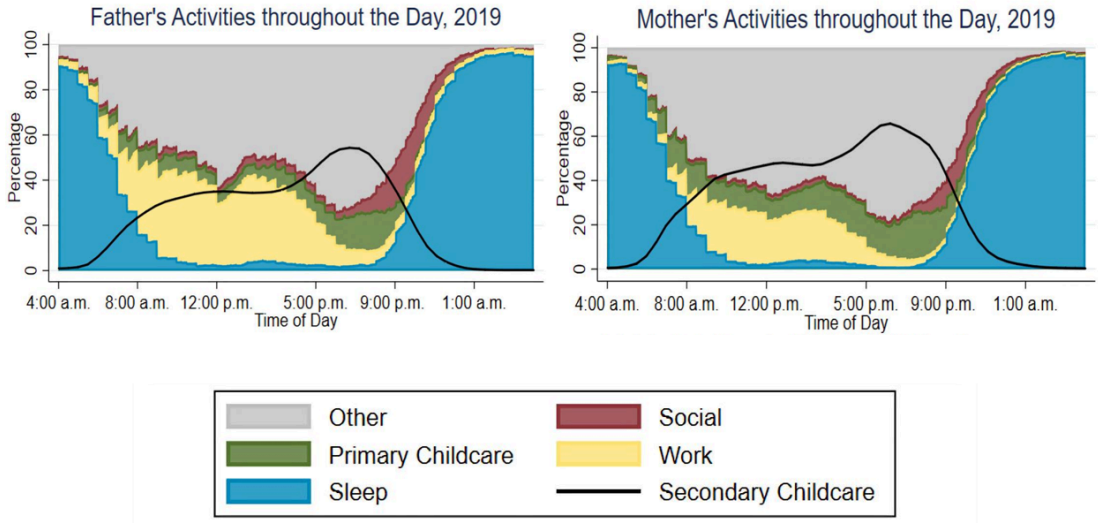


Table 2: Descriptive statistics on labor force participation and child pickup/drop off, ATUS

	Male (N=10,693)	Female (N=14,366)	Test
Age	39.484 (8.072)	36.600 (7.391)	<0.001
Labor force participation			
No	546 (5.1%)	3,657 (25.5%)	<0.001
Yes	10,147 (94.9%)	10,709 (74.5%)	
Weekly earnings	1,419.193 (795.535)	943.916 (683.942)	<0.001
Age of youngest own child	5.066 (3.736)	5.250 (3.733)	<0.001
Picked up/Dropped off child			
No	8,694 (81.3%)	10,138 (70.6%)	<0.001
Yes	1,999 (18.7%)	4,228 (29.4%)	
Time spent picking up/dropping off kids	2.176 (6.766)	4.249 (9.756)	<0.001

Next, we estimate the relationship between schoolday timing and parents' activity using a simple OLS (equation 1) only for parents.

(1) Work Start (Stop) Time$_i$ = α + β1 School Start (Stop) Time$_i$ + β2 Household Size$_i$ + β3 Age$_i$ + β4 Family Income$_i$ + β5 Child Under 17$_i$ + β6 Full Time$_i$ + β7 Race$_i$ + ε_i

Future research will attempt an arguably more causal impact that isolates the difference within parents between states with earlier and later start times (equation 2). This second estimate is essentially a two-way fixed effect model that includes controls for children's age and school timing (where children's age assigns the treatment impact of the school timing). A causal statement depends on the assumptions including homogeneous treatment effects, parallel trends and linear additive effects (Imai and Kim 2021, Goodman-Bacon 2021). The goal is to estimate a model that includes the ages of all children in the household interacted with all relevant school

timing (e.g. if a family has both elementary and middle school students we would assign them both start times).

(2) Work Start (Stop) Time = α + β1 Kindergarten Child + β2 Elementary Child + β3 Middle School Child + β4 High School Child + β5 Kindergarten Start (Stop) Time + β6 Elementary Start (Stop) Time + β7 Middle School Start (Stop) Time + β8 High School Start (Stop) Time + β9 Kindergarten Start (Stop) Time * Kindergarten Child + β10 Elementary Start (Stop) Time * Elementary Child + β11 Middle School Start (Stop) Time * Middle School Child + β12 High School Start (Stop) Time* High School Child + β13 Household Size$_i$ + β14 Age$_i$ + β15 Family Income$_i$ + β16 Fulltime$_i$ + β17 Race$_i$ + ε_i

For all estimates, the outcome variables are start and stop time for parental activities in minutes. Preliminary results focus on paid work but additional analysis will investigate other categories of activities.We control for demographics including continuous variables for household size, age, family income, an indicator for having a child (17 or younger) in the house, categorical variables for race and an indicator for if the interviewee works fulltime. We estimate regressions separately by gender to allow all of the coefficients to vary by gender. Coefficients that are positive reflect a later start time and negative coefficients show an earlier start time. For brevity we only report the coefficients on school start (stop) time for equation (1) in Table 3. To compare our findings to previous work on all-day kindergarten, Table 3 also shows equation (1) using an indicator for if the state does not provide all-day kindergarten policy.

Preliminary Results

Table 3: Change in parents' work start time (minutes)

Panel A

	(1) Mothers	(2) Fathers	(3) Mothers	(4) Fathers
All Day Kindergarten	-7.33***	-5.071***		
	(16576.667)	(18711.173)		
Elementary School Start Time			.533***	.134***
			(.007)	(.008)
Constants	285.167***	433.014***	550.777***	500.996***
	(3.609)	(4.187)	(0.782)	(0.883)
Observations	35921	35921	35031	35031
R-squared	.025	.018	.143	.014

Standard errors are in parentheses
*** *p<.01, ** p<.05, * p<.1*

Panel B

	(1) Mothers	(2) Fathers	(3) Mothers	(4) Fathers
Middle School Start time	-.096***	.568***		
	(.009)	(.009)		
High School Start time			-.35***	.318***
			(.011)	(.012)
Constant	285.167***	433.014***	717.459***	349.949***
	(3.608)	(4.187	(5.217)	(5.741)
Observations	35031	35031	35161	35161
R-squared	.009	.112	.036	.027

Standard errors are in parentheses
All Regression include controls for household size, age, family income, if the youngest child is younger than 17, if the interviewee works full time, and race
*** $p<.01$, ** $p<.05$, * $p<.1$

Panel A shows how kindergarten and elementary start times are correlated with work start times. Consistent with previous literature that finds that all day kindergarten increases paid work, particularly for mothers, we find that mothers in states with all day-kindergarten policies start work on average 7.33 minutes earlier than mothers in states with the policy. Fathers start work 5.07 minutes earlier. We add to previous work by showing a similar result past kindergarten into older elementary years. For parents with elementary aged children, a 1 minute later school start time is associated with 0.533 minutes later work start time for women and 0.134 minutes later work start time for men. Converting this to more policy relevant units, mothers start work 16 minutes later when elementary school starts 30 minutes later while fathers would experience a 4 minute later start time, on average.

Panel B focuses on older grades where we see a flip in the gendered patterns. A 30 minute later start time is associated with mothers starting work 3 minutes *earlier* ($\beta1 = -0.096$) and fathers starting work 17 minutes *later* ($\beta1 = 0.568$). This is even more pronounced in high school where a 30 minute later start time is associated with mothers starting work 10.5 minutes earlier ($\beta1 = -0.35$) and fathers starting work 10 minutes later ($\beta1 = 0.318$).

Preliminary results show that schoolday timing and parental time use are related in some expected and some unexpected ways. Household allocation decisions are gendered but not consistently, with mothers taking on more responsibility when children are younger and fathers starting work later once children are older. This flip from positive to negative coefficient for mothers is an interesting change, as well as the increased impact for fathers. Future research will include stop times and total work hours as well as time use on activities other than work to provide a more complete picture about the gendered impact of school timing on parental time use.

Next, we will replicate our analysis on school start times using school stop times from the Unlocking Time survey. Additionally, we will link the ATUS to the CPS to enable us to control for ages of all children in the household and to estimate equation (2) which compares the start time for men and women with and without children in states with early and late start times. This uses the logic of difference-in-difference replacing a pre-post comparison with gender and parenthood status. We also plan to factor in variables such as access to bussing, whether the family has an older sibling of driving age who could help transport younger siblings to school, and examine how work start times vary by parents' occupation.

Our research underscores that school-day timing is more than an educational scheduling issue. It is a consequential form of childcare policy that shapes when parents can work and how families allocate time throughout the day. Revealing gendered adjustments in work start and end times suggest that proposals to shift school schedules carry meaningful labor market implications. Policymakers designing school start-time reforms, employers seeking to understand constraints on workers with school-aged children, and advocates focused on gender equity in the labor market all have a stake in these results. More broadly, this work contributes to ongoing discussions about how public institutions can better align the rhythms of work and family life.

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