Time to Grow Up? Adult Children as Determinants of Parental Labor Supply

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Costs of Adult Children and Parental Labor Supply

- Children are critical determinants of female labor supply
  - Literature focuses on effects of the birth or of young children
  - Persistent declines in employment after childbirth (Kleven, Landais, and Søgaard 2019, Kuziemko, Pan, Shen, and Washington 2018)

- Parents continue to transfer a great deal to their adult children (McGarry 2016)
  - College expenses, co-residence, rent, major life events, cushions against negative financial shocks

- Do adult children stop being a determinant of labor supply for mothers, and/or do they become a determinant for fathers?

How are Young Children Different from Adult Children?

- Women with young children may respond more to changes in costs
  - Value time with children
  - Income transfers when children are young lead to reductions in maternal labor supply
    - Gonzalez 2013, Schirle 2015, Wingender and LaLumia 2017

- Women with adult children may respond more to changes in costs
  - Closer to retirement
  - Face lower penalties for career interruptions

This Paper Estimates the Effect of Merit Aid Programs on Parental Employment

- Causally link costs of adult children and parental labor supply
  - Difficult to find exogenous changes in the costs of adult children
- Use variation in the year of establishment of 9 strong merit-aid programs
  - Event-study framework: compare states with and without merit aid programs
  - Instrumental Variables framework: use variation in spending across state and time to estimate effect per dollar of spending
- Estimate effects 1 to 11 years after establishment
- Pool data from the Panel Study of Income Dynamics (PSID)
  - 1988 to 2015
  - Connect mothers with children
- Use two samples
  - (1) parents with any children ages 18 to 22 (college-age children)
  - (2) parents with college-going children

Merit Aid Led to Declines in Labor Supply among Moms

- No adjustment among fathers
- Mothers reduced hours of work
  - Mainly due to adjustments at the intensive margin
  - Limited evidence of adjustments at the extensive margin
- Reductions are entirely due to adjustments among women with college-going children
  - A 10% increase in spending per undergraduate student is associated with a 1.3% decline in hours among moms with college-going children
- Mothers who reduced hours the most were
  - High-income, highly educated, married, white, worked more hours, had occupations with more flexible schedules, had more children in college
  - Find evidence this is because the labor supply of these mothers is more elastic
- Smaller responses among mothers before first child goes to college (anticipation effect) and after last child leaves college (persistent effect)

Previous Studies Estimate Correlations between College Expenses and Parental Outcomes

- Suggested link between adult costs and parental outcomes is correlational
  - Financial aid based on assets is connected with lower savings rates (Feldstein 1997, Edlin 1993, Dick and Edlin 1997, Long 2003)
  - Parents are more likely employed if they are paying for college (Handwerker 2011)
  - Increasing rates of college attendance in a year predict a foreclosure rate increase in subsequent years (Faber and Rich 2018)

- Causal inference limited

Robustness Checks

- No effects for placebo groups
  - Mothers of college-age children who do not go to college
  - Mothers of college-going children whose youngest child is older than college-age
- Robust to alternative Two-Way Fixed Effects Difference in Differences (TWFE DiD) estimators
  - Cengiz et al. (2019), Callaway and Sant'Anna (2021), Borusyak et al. (2021), and de Chaisemartin and d'Haultfoeuille (2020)
- Test for parallel pre-trends
  - Borusyak et al. (2021)

Contributions

- First study to estimate the causal effect of costs of adult children on parental labor supply
- Identify a novel determinant of maternal labor supply
  - Previous literature focuses on the cost of a young child
- Identify the effect of college costs on parents
  - Previous literature focuses on effects on students (Kane 2006, Page and Scott-Clayton 2016)

Expected Effects of Merit Aid on Families

- Mechanism 1. Positive shock to the disposable income of families
  - Parental income is the primary source of funding for children's college expenses
  - Families may have multiple children (2.8 in our sample) and benefit for many years
  - Students may shift enrollment to cheaper in-state institutions
- Mechanism 2. Increase in time transfers from parents to children
  - Decline in maternal opportunity cost of leisure if children attend college closer to home
  - Time transfers from parents to adult children are important and depend on their geographic proximity (Compton and Pollak 2015)

- This paper: studies parental labor supply
- Merit aid may also lead to increase in consumption
  - increased alcohol and expensive cars consumption
    - Cornwell and Mustard (2007), Cowan and White (2015)
- Merit aid may also increase family net worth
  - Increase savings and reduce debt

State Merit Aid Programs

- Started with Georgia Hope in 1993
- Award tuition and fees to young residents who have maintained a modest grade point average
    - High school GPA of 3 or above
    - Must attend college in their state of residence
- No means test for eligibility
    - Disadvantaged students are disproportionately less likely to be eligible
    - Mostly subsidize students who would attend anyway
- Funded by lottery sales and tobacco settlements
    - Not related to state's economic condition

Goals of State Merit Aid Programs

- Encourage high-achieving students to attend college in-state
- Incentives to perform better in high school and college
- Offer low-income and high-achieving students the opportunity to enroll in a university

- Minority and low-income students are disproportionately less likely to be eligible for state merit aid programs
  - Dynarski (2004), Farrell (2004), Heller and Rasmussen (2002) and Ness and Noland (2007)
  - Majority of beneficiaries would go to college without the aid

States with Strong Merit Aid Programs: 2012

State	First Year	Program Name	Annual state merit grant aid per full-time-equivalent undergraduate student	% of 18-22 undergraduate students receiving state merit aid	Maximum merit aid as percentage of tuition and fees in public four-year institutions
Florida	1997	Florida Bright Futures Scholarship	$482	24.1	72.0
Georgia	1993	Georgia HOPE Scholarship	$2,538	34.5	73.0
Kentucky	1999	Kentucky Educational Excellence Scholarship	$921	50.7	29.0
Louisiana	1998	Louisiana TOPS Scholarship	$1,616	26.5	112.0
Nevada	2000	Nevada Millennium Scholarship	$375	25.8	42.0
New Mexico	1997	New Mexico Lottery Success Scholarship	$1,364	29.2	80.0
South Carolina	1998	South Carolina LIFE Scholarship	$2,641	41.2	68.0
Tennessee	2004	Tennessee HOPE Scholarship	$1,814	35.0	95.0
West Virginia	2002	West Virginia PROMISE Scholarship	$753	20.6	80.0

Effects of Merit Aid on Students

- Before college
  - Improve college readiness (Pallais 2009, Castleman 2014)
  - Decrease teenage labor force participation (Frisvold and Pitts 2018)
- College-going
  - Modest increases in college enrollment (Dynarski 2004, Cornwell et al. 2006)
  - Null effects on enrollment (Bruce and Carruthers 2014, Goodman 2008, Gurantz and Odle 2022)
- Choice of college
  - Decrease migration of talented students and workers to other states (Zhang and Ness 2010, Sjoquist and Winters 2014)
  - Substitution away from two-year community colleges to four-year institutions, no substitution between public and private, or in-state or out-of-state colleges (Bruce and Carruthers 2014)
  - Shift towards in-state public schools from better-resourced options (Cohodes and Goodman 2014)
  - Decrease the probability that a male enlists in the military (Barr 2016)
- College degree attainment
  - Improve rates of degree completion and reduce the college dropout rate (Scott-Clayton 2011)
  - Reduce degree attainment (Cohodes and Goodman 2014)
  - No effect on degree completion (Carruthers and Özek 2016)
- After college
  - Recipients are less likely to have adverse credit outcomes (Scott-Clayton and Zafar 2019)

Data: Connect Parents with Children

- PSID 1988-2015
  - Panel of families – annual from 1988 to 1997, every other year 1999-2015
  - Match mothers and children
  - Know the state of residency and employment of mothers
  - Construct enrollment of children
- Analyze different samples
  - Mothers of college-age children (ages 18 to 22)
    - Mothers with college-going children who are college-age
    - Mothers without college-going children who are college-age

Meet the Mothers in Our Sample

Mothers of College-Age Children

	Children College-Goers		Children Not College-Goers	
Analysis Variables	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Annual Hours of Work	1465	908	1337	965
Employed (%)	83.6	37.0	76.0	42.7
White, non-Hispanic	78.2	41.3	70.6	45.6
Age	47.3	5.7	45.7	6.3
Number of Children	2.8	1.4	3.2	1.7
Some College	52.8	49.9	22.6	41.8
Head	24.7	43.1	45.1	49.8

TWFE DiD: Event Study Framework

- $Y_{i,s,t} = \alpha + \gamma_t + \delta_s + \sum_{\tau=-3}^{-1} \boldsymbol{\theta_\tau} D_s 1(EY = \tau) + \sum_{\tau=1}^{6} \boldsymbol{\pi_\tau} D_s (EY = \tau) + X_{s,t} + Z_{i,t} + C_{s,t} + \epsilon_{i,s,t}$
- $Y_{i,s,t}$: outcome of parent *i* residing in state *s*, in year *t*, who has a college-age or college-going child in year *t*
- γ_t: year fixed effects, δ_s: state fixed effects
- D_s=1 if strong merit aid program
- EY: years since the start of a merit aid program
- EY are *grouped* event years
  - EY=0 (-1 to -2 years); EY=1 (0 to 1 years); EY=2 (2 to 3 years);...;EY=6 (10 to 11 years)
- $Z_{i,t}$: individual co-variates (race, education, marital status, age and number of kids)
- $C_{s,t}$: state by year educational controls (average tuition, spending with need-based programs)
- $X_{s,t}$: state level economic co-variates (unemployment rate, state revenue, minimum wage, governor is a democrat, poverty rate, number of AFDC/TANF recipients, number of food stamp/SNAP recipients)
- π_τ: effect of merit aid program τ grouped years since its start

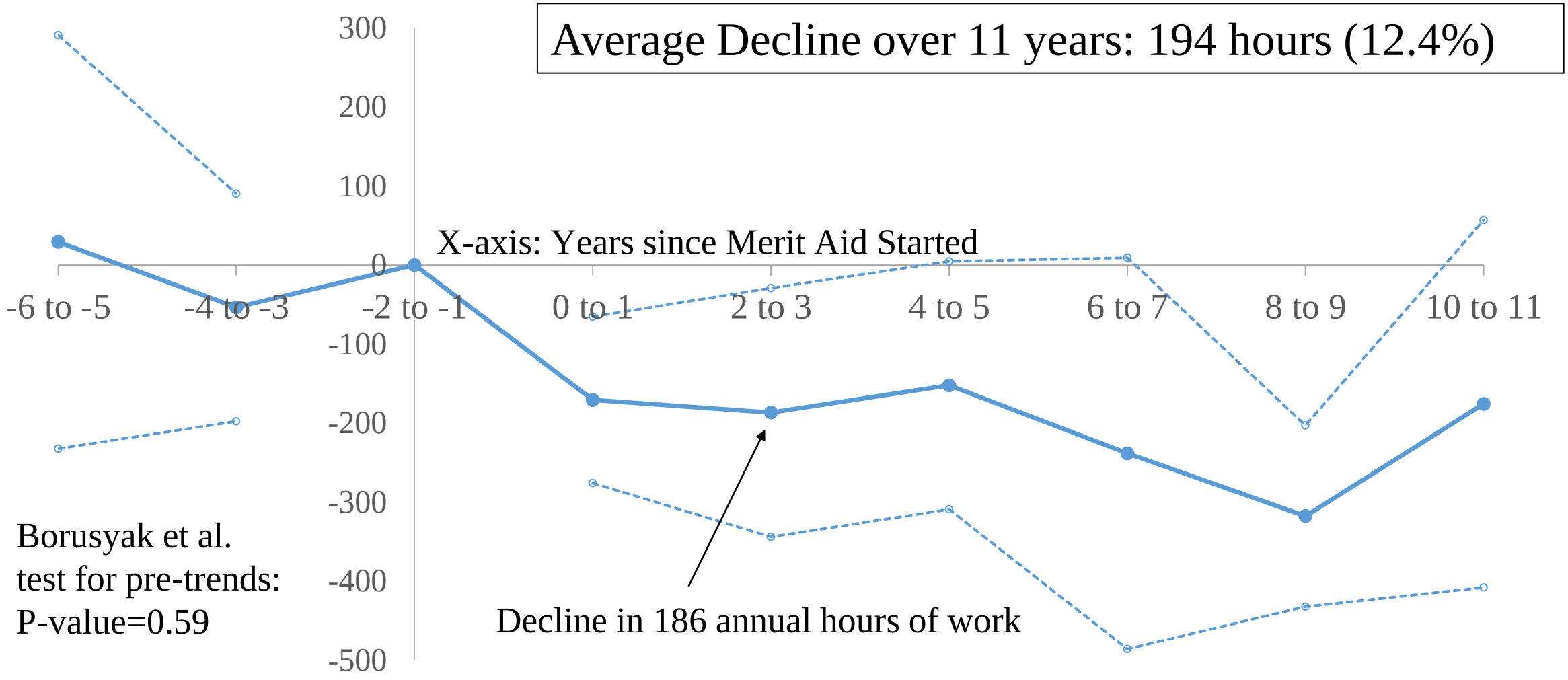
Support that Timing of Merit Aid Was Conditionally Random

- States experimented with a new policy and did not respond to economic shocks (Dynarski 2004)
- Lottery sales revenues and the proceeds from tobacco settlements are the most common sources of funding (Heller and Marin 2004)
  - Less likely affected by economic changes
- No empirical relationship between employment outcomes before merit aid started and the year the program started
- Inclusion of educational, economic, and political controls does not affect our main results
- No effect on labor supply of mothers whose youngest college-going child is older than college-age

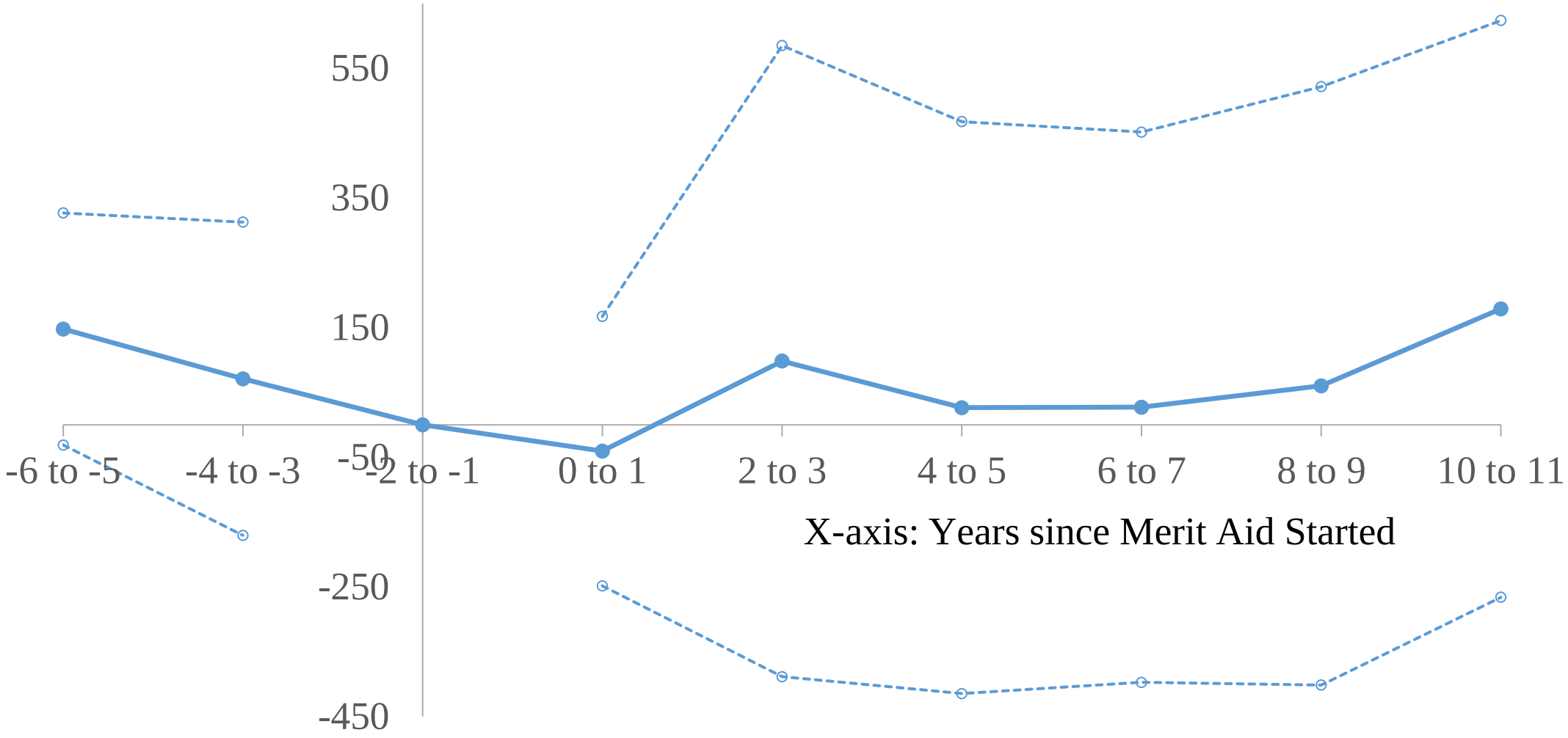
Do Merit Aid Programs Affect Hours of Work among Parents who Have Children of College-age?

Sample: Parents with Children Ages 18 to 22

Maternal Annual Hours of Work: Children ages 18 to 22



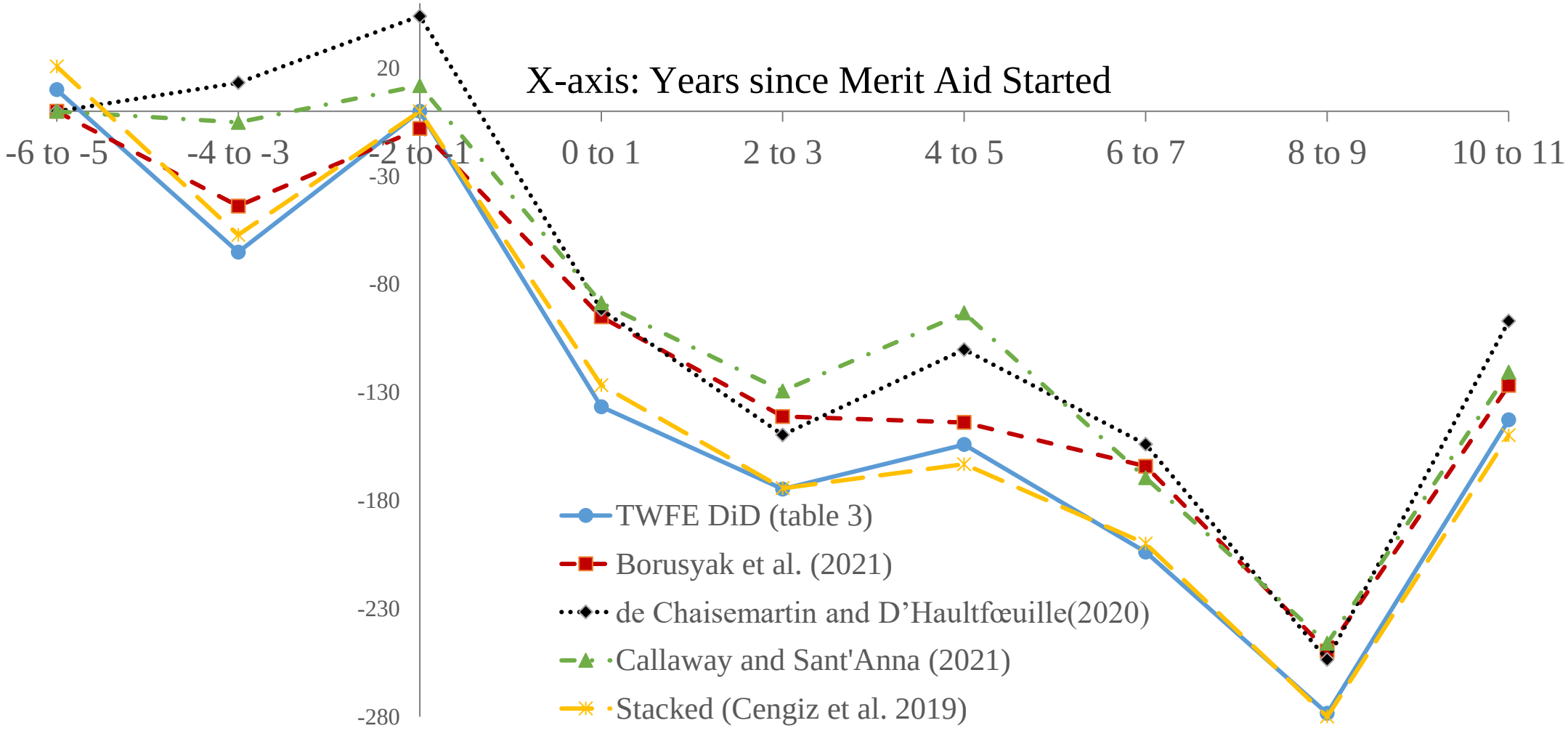
Paternal Annual Hours of Work: Children ages 18 to 22



Robustness of TWFE DiD

- TWFE DiD estimator may be biased when the treatment effect varies over time or across states
  - Comparisons are problematic between states that implemented earlier vs. later (Goodman-Bacon 2021)
  - Not an issue for us: most weight given to comparisons of states with merit aid programs to those without these programs
- We use 4 alternative estimators that accommodate problematic comparisons (earlier vs. later states)
  - Stacked regression (Cengiz et al. 2019, Baker et al. 2019)
  - Two-step estimation: Callaway and Sant'Anna (2021)
  - Efficient imputation estimator: Borusyak et al. (2021)
  - Instantaneous estimator: De Chaisemartin and d'Haultfoeuille (2020)

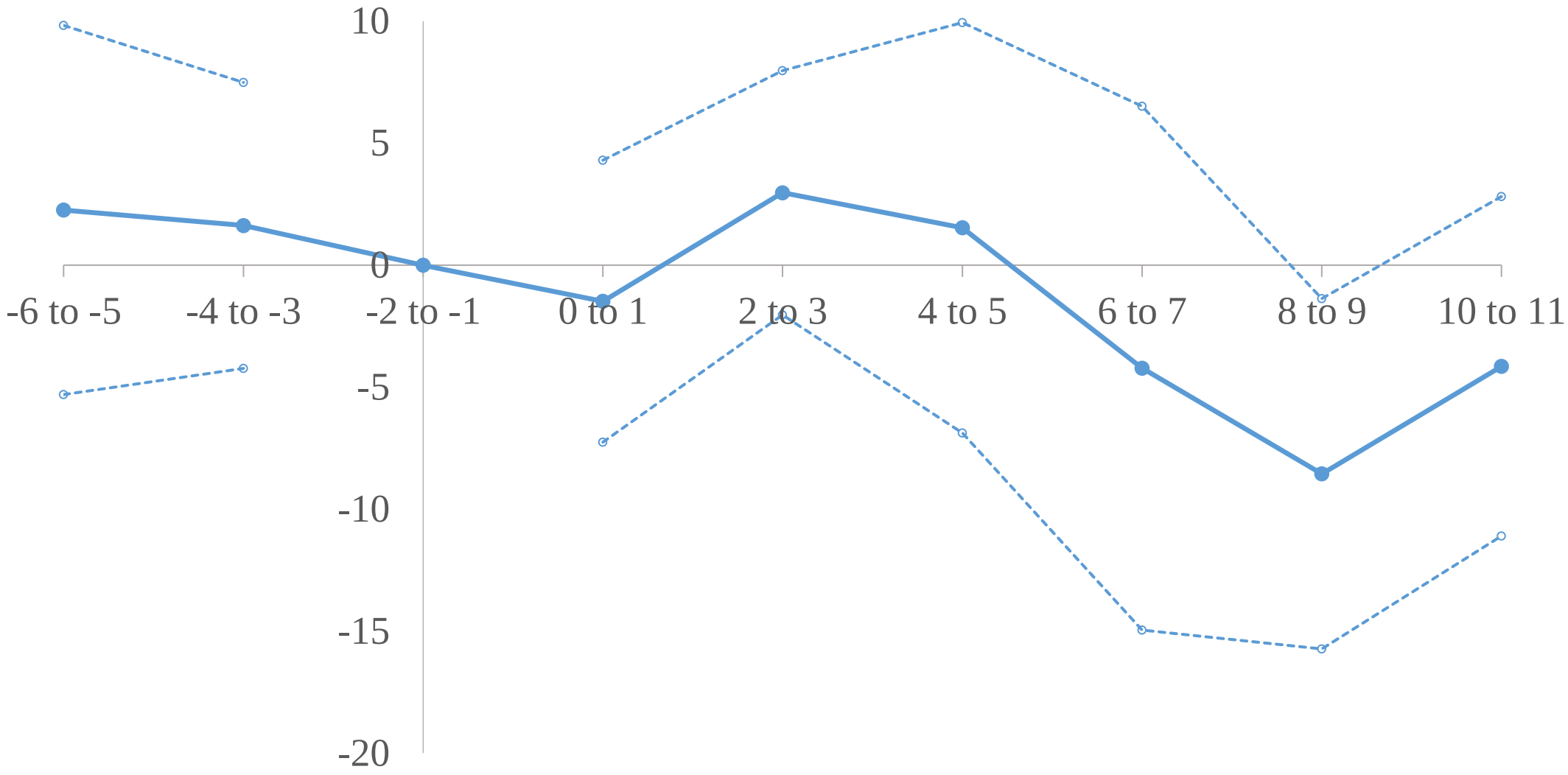
Robustness of TWFE DiD: Evidence



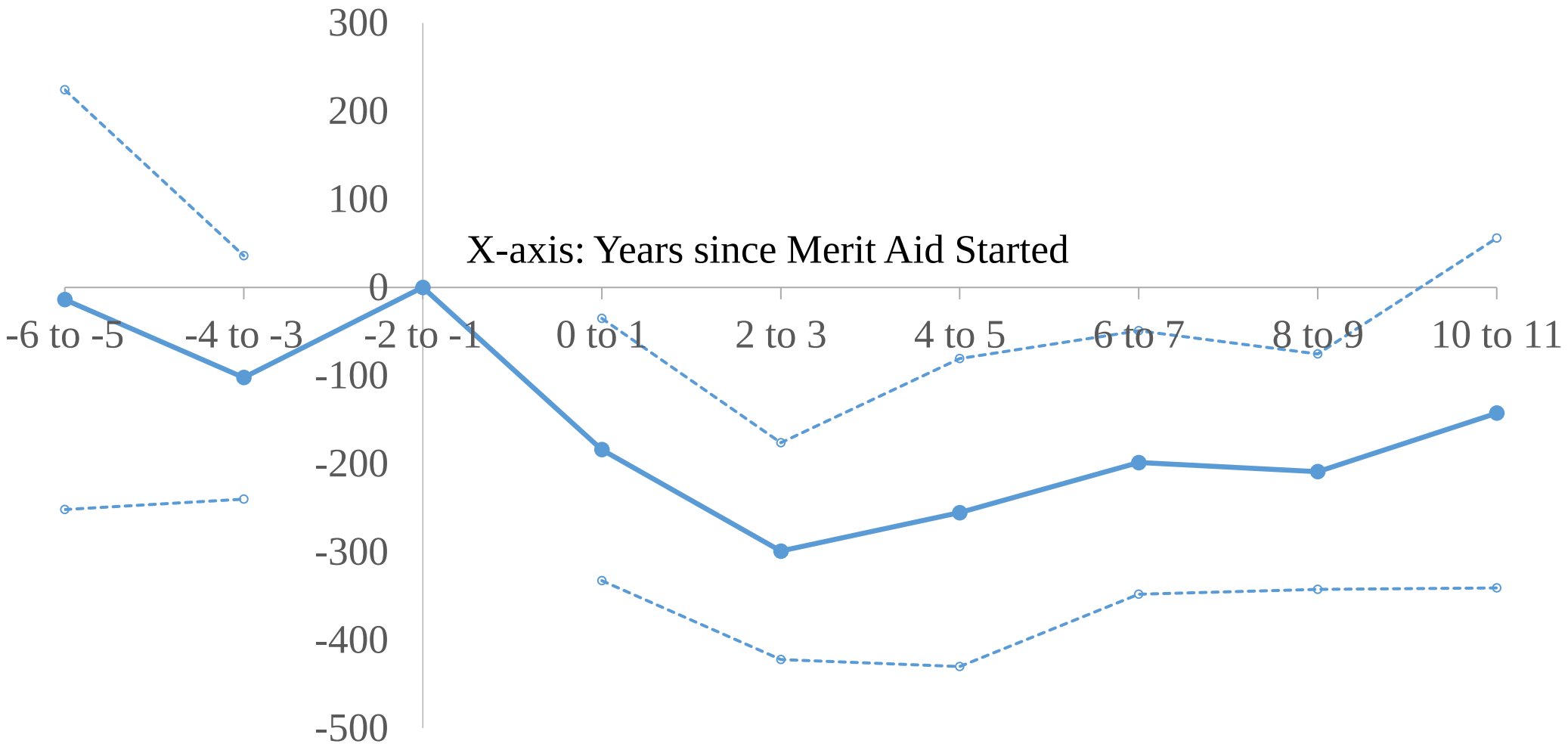
Do Mothers Adjust Employment at the Intensive or Extensive Margin in Response to Merit Aid Programs?

- Extensive margin: employment status
- Intensive margin: hours of work if employed

Employment Status: Mothers of College-Age Children



Hours of Work if Employed: Mothers of College-age Children



Are Declines in Hours Concentrated among Mothers whose Children Can Receive Merit Aid?

- Sample 1: Mothers of college-going children
  - Can receive merit aid

- Sample 2: Mothers of non-college-going children
  - Cannot receive merit aid

Issues with Using the College-going Sample

- Merit aid may increase college attendance
  - Previous evidence shows that effects are either small or null

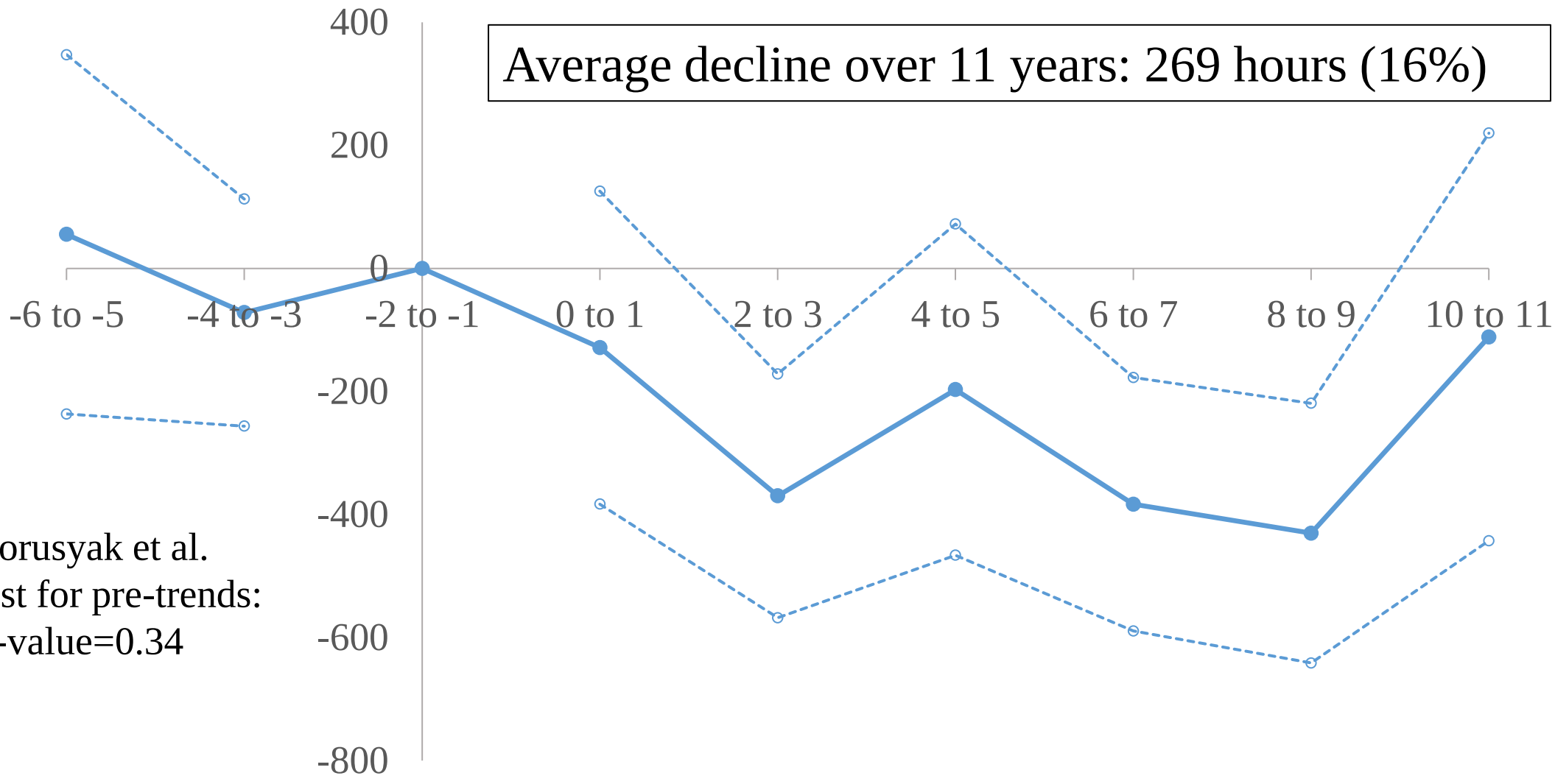
- Are parents of college-going children systematically different after merit aid?

  - Are their children more likely to attend college?
  - Are parents different demographically?

Effect of Merit Aid on College Attendance of Children and Composition of Mothers

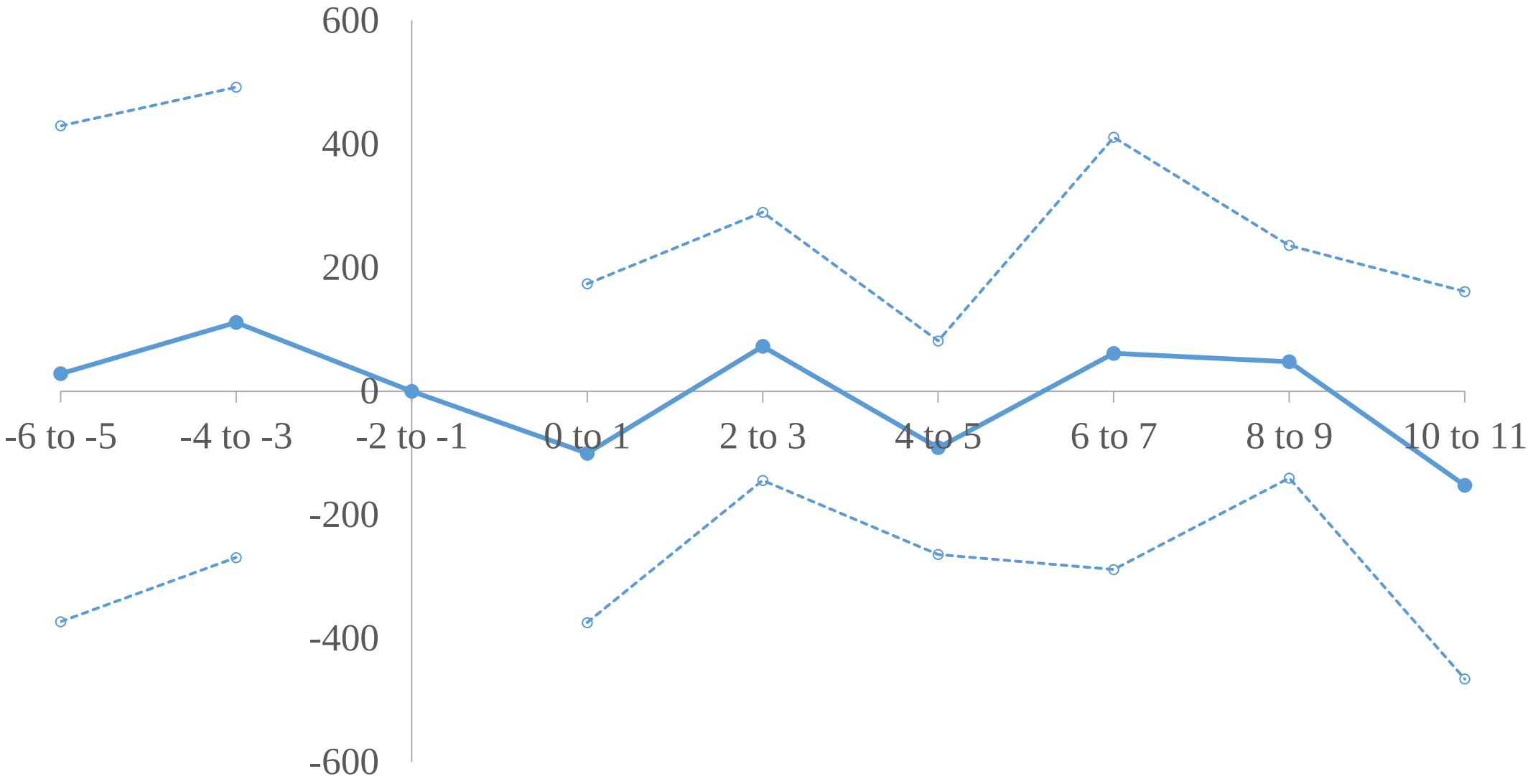
	(1) **Child in College**	(2) **Years of Education**	(3) **White**	(4) **Number of Children**	(5) **Head of Household**	(6) **Age**
A. Women with College-Age Child						
After Merit Aid	-0.0206	0.134	-0.0621	0.00929	-0.00237	0.502
	[0.0347]	[0.163]	[0.0557]	[0.126]	[0.0640]	[0.489]
Observations	12,575	13,408	13,408	13,408	13,408	13,408
Pre-treatment Mean	0.579	13	0.755	2.905	0.330	45.50
B. Women with College-Going Child						
After Merit Aid		-0.00453	-0.0363	-0.0234	-0.0305	0.351
		[0.278]	[0.0435]	[0.177]	[0.0806]	[0.523]
Observations		7,638	7,638	7,638	7,638	7,638
Pre-treatment Mean		13.51	0.781	2.820	0.251	46.03

Maternal Hours of Work: College-going Children



Borusyak et al.
test for pre-trends:
P-value=0.34

Maternal Hours of Work: Non-college-going Children

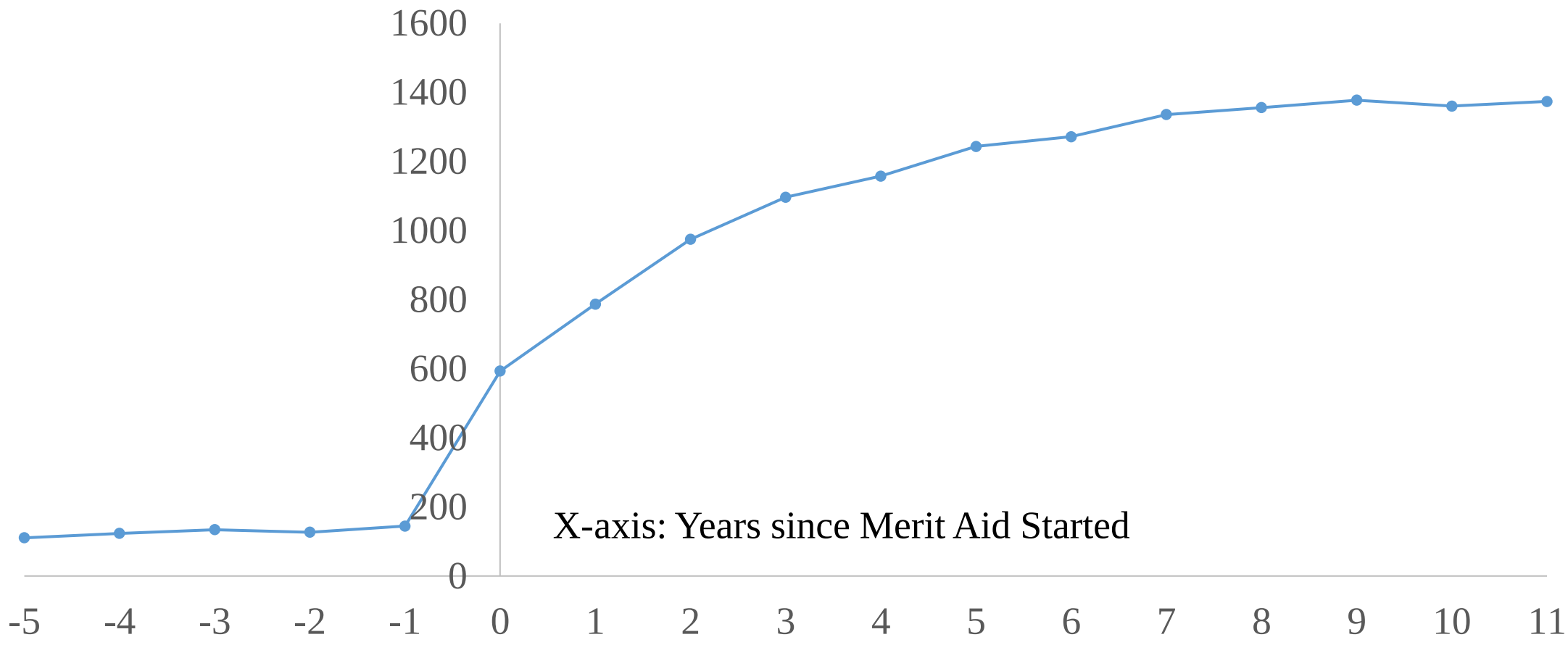


Estimating Effects per Merit Aid Transfer

- First Stage
  - $Merit_{ist} = \gamma_t + \delta_s + \alpha D_s 1(EY \geq 1) + Z_{it} + X_{st} + \epsilon_{ist}$
  - $Merit_{ist}$ is merit aid spending per full-time-equivalent (FTE) undergraduate student in individual i's state of residence s and year t
    - Spending is from the National Association of State Student Grant Aid Programs
    - FTE students are from the Integrated Postsecondary Education Data System

- Second stage
  - $Y_{ist} = \beta \widehat{Merit}_{ist} + \gamma_t + \delta_s + X_{st} + Z_{it} + C_{st} + \epsilon_{ist}$
- β: effect on Y per dollar of merit aid spending per FTE

Merit Aid Spending per FTE ($)



Effect of Merit Spending on Annual Maternal Hours of Work

Sample: Mothers of College-going Children				
Merit spending per FTE student	-0.161	-0.19	-0.202	-0.199
	[0.0797]**	[0.0848]**	[0.0881]**	[0.0863]**
Observations	7890	7890	7890	7890
First-stage F-statistic	12.92	13.62	16.34	16.07

- $1 increase in spending per FTE is associated with a reduction of 0.199 hours of work
- 10% increase in spending is associated with a 1.35% decline in hours

Heterogeneous Effects of Merit Aid

- Advantaged mothers may respond more
  - Their children are disproportionately more eligible for merit aid
    - Table below uses data from the National Postsecondary Student Aid Study in 2012
  - More elastic labor supply because of fewer credit constraints

Maternal Characteristics	**Head of Household**	**Not Head of Household**	**High School or Less**	**Some College**	**Non-white**	**White**
% receiving state merit aid	26.3	36.3	27.6	34.6	21.8	38.8

- Disadvantaged mothers may respond more
  - Lower wages make their opportunity cost lower

Heterogeneous Effects on Annual Hours of Work: Mothers with College-Going Children

	Head of Household	Not Head of Household	High School or Less	Some College	Non-white	White
Merit per FTE Student	-0.0201	-0.262	-0.0300	-0.280	-0.0613	-0.239
	[0.110]	[0.123]**	[0.139]	[0.171]	[0.0939]	[0.118]**
Observations	2,823	5,067	4,009	3,631	3,830	4,060
Pre-treatment Mean	1199	1822	1283	1897	957.9	1873
First-stage F-statistic	21.88	15.22	34.57	11.03	27.49	14.38

- Hours of work decrease the most among
  - Married, more educated, and white mothers

Heterogeneity (Cont): Mothers with College-Going Children

	Family Income at Age 18 of First Child Percentiles		
	0-33	**33-67**	**67-100**
Merit per FTE Student	-0.0872	0.0335	-0.336
	[0.109]	[0.158]	[0.141]**
Observations	1,902	1,977	2,079
Pre-treatment Mean	1151	1281	2162
First-stage F-statistic	96.30	11.39	16.87

- Hours of work decline most in families with the highest incomes

Heterogeneity (Cont): Mothers with College-Going Children

	Maternal Hours of Work at Age 18 of First Child Percentiles		
	0-33	**33-67**	**67-100**
Merit per FTE Student	-0.0601	0.00448	-0.228
	[0.129]	[0.0877]	[0.127]*
Observations	1,943	1,929	2,131
Pre-treatment Mean	660.3	1608	2040
First-stage F-statistic	25.28	15.19	14.80

- Hours of work decline most among mothers who work most hours

Heterogeneity (Cont): Mothers with College-Going Children

	Has an Occupation	Inflexible Occupation	Flexible Occupation
Merit per FTE Student	-0.152	0.116	-0.174
	[0.0963]	[0.119]	[0.125]
Observations	5284	1363	3921
Pre-treatment Mean	2056	1703	2089
First-stage F-statistic	15.29	38.32	14.08

- Hours of work decline most among mothers working in occupations with flexible schedules
  - Flexible: more than 50% of workers can vary their schedules (BLS 2019)
  - Inflexible: less than 50% of workers can very their schedules (BLS 2019)

Heterogeneous Effects by Number of College-Going Children

	1 child	2+ children
Dependent Variable: Annual Hours of Work		
Merit per FTE Student	-0.101	-0.561
	[0.0612]*	[0.229]**
Observations	6,171	1,719
Pre-treatment Mean	1621	1949
First-stage F-statistic	17.17	11.04

- Hours decline most among women with more children in college at the same time

Dynamic Effects

- Life-cycle model predictions
  - Families smooth consumption and labor supply in response to expected positive transfers
  - Anticipation effect: adjust labor supply even before child starts college
    - Depends on expectations about benefits of merit aid, intertemporal preferences and costs to borrow
  - Persistent effect: labor supply may be affected even after child leaves college

Dynamic Effects on Maternal Annual Hours of Work

	(1)	(2)
	1 to 2 years before first child in college	**1 to 2 years after last child in college**
	Dependent Variable: Annual Hours of Work	
Merit per FTE Student	-0.125	-0.0971
	[0.145]	[0.145]
Observations	6,295	5,689
Pre-treatment Mean	1485	1405
First-stage F-statistic	32.69	13.49

- Anticipation and persistent effect, while present, are smaller in magnitude than contemporaneous effects and are not statistically significant

Employment Responses vs. Size of Transfer

- Calculation is challenging
  - Lack of information who receives merit aid, expected number of years and amount of the transfer, monetary savings from a child not attending a more expensive out-of-state institution

- Maternal decline in earning, while the child is in college, accounts for 88.8% of the transfer
  - Annual maternal earnings decline by $7,899
  - Annual merit aid transfer is $8,868

Dose-Response Framework

- Allows the estimation of treatment on the treated parameters
- $Y_{i,s,t} = \alpha + \gamma_t + \delta_s + \pi PostD_s M_{i,s} + X_{s,t} + Z_{i,t} + C_{s,t} + \epsilon_{i,s,t}$
- $M_{i,s}$: estimated probability of having a child receive merit aid in a strong merit aid state (varies by race, education, and marital status)
  - Use secondary data from the National Postsecondary Student Aid Study in 2012
- Estimated π is -473
  - Increasing the probability of receiving merit aid from 0 to 100% leads to a 473 annual hours of work decline among mothers of college-going children

Discussion

- Similar to effects of income transfers to mothers during a child's early years
  - Gonzalez 2013, Schirle 2015, Wingender and LaLumia 2017
  - Also, no response among fathers
- Similar to effect of welfare transfers on labor supply of older workers
  - Giupponi 2019
  - Also, larger effects among women
- Smaller than effects of winning the lottery or receiving a tax rebate
  - Lotteries: Cesarini et al. 2017, Golosov et al. 2021
  - Tax rebate: Powell 2020
  - But, similar responses among men and women

Summary of Findings

- We document a meaningful link between a child's transition to adulthood and the labor supply of mothers, but not of fathers

- Provide the first causal evidence that adult children influence labor supply later in life

- We show it is important to consider the potential effects of making college more affordable on the whole family

Potential Implications

- Parents should be considered in college affordability discussions
- Unintended effects of college-aid policies
  - Shrinks the gap in hours of work and earnings between more and less advantaged mothers
  - The gap in consumption and wealth may go up if families do not completely replace the transfer
  - Reduction in tax revenue
- Differential effects on parental labor supply from other programs making college cheaper by income
  - We find the labor supply of higher-income mothers is more elastic