NBER WORKING PAPER SERIES

HAS THE RISE OF WORK FROM HOME REDUCED THE MOTHERHOOD PENALTY IN THE LABOR MARKET?

Emma Harrington
Matthew E. Kahn

Working Paper 34147
http://www.nber.org/papers/w34147

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
August 2025

Matthew E. Kahn thanks the Wrigley Institute for Sustainability at USC for generous funding. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

Has the Rise of Work from Home Reduced the Motherhood Penalty in the Labor Market?
Emma Harrington and Matthew E. Kahn
NBER Working Paper No. 34147
August 2025
JEL No. H2, J01, J13

ABSTRACT

When women become mothers, they often take a step back from their careers. Could work from home (WFH) reduce this motherhood penalty, particularly in traditionally family-unfriendly careers? We leverage technological changes prior to the pandemic that increased the feasibility of WFH in some college degrees but not others. In degrees where WFH increased, motherhood gaps in employment narrowed: for every 10% increase in WFH, mothers' employment rates increased by 0.78 per centage points (or 0.94%) relative to other women's. This change is driven by majors linked to careers that have high returns to hours and inflexible demands on workers' time. We microfound these results using panel data that show that women who could WFH before childbirth are less likely to exit the workforce.

Emma Harrington
University of Virginia
emma.k.harrington4@gmail.com

Matthew E. Kahn
University of Southern California
Department of Economics
and NBER
kahnme@usc.edu

The "motherhood penalty" is increasingly responsible for gender gaps in the labor market (Angelov et al., 2016; Kuziemko et al., 2018; Kleven et al., 2019). Modern men and women typically advance similarly in their careers until parenthood, at which point many women step back from their careers while men do not. This loss from the labor force threatens to reduce economic output and narrow the government's tax base (Hsieh et al., 2019). Thus, a key policy question is: how can careers become more compatible with families? The traditional answer has been to offer people flexibility over *when* and *how much* they work (Goldin and Katz, 2016). Yet many highly-paid professions still demand long and unpredictable hours (Wood et al., 1993; Bertrand et al., 2010; Goldin, 2014; Morgan et al., 2021; Erosa et al., 2022). Recently, a new dimension of flexibility has emerged: *where* to work. Could flexibility over where to work narrow the motherhood gap and redefine what constitutes a family-friendly career?

Working outside the office became increasingly feasible, even prior to the pandemic. In the early 2000s, one in ten managers could be found in the office after seven o'clock on any given weekday. But by 2019, that share had been halved — managers continued to work in the evening but did so increasingly from home. Technological improvements facilitated this shift. Faster internet connections made it increasingly seamless to log into work remotely, and smaller computer chips made computers increasingly portable. With these improvements, working from home became an increasingly good substitute for working in the office.[1]

This seemingly gender-neutral shift in technology might open more doors for mothers.

[1] In addition, new video-conferencing platforms made online meetings more seamless. Skype was released in 2003, Zoom in 2013, and Google Meet and Microsoft Teams in 2017.

Mothers might find it easier to work late at home than in the office, since they could, for example, log back in once children fall asleep.[2] Within the workday, work from home might help mothers manage disruptions — by allowing them to log back in after picking up sick kids from school or dropping off healthy kids at soccer practice. While both parents may face these midday disruptions, mothers do so twice as often, as, for example, they are more likely to be the parent contacted when a child-care need arises (Buzard et al., 2023).[3] Consistent with these advantages, prior studies show that women — and particularly mothers — value work from home more highly than men do (Mas and Pallais, 2017; Maestas et al., 2023) and have a stronger aversion to commuting (e.g., Black et al., 2014; Le Barbanchon et al., 2021).[4]

Our paper investigates how the rise of work from home (WFH) affects the motherhood penalty in the labor market, particularly in traditionally family-*un*friendly careers. We leverage technological changes that made remote work increasingly feasible in some degrees but not others. In college degrees where WFH increased, motherhood gaps in employment narrowed. This pattern is driven by college degrees where degree-holders tend to work in inflexible jobs with high returns to long hours, suggesting that locational flexibility can substitute for temporal flexibility for working mothers. To microfound these patterns, we first show that women who can work from home are less likely to exit the

[2]By contrast, working late in the office had never been common among working mothers: in the early 2000s, mothers in management were about half as likely as men to be in the office after seven p.m.

[3]*Half* of mothers working full-time picked up kids during the workday on which they were surveyed compared to a *quarter* of fathers in 2003−2019 in the American Time Use Survey.

[4]Another advantage could be multitasking: while working from home, mothers could work while their children napped, did homework, or watched TV. Yet multitasking can also be distracting, and these distractions might reduce productivity as Adams-Prassl et al. (2023) finds in an online labor market. However, this multitasking also allows mothers to pinch hit when gaps in childcare arise.

labor force after they have children. We then show evidence that women — and particularly mothers — find jobs with long hours and inflexible schedules more appealing when they can do some WFH, using both hypothetical-choice experiments and stated-preference elicitations.

Our paper leverages technological improvements before the pandemic that made remote work more accessible for people with certain college degrees but not others. In fields like marketing and finance, a growing minority of workers started to work from home most of the time, and a more sizable share started to work from home sporadically, when, for example, kids were sick or looming deadlines led to late-night hours. In fields where remote work increased, motherhood gaps in employment narrowed. On average, a ten percent increase in the share of workers working primarily from home (0.6 percentage points) is associated with a 0.78 percentage point narrowing of the gap in employment between mothers and other women (p-value $= 0.0097$). Much of the increase in mothers' employment is in full-time jobs, and we see increases in incomes even conditional on employment.[5]

For this analysis to be causal, any other changes affecting motherhood gaps in employment must be uncorrelated with changes in WFH across college degrees. Reverse causality poses one threat to this assumption: mothers' greater attachment to the labor market could change the provision of WFH (rather than WFH changing mothers' attachment). To address this concern, we estimate the changes in WFH using only the subset of men and find nearly identical results. We also find similar patterns when we condition on

[5]On average, a ten percent increase in WFH was associated with a 1.3 percent increase in employed mothers' incomes relative to other employed women's (p-value $= 0.043$).

other changes in the nature of work within specific college degrees, including changes in hours, income, educational attainment, and gender composition. Finally, instrumenting for the change in WFH using the need for physical presence from Dingel and Neiman (2020) yields a similar estimated relationship.[6]

We find that the rise of WFH is more strongly associated with employment increases for women with greater child-care responsibilities. It is stronger for women with more children. It is also stronger for women with younger children: indeed, the relationship is entirely absent for women with children over the age of sixteen.

We find that the relationship between increases in WFH and decreases in motherhood employment gaps is driven by college degrees associated with inflexible demands on workers' time — which are also some of the highest paying sectors. To show this, we classify college degrees by the inflexibility of degree-holders' common occupations. We follow the approach Goldin (2014), who uses O*Net data to proxy for inflexibility by the (i) frequency of deadlines, (ii) the importance of relationship-building (which requires syncing schedules with others), and (iii) the extent of autonomy (which makes it difficult to divide one worker's tasks across multiple people). Based on this measure, degree-holders in nursing and business fields tend to have less flexible jobs than degree-holders in education and humanities. We find that the rise of WFH was associated with a narrowing of employment gaps in the half of degrees with less flexibility but not the half with

[6]We use the Dingel and Neiman (2020) classification of occupations as amenable to WFH or requiring in-person contact. Our preferred definition also includes educators other than professors as in-person jobs since they were almost always required to be in-person prior to COVID-19. We classify degrees as typically requiring in-person work if more than half of those with the degree were in an occupation that we classify as being in-person.

more flexibility (p-value of difference = 0.0275). These findings suggest that flexibility over where to work is a substitute for flexibility over when to work.

The rise of WFH represents an expansion of what constituted family-friendly jobs: while traditionally family-friendly sectors like education or pharmacy (Goldin and Katz, 2016) were relatively unaffected by the rise of WFH, the motherhood employment gap narrowed for women with degrees in traditionally family-unfriendly fields like finance and business.

The final part of the paper microfounds these patterns. We first investigate the differential changes in labor market participation around childbirth for women who initially could WFH and those who could not. Using the panel component of the American Life Panel, we find that nearly a quarter of women who could not WFH stop working after childbirth compared to essentially none of the women who could WFH (p-value of difference = 0.018). We find this pattern persists when we account for the moderating effects of women's educational attainment, the sector of work, and the initial flexibility of women's schedules on their propensity to keep working after childbirth.

We then turn to unpacking why the rise of WFH seems to be particularly crucial to women in traditionally family *un*friendly jobs. Using hypothetical-choice data from Maestas et al. (2023), we find that women who work long hours (over forty per week) are willing to forgo 15.8 percent of their wage for the option to WFH, dwarfing the valuation of any other group.[7] We then show that when hypothetical jobs randomly vary in both

[7]This pattern is also reflected in revealed-preference behavior in time-diaries from 2003−2019: women who worked more than forty hours were more likely to do some work from home than men who worked comparable hours, with no such gender gap among people working fewer hours.

WFH and required hours, women are less likely to choose jobs with longer hours if those jobs require them to be on-site but not if they allow them to WFH. Similarly, in our own original survey of 2,021 job seekers, we find that, while women report 8% fewer ideal weekly hours than men in on-site jobs, this gender gap closes for jobs allowing WFH.

Our paper contributes to the growing literature on how working from home affects women's outcomes in the labor market, particularly after motherhood. Using US data from 2003−2019, Jack et al. (2025) find that women are significantly more likely to WFH after the birth of their first child: this revealed preference suggests WFH makes it easier to balance career and family. Using German data from 1997−2014, Arntz et al. (2022) find that after transitions to WFH, gender gaps in working hours decline, particularly among parents. In an experiment in a UK pharmaceutical firm, Sherman (2020) finds that the option of WFH improves employees' self-assessed job performance and work-life balance, especially for mothers. In experiments in India, Jalota and Ho (2023) and Ho et al. (2024) find that WFH doubles mothers' labor force participation. Using pseudo-event study approach in four Latin American countries, Zarate (2025) finds that access to remote work significantly mitigates the drop in employment around motherhood. While these studies all suggest that WFH could bolster employment rates among American mothers, the extent to which this is true remains unclear. Indeed, existing US-based evidence from the COVID-19 pandemic is mixed (Heggeness et al., 2021; Goldin, 2022; Alon et al., 2023; Farooqi, 2023; Song, 2025), potentially because of countervailing childcare shocks, which remain unequally shared (Lyttelton et al., 2020; Dunatchik et al., 2021; Pabilonia and Vernon, 2022).[8]

[8]Mothers' increased ability to balance career and family may not be the only benefit from work from home to families. Indeed, Achard et al. (2025) find that the ability to work from home allows parents to

The rest of the paper is organized as follows. Section I describes our primary data sources. Section II analyzes how the rise of WFH across sectors of the economy correlates with shrinking motherhood employment gaps. Section III turns to micro-evidence, first examining how changes in employment around childbirth vary across women with and without access to WFH and then examining how WFH is a particularly important complement to long hours for women. Section IV discusses the findings and future directions.

I Data

The time-series analyses utilize publicly-available data from U.S. household surveys (specifically, the American Community Survey) and time-diaries (specifically, the American Time Use Survey). These data sources let us characterize the heterogeneous changes in WFH across people with different skill sets. Using the household surveys, we then characterize changes in the motherhood gaps in labor market outcomes among women with more and less remotable skill sets. To measure people's skill sets, we focus on college degrees because this information is available regardless of individuals' current labor-market participation or occupational choices.

Measuring WFH in Household Survey Data. The American Community Survey (ACS) asks individuals how they *usually got to work last week* with one option of, *worked from home*. This field appears to largely capture whether individuals primarily worked from home based on Barrero et al. (2021)'s validation efforts.

invest more in their children, thereby improving their educational attainment.

Measuring WFH in Time Diaries. Most people who WFH do not do so most of the time. Thus, to capture a more complete picture of the changing landscape of WFH, we integrate time-diary data from the American Time Use Survey (ATUS). These time-diaries allow us to capture individuals who report working from home on part or all of the recorded day but might not report usually working from home. We focus on weekdays (rather than weekends), in which individuals worked at least five hours. We then measure the share of total work hours done at home and the share of evening hours done at home.

Measuring Remotable Skill Sets. The American Community Survey asks individuals about their college degree. This is an essential variable for our analysis because it gives us a measure of whether or not people's skills are suitable for WFH regardless of whether they are employed. This allows us to characterize the changes in the motherhood employment gap for women with more and less remotable skill sets.

Labor-market outcomes: We focus on whether individuals were employed in the week preceding the survey. We also consider indicators for full-time work and continuous measures for total hours and wage/salary income.

Demographics: We focus on the differences in labor-market outcomes across women with and without children. We focus on comparing women whose eldest child is under 15 to women with no children, while excluding women with older children. Our results are not sensitive to this restriction. We also consider heterogeneity across women who likely have different intensities of childcare obligations, based on the number and age of their children.

Micro-evidence: Section III uses the American Life Panel to provide additional evidence on how WFH mediates the effects of motherhood on women's labor supply.[9] We leverage two features of the data. First, its panel component allows us to follow a set of women around childbirth to see how their labor-supply changes and how these changes differ by initial access to WFH. Second, its hypothetical choice data, designed by Maestas et al. (2023), allow us to characterize willingness to pay for WFH and whether WFH is particularly valuable to women in family *un*friendly jobs with long hours.

II Time Series Changes in Work from Home

II.A Empirical Design

Our empirical design leverages the fact that technological changes in the years preceding the pandemic led to more precipitous increases in WFH for college-educated workers with some degrees than others. For example, faster internet speeds and better video-conferencing technologies made it easier to WFH for workers with marketing and computer-science degrees. These technologies, however, did not typically obviate the need to be in-person for educators, pharmacists, and health-care professionals. We then investigate the association between increases in WFH in degrees and changes in the motherhood employment gap of those degree-holders.

Estimating changes in WFH. We estimate the average annual change in WFH in each college degree in the decade prior to the pandemic. For each degree d, we limit the sample

[9] RAND's American Life Panel recruits participants to regularly take surveys online. Potential participants who lacked online access were provide with internet access and/or a device. The survey is reweighted to match the Current Population Survey.

to individuals i with that degree. We then estimate:

$$\text{WFH}_{it} = \delta_d + \beta_d^{\text{WFH}} \text{Year}_t + \epsilon_{it}, \tag{1}$$

where WFH_{it} is an indicator for individual i reporting working primarily from home in year t. The coefficient of interest is β_d^{WFH}, which summarizes the change in WFH within the degree. Figure 1(a) illustrates this estimation for marketing and education degrees. Remote work increased in both fields but did so at over twice the rate in marketing than education. The changes in WFH across degrees broadly accord with intuitions about in-person versus potentially remotable work (Figure A.1).

Estimating changes in motherhood employment gaps. We then estimate the changes in the motherhood employment gap in each degree d:

$$\text{Employed}_{it} = \theta_d + \gamma_d \text{Mother}_i + \phi_d \text{Year}_t + \alpha_d^{\text{Motherhood-Gap}} \text{Mother}_i \cdot \text{Year}_t + \zeta_{it}, \tag{2}$$

where γ_d reflects the initial difference in employment between mothers and other women among those with the degree; ϕ_d represents the time-trend in employment for women without children; and $\alpha_d^{\text{Motherhood-Gap}}$, our coefficient of interest, represents the differential time-trend in employment for mothers versus other women. Figure 1(b) illustrates this estimation for the illustrative examples of marketing and education degrees. In both degrees, mothers' employment rates increased. Yet in the in-person field of education, the increase for mothers was largely parallel to that of other women, so the motherhood employment gap only marginally narrowed. By contrast, in the remotable field of mar-

keting, mothers' employment rates increased at nearly five times the rate of that of other women, substantially narrowing the motherhood gap in employment.

In addition to estimating Equation 2 for employment, we also estimate versions of this specification for total hours worked and log income, both unconditionally and conditional on employment.

Estimating the Link Between Changes in WFH & Motherhood Employment Gaps. We use the estimated trends from Equations 1-2 to estimate how increases in WFH relate to changes in the motherhood employment gap across college degrees:

$$\hat{\alpha}_d^{\text{Motherhood-Gap}} = \psi + \rho \hat{\beta}_d^{\text{WFH}} + u_d. \tag{3}$$

We weight these regressions by the number of degree-holders. We limit to degrees with at least five thousand women to reduce measurement error, but our results are not sensitive to this restriction.

We would like to interpret ρ as reflecting the causal effect of increasing WFH on the motherhood gap in employment. For this causal interpretation to hold, other factors that change mothers' relative employment rates in degrees must be orthogonal to changes in WFH in those degrees. Notably, this identifying assumption is about *changes* rather than *levels*: as a result, it does not require that the *level* of WFH be orthogonal to the *level* of other degree-specific factors affecting the motherhood penalty. Because we focus on mothers' employment rates relative to those of other women, factors that equally affect women with and without children also do not impact the identifying assumption. Nonetheless,

this identifying assumption is a strong one, so it is valuable to consider potential threats to the design.

One threat to this design is reverse causality. As mothers with specific degrees become more attached to the workforce, they may advocate for WFH to ease their attempts to juggle career and family. Our estimated relationship could then reflect reverse causality as mothers' attachment increases WFH rates rather than the other way around. To address this concern, we estimate versions of Equation 3 where we estimate the trend in WFH solely using the sample of men. This design yields similar estimates as our baseline specification, suggesting that reverse causality does not drive our results.

Another threat to the design is that changes in WFH are correlated with other changes in work that ease mothers' attempts to juggle career and family or increase mothers' incentives to persist in the workforce. To account for some of these factors, we control for changes in average hours, educational-attainment, income, and gender composition within degrees, which we compute using the analogues of Equation 1. We find that our results are substantively unchanged by the inclusion of these controls.

Instrumenting for Changes in WFH. To bolster our design, we also instrument for changes in WFH based on whether the work associated with each college degree tends to require physical presence, using Dingel and Neiman (2020)'s classification. Our preferred definition revises Dingel and Neiman (2020)'s classification to include primary and secondary educators as in-person occupations to reflect pre-pandemic norms, but our results are not sensitive to this reclassification. We then classify college degrees as requiring in-person

work if more than half of degree-holders are in an occupation with such a requirement. We then estimate:

$$\textbf{First Stage:} \qquad \hat{\beta}_d^{\text{WFH}} = \kappa + \tau \cdot \text{Requires Physical Presence}_d + v_d \tag{4}$$

$$\textbf{Second Stage:} \qquad \hat{\alpha}_d^{\text{Motherhood-Gap}} = \psi_{\text{IV}} + \rho_{\text{IV}} \hat{\hat{\beta}}_d^{\text{WFH}} + \nu_d. \tag{5}$$

The identifying assumption is that other factors influencing the motherhood gap in employment did not differentially change across degrees that required physical presence and those that did not. To soften this identifying assumption, we again control for changes in hours, education, income, and gender composition in degrees.

II.B Results

We first analyze the heterogeneous changes in WFH across college-educated workers with different degrees. We then analyze how increases in flexibility over *where* to work related to changes in mothers' employment rates vis-á-vis those of other women with the same degrees.

Changes in WFH. Work from home increased in the decade prior to COVID-19. While a growing minority of workers worked primarily from home, there were higher levels and larger changes in workers utilizing WFH in more limited ways.[10] Among the tercile of workers whose skills became most remotable, over a fifth of work hours were spent at

[10]This analysis uses American Time Use time-diaries, which records individuals' occupation but not their college degree. To impute the likely exposure of an individuals' skills to increases in WFH feasibility, we take a weighted average of the changes in WFH by degree within that occupation in the Census and merge this into the time-diary data.

home in 2019, over doubling the rate in 2003 (Figure A.2(b)).

In addition, late-night hours in fields like finance were increasingly done from home rather than the office, among both workers and managers (Figures A.2(c)-(d)). By 2019, fully 80% of managers' work after 6pm was done from home in this top tercile of WFH compared to just 20% in 2003. This suggests that the career returns to working late *in the office* declined as WFH became increasingly technologically feasible. These changes may have been particularly impactful for working mothers who found late nights at the office especially challenging to balance with their families.

Changes in Motherhood Employment Gaps. In college degrees where WFH increased, the motherhood gap in employment narrowed. Figure 2 illustrates this relationship. Among college degrees like marketing that saw large increases in WFH (on the x-axis), there also tended to be large increases in mothers' employment rates relative to those of other women (on the y-axis). By contrast, in fields like education that saw less of an increase in WFH, there also tended to be less movement in the motherhood employment gap.

On average, a one percentage point increase in workers working primarily from home is associated with a 1.3 pp narrowing of the motherhood employment gap (p-value $=$ 0.0097, Column 1 of Table 1). On its face, this one-for-one relationship suggests that most mothers who newly work from home would have otherwise left the workforce. However, increases in fully remote work were accompanied by larger increases in more limited uses of WFH on the occasional day or evening, which may also help mothers persist in

the workforce. Indeed, since only 6% of the workforce was initially working primarily from home, a one percentage point increase represents a large, 17% shift in this extreme form of WFH. If other forms of WFH increased in proportion, this represents a major shift in locational flexibility. Under this view, every 10% increase in WFH would close the motherhood employment gap by 0.78 pp (or 0.94%).

Robustness: We find similar relationships after controlling for other changes in the nature of work in affected degrees, specifically the average hours, educational attainment, income, and gender composition (Columns 2-5 in Table 1). We also find similar patterns when characterizing changes in WFH within each degree using only the sample of men (Table A.2), which is less likely to be driven by reverse causality from increasingly attached mothers increasingly advocating for WFH.

We also find qualitatively similar patterns when instrumenting for the change in WFH using information on whether or not the college degree typically involves work that requires physical presence at, for example, a school or hospital (Table A.1).

Additional Labor-Market Outcomes: We see similar patterns for other labor market outcomes (Figure A.3). In college degrees where WFH increased, mothers started to work more total hours relative to other women and earn more income, even conditional on employment.

Mothers vs. Fathers: We compare the changes in the motherhood gap in employment within degrees to changes in the fatherhood employment gap in those degrees. The result of this analysis (in Figure A.4) is almost identical to our baseline analysis focusing solely

on changes in the motherhood employment gap (in Figure 2). This suggests that the increasing prevalence of WFH in certain degrees did not change fathers' employment relative to other men — and instead only increased mothers' employment relative to other women. This divergence is consistent with the continued gendered division of household labor, which makes WFH more valuable for mothers attempting to balance career and family.

Heterogeneity by Child-care Responsibilities. We find a tighter link between increases in WFH and increases in mothers' employment rates for mothers who likely have more extensive childcare responsibilities. Figure 3(a) shows that the estimated link is stronger for women with more children. Figure 3(b) shows that the estimated link is stronger for women with younger children. Particularly, we see that increasing access to WFH was associated with a narrowing of employment gaps between women whose youngest child was under the age of 16, but not for women with older children. This is consistent with WFH providing less logistical advantages to mothers of children who can, for example, drive themselves to soccer practice.

II.C Heterogeneity by Inflexibility

We hypothesized that the rise of remote work will be more crucial for women whose skills are well-suited to jobs that are inflexible about *when* and *how much* they work. To test this hypothesis, we follow Goldin (2014) who identifies temporally inflexible jobs using O*Net data on the tasks and work environments associated with different occupations. We then estimate how the relationship between increases in WFH and narrowing of the

motherhood employment gap varies by sectors' temporal inflexibility.

Defining Inflexibility over When and How Much to Work. Goldin (2014) identifies multiple dimensions of work that feed into temporal inflexibility. First, she identifies "time pressure" — or the frequency with which workers must meet strict deadlines. She further identifies working with others in real-time as something that leads to inflexibility over *when* to work, since collaboration requires workers to sync their schedules with their coworkers and contacts.[11] She finally identifies autonomy over work as something that would limit flexibility over *how much* to work by making it difficult to split up a job into tasks that could be done by multiple different workers.[12] This inflexibility measure produces an intuitive characterization of degrees with those in humanities and education rated as more flexible and those in business and medicine rated as less flexible (Figure A.5).

Results. The rise of WFH narrowed motherhood employment gaps more in sectors in which workers have less flexibility over when and how much to work. Figure 4(a) shows this. For degree-holders who tend to have more flexibility over when they work (to the left), there is no significant relationship between increases in WFH and narrowing of the motherhood employment gap. By contrast, in sectors where degree-holders tend to have less flexibility over when to work (to the right), a ten percent increase in the prevalence of remote work (or a 0.6 pp increase) is associated with a 1.48 pp increase in mothers'

[11]She measures this dimension of work using the frequency of "contact with others" — or how much "this job require[s] the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it" — and the import of "establishing and maintaining interpersonal relationships" — or the importance of "developing constructive and cooperative working relationships with others and maintaining them over time."

[12]She identifies autonomy by the "freedom to make decisions" — or "how much decision-making freedom, without supervision, the job offer[s]" — and the "structured versus unstructured" nature of the work — or the extent that the job is "structured for the worker, rather than allowing the worker to determine tasks, priorities, and goals."

employment relative to that of other women (p-value = 0.0013). The difference in these relationships is statistically significant (p-value = 0.028) and is robust to using more continuous measures of temporal flexibility as shown in Figure 4(b). These patterns are consistent with flexibility over *where* to work being an important substitute for flexibility over *when* to work in traditionally family-*un*friendly sectors.

II.D Contextualizing the Magnitudes

To quantify the magnitude of the estimated relationships, we consider their implications for gender gaps in employment. Figure 5(a) plots the realized trends in employment rates in the solid lines for college graduates of different genders. The dashed lines plot counterfactual trends without increases in WFH. These counterfactual trends adjust employment to deduct the estimated contribution of increases in WFH to the narrowing of motherhood employment gaps:

$$\widetilde{\text{Emp}}_{it} = \text{Emp}_{it} - \hat{\rho}(\overline{\text{WFH}}_t - \overline{\text{WFH}}_{2009})\mathbb{1}[\text{Mother}]_i \tag{6}$$

where the estimated $\hat{\rho}$ comes from Column 5 of Table 1.

This exercise suggests that the rise of WFH was an important contributor to the narrowing gender gap in employment rates among college graduates in this period. Our estimate suggests that the rise of WFH narrowed gender gaps in employment by 1.45 pp or about 14% of the baseline gap. Without increases in WFH, the gender gap in employment among college graduates would have largely stagnated. Thus, this back-of-the-envelope exercise suggests that about two-thirds of the closure of the gender gap could

be attributed to the rise of WFH. To the extent to which increases in locational flexibility were associated with other unobserved changes in family-friendly workplace policies, this exercise offers an upper bound on WFH's impacts. However, the magnitude of this upper bound suggests that WFH could be an important driver of narrowing gender gaps.

To the extent that fathers' labor-supply choices were unresponsive to those of their wives, this increase in mothers' employment would represent a substantial expansion of the tax base, as more highly educated women continued to work after motherhood.

The rise of flexibility over *where* to work appears to be particularly crucial in sectors that offer workers limited flexibility over *when* and *how much* to work. Figure 5(b) shows counterfactuals, allowing WFH to have heterogeneous effects across more and less flexible sectors. The estimates suggest that in less flexible sectors (to the right), gender gaps in employment would have *increased* in the absence of WFH but instead narrow appreciably due to WFH's rise. By contrast, in more flexible sectors (to the left), WFH does not appear to be a useful lever for narrowing gender gaps in employment rates.

III Micro-Evidence

III.A Motherhood Penalty by Baseline Access to Remote Work

We use panel data to investigate how employment rates of women change around childbirth and how this varies across women who could work from home before childbirth versus those who could not.

Panel Data and Design. Our data comes from the American Life Panel, which surveyed 2,504 people about their work arrangements in both 2015 and 2018. We identify 110 women who had children between the two survey waves, 72 of whom had been in the labor force prior to the birth. About half of these women had access to work from home before the birth (47%) and the other half did not (53%).

Identifying childbirths. The surveys ask people about their marital status and the number of people in their household. We proxy for childbirth by focusing on people who are married or partnered and have more household members in 2018 than in 2015. This definition may wrongly include women who, for example, have parents or in-laws move in. To address this, we show robustness to limiting to women of childbearing years and excluding people who see increases in eldercare responsibilities.

Measuring access to WFH. The surveys asked respondents two questions about WFH. The first question asks how frequently they worked from home, with possibilities of never (59% of respondents), several times a year (8.2%), several times a month (5.9%), several times a week (7.4%), and daily (19%). The second question asks about whether they could choose where to work during regular business hours, with about a quarter of respondents saying they had this flexibility (25.6%). We classify someone as having access to WFH if they either said they sometimes worked from home or could always choose to do so. This resulted in about half the sample being classified as having access to WFH in 2015. Respondents were asked these questions if they had been employed at any point in the twelve months prior to the survey.

Design. Our difference-in-differences design compares the change in labor supply around childbirth for women who have access to WFH to those who do not. We estimate:

$$\text{Employed}_{it} = \omega \text{Post}_{it} \times \text{Initially Can WFH}_i + \theta \text{Post}_{it} + \mu_i + \epsilon_{it}, \tag{7}$$

where we limit the sample to women who had a childbirth during the panel and for whom information on initial WFH was available. Employed_{it} is an indicator for being employed at the time of the survey. Post_{it} is an indicator for being after the childbirth, and $\text{Initially Can WFH}_i$ is an indicator for being able to WFH before the childbirth. μ_i represents individual fixed effects. Standard errors are clustered by individual.

The coefficient θ captures how labor supply changes around childbirth for women who do not initially have access to WFH. ω is our coefficient of interest, which captures how access to WFH moderates the effects of childbirth on labor supply. For ω to have a causal interpretation, a parallel trends assumption must hold: in the absence of differential access to WFH, women with access must have responded similarly to childbirth as women without access. To relax this strong identifying assumption, we allow other job attributes to also moderate the impact of childbirth on labor supply, including whether the job allows for scheduling flexibility.

Results. Women who cannot initially WFH take bigger steps away from the labor force around childbirth than those who can initially WFH. Table 2 presents these results. Among women who can initially WFH, there is no change in the probability of working around

childbirth (Column 1).[13] By contrast, among women who cannot initially WFH, nearly a quarter stop working around the childbirth (Column 2). The difference-in-differences coefficient consequently indicates that having access to WFH has a significant protective effect on the labor supply of women around childbirth (p-value $= 0.018$, Column 3).

We find similar protective effects of WFH when we allow other factors to moderate the impact of childbirth on labor supply. Column 4 allows college-educated women to be more attached to the workforce, which only marginally weakens our coefficient of interest. Column 5 allows labor-force attachment to differ by sector (e.g., teaching versus sales).[14] This inclusion marginally strengthens the estimated protective effect of WFH. Finally, Column 6 allows other (dis)amenities to moderate a woman's labor-force attachment — specifically, the flexibility of her schedule, its dependability from week to week, and whether there are frequently tight deadlines. All of these factors have the expected influence on labor-force attachment directionally, but their inclusion does not change the estimated effect of WFH. We further find similar estimates when using stricter definitions of what likely constitutes a childbirth (Table A.4).

We find similar differential effects of childbirth on total hours based on whether women initially have access to WFH. Hours decline by 8.2 hours per week for women who cannot initially WFH while insignificantly increasing for women who can (Table A.3(a)). These differential changes in hours are principally driven by the extensive margin of labor supply, but there are also suggestive effects on the intensive margin (Table A.3(b)).

[13] In this sample, one woman exits but another finds a job.

[14] The top types of work for the women in our sample are "education, training, and library occupations," "business and financial operations occupations", "office and administrative support occupations," and "sales and related occupations." There are a total of 18 occupational groups represented.

The next section provides more evidence that WFH not only helps women persist in the workforce but also enables them to work longer hours.

III.B Gendered Complementarity Between WFH and Long Hours

We first explore whether women view WFH as more of a complement to long hours than men do. To do this, we use hypothetical-choice data from Maestas et al. (2023) to test whether women who work long hours would forgo more of their pay for the option to WFH. We then turn to people's revealed preferences in time-diary data, contrasting how men's and women's use of WFH varies with their work hours.

Hypothetical-Choice Data & Design. We revisit hypothetical-choice data from Maestas et al. (2023), who asked a representative sample of prime-age Americans to compare pairs of hypothetical jobs as part of the American Life Panel. In each pair, the two jobs randomly varied in their wages and two of ten possible job attributes, with the rest set to those of the respondent's current or most recent job. One of these job attributes was the "option to telecommute."[15] Figure A.7 shows an example of this interface.

To estimate respondents' willingness to pay for remote work, the authors estimate choice models where individual i's choice of job j is modeled as a function of attributes like the option to WFH and the log wage:

$$\text{Choose Job}_{ij} = \beta_{\text{WFH}}\text{WFH}_j + \delta \ln(w_j) + X_{it}'\alpha + \epsilon_{ij}. \tag{8}$$

[15] In another part of the survey, the authors ask respondents, "Is it possible for you to work from home or another location of your choosing at least some of the time?" They use responses to this question to set the default telecommuting value in the survey.

The authors then estimate the average willingness to pay for WFH as the wage differential that would equalize the choice probabilities across WFH jobs and jobs without this amenity: $\hat{\beta}_{\text{WFH}} + \hat{\delta}\ln(w - \widehat{\text{WTP}}) = \hat{\delta}\ln(w)$. Rearranging this yields an estimate of the average willingness to pay as a percent of the wage:

$$100 \times \frac{\widehat{\text{WTP}}}{w} = 100 \times \left(1 - \exp\left(-\frac{\hat{\beta}_{\text{WFH}}}{\hat{\delta}}\right)\right). \tag{9}$$

This methodology implies that respondents are willing to sacrifice 4% of their wage on average for the option to WFH.

We extend this analysis to consider heterogeneity by gender and current work hours. We fully interact Equation 8 by workers' gender and deciles of current work hours. We then estimate the willingness to pay in Equation 9 using the relevant coefficients for each subpopulation.

Hypothetical-Choice Results: Women who work longer hours have substantially higher willingness to pay for the option to WFH. Figure 6(a) illustrates this. Women who currently work more than forty hours per week are willing to give up 15.9% of their pay for the option to work from home (95% CI = [10.0, 21.7]). This valuation is over six times that of men working comparable hours (of 2.4%, 95% CI = [-2.1, 6.9]). There is no such gender gap for people working less than forty hours, where men and women both have willingness to pay of 4%−5% of the wage.[16] While this data does not report parental

[16]Specifically, women who work less than forty hours per week are willing to give up 4.9% of their wage for the option to work from home (95% CI = [2.3, 7.6]). Men who work comparable hours are willing to give up 3.5% of their pay for this option (95% CI = [0.02, 7.0]).

status directly, limiting to married or partnered respondents with additional household members who are between the ages of 25 and 45 suggestively results in even larger gender gaps in valuations of WFH for those working long hours (Figure A.8). These results support the hypothesis that women view WFH as more complementary with working long hours than men do, especially after parenthood.

Revealed-Preference Results: To assess whether these patterns also manifest in individuals' real-world choices, we turn to time-diary data from the American Time Use Surveys in 2003−2019. Figure 6(b) plots the share of men and women who did any WFH on the day of the time-diary as a function of their reported usual hours of work. Among those who typically work more than forty hours per week, women were substantially more likely to do some WFH. By contrast, women and men who work no more than forty hours per week were similarly likely to do some WFH. These patterns persist when we condition on a rich set of occupation, industry, and demographic controls (Table A.5(a)).[17] The differences are significantly more pronounced among women with children: mothers are particularly likely to work some from home when they work long hours (Table A.5(b)).

III.B.1 Gender Gaps in Preferred Hours with and without WFH

We have seen evidence that WFH is more valuable to women who work long hours. We now investigate whether the option to WFH induces women to want to work more hours.

[17] In column 5, we include fixed effects for usual hours worked, year, occupation, industry, educational attainment, race and ethnicity, and age. We find that women who work more than forty hours per week are 3.0 pp (or 14.2%) more likely to do some WFH than men with comparable characteristics, compared to a negligible gender difference for those who work fewer hours (p-value of the difference in the gender gap $= 0.0026$).

Hypothetical-Choice Evidence. In some of the pairs of hypothetical jobs in Maestas et al. (2023), the two jobs randomly differed in both their weekly work hours and the option to WFH. We test whether the option to WFH narrows the gender gap in chosen hours, by estimating the following specification:

$$\begin{aligned}\text{Choose Job}_{ij} = \psi \text{Female}_i \times \text{WFH}_j \times \text{Hours}_j + \rho \text{Female}_i \times \text{Hours}_j \\ + \theta \text{Female}_i \times \text{WFH}_j + \gamma \text{Female}_i + \eta \text{WFH}_j + \alpha \text{Hours}_j + \epsilon_{ij}. \end{aligned} \tag{10}$$

As Maestas et al. (2023) show, women are less likely to choose jobs with longer hours, $\rho < 0$. If WFH narrows this gender gap, then $\psi > 0$. This is exactly what we find in Column 1 of Table 3, where $\hat{\psi} \approx \hat{\rho}$, suggesting that offering the option to WFH in the job with longer hours fully closes the gender gap in chosen hours. Column 2 focuses on the hours margin of requiring more than forty hours per week. Women are 20 pp less likely to choose such a job when it is on-site. When the job offers a WFH option, this gender gap suggestively goes away, although we lack power to rule out no interaction.

We supplement this analysis by conducting an additional survey of 2,021 jobseekers on the Qualtrics platform in partnership with ZipRecruiter. We ask respondents to make two hypothetical choices. One asks them about a fully on-site job with forty hours versus a hybrid job with fifty hours. Another asks them about a fully on-site job with fifty hours versus a hybrid job with forty hours. The order of these questions was randomized. Column 3 of Table 3 estimates the analogous version of Equation 10 for this dataset. We find that women are 25.5 pp less likely to choose the job with long hours when this job is

on-site but equally likely as men to choose the job with long hours when it is hybrid.

Stated-Preference Evidence. In our surveys on Qualtrics, we also ask job seekers about their ideal work hours in different work arrangements: on-site, hybrid, or remote (see Figure A.9 for the interface). While women say that they would prefer 8.2% fewer work hours than men on-site, this difference disappears for jobs that are hybrid or remote (p-value of difference-in-difference < 0.0001, Table A.6).

IV Conclusion

We study how changes in work from home (WFH) in the decade prior to the pandemic impacted motherhood penalties in the labor market. We ask whether flexibility over *where* to work can ease mothers' attempts to juggle career and family, even in jobs where flexibility over *when* to work is costly to provide.

Among college-educated workers with certain degrees — like marketing or finance — improvements in information technology made working from home an increasingly good substitute to working from the office. These jobs were increasingly offering workers some flexibility over *where* to work if not *when* to work. By contrast, workers with degrees in fields like education or pharmacy that required physical presence were largely unaffected by these technological changes.

We ask how changes in flexibility over *where* to work translate into changes in the motherhood penalty. We find that in fields where WFH became more prevalent, the gap in employment between mothers and other women narrowed. This shift in WFH expanded the

set of family-friendly occupations, transforming a set of high-paid, high-growth careers into occupations that are more reconcilable with mothers' home-lives. This expansion of family-friendly occupations promises to reduce gender inequality in the labor market.

While the future of WFH remains uncertain, large-scale survey evidence indicates that WFH is stabilizing at over twice the rates of pre-pandemic (Barrero et al., 2021; Bureau of Labor Statistics, 2025). It's also worth noting that much of the gains in WFH in our pre-pandemic time-period were in sporadic WFH when, for example, a kid was sick or a deadline required late-night hours. Nonetheless, this flexibility appears to have increased mothers' persistence in the workforce.[18] Thus, these findings indicate that as long as companies allow workers to retain some of the benefits of periodic WFH, gains for working mothers can still be retained even as companies call workers back to the office.

We focus on the labor-supply choices of mothers at a point in time. The rise of WFH may have even more far-reaching implications for gender gaps in labor markets. The expectation that women can WFH after becoming mothers may increase young women's incentives to invest in their educations, choose degrees that lead to high-growth careers, and invest in firm-specific human capital once working. By delinking women's career choices from their expected fertility, WFH may allow women to optimize more like men.[19] On the firm side, the option of WFH increases the incentive to invest in women's training because worker-firm matches are more likely to persist even if women become mothers. These longer-term implications of the rise of WFH are exciting avenues of future work.

[18]The large returns to a relatively modest amount of WFH are consistent with experimental work on hybrid arrangements, which show that just one or two days at home can slash attrition (Bloom et al., 2024).

[19]The concern that women may optimize differently from men when choosing college majors may contribute to women's frequent exclusion from analyses of major choices (Arcidiacono et al., 2020).

References

Achard, Pascal, Michèle Belot, and Arnaud Chevalier, "When Parents Work from Home," 2025.

Adams-Prassl, Abi, Kristiina Huttunen, Emily Nix, and Ning Zhang, "Violence against women at work," *The Quarterly Journal of Economics*, 2023, *138* (4).

Alon, Titan, Matthias Doepke, Jane Olmstead-Rumsey, and Michèle Tertilt, "This time it's different: the role of women's employment in a pandemic recession," Technical Report, National Bureau of Economic Research 2023.

Angelov, Nikolay, Per Johansson, and Erica Lindahl, "Parenthood and the gender gap in pay," *Journal of labor economics*, 2016, *34* (3), 545–579.

Arcidiacono, Peter, V Joseph Hotz, Arnaud Maurel, and Teresa Romano, "Ex ante returns and occupational choice," *Journal of Political Economy*, 2020, *128* (12), 4475–4522.

Arntz, Melanie, Sarra Ben Yahmed, and Francesco Berlingieri, "Working from home, hours worked and wages: Heterogeneity by gender and parenthood," *Labour Economics*, 2022, *76*, 102169.

Barbanchon, Thomas Le, Roland Rathelot, and Alexandra Roulet, "Gender differences in job search: Trading off commute against wage," *The Quarterly Journal of Economics*, 2021, *136* (1), 381–426.

Barrero, Jose Maria, Nicholas Bloom, and Steven J Davis, "Why working from home will stick," Technical Report, National Bureau of Economic Research 2021.

Bertrand, Marianne, Claudia Goldin, and Lawrence F Katz, "Dynamics of the gender gap for young professionals in the financial and corporate sectors," *American economic journal: applied economics*, 2010, *2* (3), 228–55.

Black, Dan A, Natalia Kolesnikova, and Lowell J Taylor, "Why do so few women work in New York (and so many in Minneapolis)? Labor supply of married women across US cities," *Journal of Urban Economics*, 2014, *79*, 59–71.

Bloom, Nicholas, Ruobing Han, and James Liang, "Hybrid working from home improves retention without damaging performance," *Nature*, 2024, *630* (8018), 920–925.

Bureau of Labor Statistics, "2013-2024 American Time Use Survey Public Use Microdata Samples," 2025. data retrieved from IPUMS ATUS, https://www.atusdata.org/atus/ (visited August 1, 2025).

Buzard, Kristy, Laura Gee, and Olga Stoddard, "Who You Gonna Call? Gender Inequality in External Demands for Parental Involvement," *SSRN Working Paper*, 2023.

Dingel, Jonathan I and Brent Neiman, "How many jobs can be done at home?," *Journal of Public Economics*, 2020, *189*, 104235.

Dunatchik, Allison, Kathleen Gerson, Jennifer Glass, Jerry A Jacobs, and Haley Stritzel, "Gender, parenting, and the rise of remote work during the pandemic: Implications for domestic inequality in the United States," *Gender & Society*, 2021, *35* (2), 194–205.

Erosa, Andrés, Luisa Fuster, Gueorgui Kambourov, and Richard Rogerson, "Hours, occupations, and gender differences in labor market outcomes," *American Economic Journal: Macroeconomics*, 2022, *14* (3), 543–590.

Farooqi, Hira, "Telework availability, women's labor market outcomes and fertility choices," *Working Paper*, 2023.

Goldin, Claudia, "A grand gender convergence: Its last chapter," *American Economic Review*, 2014, *104* (4), 1091–1119.

_ , "Understanding the Economic Impact of COVID-19 on Women," *Brookings Papers on Economic Activity*, 2022, *2022* (1), 65–140.

_ **and Lawrence F Katz**, "A most egalitarian profession: pharmacy and the evolution of a family-friendly occupation," *Journal of Labor Economics*, 2016, *34* (3), 705–746.

Heggeness, Misty, Palak Suri et al., "Telework, childcare, and mothers' labor supply," *Opportunity and Inclusive Growth Institute Working Paper*, 2021, *52.*

Ho, Lisa, Suhani Jalota, and Anahita Karandikar, "Bringing work home: Flexible arrangements as gateway jobs for women in West Bengal," *Structural Transformation and Economic Growth (STEG) Working Paper*, 2024, *80.*

Hsieh, Chang-Tai, Erik Hurst, Charles I Jones, and Peter J Klenow, "The allocation of talent and us economic growth," *Econometrica*, 2019, *87* (5), 1439–1474.

Jack, Rebecca, Daniel Tannenbaum, and Brenden Timpe, "The parenthood gap: Firms and earnings inequality after kids," Technical Report, Upjohn Institute Working Paper 2025.

Jalota, Suhani and Lisa Ho, "What Works for Her? How Work-from-Home Digital Jobs Affect Female Labor Force Participation," *Working Paper*, 2023.

Kleven, Henrik, Camille Landais, and Jakob Egholt Søgaard, "Children and gender inequality: Evidence from Denmark," *American Economic Journal: Applied Economics*, 2019, *11* (4), 181–209.

Kuziemko, Ilyana, Jessica Pan, Jenny Shen, and Ebonya Washington, "The mommy effect: Do women anticipate the employment effects of motherhood?," Technical Report, National Bureau of Economic Research 2018.

Lyttelton, Thomas, Emma Zang, and Kelly Musick, "Gender differences in telecommuting and implications for inequality at home and work," *Available at SSRN 3645561*, 2020.

Maestas, Nicole, Kathleen J Mullen, David Powell, Till Von Wachter, and Jeffrey B Wenger, "The value of working conditions in the United States and implications for the structure of wages," *American Economic Review*, 2023, *113* (7), 2007–2047.

Mas, Alexandre and Amanda Pallais, "Valuing alternative work arrangements," *American Economic Review*, 2017, *107* (12), 3722–59.

Morgan, Allison C, Samuel F Way, Michael JD Hoefer, Daniel B Larremore, Mirta Galesic, and Aaron Clauset, "The unequal impact of parenthood in academia," *Science Advances*, 2021, *7* (9), eabd1996.

Pabilonia, Sabrina Wulff and Victoria Vernon, "Telework and time use," 2022.

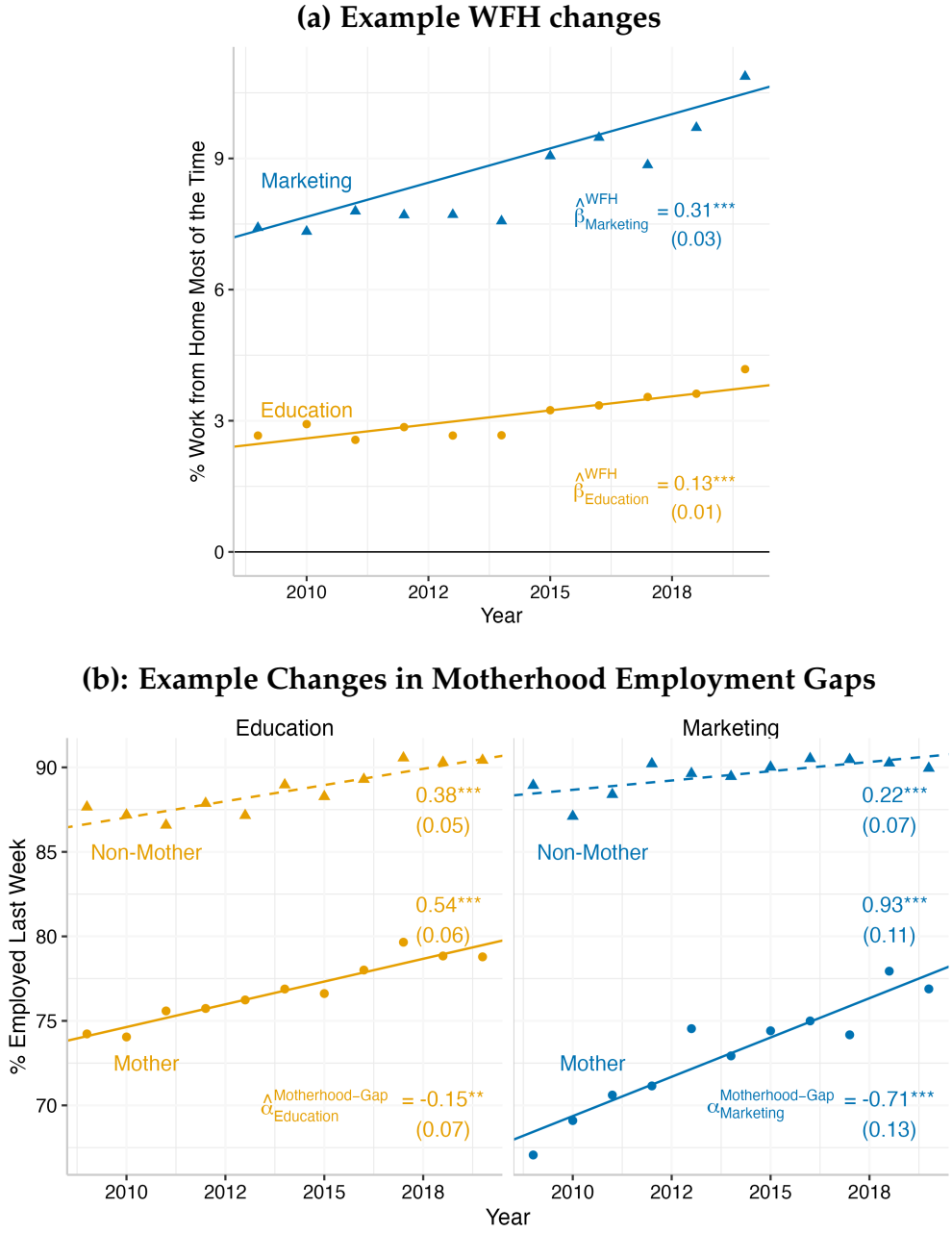
Sherman, Eliot L, "Discretionary remote working helps mothers without harming non-mothers: Evidence from a field experiment," *Management Science*, 2020, *66* (3), 1351–1374.

Song, Meng, "The Future of Work: Remote Opportunities and Female Labor Force Participation," *Available at SSRN 5127427*, 2025.

Wood, Robert G, Mary E Corcoran, and Paul N Courant, "Pay differences among the highly paid: The male-female earnings gap in lawyers' salaries," *Journal of Labor Economics*, 1993, *11* (3), 417–441.

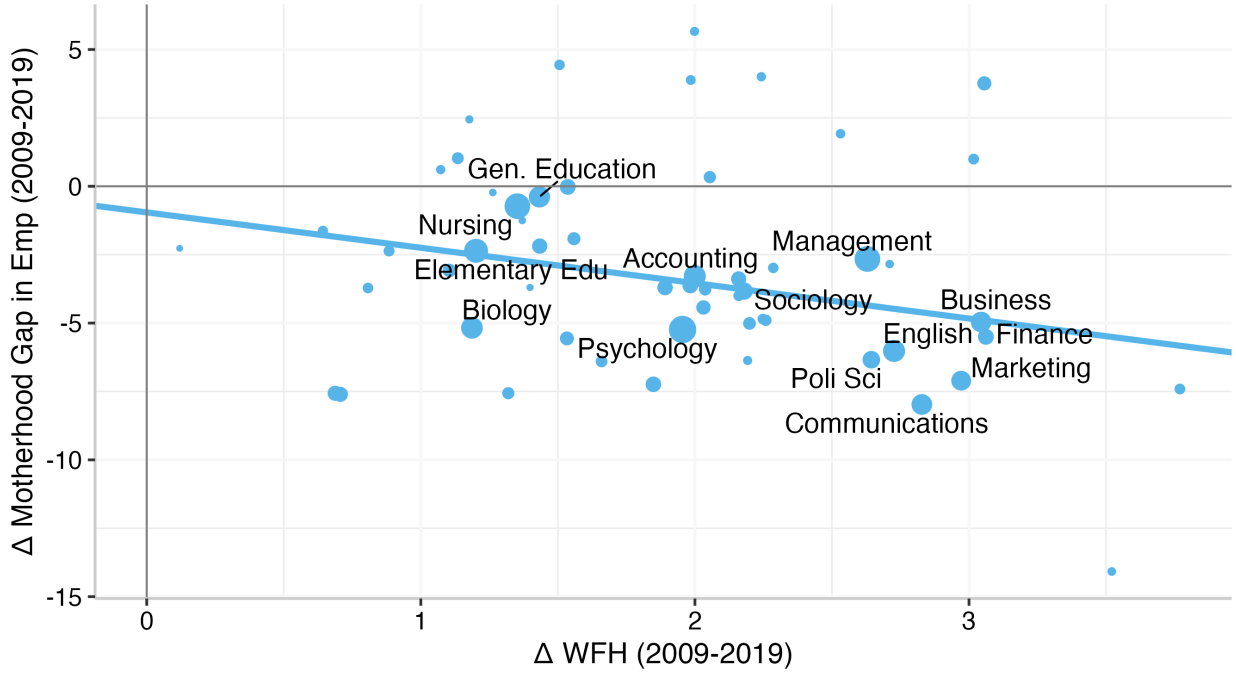
Zarate, Pablo, "Remote Work and Child Penalties," *Available at SSRN 5360652*, 2025.

Figure 1: Changes in WFH & Motherhood Employment Gaps in Specific College Degrees



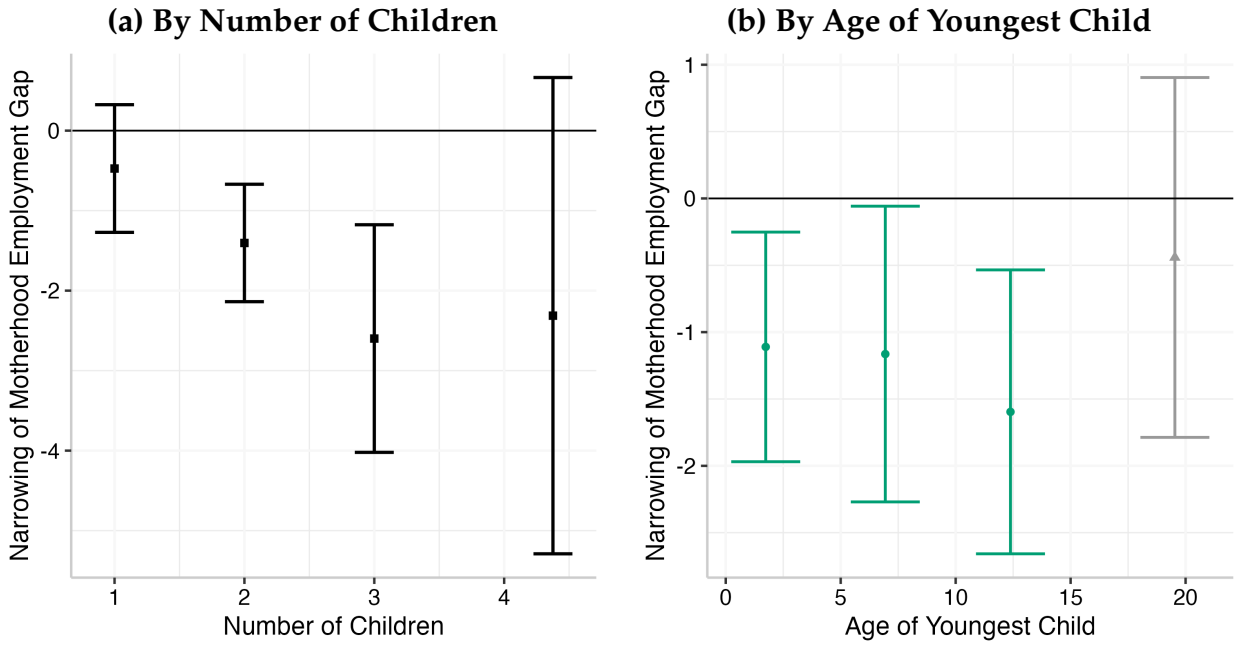
Notes: This figure illustrates changes in work from home and motherhood employment gaps in the specific examples of marketing (which is amenable to work from home) and education (which has a substantial in-person component). Data comes from the American Community Survey. The sample is limited to college-educated workers between the ages of 20 and 55. Panel (a) illustrates the changes in WFH. The fit lines and annotated coefficients reflect Equation 1. Panel (b) juxtaposes the trends in mothers' employment rates and those of other women for education and marketing. The annotated coefficients ($\hat{\alpha}_d^{\text{Motherhood-Gap}}$) reflect the differential change in employment for mothers versus other women as in Equation 2. Standard errors are robust. *p<0.1; **p<0.05; ***p<0.01.

Figure 2: Rise of WFH and Narrowing of Motherhood Gaps



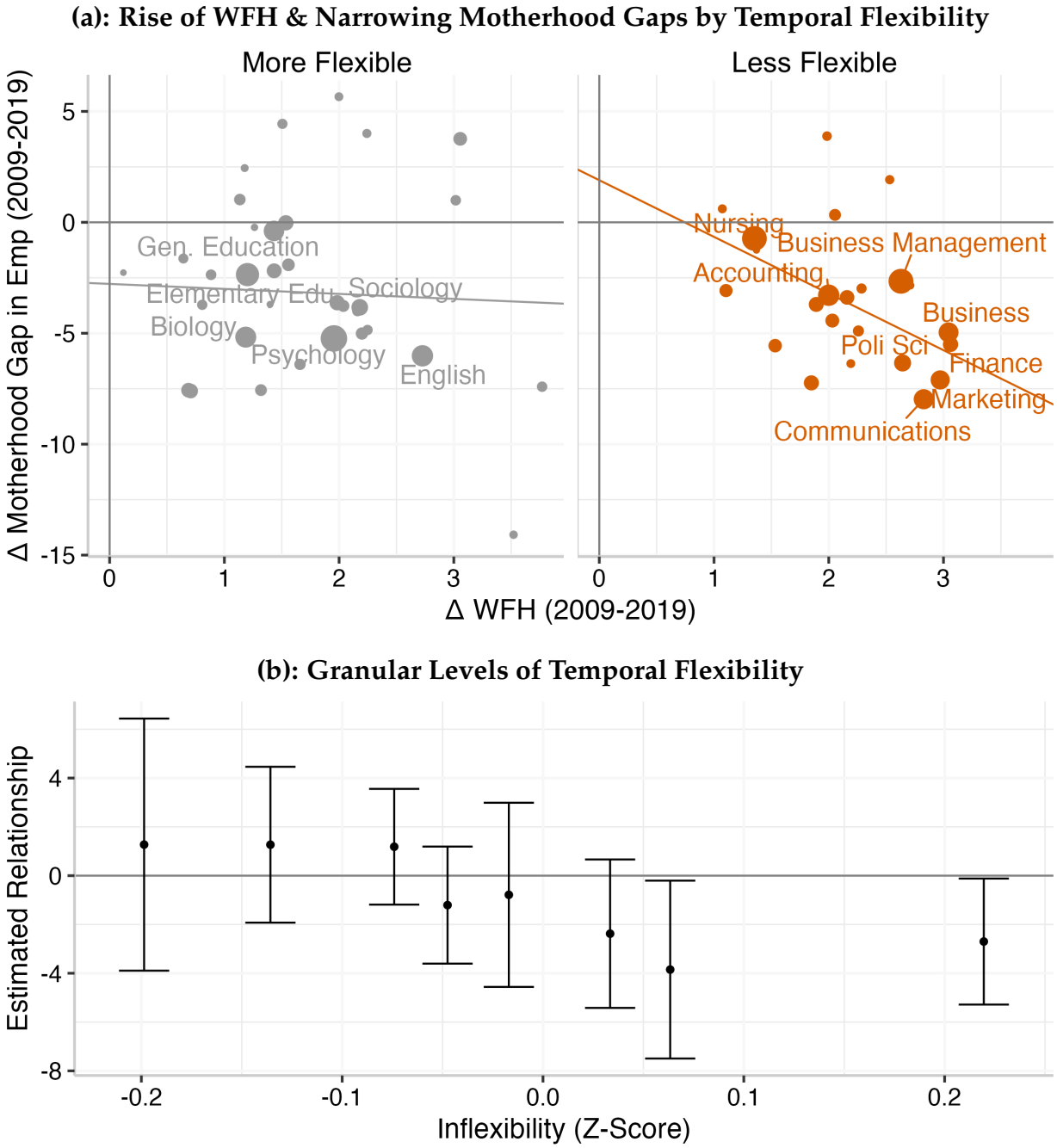
Notes: This figure shows the association between percentage point increases in WFH in college degrees and narrowing of the motherhood gap in employment rates among degree-holders. Each point represents a different college degree. The x-axis represents the degree-specific change in work from home from Equation 1, and the y-axis represents the degree-specific change in the motherhood gap in employment from Equation 2. The size of the point reflects the number of women with that degree. The fit line comes from Equation 3.

Figure 3: Tighter Link for Women With More Childcare Responsibilities



Notes: This figure shows the association between increases in WFH in college degrees and narrowing of the motherhood gap in employment among degree-holders, separately for mothers with varying (a) numbers of children and (b) ages of their youngest child. The error bars reflects 95 percent confidence intervals with standard errors clustered by degree.

Figure 4: Heterogeneity by Flexibility over When and How Much to Work

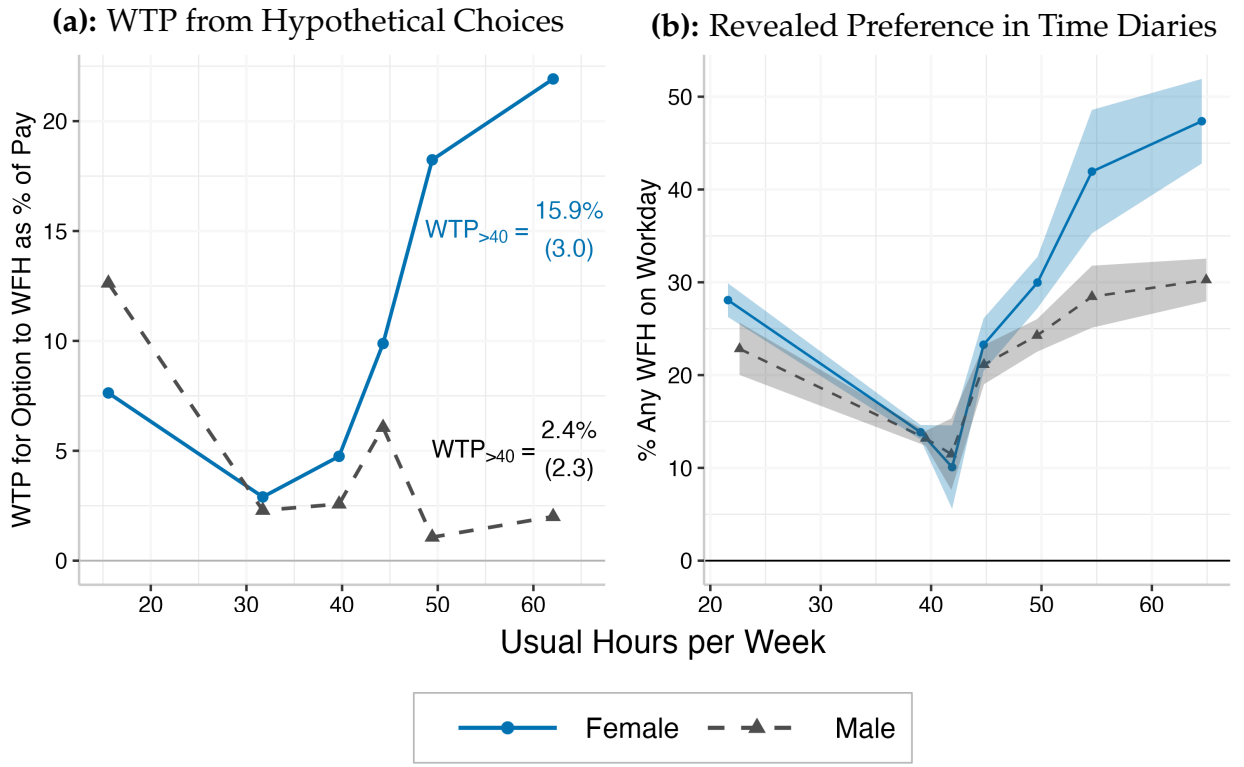


Notes: This figure illustrates the interaction between the rise of WFH and inflexibility over when work happens in the occupations associated with each degree. Inflexibility intensity is based on O*Net data, using the classification in Goldin (2014), which averages the role of "time pressure", "contact with others," "establishing and maintaining interpersonal relationships", "structured versus unstructured work," and "freedom to make decisions" in the job. Panel (a) replicates Figure 2 separating college degrees according to the average inflexibility of degree holders' jobs. Panel (b) separately estimates the coefficients from Equation 3 within each octile of inflexibility. Error bars reflect 95% confidence intervals. Figure A.6 shows similar heterogeneity by the related concept of the elasticity of earnings to hours across occupations.

Figure 5: Back-of-the-Envelope Implications of the Increase in WFH for Gender Gaps in Employment

Notes: This figure contextualizes the results by considering the implications for gender gaps in employment rates among college-educated people. Panel (a) pools all people. Panel (b) separately shows people with degrees that are associated with more and less temporally flexible occupations. The solid lines show average, realized employment rates. The dashed lines construct counterfactual trends in employment that adjust mothers' employment rates to deduct the estimated effect of increases in WFH as in Equation 6.

Figure 6: Gendered Complementarity between WFH & Long Hours



Notes: This figures illustrates the complementarity between WFH and long hours for men and women. The left plot uses data from the hypothetical choices in Maestas et al. (2023). The willingness to pay estimates are based on Equation 9 for different deciles of current hours worked per week. In the first decile, there are 224 women and 95 men; in the second, 205 women and 96 men; in the third, 171 women and 83 men; in the fourth through seventh decile at 40 hours, 660 women and 451 men; in the eighth decile, 109 women and 128 men; in the ninth, 114 women and 166 men; and in the tenth, 85 women and 132 men. The annotated coefficients show the willingness to pay of women and men who work more than forty hours per week, with standard errors clustered by respondent (for 308 women and 426 men). The right plot shows the tendency of individuals in different deciles of usual work hours to WFH in the American Time Use Surveys from 2003−2019 (Bureau of Labor Statistics, 2025). The sample is limited to weekdays where the individual worked at least some hours. There are over two hundred observations of each gender in each decile.

Table 1: Rise of WFH & Narrowing of Motherhood Employment Gaps

	Δ Motherhood Gap in Employment (2009-2019)				
	(1)	(2)	(3)	(4)	(5)
Δ WFH	−1.29***	−1.34**	−1.48***	−1.34**	−1.37**
	(0.49)	(0.52)	(0.53)	(0.57)	(0.56)
Δ Hours		−0.18	−0.57	−0.55	−1.18
		(0.66)	(0.71)	(0.72)	(0.80)
Δ % Advanced Degree			0.21	0.22	0.21
			(0.15)	(0.15)	(0.15)
Δ Income ($1,000s)				−0.07	−0.10
				(0.11)	(0.11)
Δ % Female in Degree					−0.28*
					(0.17)
Constant	−0.10	−0.09	−0.14	−0.15	−0.13
	(0.10)	(0.10)	(0.11)	(0.11)	(0.11)
Observations	75	75	75	75	75
R^2	0.09	0.09	0.11	0.12	0.15

Notes: This table presents the relationship between the increase in WFH in college degrees and narrowing in the motherhood employment gap among women with that degree. Each column estimates Equation 3. Columns 2−5 add additional controls for other changes in the nature of work in college degrees (each estimated according to Equation 1). Each observation is a different college degree and regressions are weighted to put more weight on larger majors for women. Standard errors are robust. *p<0.1; **p<0.05; ***p<0.01.

Table 2: WFH & Changes in Women's Labor Supply around Childbirth

	% Working					
	(1) Initially Can WFH	(2) Initially Cannot WFH	(3)	(4)	(5)	(6)
			Difference-in-Differences			
Post x Initially Can WFH			23.68**	22.49**	29.35***	29.34***
			(9.76)	(9.52)	(8.24)	(8.67)
Post	0.00	−23.68**	−23.68***	−27.18***		
	(4.25)	(8.85)	(8.80)	(9.86)		
Post x College Educated				8.85	12.86	8.62
				(9.90)	(8.56)	(8.04)
Post x Flexible Schedule						−1.83
						(9.41)
Post x Dependable Schedule						25.91
						(16.38)
Post x Tight Deadlines						−6.53
						(10.88)
Individual FE	✓	✓	✓	✓	✓	✓
Post x Type of Work FE					✓	✓
# Women	34	38	72	72	72	72
# Observations	68	76	144	144	144	144

Notes: This table compares the changes in employment rates around childbirth for women who, before the birth, worked from home (WFH) at least part of the time (or could WFH but chose not to) versus women who initially could not WFH. Data come from the American Life Panel conducted by RAND. Columns 1 and 2 separately consider the changes in labor supply around birth for (1) women who initially could WFH and (2) women who could not. Columns 3-5 estimate difference-in-differences designs comparing the magnitude of employment changes for women who initially could WFH versus those who could not. Column 4 allows labor-supply changes around childbirth to differ by maternal education. Column 5 allows these labor-supply changes to also vary type of work (e.g., management, law, or sales). Column 6 further allows them to depend on other attributes of women's initial job — whether the schedule was dependable or subject to change by the manager, whether the schedule was flexible, and whether there were tight deadlines at least half of the time. Standard errors are clustered by respondent. $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

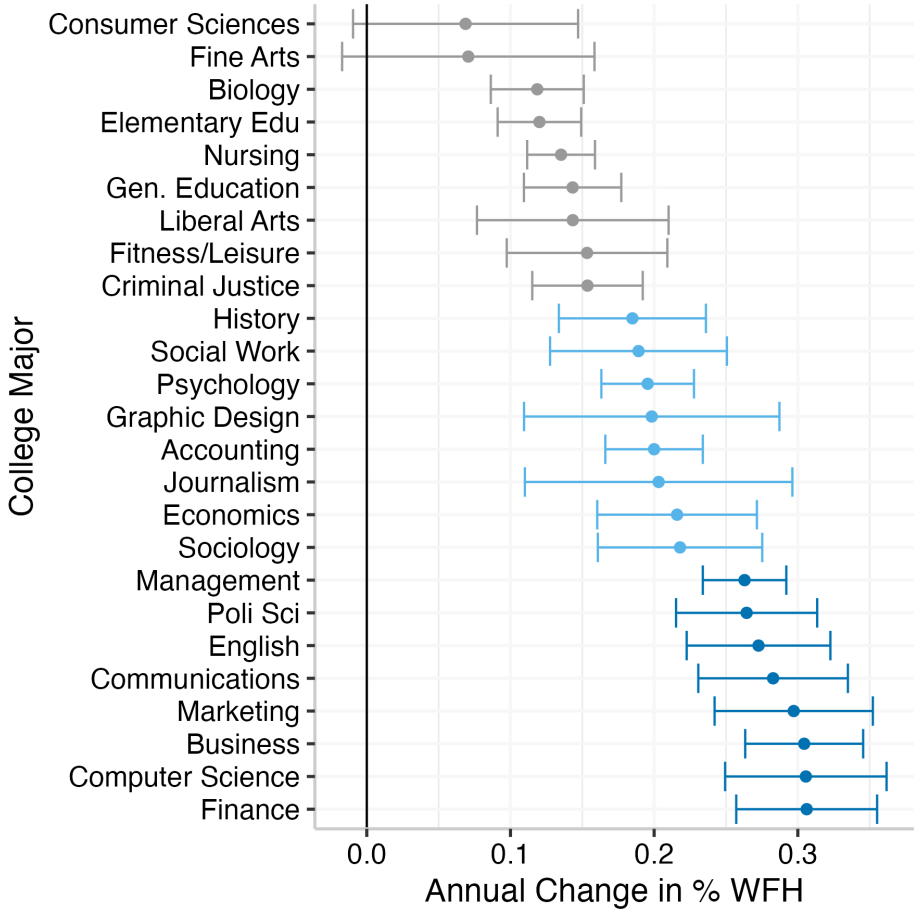
Table 3: WFH & Gender Gaps in Intensive Margin of Labor Supply

	% Choose Job		
	(1)	(2)	(3)
Female x Option to WFH x Hours	1.10*		
	(0.60)		
Female x Option to WFH x Hours > 40		22.04	31.86***
		(16.22)	(7.36)
Female x Hours	−0.78**		
	(0.35)		
Female x Hours > 40		−19.05*	−25.49***
		(10.73)	(5.21)
Option to WFH x Hours	−0.30		
	(0.48)		
Option to WFH x Hours > 40		−4.66	63.23***
		(12.80)	(5.44)
Hours	1.05***		
	(0.26)		
Hours > 40		25.61***	−13.42***
		(8.34)	(3.92)
Dependent Mean	50.0	50.0	50.0
Sample			
Maestas et al (2023): WFH & Hrs Randomized	✓	✓	
Jobseekers Surveyed on Qualtrics			✓
# Choices	635	635	3,906
# Respondents	602	602	1,953
R^2	0.17	0.13	0.18

Notes: This table presents evidence on how women and men's hypothetical job choices vary depending on the hours in the job and the option to WFH. Each column estimates Equation 10. Columns 1−2 use data from Maestas et al. (2023), limiting to pairs of offered jobs that randomly varied in both WFH and hours and including controls for the log wage interacted with gender and the attributes of the other offered job. Column 3 uses data from a survey run on Qualtrics in partnership with ZipRecruiter. Both samples are reweighted to match the Current Population Survey. Standard errors are clustered by respondent. *p<0.1; **p<0.05; ***p<0.01.

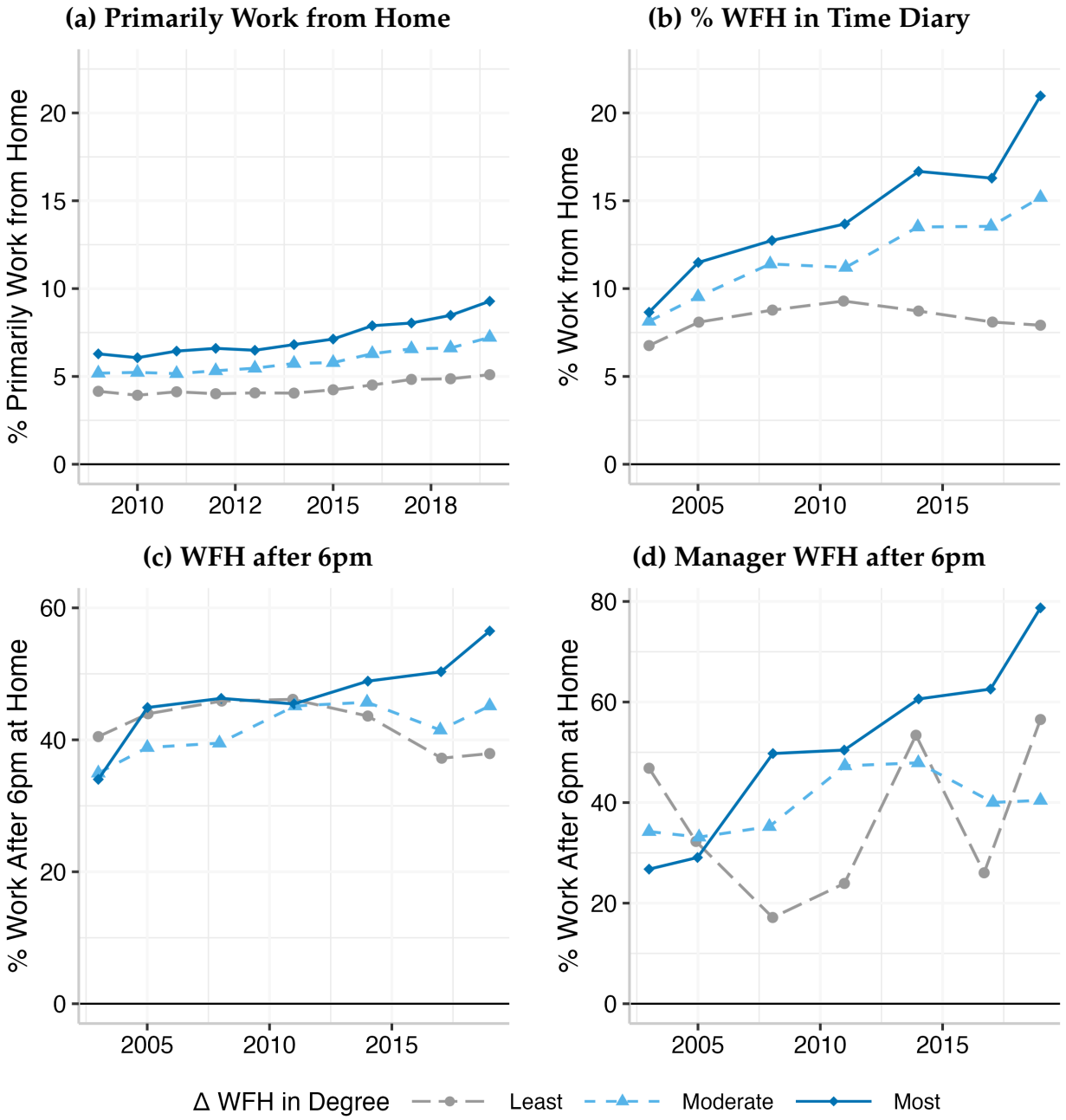
A Appendix Figures and Tables

Figure A.1: Changes in WFH & Motherhood Employment Gaps in Large College Degrees



Notes: This figure illustrates changes in work from home in large college degrees. Data comes from the American Community Survey. The sample is limited to college-educated workers between the ages of 20 and 55. Each point represents the estimated time-trend for a different degree ($\hat{\beta}_d^{\text{WFH}}$ in Equation 1). Error bars represent 95% confidence intervals. The colors represent degrees divided into terciles based on the change in WFH. Standard errors are robust. *p<0.1; **p<0.05; ***p<0.01.

Figure A.2: Changes in Dimensions of WFH



Notes: This figure shows trends in different dimensions of WFH. Panel (a) uses responses to the American Community Survey's question about whether individuals primarily worked from home. Panels (b)-(d) use time-diary data from the American Time Use Survey (ATUS) that capture where people worked on any given day. We limit the sample to weekdays in which individuals worked at least 5 hours. Since college degrees are not recorded in the ATUS, the degree information is imputed from the respondent's current occupation (see Section II.A for details). Panel (b) measures the percent of work hours that are done at home. Panel (c) focuses on work hours after 6pm. Panel (d) focuses on where managers work from home after 6pm.

Table A.1: Instrumenting Rise of WFH

	Δ WFH	Δ Motherhood Gap in Employment (2009-2019)				
	(1)	(2)	(3)	(4)	(5)	(6)
Doesn't Require Physical Presence	0.10***					
	(0.01)					
$\widehat{\Delta \text{WFH}}$		−1.97***	−2.20**	−2.47***	−2.46**	−2.14**
		(0.74)	(0.85)	(0.88)	(1.05)	(1.00)
Δ Hours			−0.53	−1.15	−1.15	−1.57*
			(0.74)	(0.82)	(0.85)	(0.90)
Δ % Advanced Degree				0.26*	0.26*	0.24*
				(0.14)	(0.14)	(0.14)
Δ Income $(1,000s)$					−0.004	−0.05
					(0.12)	(0.12)
Δ % Female in Degree						−0.27
						(0.17)
Constant	0.14***	0.04	0.07	0.04	0.04	0.01
	(0.01)	(0.15)	(0.16)	(0.16)	(0.18)	(0.18)
First Stage F-Stat		60.1	30.8	20.8	16.4	13.4
Observations	75	75	75	75	75	75
R^2	0.45	0.06	0.05	0.08	0.08	0.14

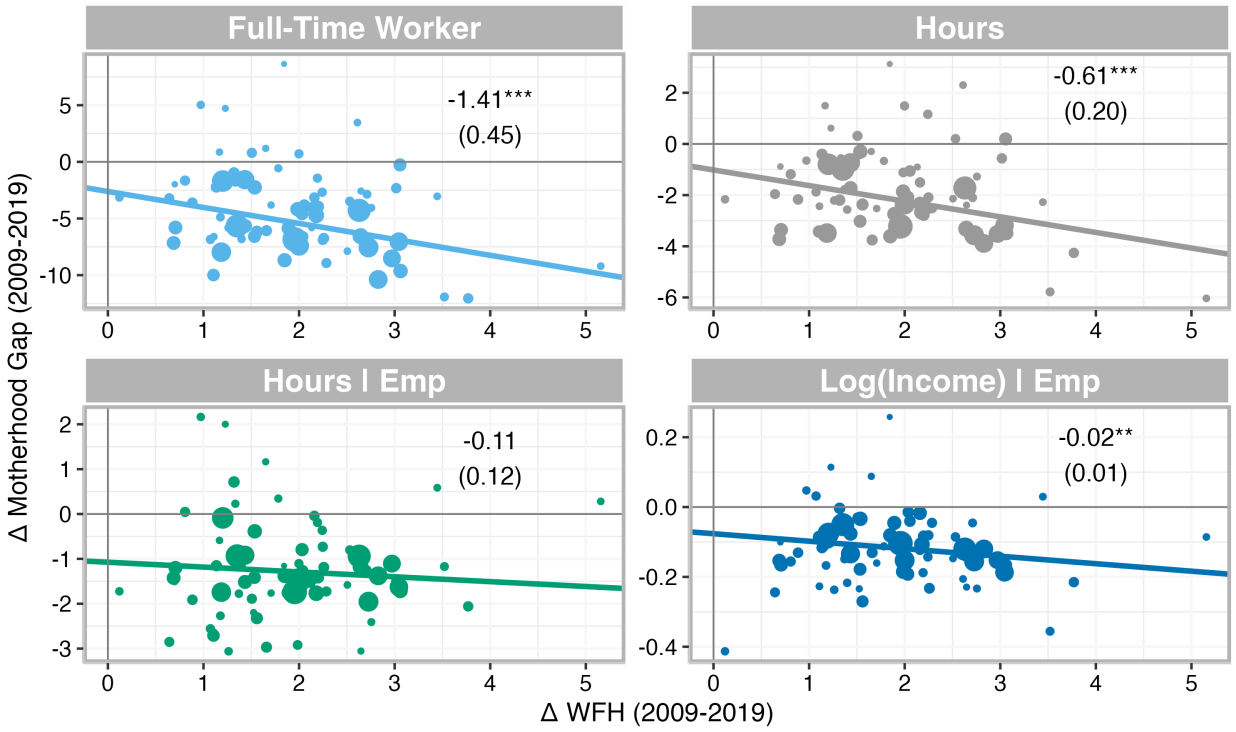
Notes: This table instruments the rise of WFH based on the need for physical presence in the college degree. This is based on Dingel and Neiman (2020)'s classification, where we have also included educators as needing to be in-person. Column 1 presents the first stage of Equation 4. Columns 2−6 estimate the two-stage least squares of Equation 5. Each observation is a different college degree and regressions are weighted to put more weight on larger majors for women. Standard errors are robust. *p<0.1; **p<0.05; ***p<0.01.

Table A.2: Rise of WFH Among Men & Narrowing of Motherhood Employment Gaps

	Δ Motherhood Gap in Employment (2009-2019)				
	(1)	(2)	(3)	(4)	(5)
Δ WFH for Men	−1.09***	−1.09**	−1.09**	−0.95**	−1.24***
	(0.41)	(0.43)	(0.42)	(0.46)	(0.46)
Δ Hours		−0.05	−0.32	−0.34	−1.26
		(0.65)	(0.70)	(0.70)	(0.79)
Δ % Advanced Degree			0.15	0.17	0.14
			(0.13)	(0.13)	(0.13)
Δ Income $(1,000s)$				−0.09	−0.10
				(0.11)	(0.10)
Δ % Female in Degree					−0.38**
					(0.17)
Constant	−0.19**	−0.19**	−0.23***	−0.24***	−0.17*
	(0.07)	(0.07)	(0.08)	(0.08)	(0.09)
Observations	75	75	75	75	75
R^2	0.09	0.09	0.10	0.11	0.18

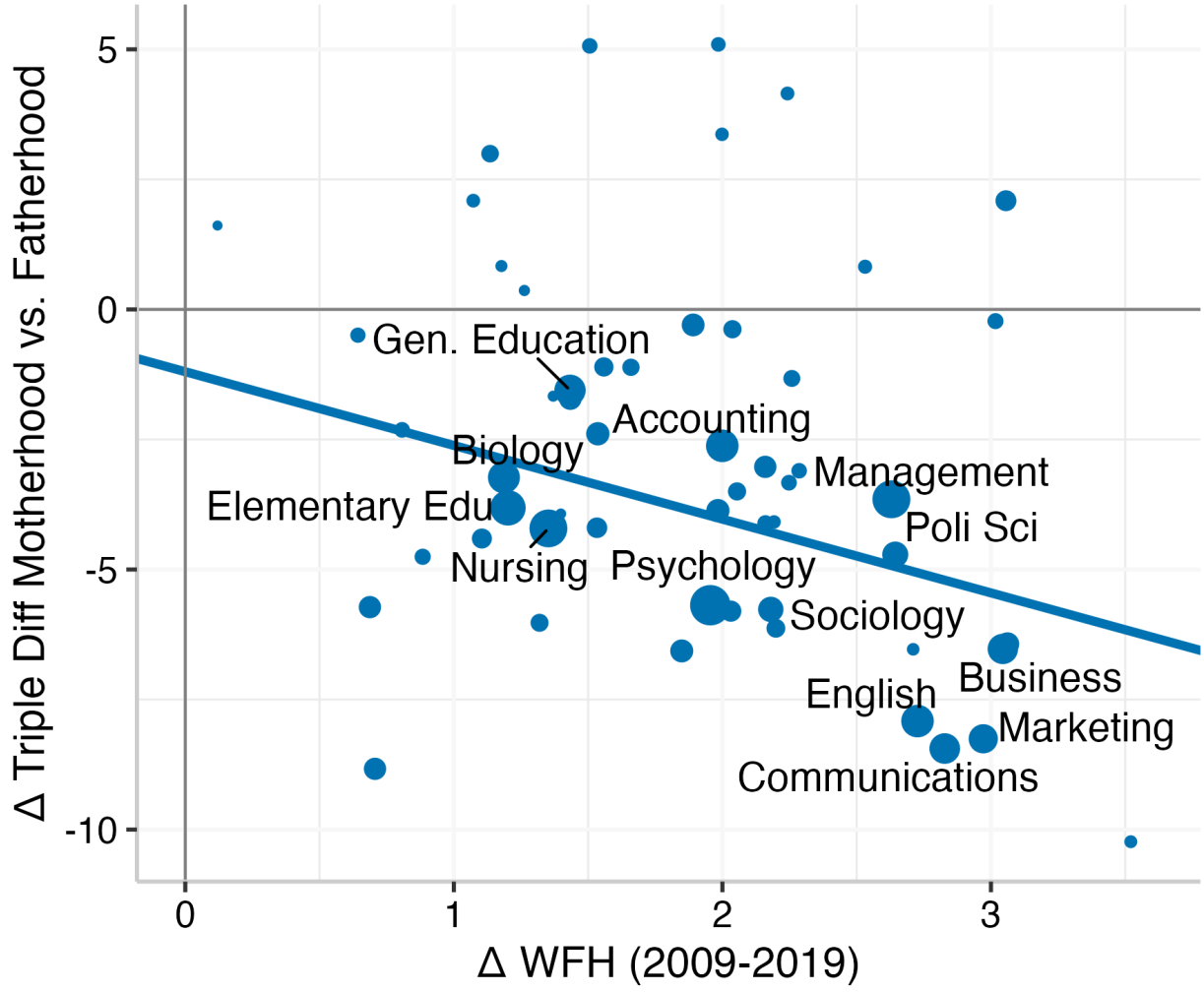
Notes: This table replicates Table 1 but estimates the change in WFH using only the behavior of men. Standard errors are robust. *p<0.1; **p<0.05; ***p<0.01.

Figure A.3: Rise of WFH & Narrowing of Motherhood Gaps in Other Labor Market Outcomes



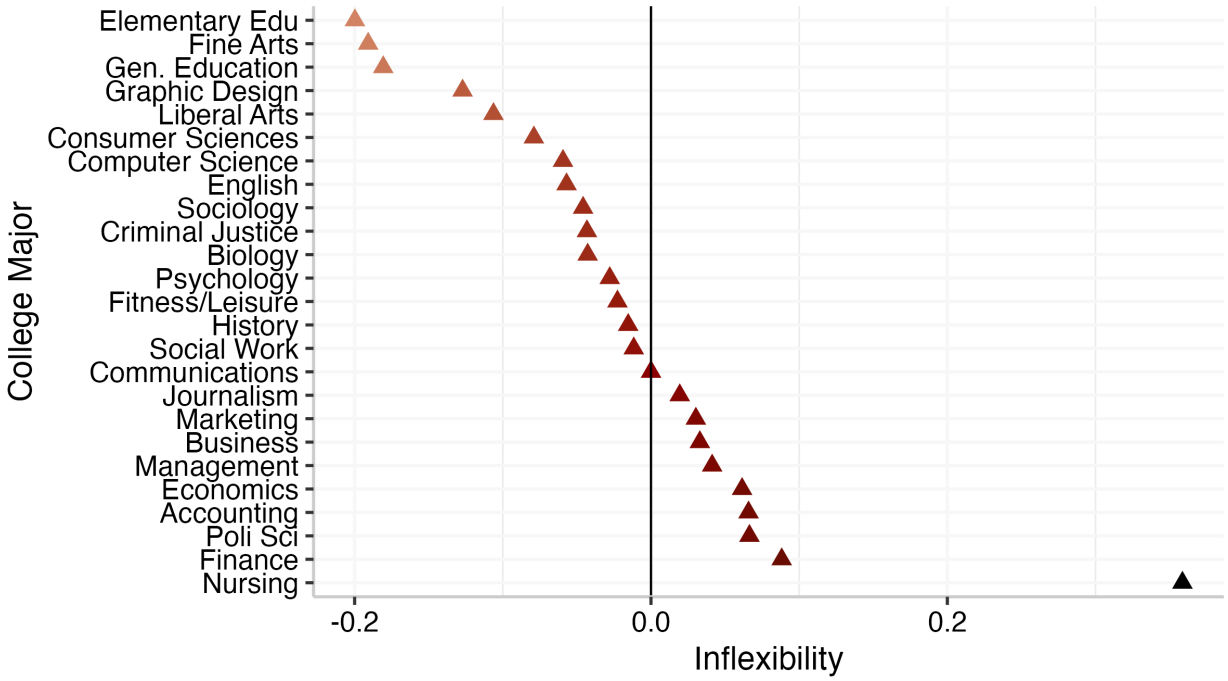
Notes: This replicates Figure 2 for alternative labor-market outcomes. The fit lines and annotated coefficients come from Equation 3. Standard errors are robust. *p<0.1; **p<0.05; ***p<0.01.

Figure A.4: Triple Difference with Motherhood Employment Gap vs. Fatherhood Employment Gap



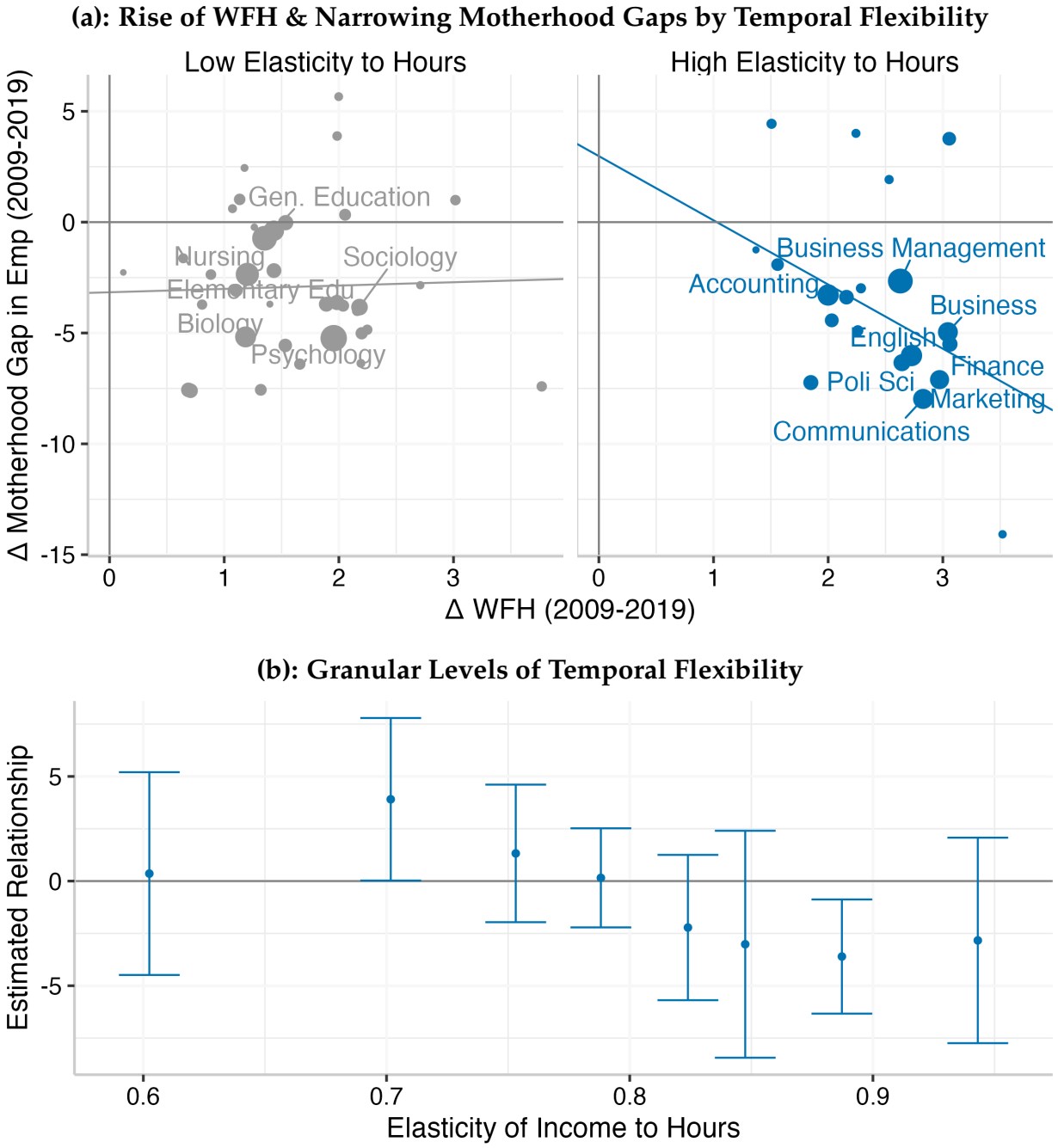
Notes: This replicates Figure 2 but compares the change in the motherhood employment gap (between mothers and other women) and the change in the fatherhood employment gap (between fathers and other men). The fit lines and annotated coefficients come from versions of Equation 3. Standard errors are robust. $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.

Figure A.5: Degrees Associated with Temporally Inflexible Work



Notes: This figure characterizes college degrees associated with occupations that tend to be inflexible about when and how much people work. Inflexibility intensity is based on O*Net data, using the classification in Goldin (2014), which averages the role of "time pressure", "contact with others," "establishing and maintaining interpersonal relationships", "structured versus unstructured work," and "freedom to make decisions" in the job.

Figure A.6: Key to have flexibility over where to work if there are high returns to more hours



Notes: This figure illustrates the interaction between the rise of WFH and elasticity of earnings to hours in each degree. The returns to hours is based on a regression of log income on log hours interacted with controls for log work weeks, a quartic in age, indicators for race, year, educational attainment, degree-field interactions, working at least 40 weeks per year, and for working at least 35 hours per week as in Goldin (2014). Panel (a) replicates Figure 2 separating college degrees according to the average elasticity of income with respect to hours among degree holders. Panel (b) separately estimates the coefficients from Equation 3 within each octile of elasticity to hours. Error bars reflect 95% confidence intervals.

Table A.3: WFH & Changes in Hours around Childbirth

	(1) Initial WFH	(2) Initial No WFH	(3)	(4)	(5)	(6)
			Difference-in-Differences			
	Panel (a): Usual Hours per Week					
Post x Initially Can WFH			10.9***	10.6***	11.1***	11.6***
			(3.2)	(3.2)	(3.2)	(3.1)
Post	2.7	−8.2***	−8.2***	−9.5***		
	(1.8)	(2.6)	(2.6)	(2.9)		
Post x College Educated				3.1	6.3*	6.0*
				(3.2)	(3.3)	(3.4)
Post x Flexible Schedule						−2.2
						(2.9)
Post x Dependable Schedule						3.4
						(6.1)
Post x Tight Deadlines						−0.1
						(3.7)
# Women	34	38	72	72	72	72
# Observations	66	75	141	141	141	141
	Panel (b): Usual Hours per Week Conditional on Working					
Post x Initially Can WFH			2.18	2.18	3.38	3.58
			(2.02)	(2.04)	(2.13)	(2.27)
Post	1.81	−0.38	−0.38	−0.44		
	(1.66)	(1.18)	(1.17)	(1.38)		
Post x College Educated				0.15	3.91*	4.47*
				(2.14)	(2.16)	(2.38)
Post x Flexible Schedule						−1.23
						(1.97)
Post x Dependable Schedule						−1.88
						(3.97)
Post x Tight Deadlines						1.97
						(2.90)
Individual FE	✓	✓	✓	✓	✓	✓
Post x Type of Work FE					✓	✓
# Women	34	38	72	72	72	72
# Observations	65	62	127	127	127	127

Notes: This table replicates Table A.3 but focuses on hours. Panel (a) considers total hours per week. Panel (b) focuses on the intensive margin of hours per week conditional on working. Standard errors are clustered by respondent. *p<0.1; **p<0.05; ***p<0.01.

Table A.4: WFH & Changes in Employment around Childbirth for Alternative Samples

	% Working		
	(1)	(2)	(3)
Post x Initially Can WFH	23.68**	33.33***	30.43**
	(9.76)	(11.28)	(11.81)
Post	−23.68***	−33.33***	−30.43***
	(8.80)	(9.82)	(9.81)
Individual FE	✓	✓	✓
Exclude Women Over 45		✓	✓
Exclude Those with Increased Eldercare			✓
# Women	72	50	45
# Observations	144	100	90

Notes: This table replicates the main difference-in-differences in Column 3 of Table 2 but considers alternative samples. Column 2 excludes women over 45. Column 3 excludes those who saw increases in eldercare responsibilities, potentially indicating that the increase in household size was because parents or in-laws moved in and not because of a childbirth. Standard errors are clustered by respondent. *p<0.1; **p<0.05; ***p<0.01.

Figure A.7: Interface for Hypothetical Choices in Maestas et al. (2023)

Imagine you are offered the two jobs shown below. Except for the characteristics highlighted below, please assume the jobs are the same in all other ways, including on characteristics not listed in the table. You may scroll over the characteristics to see their definitions. Please review the jobs and indicate below whether you prefer Job A or Job B.

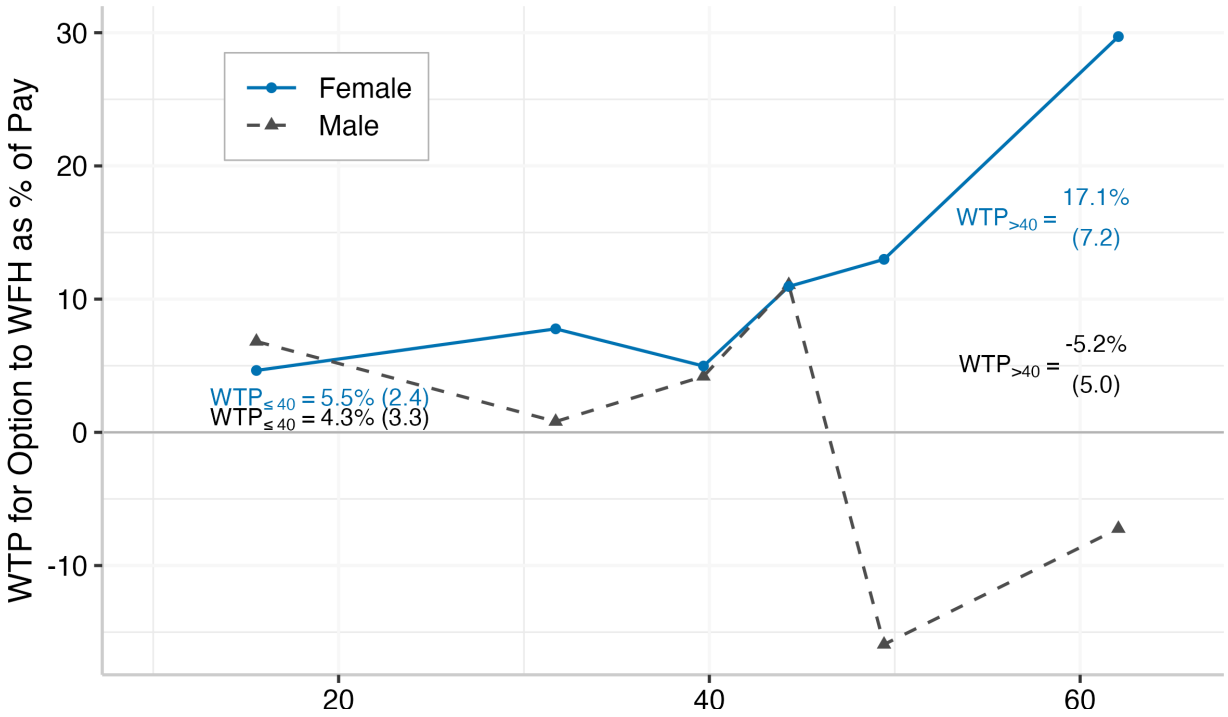
	Job A	Job B
Hours	45 hours per week	40 hours per week
Control over Hours	Set your own schedule	Set your own schedule
Option to Telecommute	Yes	No
Physical Demands	Moderate physical activity	Moderate physical activity
Pace	Relaxed	Relaxed
Independence	Your tasks and procedures are well-defined	Your tasks and procedures are well-defined
Paid Time Off (Vacation & Sick Leave)	None	None
Working with Others	Mainly work by yourself	Mainly work by yourself
Training	You have the skills for this job and there are opportunities to gain valuable new skills	You have the skills for this job and there are opportunities to gain valuable new skills
Impact on Society	Occasional opportunities to make a positive impact on your community or society	Occasional opportunities to make a positive impact on your community or society
Pay	$18.50 per hour ($370 per week)	$19.50 per hour ($390 per week)

	Strongly Prefer Job A	Prefer Job A	Prefer Job B	Strongly Prefer Job B
Which job do you prefer?				

< Back Next >

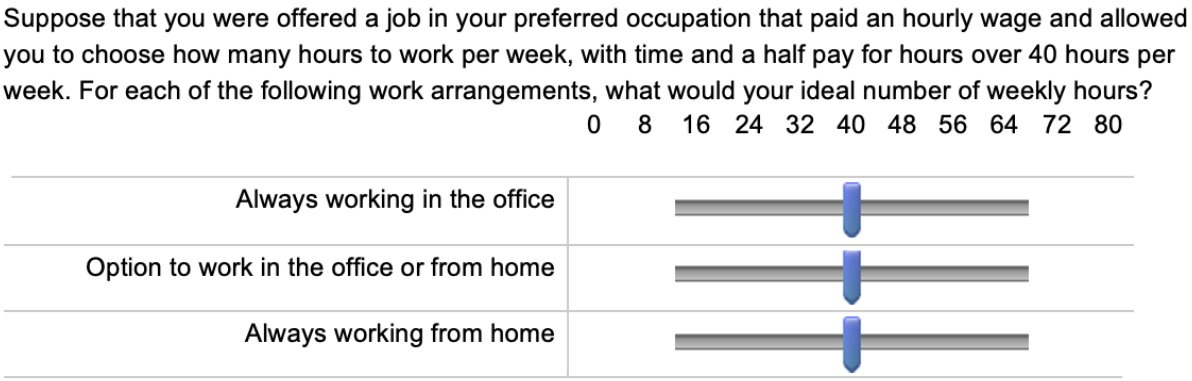
Notes: This shows the interface for the hypothetical choices in Maestas et al. (2023). Hypothetical jobs Jobs randomly varied in their pay and two job attributes with the rest of the job traits set to those of the respondent's current or most recent job.

Figure A.8: WTP for WFH by Gender & Work Hours Among Potential Parents



Notes: This figures replicates Figure 6(a) but limits to the subset of respondents who are married or cohabiting with a long-term partner, have an additional household member beyond their partner, and are between the ages of 25 and 45 since these individuals are most likely to have children. There are 266 total women and 142 total men: 46 women and 83 men work more than forty hours and 220 women and 46 men work fewer hours.

Figure A.9: Interface for Question about Ideal Work Hours in Different Arrangements



Notes: This shows the interface for the eliciting jobseekers' ideal work hours in different arrangements.

Table A.5: Gendered Complementarity Between WFH & Long Hours

	% Any WFH on Workday				
	(1)	(2)	(3)	(4)	(5)
Female x >40 Hours/Week	5.58***	5.44***	3.68***	3.35***	3.37***
	(1.17)	(1.17)	(1.14)	(1.13)	(1.12)
Female	1.37**	1.42**	−0.43	−0.45	−0.37
	(0.56)	(0.56)	(0.63)	(0.63)	(0.63)
Dependent Mean	21.1	21.1	21.1	21.1	21.1
Controls					
Hours/Week FE	✓	✓	✓	✓	✓
Year FE		✓	✓	✓	✓
Occupation FE			✓	✓	✓
Industry FE				✓	✓
Demographics & Education					✓
# Respondents	40,282	40,282	40,282	40,282	40,282
R^2	0.05	0.05	0.15	0.17	0.18

Notes: This table analyzes how the complementarity between WFH and working long hours differs by gender. Data comes from the American Time Use Survey (ATUS) between 2003 and 2019, which represents a subset of the Current Population Survey (CPS). Usual hours worked per week are reported in the CPS. The dependent variable is whether the respondent did any WFH on the workday of the time-diary in the ATUS. The coefficient of interest is the interaction between working more than forty hours per week and the respondent's gender. Demographics and education include indicators for the respondent's age, race, ethnicity, and educational attainment. Standard errors are robust. *p<0.1; **p<0.05; ***p<0.01.

Table A.6: Gender Gap in Relationship between Remote Work and Preferred Hours

	Preferred Hours	Part Time <40 Hrs	Over-Time >40 Hrs
Hybrid x Female	5.94***	−7.89*	8.79**
	(1.91)	(4.44)	(4.31)
Remote x Female	8.03***	−8.43*	3.12
	(2.34)	(5.11)	(4.82)
Female	−4.36**	5.40	−3.52
	(1.76)	(4.16)	(3.86)
Remote	2.09	−8.77***	10.88***
	(1.54)	(3.28)	(3.22)
Hybrid	0.11	−2.11	2.81
	(1.27)	(2.90)	(2.90)
Dependent Mean	33.50	57.76	33.89
Respondents	535	535	535
Adjusted R^2	0.02	0.01	0.01

Notes: This table presents the gendered relationship between working arrangements and preferred weekly work hours. Each column fully interacts the work arrangement with a female indicator. The omitted category for work arrangements is fully on-site work. In each specification, there is one observation for each hypothetical working arrangement for each respondent. Standard errors are clustered by respondent. The sample is collected on the Qualtrics platform and targeted to jobseekers. See Figure A.9 for the interface for the question. *p<0.1; **p<0.05; ***p<0.01.