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Work Environment and Opt-Out Rates at Motherhood across High-Education Career Paths

Jane Leber Herr
herrj@nber.org

Catherine D. Wolfram
University of California, Berkeley, wolfram@haas.berkeley.edu

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Abstract
Observing a sample of Harvard alumnae in their late thirties, the authors study the relationship between workplace flexibility and the labor force participation of mothers. They first document a large variation in labor force participation rates across higher education fields. Mindful of the possibility of systematic patterns in the types of women who complete various graduate degrees, they use the rich information available for the sample, supplemented by the longitudinal nature of a subset of these data, to assess the extent to which these labor supply patterns may reflect variation in the difficulty of combining work with family. Although ruling out systematic sorting entirely is not possible, their evidence suggests that inflexible work environments "push" women out of the labor force at motherhood.

Keywords
workplace flexibility, labor force participation, women

WORK ENVIRONMENT AND OPT-OUT RATES AT MOTHERHOOD ACROSS HIGH-EDUCATION CAREER PATHS

JANE LEBER HERR AND CATHERINE D. WOLFRAM*

Observing a sample of Harvard alumnae in their late thirties, the authors study the relationship between workplace flexibility and the labor force participation of mothers. They first document a large variation in labor force participation rates across higher education fields. Mindful of the possibility of systematic patterns in the types of women who complete various graduate degrees, they use the rich information available for the sample, supplemented by the longitudinal nature of a subset of these data, to assess the extent to which these labor supply patterns may reflect variation in the difficulty of combining work with family. Although ruling out systematic sorting entirely is not possible, their evidence suggests that inflexible work environments "push" women out of the labor force at motherhood.

One of the most profound social changes of the 20th century has been the dramatic increase in the percentage of women in the labor force. Recent statistics, however, suggest that the increase in female labor force participation began to level off in the late 1990s (Mosisa and Hippie 2006). This has led to speculation about whether the "natural" rate of female labor force participation has been achieved (Goldin 2006), whether instead a temporary slow-down driven by economic conditions is occurring (Boushey 2005), or whether additional policy, cultural, or social changes would help accommodate more women in the workforce (Drago and Hyatt 2003).

One response to this stagnation in the work rates of women, a majority of whom have children, has been to focus on the "family friendliness" of jobs,

that is, the relative utility they provide to women who must balance work and family commitments. One aspect of family friendliness, the variation across jobs in the long-run consequences of post-childbirth labor force gaps, has been well studied in the economic literature, starting with Mincer and Polachek's (1974) model of human capital depreciation. A second aspect, the influence of the flexibility of work hours on mothers' labor force participation, has generated much less consideration. To our knowledge, this study is the first to consider directly the influence of workplace flexibility on the labor supply of mothers.

Observing a sample of Harvard alumnae in their late thirties, we find that labor force participation rates of mothers vary markedly across professions: 94% of MDs work, compared with 79% of JDs and only 72% of MBAs. If variation in flexibility helps explain these large differences, it may suggest that elements of the work environment drive mothers out of the labor force. We therefore evaluate the extent to which this pattern is explained by systematic differences in the characteristics of women who pursue these degrees. We then directly consider the role of the work environment in female labor force participation.

One benefit of considering the influence of workplace flexibility among highly educated women is that a graduate degree is observable, providing a clear delineation across which we expect systematic variation in work environment. Furthermore, highly educated women may be more responsive to a given level of flexibility. Although work environment may affect all women's utility, because these women are more likely to be married to high-earning men, they may have a greater capacity to respond by exiting the labor force.[1] By using this set of women, we are therefore focusing on a particularly sensitive subset of the population (akin to the so-called canaries in the coal mine), and can thus detect the effect of flexibility when using a relatively blunt measure such as labor force participation.

At the same time, we might expect educated women to work in positions with greater benefits and professional standing, suggesting that they should have a greater capacity to adjust their work schedule in response to motherhood. If we then find evidence that workplace flexibility is correlated with labor force participation among these women, this may reflect an underestimate of the effect felt by women in lower ranks of the professional hierarchy.

A final strength of our analysis is the richness of the data available for our sample, which includes detailed information on family, education, and current work setting. We also observe information about these women at college graduation and can tie this to their subsequent work and family choices. One key consideration in our analysis is the elements of taste that influence not only a woman's labor supply decision at motherhood but also the initial decision across graduate degrees and the jobs they can lead to. Further-

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[1]Conversely, because these women are more likely to be the primary earner in their household, they may have greater parity with their spouse in home production, and may therefore be less likely to quit.

more, for a subset of our sample, we can observe women both before and after motherhood, to consider how pre-childbirth work environment affects post-childbirth labor supply. Our aim is to assess whether flexibility influences women's labor supply decision after motherhood, while mindful of the inherent differences in the set of women who pursue a given career path.

Framework for Assessing Women's Career and Work Choices

In this section we lay out a framework for assessing the influence of workplace flexibility on the labor force participation decision of mothers. Given that we focus on variation in work levels among women with different graduate degrees, we face the complication created by two selection processes: the initial sorting of women across "fields" (as defined by graduate degree), and the subsequent sorting across job types (e.g., for JDs, working for a large law firm compared with working for the government; or for MBAs, working at a Fortune 500 company compared with a small firm).[2] This section describes how women make these decisions based on the relative family friendliness of a given field or specific job, as well as on individual taste.

Consider the labor supply decision at time t of a given mother i. The first dimension of this decision is the comparison of the relative value of her marginal hour at work (w_{it}) and at home ($w_{it}*$), when the value of the latter has risen with the time demands of children (Heckman 1974).[3] In this standard married woman's labor supply model, a woman will work, $h_{it} > 0$, if the hourly wage is greater than her reservation wage assessed at $h = 0$. Such a woman will then choose her optimal labor supply, $h_{it}*$, where the two are equal.

This formulation assumes, however, that women have perfect control over their work hours. Suppose, instead, that there exist minimum hours requirements, and that these constraints vary across jobs j.[4] A job with a high

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[2] A third potential complication exists if work environment influences the initial decision to have children. If some women working in inflexible jobs respond by foregoing motherhood, the average taste for children among those who choose to have kids will be higher among mothers from an inflexible environment. If this taste is positively correlated with taste for time at home with one's children, labor force participation rates among these women will be accordingly lower. As we show in Section B of the website Appendix referenced in footnote 17, we find no evidence of variation in the propensity to have children among women from varying work environments, so, for the sake of simplicity, we ignore this issue here. (We also find little overall evidence of selection into parenthood on ability, although among mothers, for MBAs we find evidence of positive selection into "late" motherhood, defined as a first birth more than 10 years after college graduation.)

[3] Note that although the offered wage in her current job may have reflected her best alternative before motherhood, a richer specification would consider that she is now choosing between her post-motherhood reservation wage and the offered wage and corresponding job characteristics of each of the jobs that she is qualified for, with the caveat that the choice to shift across jobs can in some instances be one way.

[4] There is a well-established literature on the inflexibility of work hours (see, for instance, Altonji and Paxson 1986). Cogan (1981) first considered the question of minimum hours constraints; in his case, individuals have a "reservation" hours level created by the fixed cost of entry into the labor force.

Figure 1. Married Woman's Labor Supply Model with Minimum Hours Requirement
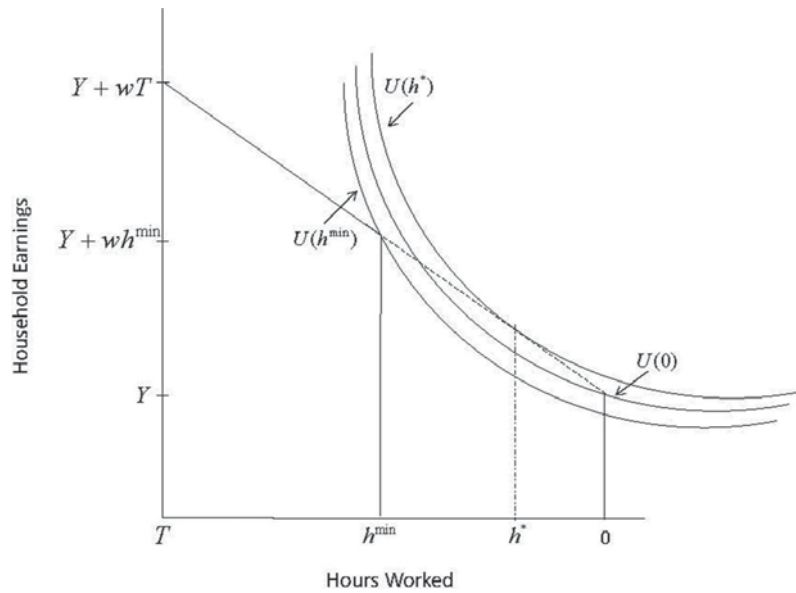
minimum will thus offer women fairly little flexibility in adjusting their work hours after motherhood.

Under this assumption, as shown in Figure 1, the budget constraint of the married woman's labor supply model now has a second corner solution at $h = h^{min}$.[5] For all mothers for whom h^* falls below the minimum hours requirement in their job j, the first consideration in the decision of whether to remain working is the comparison of the utility, at time t, of working $h_t = h_j^{min}$ versus $h_t = 0$. For those women for whom $U_t(h_t = 0) > U_t(h_t = h_j^{min})$—as drawn in the example in Figure 1—a second consideration is the long-run career implications of a labor force gap, which again will vary across jobs.

A labor force gap may affect a woman's wage path upon her return to work through two distinct mechanisms. The first is the rate at which job-specific human capital depreciates during this time off (Mincer and Polachek 1974), and how quickly it rebounds thereafter (Mincer and Ofek 1982). Given the short labor force gaps observed among current cohorts of highly educated women (Goldin and Katz 2008), the second, potentially more important factor, is a permanent penalty for time off (Albrecht et al. 1999)—such as being irreversibly relegated to a lower-wage "mommy track."

Among women in the high-education fields considered here, Goldin and Katz (2011) find that the earnings penalty for an 18-month career interruption, measured 15 years after college graduation, is 16% for MDs, 29% for

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[5]In Figure 1, total hours worked is measured on the *x*-axis from right to left, ranging from 0 to the maximum *T*. On the *y*-axis, *Y* reflects husband's earnings, and *w* the wife's hourly wage. The indifference curves reflect a given woman's relative taste for time at home versus her taste for consumption. As drawn, the given woman's optimal labor supply (h^*) falls below the minimum hours requirement in her job, and working 0 hours provides higher utility than working h_j^{min}.

both JDs and PhDs, and 41% for MBAs. They also find that, whereas the earnings loss for MDs is roughly linear in time off, the loss for MBAs is persistent and unrelated to the length of the labor force gap. Bertrand, Goldin, and Katz (2010) find a similarly large 37 log-point wage penalty for time off among MBAs, measured on average 6 years after graduate school, with two-thirds of this cost reflecting a discrete penalty for any time out of the labor force. In combination, these results suggest that, in terms of this dimension of family friendliness, MBAs work in especially unfriendly environments.

Now consider the comparison of two fields whose jobs have similar average penalties for time off, for instance JDs and PhDs. Since we see that PhDs are more likely to remain working after motherhood, this could suggest that the average $h^{\min}$ among JD-type jobs is higher—that PhDs generally work in more flexible environments.

Yet this conclusion ignores that other factors will also vary systematically across fields. For instance, average wages will vary, shifting the slope of the budget constraint, and since many women meet their spouse in graduate school, we would also expect systematic variation in their husbands' salary, Y. Furthermore, the tastes of women working in each field may vary, which will influence the shape of the indifference curves in Figure 1.

Specifically, women may initially sort across fields and subsequent jobs based on elements of taste that will likewise influence the labor supply decision at time t (Polachek 1977). For instance, one factor that will influence a mother's labor supply decision will be the relative importance of her sense of professional identity that she derives from working in her field, ψ. Furthermore, we would expect this sense of identity to vary across fields—a given woman may feel a very strong professional identity associated with being a doctor, but no such affinity to being a lawyer.

For fields with high initial investment costs, this element of taste may help explain the high work rates observed among mothers. For instance, one would anticipate that the average value of ψ would be especially high among women who choose medicine; those who would derive less satisfaction from the work would be daunted by the length of training required. This, in turn, would mean that the average MD derives more satisfaction from her work, and thus would be more likely to remain in her job after motherhood.

A second key element of taste is a woman's preference for time at home with her children, ζ.[6] If no variation in the cost for time off exists, all else being equal, we should expect women with high ζ to choose jobs with low hours requirements, thus offering themselves greater flexibility in adjusting their work hours once they have children.[7]

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[6]This factor is distinct from the taste for leisure, and thus only directly influences a woman's labor supply after motherhood.

[7]An intriguing possibility is that high-ζ women may use graduate school as a marriage market for high-earning spouses. Considering the three high-salary professions—doctors, lawyers, and businessmen—the least costly choice would be to enroll in business school. Using our Harvard data, comparing the labor force participation rates of women who are paired before graduate school versus those who marry a classmate, a comparison across degrees finds no evidence suggesting this phenomenon.

Given this direction of sorting, because the mean value of ζ will be higher among mothers who choose flexible jobs, their optimal labor supply (h^*) will be lower than the level among mothers who instead choose inflexible jobs. Thus for a *given* value of h^{min}, all else being equal, women who choose flexible jobs should be *more* likely to quit after motherhood. If we cannot fully absorb variation in ζ, our measure of the influence of workplace flexibility on mothers' labor supply will therefore understate the true causal effect.

Now consider sorting on ζ in terms of the long-run cost for time off.[8] There will be some women with especially high values of ζ who intend to leave the labor force after motherhood, regardless of the level of h^{min} in their job. Among these women, for those who anticipate a return to work, their initial choice across jobs will be driven primarily by variation in the penalty for time off. If in most instances jobs with low penalties likewise have low minimum hours requirements, this will lead to the same direction of sorting as discussed above. But if some jobs have high minimum hours requirements but low penalties for time off, such as being a school teacher (Flyer and Rosen 1997), these jobs may attract women with high ζ despite the high h^{min}.[9]

Throughout this section, however, we are likely overstating the level of bias created by variation in taste by assuming complete information. In truth, women make choices under great uncertainty. Gauging either dimension of the family friendliness of a given job before the fact can be difficult. And at the point of choosing a graduate program, determining the distribution of family friendliness across the set of jobs that the degree can lead to will be even harder, especially since it will change over time, and at potentially varying rates.[10]

Furthermore, women may not be fully cognizant of their value of ζ before they have their first child, which for most occurs after they have started their first postgraduate job. In our Harvard sample, the average age at first birth is 32, on average 7 to 9 years after applying to graduate school. Thus at each stage, the effects of selection are likely to be dampened by a lack of complete information.

Data and Descriptive Statistics

In this section we begin by discussing the Harvard data and then introduce our measure of workplace flexibility.

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[8]We should also expect systematic differences in ψ by the cost for time off. On average, only women with a strong affinity for the work will select jobs with high penalties, decreasing the probability that they will subsequently want to leave the labor force.

[9]See Table 3 and footnote 24 for evidence of the long hours requirements for school teachers. Furthermore, women with high ζ may also select teaching based on the nature of the job—working with children.

[10]When choosing across graduate programs women will also have, at best, a rough estimate of their (potential) spouse's future earnings.

Harvard Graduate Data

We collect data from the 10th and 15th anniversary reports for the Harvard graduating classes of 1988 through 1991, focusing on women observed 15 years after earning their BA (in 2003 to 2006), when they are approximately age 37.[11] Among these classes, 55% of women responded to the 15th-year survey.

The anniversary reports provide rich professional and demographic information. The former includes detailed information on postgraduate education (including the program attended, institution, and year of graduation), and current occupation and firm. The latter includes spouse's detailed education and occupation, and children's years of birth.

We supplement the anniversary reports with data collected from the yearbook, including college activities (major and varsity sports participation), family background (region of origin, private school attendance, and race/ethnicity), and dormitory. Students chose dorms at the end of their first year, and many were known to have a certain identity (e.g., "artsy," "jocks," "legacy," or "pre-med"). As discussed below, we find that this information predicts much about these women's subsequent career decisions.

In the anniversary reports many graduates also write a narrative describing their life and achievements over the previous five years. Among those respondents moving into parenthood, this often focuses on a description of life after children, including a discussion of their work choices. From these comments, as well as those reporting their occupation as "mom" or its equivalent, we can measure the current employment status of Harvard-educated women who are now mothers.[12]

One limitation of the Harvard data is that we lack information on earnings. We therefore hired a career consultant to impute salaries for both the graduates and their spouses, providing him with our extensive information on an individual's education, location, occupation, and firm. Because he did not observe gender or parental status, these estimates reflect gender-neutral salary levels associated with a given career. We estimate gendered wages from these salary values using detailed sector/industry/occupation average hours and gender wage gaps, as described in detail in the website Appendix.[13]

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[11]See the Appendix, available online at http://harrisschool.uchicago.edu/centers/chppp/pdf/Herr-Wolfram_WorkEnvOptOut_App.pdf for greater detail, including Section A for a discussion of the survey response patterns. Given the age of the children of these Harvard graduates (on average, the oldest is 5), we do not address opt-in patterns, or re-entry into the labor force. Although some women may have already moved out and back into the labor force by their 15th year, too few have their first child by their 10th year to let us consider what proportion of those mothers out of the labor force at the 10th have returned by the 15th, and the data are structured such that we cannot reliably establish who both left and returned in the five years in between. Our analysis relies on a data source other than the "Harvard and Beyond" survey (Goldin and Katz 2008, 2011), although our sample overlaps with its 1990 cohort.

[12]Using data from married Harvard couples, we test for two potential sources of bias: that stay-at-home mothers underrespond to the survey or fail to report their at-home status, or that at-home mothers are overrepresented. We find weak evidence that at-home mothers may be slightly overrepresented.

[13]Website Appendix Section D discusses whether our initial salary estimates are systematically under-

Table 1. Family Formation and Employment Rates of Harvard Graduates

Variables	All	MD	PhD	JD	MBA	MA	None
			Family formation patterns				
Married at 15th (%)							
Women	77.1	81.2	73.5	76.5	77.6	75.8	78.1
	[1,522]	[223]	[219]	[311]	[210]	[285]	[274]
Men	79.8	82.9	80.4	80.4	82.2	75.3	77.2
	[1,934]	[286]	[230]	[429]	[343]	[215]	[431]
If Married at 15th, Children (%)							
Women	79.6	85.1	72.7	82.4	84.7	76.9	76.2
	[1,173]	[181]	[161]	[238]	[163]	[216]	[214]
Men	76.2	78.5	70.3	78.6	80.9	72.8	73.0
	[1,544]	[237]	[185]	[345]	[282]	[162]	[333]
			Employment rates				
Parents at 15th (%)							
Women	78.8	94.3	85.7	79.2	72.3	73.7	69.6
	[961]	[157]	[119]	[202]	[141]	[171]	[171]
Men	99.5	98.9	100.0	100.0	100.0	99.1	98.8
	[1,195]	[190]	[132]	[274]	[231]	[119]	[249]
Childless at 10th (%)							
Women	97.5	99.4	99.1	98.0	95.3	96.1	97.7
	[1,091]	[159]	[113]	[252]	[148]	[206]	[213]
Men	97.5	100.0	99.3	97.8	95.5	97.3	97.0
	[1,366]	[163]	[136]	[315]	[243]	[146]	[363]

Notes: This table reports mean values, with sample sizes [*n*] in brackets. The majority of these statistics reflect information for 15 years after graduation among all Harvard graduates who responded to their 15th-year reunion survey. The 10th-year data reflect information for those observed in the 10th-year survey.

The top panel of Table 1 reports the family formation patterns, by graduate degree and gender, for Harvard alumni observed 15 years after graduation.[14] Females are less likely to be married, but among those married, more likely to have children. The pattern varies across degrees, however, especially among women. For instance, among married women, MDs, MBAs, and JDs are appreciably more likely to have children than are PhDs, MAs, or women with no graduate degree.[15] Furthermore, comparing these rates with those observed among women from the 2003 National Survey of College Graduates (NSCG), we find that these patterns are surprisingly similar, both overall, and by degree.[16]

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stated. We conclude that spouse's, but not own, earnings may be too low. Because this pattern may vary systematically by spouse's graduate degree, we include his degree directly in our analysis.

[14]We do not distinguish between types of MAs (other than MBAs), primarily because a large proportion of graduates provide no detail on the type received.

[15]For MDs and MBAs, each of these differences is significant at the 10% level or higher, and JDs are significantly more likely to have children than PhDs (at the 5% level).

[16] In the NSCG we observe highest degree attained, grouped by PhD, MA, or a professional degree. We distinguish MBAs from MAs based on graduate field of study (business); among those with professional degrees, we distinguish JDs, MDs, and those with specialized MAs, based on field of study and occupation. Using respondents who are between the ages of 35 and 40 (and for the sake of homogeneity, those who completed their BA in the United States by the year they turned 25 and who never attended community college), among women, 77% are married, and of those married, 81% have children. We also

The lower panel of Table 1 shows a comparison of employment rates, by gender, degree, and parental status. (Because a relatively small proportion of graduates remain childless by their 15th year, we report employment patterns for childless alumni 10 years after graduation, when 73% have no children.) From these data we see that employment rates are very high for both men and childless women, and rates vary by fairly little across graduate degrees.[17]

Among mothers, however, the proportion working varies strongly by degree. For instance, 94% of MDs work, compared with 72 to 73% of MBAs and MAs, and 69% of women with no graduate degree. Furthermore, these employment rates are again strikingly similar to those observed for women from the NSCG, where 93% of MDs work, compared with 73% of MBAs and MAs.[18]

Our final sample is limited to the 934 married Harvard mothers observed 15 years after graduation. Table 2 reports summary statistics for this sample (additional variables can be found in the website Appendix Table A-1).[19] We see that by our estimates, MDs earn the highest hourly wages, followed by JDs and MBAs, while PhDs earn the least. The same pattern holds by degree for spouse's earnings, chiefly because of the large proportion of women who are married to men holding the same degree. We also see a striking lack of variation in the timing of first birth; almost all groups have their first child on average at age 32.[20]

We also focus separately on the subset of these Harvard mothers whom we observe both before and after first birth, the "longitudinal" sample. This sample includes 286 women observed both 10 and 15 years after graduation, who had their first child within this period, who provide sufficient work information at both points, and who do not hold either an MD or

find that among married women, 75% (MD), 81% (PhD), 82% (JD), 79% (MBA), and 83% (MA) have children.

[17]Although employment rates are above 95% in all graduate degree groups, among both childless women and men, MBAs are the least likely to work. (In both genders, these differences relative to MDs and PhDs are statistically significant at the 10% level or higher.)

[18]Starting from the sample described in footnote 16, we limit the sample to women with children under age 6 to better reflect the demographics of the Harvard sample. Within this population, 87% of PhDs are employed, as are 80% of JDs and 65% of women with only a BA. Likewise, among their sample of Harvard business, law, and medical school alumnae who graduated 15 to 25 years before our sample, Swiss and Walker (1993) find similar results: by their 30s and 40s, only 75% of MBA mothers are working, compared with 89% of JDs and 96% of MDs. Note that across the board, however, these rates are high compared with those for the average population of college graduates, calling into question the media focus on the "excessive" opt-out rates among highly educated mothers (e.g., Belkin 2003; Wallis 2004).

[19]Also see the website Appendix Section C for a detailed listing of the types of jobs held by women within each graduate degree group.

[20]We also find little variation in the career timing of first birth (defined in terms of the year in which a woman completed her graduate degree), either across degrees, or, within degrees, across job types. For instance, among JDs in the longitudinal sample, the average career timing is 6.8 years after graduate school among women working for large, inflexible law firms before motherhood, and 7.0 and 7.1 years among those working for the government or for nonprofits. Thus, in this cohort we find no evidence suggesting that women adjust their timing in response to job-specific incentives, such as an incentive to delay motherhood until making partner.

Table 2. Summary Statistics

Variables	All	MD	PhD	JD	MBA	MA	None
Working at 15th	78.1	94.2	85.5	77.6	71.7	72.9	68.7
Hourly wage (estimated)	43.41	58.21	28.92	48.18	49.92	30.88	35.08
(2000$)	(24.63)	(20.97)	(9.97)	(21.13)	(37.29)	(16.25)	(19.99)
Schooling information							
Undergraduate Major:							
Sciences	15.0	43.5	31.6	3.4	3.9	6.8	6.6
Psychology	10.4	10.2	10.5	8.0	10.2	13.6	10.3
Economics & social studies	13.3	2.7	5.3	13.6	35.2	8.2	14.7
Political science	6.9	2.0	2.1	17.0	8.6	3.4	4.4
Other social sciences	8.9	12.9	4.2	3.4	4.7	17.7	9.6
English	21.0	12.2	22.1	26.7	14.1	23.1	26.5
History	10.9	10.9	8.4	14.2	10.9	6.8	12.5
Played sports in college	31.2	29.9	17.9	26.7	39.1	38.1	33.1
Top-10 graduate program	47.5	34.4	53.0	44.4	70.3	40.4	—
Family variables							
Age at first birth	32.0	32.0	32.4	32.1	32.3	32.2	31.1
	(2.8)	(2.8)	(2.9)	(2.7)	(2.6)	(2.9)	(3.1)
Total children at 15th	1.88	1.84	1.74	1.94	1.88	1.86	1.97
	(0.79)	(0.67)	(0.78)	(0.74)	(0.85)	(0.88)	(0.79)
Changed name at marriage	57.1	50.6	39.3	56.6	73.9	52.4	66.9
Spouse's salary (estimated)	119.3	141.8	93.8	129.4	133.6	107.7	101.0
('000s, 2000$)	(77.4)	(83.0)	(58.9)	(87.6)	(76.7)	(75.1)	(58.4)
Spouse, same graduate degree	42.4	43.5	41.0	49.0	46.4	21.1	52.8
Sample size	934	154	117	196	138	166	163
(% of total)		(16.5)	(12.5)	(21.0)	(14.8)	(17.8)	(17.5)

Notes: This table reports variable means, and for continuous variables, lists standard deviations in parentheses (all other variables reflect percentages).

PhD.[21] We exclude these two degree groups from the longitudinal sample because too many remain in training 10 years after graduation.[22]

Identifying Flexible Fields

The flexibility of a given job is a function of several factors, including the availability of "work–family" policies and the culture of the workplace. Elements of the former will include the generosity of available maternity leave, formal part-time or flextime policies, or telecommuting options. The latter will include de facto norms on the implications of using such policies, as well as the importance of factors such as "face time."[23]

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[21]Women in the Harvard longitudinal sample have higher labor force participation rates 15 years after graduation: 84% for the JDs, 74% for the MBAs, and 81% for both the MAs and those with no additional degree.

[22]We lack sufficient information on these women's pre-childbirth/post-training work environment to assess its influence on their subsequent labor supply. For instance, 43% of women who hold a PhD by 15 years after graduation are still in graduate school or are completing postdoctoral fellowships 5 years earlier, and 58% of MDs are completing their residency or fellowships, or are still in medical school.

[23]One might also consider the production function of a job as a central factor of its family friendliness, such as the flexibility of where and when the work itself is done or in who completes it, although the production function need not be a fixed characteristic.

Because we cannot directly observe the broader set of elements that go into the flexibility of a given job, our measure of flexibility is primarily built on the simplest dimension—the capacity to cut one's hours. For our first step in defining flexibility, we use the distribution in the NSCG of hours worked among childless women. The NSCG provides detailed data on hours worked, employer sector (e.g., for-profit, nonprofit, government), employer size, and occupation. We use these data—by graduate degree—to distinguish types of work environments, for instance large compared with small firms; or in education, working as a teacher compared with working in another capacity. Since we use this measure only in the analysis of the longitudinal sample, we do not consider MDs and PhDs.

Grouping childless women by degree and job type, we define as "inflexible" those settings in which fewer than roughly 5% work part-time. We use data on the proportion working part-time because we think it will reflect the existence of a minimum hours requirement. As the top panel of Table 3 shows, this criterion captures almost exactly the same job types across all degrees: big firms, the government, teaching, and for JDs and MBAs, small firms.[24]

Finally, because we observe firm names in our Harvard data, we can capture additional information on flexibility by using firm-specific family friendliness rankings. In particular, we reclassify as "flexible" those large firms that are included in the list of Top Ten Family-Friendly Firms as compiled by the Yale Law Women, or the list of Best Places [for working mothers] by *Working Mother* magazine.[25] Both rankings specifically reflect information on both the availability and uptake of work–family policies, thus for large for-profit firms, our measure captures the richer dimensions of workplace flexibility. Using this information, 20% of the Harvard women in large firms are recategorized as working in a flexible environment, including 25% of MBAs and JDs.

One concern with this definition is that our initial measure of flexibility is endogenous to sorting across work environments. As discussed above, among women who anticipate having children, those with high taste for time at home with their kids (ζ) may select more flexible jobs. Although ζ should not yet directly influence the labor supply choices of these *childless* women, among those who have chosen jobs with low h^{min}, women who likewise have high taste for leisure will have a greater capacity to work part-time, even before motherhood.

An alternative approach would be to rely on the labor supply patterns of men to gauge access to part-time schedules. Looking at the bottom panel of

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[24]Some may find this result for teaching surprising; these data clearly suggest that it is relatively difficult to work part-time as a primary- or secondary-school teacher. (Among NSCG mothers of small children, only 12% of teachers work part-time, compared with 40% or more of those who work in the environments categorized as "flexible.") As we note above, however, teaching has a low penalty for time off (and allows women to work closely with children), thus we distinguish teachers from those in other "inflexible" environments in our specifications reported in Table 7.

[25] See website Appendix Table A-4 for a list of the firms included in each of these sources.

Table 3. Labor Supply Patterns of Childless Women and Men

Graduate degree	Big firm	Small firm	Nonprofit	School teacher	Education	Government	Self-employed
			Childless women				
% Part-time (< 35 hrs/wk)							
BA	**4.6**	12.9	12.4	**5.5**	18.8	**4.1**	16.0
	[1,078]	[319]	[217]	**[237]**	[266]	**[244]**	[325]
MA	**4.7**	18.8	10.1	**1.8**	30.0	**3.6**	15.5
	[296]	[96]	[159]	**[228]**	[400]	**[165]**	[103]
MBA	**0.5**	**3.4**	9.0	—	—	**0**	13.5
	[212]	**[29]**	[89]	—	—	**[39]**	[37]
JD	**1.4**	**0**	12.1	—	—	**4.1**	14.3
	[72]	**[24]**	[33]	—	—	**[74]**	[56]
			Men				
% Part-time (< 35 hrs/wk)							
BA	**1.7**	3.7	6.2	**5.9**	14.3	**1.9**	7.0
	[3,054]	[854]	[227]	**[255]**	[301]	**[519]**	[855]
MA	**1.4**	4.6	3.9	**2.4**	29.9	**2.5**	5.7
	[865]	[218]	[103]	**[168]**	[368]	**[162]**	[212]
MBA	**0.7**	**2.1**	8.0	—	—	**0.7**	9.9
	[1,094]	**[189]**	[112]	—	—	**[148]**	[202]
JD	**0.8**	**3.6**	2.1	—	—	**0**	5.0
	[125]	**[110]**	[48]	—	—	**[114]**	[201]

Notes: Each cell reports the proportion working part-time (less than 35 hours per week), and the cell size [*n*] in brackets. Environments defined as inflexible are distinguished in bold. Relative to JDs and MBAs, a much higher proportion of MAs and BAs work in education, so we distinguish education from other nonprofits, and within education, distinguish primary- and secondary-school teachers from those working in other capacities. For both genders, our sample captures all NSCG respondents with positive work hours, who are between the ages of 25 and 35 for BAs and MAs, and between the ages of 25 and 48 for JDs and MBAs (to offer larger cell sizes). These definitions are not sensitive to the age ranges used.

Table 3, we see that men are generally less likely to work part-time. Yet the pattern across job types is surprisingly similar. The only clear difference is in small firms, where fewer than 5% of men with an MA or BA work part-time. In this instance, we rely on the data for women because occupational sex segregation suggests that mothers are more likely to work in jobs similar to those held by childless women than by men. Overall, however, we find reassuring the general similarity of the labor supply patterns across these two populations.

Using this definition, Table 4 shows the proportion of the Harvard longitudinal sample working in inflexible jobs before and after motherhood, overall and by graduate degree. Before having children, we see that roughly three-quarters of JDs and MBAs work in inflexible jobs, compared with only half of women with no graduate degree, and a third of MAs.[26] Yet the types

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[26]Based on insight from other sources on the constraints in law, if we were to designate only litigation-heavy government positions as inflexible (Swiss and Walker 1993), and distinguish jobs as legal counsels for big firms as flexible (Mason and Eckman 2007), a much lower 60% of the JDs would be categorized as working in an inflexible environment before having children. (In the longitudinal sample, among JDs working for the government before children, 35% work in litigation-heavy positions, e.g., assistant U.S. attorney; among JDs working for large inflexible firms, 10% work as corporate counsels.) We do not in-

Table 4. Distribution of Flexible Work Environments

Work environment	All	JD	MBA	MA	None
Before children					
Inflexible (%)	59.8	75.0	71.2	36.0	52.8
Big inflexible firm	**35.0**	**32.6**	**51.5**	**16.0**	**45.3**
Government	**9.4**	**18.5**	**1.5**	**9.3**	**3.8**
School teacher	**3.5**	**—**	**—**	**10.7**	**3.8**
Small firm	18.9	23.9	18.2	20.0	9.4
Big flexible Firm	9.1	10.9	18.2	0.0	7.5
Nonprofit	12.9	10.9	4.5	25.3	9.4
Other education	4.9	—	—	14.7	5.7
Self-employed	6.3	3.3	6.1	4.0	15.1
After children					
Inflexible, if working (%)	47.1	55.3	61.7	30.0	40.5
Big inflexible firm	**23.1**	**25.3**	**28.1**	**13.5**	**26.9**
Government	**5.7**	**11.0**	**1.6**	**5.4**	**1.9**
School teacher	**2.1**	**—**	**—**	**5.4**	**3.8**
Small firm	10.0	9.9	15.6	5.4	9.6
Big flexible firm	5.0	6.6	7.8	1.4	3.8
Nonprofit	17.4	22.0	10.9	20.3	13.5
Other education	4.6	—	—	13.5	5.8
Self-employed	12.1	8.8	9.4	16.2	15.4
Out of labor force	19.9	16.5	26.6	18.9	19.2
Sample size	286	92	66	75	53

Notes: This table reports the distribution of work environments observed among women in the Harvard longitudinal sample 10 and 15 years after college graduation. In both the top and bottom panels, the first line reflects the percentage working in inflexible settings, calculated from among only those currently employed. The remaining lines report the percentage of each degree group working in each type of work setting, including, at the 15th, those out of the labor force. Environments defined as inflexible for all graduate degrees are distinguished in bold.

of jobs held by MBAs and JDs are quite different, with many fewer JDs in large inflexible firms. By comparison, the types of jobs held by MBAs and women with no graduate degree are much more similar.

After having children, we see (in Table 4) that the proportion of women working in inflexible jobs has dropped by 20 percentage points among JDs, but by only 10 points among MBAs and women with no graduate degree. For the latter, we see a larger proportion of women leaving big inflexible firms, whereas for JDs we instead see women leaving the government and small firms. Overall, note the clear increase in the proportion working for nonprofits and in self-employment.[27]

Empirical Strategy

The following section outlines how we will attempt to identify the treatment effect of workplace flexibility, given the sources of potential bias discussed above.

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corporate this information into our primary measure of flexibility because we have no similar means to refine our definition for women with other degrees, who tend to work in much less homogenous settings.

[27]This shift toward self-employment supports past research suggesting that women enter self-employment as a means to balance household responsibilities with a maintained labor force presence (Connelly 1992; Hundley 2000; Lombard 2001).

Controlling for Differences in Characteristics

Exploiting the richness of our data, we begin with the simple approach of assessing whether the observed labor supply differences across women with differing graduate degrees can be explained by their characteristics. In particular, using the full Harvard sample, we use a probit specification to estimate the following equation,

$$(1) \qquad p(h_i > 0) = F\left(\alpha + \sum_j \beta_j S_{ij} + \gamma_1 X_i + \gamma_2 \theta_i \right),$$

where S_j reflects the type of graduate degree, X are factors that influence the wage and reservation wage, and $\theta = (\zeta, \psi)$ are unobserved tastes. We first run this specification with no controls, then add elements of X standard to the married woman's labor supply model, followed by proxies for θ. Our focus is on the degree coefficients, β_j, which reflect the level difference in labor supply between each degree j and MBAs, the excluded category.

Our variables X include a woman's potential wage, number of children, and our estimate of her spouse's earnings.[28] We also include proxies for family assets (whether she attended a private high school, and whether her husband attended a private university), and controls to capture variation in childcare costs (census region, and whether she lives in the same region in which she was raised, suggesting proximity to family). As with many of the variables that we classify as "X," current region may also capture an element of taste, if geographic variation exists in the social norms on the acceptability of being a working mother (Fogli and Veldkamp 2011).

As noted above, because we do not directly observe spouse's earnings, we rely on estimates based on his education, occupation, location, and in some instances, firm. We also supplement this with detailed information on his education type and quality, including his graduate degree.[29] Along with its influence on his earnings, the last factor may also speak to different time constraints that translate into variation in the value of a woman's time at home. For instance, husbands who are MDs may be on call many nights, and husbands who are MBAs may travel frequently, making each less available for household responsibilities.

We next include controls that may speak more directly to underlying elements of taste, θ. For instance, we expect undergraduate major to reflect much about taste, especially ψ. We can also control for whether a woman had her first child before she started graduate school; choosing a career

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[28]See website Appendix Section D for greater detail on how we build potential wages. Following Blau and Kahn (2007) and Juhn and Murphy (1997), we instrument for wages using predicted wage distribution dummies to address measurement error. Because we rely on salary estimates as our building block, to absorb any residual effect that may not be captured in our career consultant's estimates, we also control for whether each woman attended a top-10 graduate program and whether she holds more than one graduate degree. We also include year-of-graduation (from graduate school) fixed effects, to allow for long-term effects of the economic environment at the time of graduation (Oyer 2008).

[29]Quality is reflected by whether he attended a top-20 undergraduate, or top-10 graduate, program.

path after motherhood may signal a strong value associated with the identity of working in that field.

Our detailed information on marriage and spouses also provides an especially rich set of potential proxies for ζ. This includes whether a woman changed her name at marriage and her age difference with her spouse.[30] Both may speak to differences in the strength of gender norms within the household. In addition, we include a rich set of controls that are likely to pick up both elements of taste. These include family background, such as race/ethnicity, and place of origin. We can also control for the dorm in which each woman lived during college, and whether she played sports.

Given our focus on β_j, our assumption is that these elements of X and proxies for θ absorb much of the variation in taste that leads to sorting across graduate degrees. As a check, we can test this directly for the subset of controls observed by the time of college graduation, C_i (see website Appendix Table A-5). Not only do we find that undergraduate major is strongly related to a woman's subsequent graduate degree but other factors are likewise important, such as a woman's race, where she grew up, and whether she played sports.

Controlling for Pre-Childbirth Work Environment

After controlling for X and θ in Equation (1), if there remain large differences in labor force participation across fields—β_j remain significantly different from zero—one might interpret this as evidence of systematic variation in other factors, such as work environment. For the longitudinal sample, we can test for this directly by assessing whether working in a flexible environment before having children, F_{i10}, predicts subsequent labor supply:

$$(2) \qquad p(h_i > 0) = F\left(\alpha + \sum_j \beta_j S_{ij} + \delta F_{i10} + \gamma_1 X_i + \gamma_2 \theta_i \right).$$

As discussed above, however, because women can sort across jobs, in the probit estimation of Equation (2), we cannot necessarily interpret our estimate of the coefficient δ as a measure of the causal effect of work environment. If women sort across jobs such that those observed in flexible environments before children have systematically higher ζ (and thus lower h^*), and if we cannot fully control for taste, the coefficient estimate of δ will be attenuated toward zero.[31] (Any measurement error in F_{i10} will likewise cause attenuation.)

To address the bias introduced by this possible sorting, we adopt a control-function strategy (Garen 1984). Using the rich data from when the members of our longitudinal sample were college-age, C_i, we begin by pre-

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[30]Goldin and Shim (2004) use the Harvard anniversary reports to assess women's surname choices at marriage.

[31]Given the types of jobs classified as flexible, sorting across jobs may also vary systematically with ψ. For instance, nonprofit jobs—which may attract high-ψ women—are classified as flexible. Yet teaching and government, which are classified as inflexible, may attract women with similar taste.

dicting via OLS a woman's choice of pre-childbirth (postgraduate school) work environment: $\hat{F}_{i10} = P(F_{i10} = 1 | C_i, S_{ij})$. We then calculate the residual element of workplace flexibility, $\tilde{F}_{i10} = F_{i10} - \hat{F}_{i10}$. To the extent that C_i absorbs the factors that drive selection across jobs, we can interpret $\tilde{F}_{i10}$ as the random element of a woman's pre-childbirth work environment.

We find that the factors observable at college graduation are clearly related to the types of jobs women hold 10 years later (see website Appendix Table A-6). For instance, undergraduate major has a strong relationship with whether a woman subsequently works in a flexible job, and place of origin, sports participation, and undergraduate dorm are also related to subsequent job choices.

One might worry, however, that these college-level variables are more likely to pick up variation in ψ than in ζ. Do 19- or 22-year-old women really know if they will want to take time off when they have children? Our results suggest that they do. If we regress the residual element of workplace flexibility, $\tilde{F}_{i10}$, on factors that are likely correlated with ζ that occur after graduation but before the 10th-year job, these controls provide little additional explanatory power, even though many are strongly related to subsequent labor supply after motherhood (as we show in Table 6).[32]

Furthermore, we find that C can predict who will take her husband's name at marriage, which we consider a proxy for ζ. In particular, undergraduate dorm preference provides this power, suggesting that the element of taste that drives a woman's choice of dorm at the age of 19 is strongly correlated with ζ.[33]

Given this decomposition of observed pre-childbirth work environment, we then rerun Equation (2), replacing F_{i10} with the predicted value and the residual, $\hat{F}_{i10}$ and $\tilde{F}_{i10}$. In this control-function regression, to the extent that the college-level factors C_i absorb selection across jobs, the coefficient on $\tilde{F}_{i10}$ should give us the causal effect of workplace flexibility, and the difference between the coefficients on $\tilde{F}_{i10}$ and $\hat{F}_{i10}$ will give us insight into the direction of the bias created by selection. Furthermore, any attenuation in the graduate degree coefficients after controlling for work environment will suggest that variation in flexibility across fields helps drive the overall variation in labor supply.

Results

Table 5 reports the marginal effects associated with the degree coefficients, β_j, when we run Equation (1) on the full Harvard sample. Line (1) reports

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[32]When we regress $\tilde{F}_{i10}$ on whether a woman changed her name at marriage (if married by then), the age difference with her spouse, the type and quality of her husband's education, her age at marriage, and whether she attended a top-10 graduate program, these variables are completely unrelated. (The regression has an R^2 of 0.08, an adjusted R^2 of −0.01, and the joint significance of these regressors is 0.5.)

[33]A regression of whether a woman changed her name at marriage on C has an R^2 of 0.24 and an adjusted R^2 of 0.10. In particular, the dummies for undergraduate dorm are jointly significant with a p-value of 0.01, and dummies for region of origin are jointly significant with a p-value of 0.10, whereas the remainder of the variables are insignificant at standard testing thresholds.

Table 5. Differences in Probability of Working by Graduate Degree

Specification	MD		PhD		JD	MA	None	R^2
(1) Uncontrolled	0.205***	**	0.114***	*	0.049	0.011	–0.025	0.05
	(0.027)		(0.036)		(0.039)	(0.043)	(0.045)	
(2) + Xs	0.172***	*	0.090**		0.069*	0.044	0.007	0.21
	(0.026)		(0.042)		(0.038)	(0.047)	(0.073)	
(3)+ Proxies for θ	0.158***	**	0.066		0.046	0.015	–0.029	0.28
	(0.025)		(0.045)		(0.040)	(0.052)	(0.081)	

Notes: Each line reflects the results from a different probit regression of labor force participation after motherhood, including an increasing number of controls, with the excluded category MBAs. The values listed are the marginal effects associated with the given degree coefficient, β_j, from Equation (1), with its standard error in parentheses. The first line reports results when we control only for graduate degree. The second and third lines reflect the results when we control for the observable elements of the wage equation (X) and proxies for the unobservable elements (θ). Lines (2) and (3) are estimated via instrumental variables; see footnote 28 for more detail. See the notes to Table 6 for a full listing of the controls included in the regressions reported in Lines (2) and (3), as well as the marginal coefficients for a subset of these controls. The columns between the coefficients in this table report whether the differences between adjacent graduate programs are statistically significant. The last column reports the pseudo-R^2 when we run the probit without instrumenting for own wage. Significance levels marked as * significant at 10%; ** at 5%; and *** at 1%.

the results before including controls, Line (2) the results after including only *X,* and Line (3) the fully controlled specification. The columns between the marginals report whether the differences between adjacent graduate programs are statistically significant. Table 6 reports the marginal effects for a subset of the controls X and θ.

In Line (1), we see that before controlling for individual characteristics, MDs work appreciably more than PhDs, and both MDs and PhDs work more than MBAs, the excluded category. But we cannot reject that MBAs are as likely to work as JDs, MAs, or those with no graduate degree.

As the results in Line (2) and Table 6 demonstrate, the elements of *X* are highly correlated with labor supply in the predicted ways. For instance, women with higher potential wages are more likely to work, and those with higher-earning spouses and more children are less likely. Yet including these controls does little to narrow the difference in labor supply across graduate degrees. The coefficient on JDs in fact rises, in part because they have more children than MBAs, augmenting the difference between these two fields.

When we include the proxies for taste, we likewise find that many are strongly related to labor force participation. For instance, women who begin graduate school after having a child—a proxy for ψ—are 10 percentage points more likely to remain working. We also see that those who change their last name at marriage are instead 11 percentage points more likely to quit. Because MBAs are by far the most likely to do so, this in part explains their lower participation.

Despite the power of these controls in predicting work patterns, and the resulting attenuation of most of the degree coefficients toward zero, the overall changes are fairly small. Comparing Lines (1) and (3) in Table 5

Table 6. Marginal Effects for Controls *X* and θ

Independent variable	+ *Xs* marginal	(s.e.)	+ θ*s* marginal	(s.e.)
Conventional elements of the labor supply decision, *X*				
Log potential wage	0.149*	(0.078)	0.125*	(0.076)
Extra degree (non-MA)	0.114*	(0.051)	0.097**	(0.047)
Top-10 graduate school	0.033	(0.030)	0.027	(0.029)
Private high school	−0.062**	(0.030)	−0.057*	(0.030)
Live in same region as grew up	0.036	(0.027)	0.029	(0.027)
Family size (excluded = 1 child)				
2nd child	−0.115**	(0.026)	−0.088**	(0.026)
3rd child	−0.133**	(0.045)	−0.134**	(0.046)
Spouse information				
Log earnings	−0.059**	(0.028)	−0.056**	(0.026)
Top-10 graduate program	−0.061*	(0.036)	−0.052	(0.034)
Graduate degree (excluded = none)				
MD	−0.117*	(0.070)	−0.172**	(0.079)
PhD	0.035	(0.047)	0.014	(0.049)
JD	−0.074	(0.051)	−0.077	(0.052)
MBA	−0.078	(0.054)	−0.072	(0.054)
MA	0.020	(0.046)	−0.003	(0.048)
Taste-based elements of the labor supply decision, θ=(ζ,ψ)				
Changed last name at marriage			−0.105***	(0.026)
Age gap with spouse				
Older			−0.132*	(0.072)
Years (if not older)			−0.039***	(0.012)
Years (if not older), sq (*x10¹*)			0.024**	(0.011)
First child before graduate school			0.097***	(0.036)
Played college sports			−0.052	(0.032)
Minority			0.048	(0.033)

Notes: The first two columns report the marginal effect and standard error for the controls *X*, corresponding to the results reported on Line (2) of Table 5; the second set reports the results when we also include proxies for unobserved taste (θ), corresponding to Line (3). Other elements of *X* include year of graduation from graduate school, whether the individual has an additional MA or a 4th or more children, whether her husband attended a top-20 undergraduate institution, and current region of residence. Other elements of θ include year of college graduation, region in high school and whether a woman grew up in a big city and/or in a low-density state, undergraduate major and whether it was a small major, and undergraduate dorm. Significance levels marked as * significant at 10%; ** at 5%; and *** at 1%.

shows that persistent differences in labor supply remain, even after controlling for this rich set of individual-specific factors.

Table 7 reports the results of estimating Equation (2), where we rerun the fully controlled specification on the longitudinal sample, now controlling directly for pre-childbirth work environment. Column (1) lists the degree-specific coefficients, β_j, for this subset of women before controlling for workplace flexibility, Column (2) reports the results when we control for the observed value, F_{i10}, and Column (3) reports the control-function results.

As Columns (2) and (3) show, working in a flexible job before having children is significantly associated with a woman's labor supply five years later. The insignificant difference between the coefficients on $\hat{F}_{i10}$ and $\tilde{F}_{i10}$ in Column (3), combined with the evidence above that $\tilde{F}_{i10}$ is largely orthogonal

Table 7. Effect of Pre-Childbirth Work Environment

Independent variable	(1)	(2)	(3)
Graduate degree controls (Excluded = MBA)			
JD	0.042	0.034*	0.036*
	(0.030)	(0.024)	(0.025)
MA	−0.022	−0.014	−0.017
	(0.065)	(0.045)	(0.046)
None	0.043	0.025	0.023
	(0.037)	(0.024)	(0.024)
Pre-childbirth work environment			
Flexible job (F_{i10})		0.061***	
		(0.030)	
Residual flexibility ($\tilde{F}_{i10}$)			0.052**
			(0.030)
Predicted flexibility ($\hat{F}_{i10}$)			0.086**
			(0.052)
School teacher		0.002	−0.001
		(0.033)	(0.039)
Pseudo R^2	0.45	0.49	0.49

Notes: Results reflect the marginal effects associated with the listed variable, with its standard error in parentheses. Each column reflects a different specification predicting labor force participation after children (15 years after college graduation) among the longitudinal sample, reporting results before and after controlling for pre-birth work flexibility. (All of the previously discussed controls, listed in Table 6, remain in each of these specifications.) Reported values reflect the marginal effect calculated from a probit regression; we do not use the IV specification described in the notes to Table 5 because doing so has no effect on the results. See footnote 24 for why we separately distinguish teachers from those in other inflexible environments. Because wages may be systematically lower in flexible jobs, we also run regressions that control for wages in a more flexible way; this has no effect on the results reported here. Standard errors reported in parentheses; significance levels marked as * significant at 10%; ** at 5%; *** at 1%.

to taste, suggest that sorting across work environments creates little bias in the estimated effect of workplace flexibility.[34] The coefficients on F_{i10} in Column (2) and on $\tilde{F}_{i10}$ in Column (3) are accordingly very similar: women who work in a flexible environment are 5 to 6 percentage points less likely to leave the labor force after motherhood.[35]

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[34]Note that the larger (although statistically equivalent) coefficient on $\hat{F}_{i10}$ suggests that, if anything, the *type* of women who choose flexible jobs are the type who are systematically *more* likely to remain working, the opposite direction of sorting predicted. (This same pattern holds if we rerun the specifications excluding the MBAs from the sample.)

[35]One might ask whether this result reflects variation in the production functions of jobs across industries. Are the jobs in certain industries easier to pair with motherhood than the jobs in other industries, simply by the nature of the work? We do not include industry fixed effects for two reasons: (1) controlling for industry may also capture systematic variation in work norms and mores (e.g., variation in the strength of the "old boys" network), which may influence workplace flexibility, and (2) we do not believe that production functions are a fixed characteristic. (Consider the shift in the structure of many medical specialties over the past 30 years, and its influence on the capacity for MDs to work part-time.) If, however, we split the sample of women who worked in large for-profit firms into seven broad industry groups, within each, the proportion who remain working is higher among those who worked for flexible firms. For instance, in banking, 88% of those who worked in such firms remain working after motherhood, compared with only 67% of those who previously worked for inflexible firms.

Table 8. Switching Patterns across Work Environments

Work environment at 15th	All	JD	MBA	MA	None
Working in an inflexible job at 10th (%)					
Inflexible	51.8	57.4	53.3	33.3	53.6
Flexible	23.2	23.5	15.6	40.7	17.9
At home	25.0	19.1	31.1	25.9	28.6
Working in a flexible job at 10th (%)					
Inflexible	16.8	13.0	26.3	19.1	8.3
Flexible	70.8	78.3	57.9	66.0	83.3
At home	12.4	8.7	15.8	14.9	8.3

Notes: Data for the Harvard longitudinal sample.

Revisiting Variation in Labor Supply by Graduate Degree

Although the results in Table 7 make clear that workplace flexibility influences mothers' labor supply, whether they explain the work patterns we observe across women by graduate degree is less clear. As discussed above, if variation in flexibility is a driving factor, controlling for it directly should attenuate the degree coefficients in Equation (2). Although we do find that two of the three degree coefficients in Table 7 are attenuated slightly toward zero, the results are too imprecise to conclude that variation in labor supply across graduate degrees is driven by variation in flexibility, at least as evident using our admittedly blunt measure.

Furthermore, at the graduate degree level, flexibility and subsequent labor supply do not appear to line up: by our measure, JDs are most likely to work in inflexible jobs before motherhood (followed closely by MBAs), yet they are the least likely to quit.[36] Does this suggest that their inflexible jobs are *less* inflexible than those held by MBAs? Or is it instead that their shorter-hour job alternatives are more appealing than the alternatives for women working in MBA-type jobs?

For the longitudinal sample, Table 8 reports the distribution of 15th-year job setting, grouping women by whether they worked in an inflexible or flexible job before motherhood. In the top panel we see, for instance, that among those women working in inflexible jobs beforehand, JDs, MBAs, and women with no graduate degree are roughly equally likely to remain in such an environment.[37] Notice that the 15th-year distribution for MBAs and women with no graduate degree are very similar, echoing our finding in Table 4 that these two groups work in similar types of jobs.

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[36]See footnote 21 for the labor force participation levels by graduate degree in the longitudinal sample. Considering the proportion of JDs in inflexible jobs, as noted in footnote 26, our measure may overstate this proportion, although the proportion for other fields will likewise be measured with error. If we use the alternate classification, the JD coefficient in Equation (2) is attenuated by slightly more; the estimates of the effect of workplace flexibility are completely unchanged.

[37]Within each graduate degree group, the proportion who stay, switch, or quit are very similar across the job types categorized as inflexible. For instance, among JDs, 60% of those who worked in large inflexible firms before motherhood remain in an inflexible environment, as do 65% of those who worked for the government.

Focusing on the top panel of Table 8, we see no evidence to suggest that the inflexible jobs held by JDs are relatively less inflexible: JDs are no more likely to remain in an inflexible environment after motherhood than either MBAs or women with no graduate degree. (With our data, we cannot distinguish whether a woman has reduced her hours to part-time.) Yet among those who leave, JDs are more likely to switch to a flexible job, whereas MBAs and women with no graduate degree are more likely to quit.[38]

These results may suggest that the career consequences of choosing a shorter-hour alternative—either taking advantage of work–family policies to go part-time, or switching to a more flexible job—may be especially high for women working in MBA-type jobs. For instance, suppose that in certain jobs, one can be irreversibly relegated to the "mommy track" simply by temporarily working part-time. In jobs for which productivity is especially hard to measure, long hours can become its signal (Landers, Rebitzer, and Taylor 1996), and the use of part-time schedules may therefore be especially harmful to career advancement.

Existing research supports this possibility (Eaton 2003; Hewlett et al. 2005). For instance, Hewlett et al. find that women working in business perceive greater barriers to using work–family policies than do women in law, medicine, or academia, and take-up rates are accordingly lower. Furthermore, among women in business, they find that 32% report an "unspoken rule" that those who use such policies will not be promoted, compared with only 24% of women in law.[39]

If, as these results suggest, MBAs are more likely to work in jobs with a permanent penalty for part-time work, the relative loss in lifetime earnings of going part-time may be only slightly smaller than the loss associated with a labor force gap. This may help explain the greater tendency of MBAs to quit after motherhood, rather than to shift to a shorter-hour alternative.[40]

For a woman working in an inflexible job before motherhood, this discussion highlights that the characteristics of the more flexible job alternatives she faces—beyond their shorter hours—will also influence her labor supply decision. This will include both the earnings and promotion potential associated with the given job, as well as whether the work is as interesting or dynamic as her previous job. Thus, although our results in Table 7 clearly show that jobs with high hours requirements push mothers out of the labor force,

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[38]Among those who leave an inflexible environment, this difference in the propensity to quit (comparing JDs with MBAs or women with no degree) is significant at the 15% level. The same holds true if we limit the comparison to women working in large inflexible firms before motherhood.

[39]A higher 41% of women in finance and banking report such an unspoken rule (the authors do not indicate whether these differences are statistically significant). These results are especially telling for Harvard women, since 26% of the MBAs in the longitudinal sample worked in finance or banking before they had children.

[40]Given that MBAs face especially high penalties for labor force gaps, however, if the penalties are similar for part-time work, the puzzle remains why MBA women consider *either* alternative. Furthermore, if women are aware of these large penalties when they select graduate fields, the women who choose an MBA should have lower average values of ζ and thus relatively high h^*. In combination, this evidence suggests that h^{min} in MBA-type jobs must be *especially* high to be forcing these women off the "fast track."

this evidence suggests that a number of factors may explain the differences in mothers' labor supply across graduate degrees, including the characteristics of the jobs women worked in before children and the characteristics of the jobs available for them to switch to.

Conclusion

Our results provide new insight into the influence of workplace flexibility on the labor supply decision of mothers. Using data for Harvard graduates, we focus on the labor supply of highly educated women, many of whom delayed motherhood as they completed additional schooling and established their careers. Yet despite the large opportunity cost of doing so, we see that a substantial proportion leave the labor force, at least temporarily, at the transition into motherhood.

More strikingly, we find that this propensity varies dramatically across career paths, suggesting that certain fields may be systematically more flexible, or "family friendly," than others. This difference remains, even when we take into consideration variation in a rich set of observable characteristics, many of which we expect to be correlated with unobservable elements of taste important in both the labor supply decision and selection across careers. Furthermore, we find that women who worked in flexible jobs before they had children are 5 to 6 percentage points more likely to remain working after motherhood.

Although ruling out explanations based on selection is extremely difficult, we find these results suggestive that the inflexibility of a woman's work environment plays a causal role in "pushing" her out of the labor force at motherhood. Our results therefore suggest that with improved work–family policies or changes to social norms, a smaller proportion of women might exit, or opt out of, the labor force at motherhood.

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