NBER WORKING PAPER SERIES

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Jane Leber Herr
Catherine Wolfram

Working Paper 14717
http://www.nber.org/papers/w14717

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
February 2009

We would like to thank David Card, Claudia Goldin, Lucie Schmidt, Annalisa Mastri, Jason Grissom, Constanca Esteves-Sorenson, and participants of the UC Berkeley Labor Lunch series for their comments and suggestions. We would also like to thank Joshua Langenthal, Marci Glazer, Charles Jones, and Zachary Leber for the use of their Harvard anniversary reports, Jessica Chen, Margaret Gough, Cathy Hwang, Omar Jabri, Tatyana Shmygol and Jenny Zhuo for providing excellent research assistance, and Peter Jacobs for providing our estimated salaries. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

"Opt-Out" Rates at Motherhood Across High-Education Career Paths: Selection Versus Work Environment

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NBER Working Paper No. 14717
February 2009
JEL No. J01,J13

ABSTRACT

This paper examines the propensity of highly educated women to exit the labor force at motherhood. We focus on systematic differences across women with various graduate degrees to analyze whether these speak to differences in the capacity to combine children with work over a variety of high-education career paths. Working with a sample of Harvard alumnae observed 10 and 15 years after graduation, we find that the labor force attachment of mothers at the 15th year is highest among MDs (94 percent) and lowest among MBAs (72 percent) and women with no advanced degree (69 percent). We then use a rich set of biographical information on the alumnae, combined with data on their workplaces, to try to disentangle whether the working patterns observed reflect selection on the types of women pursuing different graduate degrees, or variation in the difficulty of combining work with family along different career paths. Our results suggest that work environments contribute to women's decision to exit the labor force at motherhood.

Jane Leber Herr
Harris School of Public Policy Studies
University of Chicago
1155 East 60th Street
Chicago, IL 60637
jlherr@uchicago.edu

Catherine Wolfram
Haas School of Business
University of California, Berkeley
Berkeley, CA 94720-1900
and NBER
wolfram@haas.berkeley.edu

1 Introduction

Recent statistics suggest that the increase in female labor force participation observed over the second half of the 20th century began to level off in the late 1990s and early 2000s (Mosisa and Hippie, 2006). This has led to speculation about whether the "natural" rate of female labor force participation has been reached (Goldin, 2006), whether this is instead a temporary slow-down driven by economic conditions (Boushey, 2005; Joint Economic Committee, 2008), or whether there are remaining policy, cultural, or social changes that would accommodate more women in the workforce (Drago and Hyatt, 2003).

Accompanying this broad trend, recent media reports have highlighted the propensity of highly educated women to exit the labor force at motherhood. For instance, two cover articles, the "Opt-Out Revolution" in the *New York Times* magazine (Belkin, 2003) and "The Case for Staying Home" in *Time Magazine* (Wallis, 2004), focused on the choices of highly educated 30-somethings. In 2005, another *New York Times* front-page article focused on undergraduates at elite colleges, many of whom professed a desire to put their careers on hold once they became mothers (Story, 2005).

These reports have sparked heated debates. Some argue that this implies lower social returns to investment in female education, suggesting that fewer women should be admitted to elite colleges and professional schools.[1] (Meanwhile, the number of women earning professional degrees and doctorates has grown much more quickly than the number of men.[2]) Others have responded by calling for changes to policies that discourage women from combining motherhood with high-powered careers (Batt and Valcour, 2003).

These varying reactions rest on fundamentally different views of the drivers of women's labor supply decision at motherhood. The central question is the extent to which women in

[1] See, for example, the online debate between Gary Becker and Richard Posner (http://www.becker-posner-blog.com/archives/2005/09/ for Posner's initial comments, and http://www.becker-posner-blog.com/archives/2005/09/comment_on_care.html for Becker's response).

[2] For instance, the number of males earning doctorates rose by 7 percent from 1995-96 to 2005-06, compared to 54 percent among women, and more women are projected to earn doctorates than men by 2010 (National Center for Education Statistics, 2007).

high-education career paths are inherently more likely than similarly-situated men to exit the labor force at parenthood only because of a higher taste for time at home, or whether there remain elements of the work environment, perhaps mutable with different policies or cultural norms, that drive higher female exit rates.

This paper uses a unique data set on highly educated women to shed light on the factors influencing mothers' labor supply choices. Specifically, using detailed data on nearly 1,000 women who graduated from Harvard College between 1988 and 1991, we analyze labor force participation rates 15 years after graduation, when these women are approximately 37 years old.[3]

A benefit of our data is the enormous richness in the individual-specific information available for these women. The data include information on each alumna's college and high-school experience, her post-graduate education, her occupation and firm if working, marital information including her spouse's education and occupation, and her family structure. Given this rich professional information, we also develop imputed salary estimates for each woman and her spouse based on reported education, occupation, firm, and geographic location.

We begin with the observation that there are large differences in labor force participation rates across mothers based on the type of advanced degree they hold. For example, 94 percent of the women who earned MDs are still in the labor force, compared to 72 percent of the MBAs and 69 percent of those with no advanced degree. Our aim is to assess the extent to which this pattern speaks to either inherent differences in the set of women who pursue a particular post-college career path (*i.e.*, selection), or differences in the types of jobs to which these degrees lead (*i.e.*, treatment).

[3]Goldin and Katz (2008) report preliminary results from a large data collection effort on several cohorts of Harvard and Radcliffe graduates (the Harvard and Beyond study). Their study depicts broad trends in various schooling, family and work choices made by men and women graduating around 1970, 1980 and 1990. Our analysis relies on a different data source, although our sample overlaps with their 1990 cohort. See Section 3 and Appendix B for a more detailed discussion of our data sources.

After discussing a theoretical model of the elements likely to factor into a woman's labor supply decision at motherhood, we next use the Harvard data to assess whether systematic differences across career paths can be explained by variation in women's characteristics. For example, MDs earn more than their counterparts, so they face a higher opportunity cost of exiting the labor force at motherhood. Yet because many MDs marry other MDs, their spouses' salaries are also high, which should in turn make them less likely to work.

Ultimately, even controlling for a rich set of variables, some of which speak directly to observable factors that we expect to build into the labor supply decision, and others which may capture tastes for work or time at home, the disparities in labor force participation by advanced degree remain almost unchanged.[4] This large and statistically significant difference in the propensity to remain working across women who pursue different post-college career paths may therefore speak to systematic differences in the characteristics of the jobs to which these careers lead.

We next directly address the question of how a woman's work environment affects her labor supply at motherhood by considering how variations in job characteristics impact women's propensity to exit the labor force. To do this, we use our rich professional information to characterize each woman's work environment both 10 and 15 years after graduation, and focus on those women who had their first child within these five years.

Ideally, we would like to capture several dimensions of women's jobs, including both variation in "work-family" policies and differences in production functions across careers. Elements of the former will include both variation in formal policies – such as the generosity of available maternity leave, formal part- or flex-time policies, or telecommuting – and *de facto* norms on the implication of using them. Elements of the latter may include flexibility in the work itself or in who completes it. For instance, if ER doctors are more easily substituted for one another than management consultants, women with MDs may find it easier to take

[4]Because we are focusing on a very homogenous group of women – not only are they all college-educated, but they all attended the same elite school and are all observed exactly 15 years after graduation – our data by construction mitigate many of the selection problems at the individual level.

time off to care for a sick child. Systematic variation in any of those characteristics may affect the "family friendliness" of different jobs, that is, the relative utility they provide to women who must balance work and family commitments.[5]

Although we cannot directly observe those job characteristics, we build an approximate measure of the family-friendliness of a woman's work environment. For instance, for women with MBAs, JDs, MAs, or no advanced degree, we define as family friendly those jobs in the public or nonprofit sectors, as well as positions in firms that have been labeled family friendly within their field. We then show that women who worked in family-friendly environments before motherhood are much more likely to remain in the labor force afterwards.[6] We also analyze job transitions among the women who did not work in family-friendly environments before children, and show that, in comparison to JDs and MAs, women with MBAs and no advance degree are much more likely to quit than to shift to a family-friendly job.

Several caveats are in order in interpreting our results. First, our analysis focuses on a very specialized set of mothers. For example, because Harvard women tend to marry highly educated and well-paid men, a larger proportion can afford to stay home. Yet even if our sample is more likely to *respond* to relative differences in family-friendliness by choosing to leave their job, our results likely speak to general differences in the pressures faced by working mothers in these career paths. Furthermore, we might expect Harvard-educated women to work in positions with greater benefits and professional standing, suggesting that they should have greater capacity to adjust their work environment in response to kids (Tomlinson, 2004). Similarly, 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.

Second, note that because we observe women in their late 30s, we are unable to address

[5]Below we attempt to distinguish the utility that the modal woman would derive from a particular work environment (*e.g.*, based on its hours requirement and flexibility), from the utility that an individual woman may receive from her job-specific match, which may reflect selection across careers.

[6]Note that as we measure the effects of this variable among women with a particular advanced degree, we are more likely to be picking up variations in policies and norms than differences in the production functions across broad career tracks.

"opt-in" patterns, or re-entry into the labor force. The majority of highly educated mothers who leave the labor force intend to return (Wallis, 2004; Swiss and Walker, 1993). Thus it is possible that the variation in labor supply patterns observed in their late 30's is associated with the ease with which women in different fields can re-enter the labor force (Baker, 2002). Yet it is much easier to leave the labor force than to return (Swiss and Walker, 1993; Hewlett, 2005). Thus if women's expectations are overly optimistic, labor force participation in the late 30s is likely a strong predictor of future employment outcomes.

More importantly, it is extremely difficult to rule out explanations based on selection. While we benefit from a rich and diverse set of individual-specific controls, our data lack precision in two important areas. In particular, our salary figures are imputed. And, because our measure of family friendliness is coarse, it may indirectly capture other elements of the work environment that build into women's career selection decisions.

Nonetheless, considering both our inability to explain the observed differences in labor supply across advanced degrees, and our results on the importance of the family friendliness of a woman's job in explaining work propensity after motherhood, our results are consistent with the view that a mother's work environment influences her decision about whether to remain in the labor force. Put more strongly, our results suggest that improved work-family policies or changes to social norms could drive labor force participation of women in high-education careers closer to parity with men.

This paper proceeds as follows. We begin in Section 2 by laying out a framework for a mother's labor force participation decision, and the related selection decision across career paths. Section 3 then describes our data, and Sections 4 and 5 follow with our main results. The first establishes that the significant differences in the labor force participation rates of mothers by advanced degree are robust to controlling for a large number of person-specific characteristics; the second describes results that include a measure of the family friendliness of a woman's work environment. Given these findings, in Section 6 we discuss some possible interpretations of our results, and in Section 7 we conclude.

2 Model of the Underlying Question

There is a vast literature on the factors that influence married women's labor supply (for recent examples see Goldin, 2006, and Blau and Kahn, 2005). Similar to this study, a subset of this literature has begun to focus on variables that elaborate on the traditional economic model, including gender role attitudes (Fortin, 2005), social learning (Fogli and Veldkamp, 2008), and inter-generational preference transmission (Fernandez and Fogli, 2005). In addition, one of the main questions addressed with the traditional model is how labor force interruptions, such as those driven by children, affect women's careers (Mincer and Ofek, 1982), with a subset of this literature focusing on women in high-education professions (Bertrand, Goldin, and Katz, 2008; Wood, Corcoran, and Courant, 1993; Judiesch and Lyness, 1999; Schneer and Reitman, 1997).

As yet, however, there has been relatively little economic research on the effect of work environment on women's labor supply choices. Those papers that have considered work environment have instead focused, for instance, on whether wage differences between those with and without work-family policies reflect evidence of a compensating wage differential or productivity gains from increased flexibility (Johnson and Provan, 1995), or whether worker selection across firms with varying levels of such policies can help explain the "motherhood wage gap" (Nielsen, Simonsen, and Verner, 2004).

In comparison, within the sociology literature there is a significant body of research on the effect of work-family policies on the conflict between family and work commitments.[7] (This literature began with *The Time Bind*, the seminal work by Arlie Hochschild.) Most comparable to our sample, Swiss and Walker (1993) look at this question among alumnae from Harvard's business, medical, and law schools who graduated between 1971 and 1981.

The underlying complication throughout the existing economics and sociology litera-

[7] Another strain of literature in the area of organizational behavior and human resource management focuses on the "business case" for these policies, such as their effect on labor turnover (Batt and Valcour, 2003), profits (Arthur and Cook, 2003), productivity (Clifton and Shepard, 2004), and shareholder value (Arthur and Cook, 2004).

tures, however, is distinguishing the treatment effect of a woman's work environment, given underlying selection patterns. To see this, following Heckman (1974), suppose a given woman i bases her labor supply decision in year t on the relative value of her marginal hour at work (w_{it}) and at home (w^*_{it}):

$$w_{it} = b_0 + \sum_j b_{1j} S_{ij} + b_2 E_{it} + b_3 Z_{it} + \nu_{it}, \tag{1}$$

$$w^*_{it} = \beta_0 + \beta_1 h_{it} + \beta_2 K_{it} + \beta_3 Y_{it} + \beta_4 A_{it} + \varepsilon_{it}. \tag{2}$$

In Equation (1) S_{ij} is a vector of dummy variables indicating whether woman i has a graduate degree of type j (*e.g.*, MBA or MD), E_{it} is her work experience at time t, and Z_{it} other factors that enter into her offered wage; the elements of Equation (2) include hours worked (h_{it}), a vector reflecting the number and age structure of her children (K_{it}), her husband's salary (Y_{it}), and non-earned income (A_{it}).[8] The general practice is to assume that a woman works, $h_{it} > 0$, if the offered hourly wage is greater than her reservation wage assessed at $h = 0$, $w_{it} > w^*_{it}(0)$. Such a woman will then choose her optimal labor supply, h^*_{it}, where the two equations are just equal.[9]

Yet this assumes that women have perfect control over their work hours. Suppose, instead, that there exists a minimum requirement for a given career path, h^{min}_j, that varies across fields j.[10] Under this assumption, the relevant comparison is the offered wage versus

[8]Note that we have written Equations (1) through (4) assuming that all but the salary coefficient are equal across degrees. Empirically we find this to be true for the most part, although the own- and spouse's-earnings coefficients appear slightly larger in absolute value for MDs than for other women. In the final specification we do not include interactions between degree type and these variables because there is very little variation across degrees, and because it would complicate the interpretation of the degree-specific controls.

[9]As written, this model assumes that women make their current-period decision without factoring in the future consequences of their choice. A more complete specification would consider the path of period-specific labor supply in a life-cycle setting, where current choices affect future wage offers. This will occur not only through experience, E_{it}, but current choices may also affect future wages if there exist wage penalties for labor supply gaps, and those penalties may in turn vary across careers j. For instance, Bertrand *et al.* (2008) find that MBAs face enormous financial penalties for any gap in labor supply.

[10]In a more complicated model, h^{min}_j could reflect not just hours, but overall flexibility that may make certain high-education careers more family friendly than others. For instance, if women derive utility from having control over their work schedule (*e.g.,* having the capacity to reschedule work commitments to accommodate their children's school events), lower h^{min}_j would reflect those jobs with greater flexibility rather than necessarily shorter hours.

the reservation wage at h_j^{min}, which is now a function of both this minimum hours requirement, and the minimum earnings associated with working those hours, $w_{it}h_j^{min}$:

$$w_{it}^*(h_j^{min}) = \beta_0 + \beta_1 h_j^{min} + \beta_2 K_{it} + \beta_3 Y_{it} + \beta_4 A_{it} + \beta_5 (w_{it} h_j^{min}) + \varepsilon_{it}. \tag{3}$$

Thus a given woman in field j will work only if:[11]

$$\begin{aligned} P(h_{it} > 0 | S_{ij}) &= P\Big(w_{it}(S_{ij}) > w_{it}^*(h_j^{min})\Big) \\ &= P\Big(b_0 + b_{1j} S_{ij} + b_2 E_{it} + b_3 Z_{it} + \nu_{it} > \\ &\qquad \beta_0 + \beta_1 h_j^{min} + \beta_2 K_{it} + \beta_3 Y_{it} + \beta_4 A_{it} + \beta_5 (w_{it} h_j^{min}) + \varepsilon_{it}\Big). \end{aligned} \tag{4}$$

Now consider the observation that 15 years after college, MDs are more likely to work than MBAs, $P(h_{i15} > 0 | S_{MD}) > P(h_{i15} > 0 | S_{MBA})$.[12] If the salary coefficients are equal, $b_{1MD} = b_{1MBA}$, and all of the variables in Equations (1) and (3) are similarly distributed, this suggests that $h_{MD}^{min} < h_{MBA}^{min}$ – namely, that being a doctor is more easily combined with family than working in the business world.

Yet we have no reason to believe that the underlying elements of the wage and reservation wage equations should be equal across women in different fields. For instance, we hardly expect the salary coefficients to be the same. And since many women meet their spouse in graduate school, we would similarly expect systematic variation in their husbands' salaries. Furthermore, we might expect the number and timing of children to vary, either because of systematic variation in taste, because women decide to time kids around schooling of different lengths, or because of variation in h_j^{min} itself.

[11] Given the presence of w_{it} on both sides of Equation (4), this reduces to:

$$\begin{aligned} &P\Big(\nu_{it}(1 - \beta_5 h_j^{min}) - \varepsilon_{it} > \\ &\qquad \beta_0 + \beta_1 h_j^{min} + \beta_2 K_{it} + \beta_3 Y_{it} + \beta_4 A_{it} - (1 - \beta_5 h_j^{min})(b_0 + b_{1jt} S_{ij} + b_2 E_{it} + b_3 Z_{it})\Big). \end{aligned}$$

See Appendix A for more discussion.

[12] As written, this assumes that experience is measured from the completion of college, not graduate school, and ignores the difference in the length of schooling. As we will discuss shortly, the latter element will in fact be relevant in women's selection across alternative schooling choices.

More broadly, we know that women are not randomly assigned to their professional career path, but choose a particular graduate program based on their individual preferences. In particular, women will choose the path that maximizes their expected lifetime utility: $S_i = S_{ij}$ if and only if $E[U_{ij}] > E[U_{ik}]$ for all $k \neq j$, where $E[U_{ij}]$ reflects the difference between a woman's expected lifetime benefits and costs of a given degree program S_{ij}, and thus career path j. The costs include the tuition and years of schooling, while the benefits include her expected change in earnings plus a factor ψ_{ij} that reflects her identity value received from following that career path, multiplied by the years she anticipates working:

$$E[\text{Cost}_{ij}|S_{ij}] = E[\text{tuition}_j|S_{ij}] + E[(\text{years in school})_j|S_{ij}] * (\text{forgone wages/year})_i, \quad (5)$$

$$E[\text{Benefit}_{ij}|S_{ij}] = \Big(E[\Delta\text{earnings}_i|S_{ij}] + \psi_{ij}\Big) * E[(\text{years working})_i|S_{ij}]. \quad (6)$$

Returning to Equation (3), which reflects the value of a woman's time at home, we can decompose the error term into two elements influencing her reservation wage. First, ψ_{ij}, which captures the value of her professional identity from working in field j, and second ζ_{it}, capturing her taste for time at home with her children (which may vary over time, for instance, based on the age of her kids). Notice that since ψ_{ij} can only be enjoyed if working, it enters negatively into the reservation wage error: $\varepsilon_{it} = \zeta_{it} - \psi_{ij}$.[13]

In Equation (6), the estimated benefits associated with each career path, the field-specific expectation of years worked will be a function of h_j^{min}:

$$\begin{aligned} E[(\text{years working})_i|S_{ij}] &= E\Big[\textstyle\sum_t P(h_{it}^* > h_j^{min})\Big], \\ &= E\Big[\textstyle\sum_t P\Big(b_0 + b_{1j}S_{ij} + b_2E_{it} + b_3Z_{it} + \nu_{it} > \\ &\qquad \beta_0 + \beta_1 h_j^{min} + \beta_2 K_{it} + \beta_3 Y_{it} + \beta_4 A_{it} + \beta_5(w_{it}h_j^{min}) + \zeta_{it} - \psi_{ij}\Big)\Big], \end{aligned}$$

where h_{it}^* reflects the year-specific ideal hours worked, given time-varying elements such as the number and age of a woman's children. Thus h_j^{min}, ζ_i and ψ_{ij} build into a woman's

[13]Much of the popular press and sociology literature discuss the personal identity issues associated with leaving the labor force (Wallis, 2004; Swiss and Walker, 1993; Stone and Lovejoy, 2004). In Section 5, we address the fact that ψ may vary across occupations within a field j.

decision of which career path, and thus graduate program, to choose.[14]

In light of this selection mechanism, again consider women choosing medical versus business school. Suppose that the increment in per-year earnings is approximately equal for MDs and MBAs, and for the moment assume that $h_{MD}^{min} = h_{MBA}^{min}$. But notice that the cost of the two degrees differ, primarily because medical school requires four years' training to business school's two. Under these conditions we can then consider the expected differences in unobservable characteristics between women who select an MD versus an MBA.

For instance, for a given level difference in identity associated with becoming a doctor rather than a businesswoman, $\psi_{MD} - \psi_{MBA}$, we would expect a lower taste for time at home among those who choose an MD: $E[\zeta|MD] < E[\zeta|MBA]$. All else equal, this lower propensity to stay home, and thus greater total work years, is necessary to offset the difference in cost of the two programs.

Similarly, for a given taste for time at home, ζ, we would expect a higher value of ψ among those who become doctors: $E[\psi_{MD}|MD] > E[\psi_{MBA}|MBA]$. If taste for time with kids is equally distributed across both groups, those who choose an MD must gain greater professional identity associated with being a (working) doctor, than the professional identity provided by working in the business world among those who choose an MBA.

The purpose of this exposition is to highlight the problems inherent in interpreting the differences in observed labor supply among mothers in different professional careers as evidence of variation in job characteristics alone. Differences in the proportion working may also stem from systematic variation in the observable elements of either the wage or reservation wage equations, X, or in the unobservable elements of taste, $\theta = (\zeta, \psi)$.

In the analysis that follows, we develop an empirical model to capture variation in the observables X, and multiple factors that may proxy for the unobservables θ. After including

[14]It might be more appropriate to write $E[h_j^{min}]$ and $E[\zeta_{it}]$, since women may not be able to observe the full variation in family-friendly characteristics before the fact, and also may not know their own taste for time at home until their first child is born.

these controls – and finding that the relative work patterns remain almost unchanged – this provides suggestive evidence that the remaining systematic differences reflect true differences in h_j^{min}.

As a second step, we then consider labor supply patterns *within* education groups, comparing women working in family-friendly versus normal work environments, to allow for differences in h^{min} across jobs within the same career path j. Taking into consideration sorting across job types, we find labor supply differences associated with the family-friendly status of a woman's work environment.

3 Data and Descriptive Statistics

In this section we begin by introducing the Harvard College data and describing how we define our key variables. Because we focus on differences in labor supply by graduate degree, we then outline the types of careers observed among the Harvard women 15 years after graduation. Lastly, we present summary statistics for our sample.

3.1 Harvard Graduate Data

To analyze variations in labor supply patterns of highly educated mothers, we rely on data collected from the 10th and 15th anniversary reports for the Harvard College graduating classes of 1988 through 1991, supplemented with information from their graduation yearbooks.[15] (See Appendix B for a detailed discussion of the data sample and how we define our terms, and Appendix C for an assessment of possible selection into our sample by graduate degree, labor force participation, and parental status.[16])

The anniversary reports provide rich professional and demographic information for those who respond to the Harvard Alumni Association surveys conducted every 5 years.

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

[16] If we include in our analysis in Section 4 a measure reflecting the predicted probability of being captured in our sample – those women observed 15 years after graduation who are married and have had a child by this point – it has no effect on our results and is not systematically related to labor force status. (The mean predicted probability is 0.40, and varies very little across degree types from 0.39 for PhDs to 0.41 for MBAs.)

The professional data include detailed information on post-graduate education (including the program attended, institution, and year of graduation), and current occupation and firm.[17] The personal information include spouse's name, education, and occupation, and children's name and year of birth. We supplement this with data collected from the yearbook, including college activities (undergraduate major and whether she participated in a varsity sport), and background information (where she lived at the end of high school, whether she attended a private high school, and her race/ethnic origin).

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 mothers.[18]

In addition to the self-reported data, we hired a career consultant to impute salaries, given an individual's education, location, occupation and firm. Because he did not observe gender or parental status, these estimates reflect 'normal', gender-neutral salary levels associated with a given career. Thus although these values may reflect changes in labor supply made in response to children at the extensive margin (*e.g.*, switching jobs), they will not reflect changes made at the intensive margin (*e.g.*, cutting back hours).[19]

Lastly, using reported firm and occupation data we develop a set of variables to measure the family friendliness of the environments in which women work. Since career options vary by type of advanced degree, and since our main intention is to measure whether women within a broadly defined field (*e.g.*, lawyers) made choices driven by their work environment, our data sources and methodologies vary slightly across graduate degrees.

[17] In some cases, women who have left the labor force report their previous occupation.

[18] Using data from married Harvard couples, we test for two potential sources of bias: that stay-at-home mothers under-respond to the survey or fail to report their at-home status, or that at-home mothers are over-represented. As discussed in Appendix C.2, we find no evidence that at-home mothers are under-represented, and weak evidence that they may be slightly over-represented.

[19] See Appendix B for a discussion of whether these values are systematically understated for this population of Harvard graduates.

In particular, for JDs, MBAs, MAs, and women with no graduate training, we code their work environment as family friendly if they were employed in the public or nonprofit sectors, or if their private-sector firm was included in the list of "Top Ten Family-Friendly Firms" as compiled by the Yale Law Women (if lawyers), and the list of "Best Places" for working mothers by *Working Mother* magazine (if not).[20] Our approach is broadly consistent with Nielsen *et al.* (2004), who consider all public sector jobs as family friendly, and Preston (1990), who notes that differences in job characteristics could be an explanation for the high density of women in the nonprofit sector.

Notice, however, that for these four education groups our definition of family friendliness may also capture a systematic difference in ψ, reflecting a woman's passion for and identity associated with her career. For instance, women opting to work for a nonprofit organization over a corporate firm may do so because of the identity value it provides, rather than for its family-friendly setting. We take up this issue in Section 5.

To classify family-friendliness for MDs, we rely on information on average hours worked by medical specialty. Using data from Dorsey, Jarjoura and Rutecki (2003), we define as family friendly all specialties below the mean of 54 hours per week.[21] Lastly, we do not include PhDs in the family-friendly analysis. Among PhDs, many are still in graduate school 10 years after college, leaving too few with work environments to characterize. Further, as most non-student PhDs work for a particular type of nonprofit (*i.e.*, universities), we lack a strong prior on how to characterize variations in family friendliness within this group.

[20] *Working Mother* ranks corporations both by the number and types of work-family benefits offered, and by the proportion of employees who use them (Drago and Hyatt, 2003). We use the October 2001 rankings as roughly representative of the period 10 to 15 years after graduation for our cohorts. The Yale Law Women's listing can be found at http://media.gibsondunn.com/fstore/pubs/YaleTop10.pdf, and is based on a 2004 student-run survey. We code JDs who were no longer working as attorneys using the criteria for women with MBAs, MAs, and no advanced degree.

[21] Average weekly hours varied from 61 for anesthesiologists and OB/gyn specialists, to 45 for dermatologists and pathologists.

3.2 Career Paths by Graduate Degree Among Harvard Women

To provide some context to women's choices across career paths, Table 1 lists variation in the costs of attending different types of graduate programs (see also Baker, 2002). The first line lists the average number of years of training, followed by representative annual tuition costs for these programs during the early 2000s.[22] In the third line, we then estimate the full cost, including tuition and the opportunity cost of time, using the typical length of the graduate program and assuming a common $50,000 annual level of forgone wages.[23]

Table 1: **Graduate School Costs and Timing**

	MD	**PhD**	**JD**	**MBA**	**MA**
Years in school	4.0	7.0	3.0	2.0	2.2
Annual tuition cost ($, '000's)	28	0	25	23	23[1]
Total cost[2] ($, '000's)	312	350	225	146	127
Years between BA & advanced degree	1.9	1.6	1.9	3.9	3.3

NOTES:

1. Annual tuition for those in professional non-business masters programs. As with PhDs, we assume no tuition for those in PhD programs.
2. Assumes lost per-year income of $50,000.

Table 1 highlights that earning an MD costs more than an MBA, not because of the difference in annual tuition, but because of the opportunity cost of time. Similarly, given their long training time, even though we assume no tuition costs for PhDs, by our back-of-the-envelope calculation, this is the most expensive graduate degree to attain.

Next we consider the extent to which different graduate degrees determine career paths by comparing the type of work undertaken by women holding these degrees among those working 15 years after graduation:

[22] See Appendix B for data sources and details.

[23] These calculations assume that the employment opportunities before graduate school are equal, yet as shown in the last row of Table 1, because of differences in the norms in timing, this assumption is systematically violated because women enter these programs with different levels of work experience. For instance, on average, MBAs go to school with almost four years of work experience, while JDs and MDs return to school less than 2 years out of college. Nonetheless, because earning an MBA takes half as long as earning an MD, MBAs would have to be earning more than twice as much as the MDs when they entered graduate school to generate a similar total cost of schooling. Furthermore, because MDs also do residency programs and may continue with specialty-specific fellowships, during which salaries remain low, this calculation understates the true cost of earning an MD.

- **MDs:** The majority of MDs work in specialties centered on women, children, and family: 31 percent in pediatrics, 13 percent in obstetrics/gynecology, and 8 percent in family medicine. (Note that of these, only family medicine is defined as family friendly, given average work hours.) The next largest specialties are psychiatry (6 percent), emergency medicine (5 percent), and surgery (5 percent).[24]

- **PhDs:** Among the PhDs, 47 percent are tenure-track professors. The next largest groups are scientists working in industry (10 percent) and non-industry research settings (11 percent). An additional 11 percent are psychologists, 6 percent work in non-science industry jobs, 6 percent are writers, and 3 percent are in non-tenure track academic positions.

- **JDs:** The majority of JDs work in law firms (43 percent, of which 55 percent work at one of the 250 largest law firms in the country) or as corporate counsels (14 percent). The remainder work primarily in nonprofit or public-sector environments: 15 percent within government, 9 percent in academia, and 11 percent for other nonprofit institutions.[25] Because women may adjust their work choices at motherhood, we can also consider the occupational mix observed at the 10th year among those with no children by that point. Among this subset, a higher fraction (55 percent) worked at a law firm (57 percent of these in large firms) and 8 percent as corporate counsels, compared to 22 percent in government, 7 percent in nonprofits, and 5 percent in academia.[26]

- **MBAs:** Among MBAs, the two most common occupations are in the financial sector (27 percent) and consulting (17 percent). An additional 31 percent work in industry: 13 percent in technology, 10 percent in biotechnology/pharmaceuticals, and 8 percent in other industry jobs. Thus 75 percent of MBAs work in finance, consulting or industry. By comparison, only 20 percent work for nonprofits, including 7 percent in education (as teachers or otherwise associated with educational institutions). At the 10th, 92

[24]Among MDs we can only observe the specialty for 70 percent, whereas for the other degrees we can use occupation or firm to distinguish the field for over 90 percent of those working.

[25]Throughout this discussion we distinguish between education and other nonprofit sectors.

[26]We do not provide the 10th-year occupational distribution for MDs or PhDs, the former because they line up perfectly with the 15th-year specialty, and the latter because 34 percent were still in school.

percent of not-yet-mothers work in finance, consulting or industry – 26 percent in finance and 28 percent in consulting – and only 5 percent work for education or other nonprofit institutions.

- **MAs:** By comparison, more than half of MAs work in nonprofit environments or the public sector: 24 percent in education (of which only one-third are teachers), 9 percent in healthcare, 15 percent in other nonprofit institutions, and 5 percent for the government. (Among non-parents observed at the 10th, a similar half work in the public or nonprofit sectors.) By comparison, only 7 percent work in consulting, 4 percent in finance, and 6 percent in industry. An additional 6 percent work in news, 5 percent in architecture, 5 percent in publishing, and 10 percent as artists or writers.

- **No Degree:** The occupation and sector mix of women with no graduate degree reflects a mix of those observed among MBAs and other MAs. For instance, like MBAs, the largest proportion work in the financial sector (16 percent), and an additional 5 percent work in consulting and 20 percent in industry. Like MAs, however, many (24 percent) work in nonprofit environments or the public sector, including 10 percent in education and 11 percent in other nonprofits. An additional 6 percent work in publishing, 6 percent in news, and 5 percent in advertising, plus 16 percent as artists or writers. (Among non-parents observed at the 10th, 37 percent work in finance, consulting or industry, and only 19 percent are in nonprofit or public sector jobs.)

3.3 Summary Statistics

The Harvard graduating classes of 1988 through 1991 included 2,767 women, 1,522 of whom we observe 15 years after their graduation (55 percent), when they are approximately 37. Table 2 reports marital and fertility patterns for these 1,522 women, both for the sample as a whole, and by their primary graduate degree.

Among these women, 77 percent are married by their 15th year, and 61 percent also have children. Yet these percentages vary appreciably across fields, in terms of both marriage

Table 2: **Marriage and Fertility Patterns**

	All	**MD**	**PhD**	**JD**	**MBA**	**MA**	**None**
Married at 15th (%)	77.1	81.2	73.5	76.5	77.6	75.8	78.1
If married, parent by 15th (%)	79.6	85.1	72.7	82.4	84.7	76.9	76.2
Married and parent at 15th (%)	61.4	69.1	53.4	63.0	65.7	58.2	59.5
Sample Size:	**1522**	**223**	**219**	**311**	**210**	**285**	**274**
(% of total):		**(14.7)**	**(14.4)**	**(20.4)**	**(13.8)**	**(18.7)**	**(18.0)**

rates and fertility rates within marriage. For instance, for the latter we find the potentially surprising pattern that women with professional degrees are *most* likely to have children, whereas women with no degree are almost the least. (Women with PhDs are both the least likely to marry, and the least likely to have children within marriage.) Thus in combination, whereas only a slight majority of women with PhDs are a (married) parent by the 15th year after graduation, almost 70 percent of MDs are married with kids.[27] Of these 1,522, we focus our analysis on the 934 who are married and have had their first child by 15 years after college graduation.

Table 3 reports summary statistics for our sample of 934 married Harvard mothers. The first line shows that while 78 percent of the sample are in the labor force, the proportion working 15 years after graduation varies strongly by field.[28] Among MDs, 94 percent are working, compared to 72 to 73 percent of MBAs and MAs, and only 69 percent of those with no graduate degree.[29] 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

[27]Appendix C.3 analyzes whether there are systematic differences between women who have children by the 15th year and those who do not. Based on a comparison of characteristics observable at graduation from college, we only find clear evidence of selection into parenthood among MBAs. However, for MBAs, as well as MDs and JDs, we find no difference between mothers and non-mothers in the proportion who attended a top-10 graduate program. Thus, based on this admittedly noisy proxy, we find no evidence of ability differences by parental status.

[28]Note that this mean labor force participation rate of 78 percent is high. For instance, using as a comparison 2000 Census data on labor force participation rates of married women, aged 35 to 40, who held at least a bachelors degree, only 72 percent were in the labor force. Furthermore, although these women had slightly more children (2.15 versus 1.88 in our sample), their youngest were much older (5.2 versus 2.8). (In comparison to the general population, Boushey, 2005, points out that among the highly educated, having a child is the *only* reason women leave the labor force.) Thus our data call into question the media focus on the 'excessive' opt-out rates among highly educated mothers.

[29]Using their Harvard & Beyond data, Goldin and Katz (2008) find this same relative ranking of employment rates 15 years after college graduation, switching only the order of MBAs and MAs, although these numbers reflect data for all three cohorts (and only for women with 2 children).

Table 3: **Summary Statistics**

	All	**MD**	**PhD**	**JD**	**MBA**	**MA**	**None**
Working at 15th (%):	78.4	94.2	85.5	78.6	71.7	73.5	68.7
Family Variables:							
Age at first birth	32.0	32.0	32.4	32.1	32.3	32.2	31.1
Total children (at 15th)	1.88	1.84	1.74	1.94	1.88	1.86	1.97
Age of youngest (at 15th)	2.80	2.74	2.60	2.65	2.73	2.65	3.40
First child before school (%)	2.8	0.6	0.9	5.1	2.9	6.0	-
Spouse same degree[1] (%)	42.4	43.5	41.0	49.0	46.4	21.1	52.8
School Variables (%):							
Missing yearbook data[2]	11.2	4.5	18.8	10.2	7.2	11.4	16.6
Matching graduate & undergraduate fields	35.3	44.2	63.5	25.4	28.9	24.1	-
Small undergraduate major[3]	11.7	9.5	10.5	13.1	6.3	17.7	11.8
Played sports in college	31.2	29.9	17.9	26.7	39.1	38.1	33.1
Public graduate program	35.7	44.2	41.9	25.0	28.3	42.2	-
Top-10 graduate program	48.9	34.9	-	44.6	70.3	-	-
Background Characteristics (%):							
Minority	16.6	24.5	11.6	17.0	21.1	11.6	12.5
Live in same region as grew up	36.1	40.1	30.5	36.4	32.8	36.7	37.5
Private high school	35.7	32.7	32.6	35.8	40.6	36.7	35.3
Salary Estimates (2000$, thousands):							
Salary at the 15th:	108.6	167.7	71.2	135.3	134.3	57.9	77.1
Imputed (if working)	114.5	166.5	70.0	136.1	138.6	64.3	79.8
Estimated (if at home)	91.3	149.6	71.2	130.4	121.0	44.8	73.8
Salary at the 10th:	97.1	151.5	48.7	129.0	105.6	57.5	75.2
Imputed (if working)	102.6	150.7	52.4	136.0	106.6	55.2	94.4
Estimated (if missing/at home)	87.8	153.3	39.8	115.0	103.8	61.3	58.8
Estimated salary (%)	37.3	31.8	29.1	33.2	37.0	36.7	54.0
Spouse's salary at 15th	120.2	142.8	94.9	130.2	133.6	109.3	101.9
Sample Size:	**934**	**154**	**117**	**196**	**138**	**166**	**163**
(% of total):		**(16.5)**	**(12.5)**	**(21.0)**	**(14.8)**	**(17.8)**	**(17.5)**

NOTES:

1. Based on primary graduate degree (see Appendix B).
2. Reflects those women that we could not match with a yearbook record, providing missing data for all background characteristics.
3. Any undergraduate major with 50 or fewer graduates per year.

similar results: by their 30s and 40s only 75 percent of MBA mothers are working, compared to 89 percent of JDs and 96 percent of MDs.

The next lines of Table 3 reflect elements that may drive this variation in labor supply, including observable characteristics X commonly included in the wage and reservation wage equations, and factors that may proxy for the taste-based elements of the labor supply decision, θ. It is interesting to note that in several cases we see that these numbers go in the 'wrong' direction. For instance, MDs, with the highest labor force participation, have more children than PhDs or MAs.

The last panel of Table 3 lists salary estimates for both 10 and 15 years after graduation. The first line lists mean salaries at the 15th, which reflect values imputed by a career consultant for those working, and estimates based on these values for those at home. The next two lines then separate these values to allow a comparison between the 'observed' and estimated salaries for these two groups. Similarly, the following three lines provide mean 10th-year salaries, and values separately for those observed working (imputed), and for those at home or missing from the 10th-year survey (estimated).

Note that in most studies of married women's labor supply, one worries that earnings estimated for non-working mothers – based on observed values for working women – will overstate their true potential income. Yet because we use imputed salaries for those women who are working, they speak to the gender-neutral 'normal' salary level associated with a given career. This means that they will be unbiased by unobservable, individual-specific elements of the wage equation. In that way we can think of these imputed salaries – and the estimated values built from them – as an instrument for true salaries, given the observables.[30]

[30]Because we expect the unobserved element of the wage equation, ν_i, to be larger for those working than those who are not, we expect our salaries to understate incomes for the former, and to overstate them for the latter. Among women at home, however, for those with 'observed' 10th-year salaries, this will be tempered if the unobservable factor is in part an individual fixed effect. We see evidence consistent with this hypothesis: 10th-year 'observed' salaries are lower for those who will be out of the labor force five years later than for those who remain ($85,000 versus $106,000). As we see in Table 3, this difference translates into estimated 15th-year salaries that are lower than 'observed' values for those working. This suggests that the longitudinal nature of our data provides a better gauge of the potential income of those currently at home.

4 Explaining Variation in Labor Force Participation

As the first line of Table 3 shows, the proportion of Harvard mothers working 15 years after college varies strongly by graduate program, which may reflect systematic differences in the capacity to combine family with career. Yet as the remainder of the table shows, women also vary in ways that we would expect to affect labor supply, highlighting the discussion in Section 2 of the problems inherent in interpreting the difference in observed labor supply as evidence of variation in work environments. In the following section we explore the extent to which this variation by degree can be explained by these factors, beginning with the observable elements of the wage and reservation wage equations, X, and then considering factors that may measure taste-based elements, θ.

To begin, the first line of Table 4 lists the level differences, by graduate degree, in 15th-year labor supply, as compared to Harvard graduate women who completed no additional schooling.[31] (The columns between the coefficients report whether the level differences between adjacent graduate programs are statistically significant.) As shown here, controlling for no other factors, MDs work appreciably more than PhDs (and thus more than all other groups), while PhDs in turn work more than JDs. By comparison, we cannot reject that work levels are equal among JDs, MBAs and MAs, but we can reject that JDs are comparable to women with no additional schooling.

4.1 Controlling for Observable Elements

The next panel of Table 4 shows the effect on these level differences in labor supply when we control for an increasing number of the observable elements, X, considered important in either the wage or reservation wage equations. We begin by controlling for a woman's value of an hour of time at work by including imputed annual salary at the 15th year, or estimated salary for those currently at home.[32] As shown in Table 5, which lists the marginal effects

[31] These values reflect the coefficients (marginal effects) on graduate degree dummies in a probit of the probability that a given woman is working. Each line reflects the results from a different regression, the first when we include no other variables, and the following as we include an increasing number of controls.

[32] As discussed, because we expect these values to understate salaries for those working and overstate them for those at home, this may underestimate the importance of own earnings in explaining work patterns.

Table 4: **Differences in Probability Working by Graduate Degree**

	MD		PhD		JD		MBA	MA
No controls:	0.214**	*	0.131**		0.079*		0.024	0.037
	(0.024)		(0.032)		(0.034)		(0.041)	(0.038)
Observable Elements of the Labor Supply Decision (X):								
+ Log salary at 15th	0.198**	+	0.128**	+	0.059		0.004	0.053
	(0.026)		(0.032)		(0.037)		(0.043)	(0.037)
+ Minority	0.197**	+	0.127**	+	0.062		0.005	0.058
	(0.026)		(0.032)		(0.036)		(0.043)	(0.037)
+ Number & age of kids	0.184**	*	0.097*		0.062	+	-0.014	0.033
	(0.025)		(0.034)		(0.035)		(0.044)	(0.038)
+ Log spouse's salary	0.200**	**	0.100*		0.089*	*	0.017	0.046
at 15th ($000s)	(0.022)		(0.033)		(0.032)		(0.041)	(0.036)
+ Private high school	0.200**	**	0.097*		0.090*	+	0.021	0.046
	(0.022)		(0.033)		(0.032)		(0.040)	(0.036)
+ Public graduate program	0.196**	**	0.090*		0.085*	+	0.014	0.037
	(0.023)		(0.035)		(0.033)		(0.042)	(0.039)
+ Spouse's graduate degree	0.183**	**	0.087*		0.067+	+	-0.008	0.031
	(0.025)		(0.036)		(0.036)		(0.046)	(0.042)
Taste-Based Elements of the Labor Supply Decision, $\theta = (\zeta,\psi)$:								
+ Age at first birth	0.182**	**	0.086*		0.064	+	-0.011	0.030
	(0.025)		(0.036)		(0.037)		(0.046)	(0.042)
+ First child before school	0.180**	**	0.084*		0.054	+	-0.021	0.021
	(0.025)		(0.037)		(0.038)		(0.048)	(0.043)
+ Undergraduate degree	0.168**	**	0.064		0.042	+	-0.039	0.012
matches graduate field	(0.028)		(0.042)		(0.040)		(0.050)	(0.045)
+ Small undergraduate	0.167**	**	0.063		0.039	+	-0.038	0.005
major	(0.028)		(0.042)		(0.040)		(0.050)	(0.045)
+ Undergraduate major	0.171**	*	0.073		0.041	*	-0.043	0.004
	(0.028)		(0.041)		(0.040)		(0.051)	(0.045)
+ Played sports in college	0.170**	**	0.068		0.038	+	-0.040	0.004
	(0.028)		(0.042)		(0.040)		(0.051)	(0.045)
+ Current region	0.164**	**	0.061		0.042	*	-0.051	0.002
	(0.028)		(0.042)		(0.039)		(0.052)	(0.045)
+ Region in high school	0.163**	**	0.060		0.047	*	-0.048	0.000
	(0.028)		(0.042)		(0.039)		(0.052)	(0.046)
+ Live in same region	0.162**	**	0.063		0.045	*	-0.047	0.000
as grew up	(0.028)		(0.041)		(0.039)		(0.051)	(0.046)

NOTES: $^{+}$ = significant at 10%; * = significant at 5%; ** = significant at 1%

of each control on women's labor supply, as expected an increase in own potential salary is associated with a greater propensity to work.[33]

We also see from Table 4 that in comparison to women with no graduate degree, controlling for the high salaries of MDs, JDs, and MBAs appreciably lowers their level difference in the propensity to work. Yet the statistically significant differences across career paths remain. For instance, MDs are still more likely to work than any other group, signaling that their high participation rate is not driven exclusively by their high wages.

We next consider the effect of race, included here as a potential element of the wage equation because the imputed salaries were built without a knowledge of a woman's race or ethnic origin. If minority women face discrimination, including this control may absorb systematic differences in salaries associated with race. As we see, however, this control has little effect on any of the degree-specific differences in labor supply. This holds, despite the fact that minority women systematically work *more* than white women (see Table 5)[34], and that they are more strongly concentrated among JDs, MBAs, and especially MDs.[35]

The next four factors speak to elements commonly included in the reservation wage equation to explain variation in the value of a woman's time at home. These include the number and age structure of her children, her husband's salary, and her non-income assets. Note that for the last we are forced to rely on indicators of whether a woman attended a private high school and a public graduate program.[36] (Per the discussion in Section 2, the

[33]The first column of Table 5 reports the coefficients on the elements of X in the regression in which all are included (corresponding to the coefficients at the bottom of the second panel of Table 4), and the second column reflects the coefficients for the fully-controlled regression (reported in the last line of Table 4).

[34]Note that if minority women faced negative wage discrimination, we would expect them to work less. Since the effect goes in the other direction, this suggests that race and ethnicity have a stronger effect through taste for work or other social norms driving higher work rates. (When we control separately for Asian women and for all other minorities, the coefficients for the two groups are almost identical.)

[35]As another element of the potential wage, we try controlling for year-of-graduation fixed effects (both undergraduate and graduate), to allow for long-term effects of the economic environment at the time of graduation (Oyer, 2008). We do not include these factors because they are never jointly significant and do not change the relative labor supply levels across education groups. We also try controlling for the calendar year of a woman's first birth, in case the economic environment affects her choice of whether to leave the labor force, but this, too, has no discernable effect.

[36]Note that the high school indicator may also be correlated with elements of θ, if, for instance, there are different social norms about working among women who attended private schools.

Table 5: **Effects of Additional Controls on Probability Working**

	Observables Alone (X)	**+ Taste-Based Elements (θ)**
Observable Elements of the Labor Supply Decision (X):		
Log salary at 15th	0.024^{+}	0.021^{+}
	(0.012)	(0.013)
Minority	0.064*	0.058
	(0.027)	(0.036)
2nd child, 3rd child	-0.123**, -0.142**	-0.091*, -0.119*
	(0.027, 0.42)	(0.037, 0.054)
Age of youngest child	-0.007	0.005
	(0.007)	(0.012)
Log spouse's salary at 15th	-0.076**	-0.078**
	(0.028)	(0.028)
Private high school	-0.054^{+}	-0.047
	(0.029)	(0.030)
Public graduate program	0.028	0.028
	(0.030)	(0.030)
Spouse's graduate degree (if different from own):		
MD	-0.139*	-0.152*
	(0.077)	(0.081)
PhD	0.058	0.069
	(0.047)	(0.044)
JD	-0.056	-0.066
	(0.057)	(0.059)
MBA	-0.089^{+}	-0.094*
	(0.052)	(0.053)
MA	0.040	0.037
	(0.049)	(0.049)
None	0.022	0.030
	(0.038)	(0.036)
Taste-Based Elements of the Labor Supply Decision, $\theta = (\zeta, \psi)$:		
Age at first birth		0.015
		(0.011)
First child before school		0.110^{+}
		(0.038)
Undergraduate degree matches graduate program		0.043
		(0.033)
Small undergraduate major		0.065
		(0.035)
Played sports in college		-0.042
		(0.031)
Live in same region as grew up		0.045
		(0.028)

NOTES: $^{+}$ = significant at 10%; * = significant at 5%; ** = significant at 1%

latter could also reflect the total cost of the graduate program chosen, and thus be part of the selection decision across career paths.[37])

Consider first the controls for number of children and the age of the youngest. As we see in Table 5, the presence of a second and third child is strongly predictive of a woman's labor supply status, although the age of the youngest has no additional explanatory power. Because women with no degree have more children than any other education group, in all cases the degree-specific coefficients fall.

By comparison, when we control for spouse's salary, the coefficients for women in the high-income fields rise again.[38] As we see in Table 5, an increase in spouse's salary lowers the probability that a woman works.[39] Yet because of the high correlation in degrees across spouses (42 percent of our sample hold the same graduate degree as their husband), high-earning men are systematically married to high-earning women, leading these degree coefficients to rise relative to women with no additional schooling.

We then control for whether a woman attended a private high school and a public graduate program. Based on the first proxy for family assets, we see in Table 5 that women likely to have greater non-earned income are systematically less likely to work. Yet because there is little variation in private school attendance across degrees, its inclusion has little effect on the coefficients in Table 4. Similarly, controlling for public graduate school attendance has little effect. (Note that because this last variable is undefined for women with no graduate degree, from this point forward the relevant comparison of differences in labor

[37]Unfortunately we cannot control for the estimated per-degree costs listed in Table 1 because we have no variation in this variable for MDs, JDs, and MBAs, as those degrees all have uniform lengths. Thus the public graduate program variable is our best means of controlling for the difference in costs. Similarly, whether a woman attended a top-10 graduate program may enter the selection decision by influencing the expected benefits of attaining the degree. We do not include this, however, because this variable is only defined for three of our five schooling categories.

[38]Notice that we are measuring spouse's earnings after the first child is born, which may reflect labor supply adjustments, especially among men married to women with a high taste for time at home, ζ. We may therefore be 'over-controlling' for its effect on women's labor supply, but in turn may be absorbing some of the effect of ζ on her participation decision.

[39]Notice the large coefficient on husband's salary, in comparison to own salary (see, by contrast, Blau & Kahn, 2005). This may be driven by a relatively larger underestimation of spouses' salaries (see Appendix B).

supply patterns are across women in varying graduate programs, rather than in comparison to women with no additional schooling.)

Lastly we control for the graduate degree held by each woman's spouse (if it differs from her own).[40] Although not a variable commonly included in the reservation wage, this factor may speak to systematically different time constraints for husbands that may translate into variation in the value of a wife's time at home (Stone and Lovejoy, 2004). For instance, husbands who are MDs may be on call many nights, and husbands who are MBAs may travel frequently, making each relatively less available for household responsibilities. The results in Table 5 show evidence to this effect: among women not themselves an MD, being married to an MD decreases the probability that she works, and likewise for non-MBA women married to men with MBAs, even after controlling for husband's salary. Yet the statistically significant differences in labor supply across groups remains.[41]

Thus at the completion of including controls for these observable factors of the wage and reservation wage equations, X, although the level differences in the propensity to work across women in varying career paths have dropped somewhat from their initial, uncontrolled values, the systematic differences remain. In particular, MDs are still significantly more likely to work than any other group, and MBAs are now clearly less likely to work than either JDs or PhDs.[42] The only groups now indistinguishable, who at first appeared statistically different, are women with PhDs and JDs.

4.2 Controlling for Taste-Based Elements

In the bottom panel of Table 4 we report the effect on the degree coefficients of successively adding various factors that may capture the taste-based elements that influence the labor supply decision, θ. As discussed in Section 2, these include ζ_i, which reflects a woman's taste

[40] Because of the high correlation in degrees across spouses, if we simply control for husband's degree it absorbs much of the information on the wife's degree. We therefore use women married to men in the same field as the excluded category.

[41] Considering that many MDs and MBAs are married to men in the same field, these coefficient estimates suggest that MDs and, to a lesser degree, MBAs, would have a higher probability of working if we could control for spouse's work constraints directly, rather than relying on their graduate degree as a proxy.

[42] The latter comparisons are significant at the 10 percent and 5 percent levels, respectively.

for time at home with her children, and ψ_{ij}, which reflects the psychic value she receives from her identity as defined by working in career path j.

The first element we consider is the age at which she had her first child, which may speak to her taste for children, and thus be correlated with her taste for time at home, ζ_i.[43] As shown in Table 5, women who delay children are more likely to work. Yet this factor has little power in explaining variation in work propensity because it itself varies little across our population: as we see in Table 3, on average Harvard women have their first child at 32.[44]

We next consider whether women had their first child before graduate school. Because such women have chosen their career path after motherhood, this may signal a strong value associated with the identity of working in that field. As we see in Table 5, this characteristic is in fact strongly related to higher work propensities. Yet although its inclusion lowers the coefficients on each of the graduate school dummies, it has little effect on their relative levels, and thus does not help explain the cross-field variation in labor supply.

The next factor, whether a woman's graduate program matches her undergraduate degree, may also act as a proxy for ψ if it signals a long-standing interest in a field.[45] In the same vein, we also control for whether a woman selected a small undergraduate field, which also may signal a strong taste towards the given specialty. As we see from our results, the coefficients on these controls are both positive, yet their inclusion again does not help explain the cross-field variation in labor supply.[46]

[43] We estimate a woman's age at first birth based on the calendar year that her first child was born and the assumption that she was 22 when she graduated from college.

[44] As other potential proxies for ζ we considered fertility delay within marriage, having your first child during graduate school (namely, being unwilling to delay fertility till completing school), and the career timing of the first child for those with their first child afterwards (defined as the number of years post-graduate school). Note that while less career delay may reflect higher values of ζ, women who delay longer may have greater power to adjust their work environment at motherhood (both of which suggest that delay should be positively correlated with labor supply). None of these potential controls affects the degree coefficients and each are insignificant in predicting labor supply.

[45] See Appendix B for details on how we define this match.

[46] We also control for undergraduate major (science, social science, or arts/humanities; a more narrow grouping has the same overall effect), which is insignificantly associated with the propensity to work, but increases the variation in labor supply by raising the coefficients for the high-working fields (MDs and PhDs).

For the last college-specific control, we include a variable capturing whether the woman played varsity sports. This factor may capture women whose self-identity is tied more strongly to their athleticism than to their careers, so it may act as a (negatively correlated) proxy for ψ. As we see in Table 5, having played sports is in fact negatively related to the propensity to work, but again this factor does little to explain across-degree differences.

The last three elements included in Table 4 – where she currently lives, where she lived at the end of high school, and whether the two are the same – may speak to variation in taste or circumstances that might be correlated with either ζ or ψ. For instance, social norms on the acceptability of being a working mother may vary across geographic regions (Fogli and Veldkamp, 2008). Controlling for current region may also capture differences in the availability, quality, or cost of child care.[47] Finally, these controls may pick up any errors in our compensation consultant's methodology that are systematic by region. As we see from Tables 4 and 5, however, these factors again have little power in explaining variation in labor supply.[48]

Thus overall, after including this full set of controls, some of which we expect to be correlated with a woman's taste for time at home, and others with the identity value she places on her career, these factors have done little to explain the variation in labor supply across women in different fields. In particular, MDs remain much more likely to work than any other group, and MBAs remain less likely.[49] Thus the results reported in Table 4 suggest that some other factor, potentially the family friendliness of a given field, instead drive these differences in work propensity.

[47] If this is the case, this factor may be more appropriately grouped with the reservation wage variables.

[48] Although the variable indicating that a woman lives in the region in which she lived before college has a positive effect on work rates (potentially reflecting the availability of family to provide a source of free, high-quality child care), it does nothing to explain the relative work levels across career paths.

[49] MBAs are significantly less likely to work than all other groups except the MAs (significant at the 5 percent level relative to both JDs and PhDs). If we rerun the full specification, but exclude all variables that are defined only for women who hold a graduate degree – thus allowing us to compare women with no graduate training to the other education groups – we find that those with MDs, PhDs and JDs are significantly more likely to work than those with no additional schooling (with coefficients 0.178**, 0.089*, and 0.069^{+}, respectively), whereas those with MBAs and MAs are not (-0.016, 0.027).

5 Labor Force Participation and Work Environment

To gain additional perspective on the extent to which mothers' labor force participation is driven by work environment, we begin in Section 5.1 by analyzing the relationship between the family friendliness of a woman's work environment at her 10th year, and the probability that she remains working at the 15th, focusing on those mothers who had their first child within these five years.[50] In Section 5.2, we then consider more broadly how a woman's access to family-friendly jobs is associated with her work choices 15 years after graduation, including whether she has transitioned to a family-friendly environment or chosen to leave the labor force.

Before we begin, however, it is important to note that women select their work environment, and those who choose family-friendly jobs may systematically vary from those who do not (Nielsen, Simonsen, and Verner, 2004). In particular, as noted above, our definition of family friendliness may directly capture an element of ψ if, for instance, women who select a nonprofit over a corporate career do so because of the identity value it provides. If we then observe higher labor force attachment of mothers working in a family-friendly environment, this may result only from a greater utility of work.

Alternatively, women who choose family-friendly jobs may place higher value on time at home once they have children. For instance, assuming most Harvard women anticipate working for much of their adult lives, women with high values of ζ may choose a family-friendly job if it means fewer work commitments at all stages of their career. (This may reflect both choosing a lower hours path for the long haul, and taking a few years off during the most time-intensive child-rearing years.) If so, the association between family-friendly work environment and the propensity to remain in the labor force may be biased downwards by this relationship with ζ.

To assess these two possibilities, we examine the correlation between our family-friendly

[50] See Appendix C.4 for a discussion of the difference between mothers who had their first child by their 10th year versus those who did not.

measure and a subset of the controls discussed above which may capture one or the other of these taste factors. In particular, based on our results above, we group those factors more likely to reflect ψ (such as variables related to her undergraduate and graduate degree match and her sports participation during college), weighted by their relative importance in influencing women's labor supply using the coefficients from Table 5, to build an estimated measure, $\hat{\psi}$. We similarly group those factors more likely to proxy for ζ, including variables related to her age at motherhood and number of children, to build an estimated measure $\hat{\zeta}$.

Looking at women who have not yet had their first child at the time of their 10th-year report, we find a positive and marginally significant correlation between the family friendliness of a woman's work environment and $\hat{\psi}$, but no relationship with $\hat{\zeta}$.[51] This weak positive correlation with $\hat{\psi}$ suggests that our family-friendly measure may in part pick up remaining omitted characteristics (if it is correlated with that part of ψ not already captured by our other controls). Yet because this correlation is not particularly strong, it is likely that our results below, which show a clear relationship between family friendliness and the propensity to work, speak to a causal effect of the work environment itself.

5.1 15th-Year Labor Supply by 10th-Year Work Environment

We focus on the relationship between 15th year labor supply and 10th year work environment for the set of women who had their first child in the intervening years. Furthermore, because our measure of family friendliness is comparable only across JDs, MBAs, MAs, and those with no graduate degree – working in the public sector or for nonprofits or family-friendly firms – we focus on this subgroup of women.

Table 6 reports the results of adding our family-friendly measure to the fully-controlled probit of Section 4. If a woman's work environment affects her labor supply, we expect two results: that the family-friendly variable would be a strong predictor of remaining in the

[51] Following our approach in Section 5.1, we test this in the subset of women with a JD, MBA, MA, or no graduate degree. Our family-friendly variable and $\hat{\psi}$ have a correlation coefficient of $\rho = 0.10$ with a t-statistic of 1.59. Note that our result for $\hat{\zeta}$ calls into question claims that establishing a family-friendly work environment will attract women who are systematically more likely to leave the labor force (see, for instance, conservative career expert and columnist Dr. Marty Nemko, www.martynemko.com).

labor force, and that including it would attenuate the remaining level differences in labor supply across fields. Considering the higher labor force attachment of JDs than MBAs, this would be consistent with the idea that lawyers are presented with more family-friendly job opportunities.

To begin, the first column of Table 6 lists the degree-specific coefficients for the subset of women before controlling for family friendliness.[52] The second column then includes the family-friendly variable, measured 10 years after graduation, before these women had children. We see that this variable is positive and significantly related to a woman's labor supply in her 15th year, suggesting that women in family-friendly environments are more likely to continue working. Furthermore, comparing the coefficients on each degree group across the first two columns, we see that each is attenuated, suggesting that controlling for family friendliness – even with our admittedly noisy measure – helps explain some of the labor supply differences across degrees.[53]

Table 6: **Effect of Family-Friendly Environment**

Graduate Degree Controls:			
JD	0.102^{+}	0.093	0.093^{+}
	(0.052)	(0.053)	(0.050)
MBA	-0.033	-0.030	-0.012
	(0.074)	(0.073)	(0.067)
MA	0.039	0.009	0.033
	(0.058)	(0.065)	(0.058)
Family-Friendly Controls:			
Family-friendly dummy		0.082^{+}	0.113*
		(0.041)	(0.042)
School teacher dummy			-0.370*
			(0.214)
Sample Size	**252**	**252**	**252**

NOTE: $^{+}$ significant at 10%; * at 5%; ** at 1%

[52]Comparing these results to those in Table 4 we see that limiting the sample to those women who were observed working and not yet parents by their 10th year accentuates the difference between women with no advanced degree and those with JDs and MAs.

[53]Because women working in family-friendly jobs earned significantly less than other women at the 10th year ($90,000 versus $110,000), we also estimate specifications that allowed for nonlinearity in the relationship between income and labor force participation. The coefficient on the family-friendly variable fell by less than 10 percent and remained statistically significant.

In the third column we include an additional variable to capture the women working as school teachers, who by our definition are working in a family-friendly environment because they work in either a nonprofit or public sector job. We suspect, however, that women who select into teaching – working with other people's children – may have a strong desire to stay at home with their own, ζ.[54] Consistent with this, the coefficient on this control is strongly negative, and in turn makes the coefficient on the family-friendly variable larger and more clearly distinguishable from zero.

We also separately estimate labor supply equations for the MDs. Based on our measure of family friendliness (those in shorter-hour specialties), among the subset of MDs with known specialty there is no relationship between work environment at the time of the 10th-year survey and subsequent labor supply at the 15th. Note, however, that of these 114 women, only 3 leave the labor force (2 from non-family-friendly specialties), thus we have very little statistical power to make this comparison.

5.2 Work Environment Transitions Between Years 10 and 15

To this point we have analyzed whether the family friendliness of a woman's job when she became a mother influenced her decision to remain in the labor force. It is possible, however, that her pre-birth environment is less important than the opportunity to switch to a job that allows her to combine work with family once she becomes a mother. To provide insight on such transitions at parenthood, we therefore examine patterns of women's work environment 15 years after graduation as a function of their starting point five years earlier.

Again focusing on women who are not yet parents 10 years after graduation, the top two lines of Table 7 summarize the proportion of women working in each type of environment before children. As we see, MBAs are the least likely to be working in family-friendly jobs at this stage, and MAs are the most. The next three lines summarize the proportion observed in each work environment at their 15th year (once they have children), and the bottom panel

[54] Furthermore, primary and secondary school teachers face little to no penalty for time out of the labor force (Flyer and Rosen, 1997).

describes the breakdown of 15th-year environment as a function of a woman's 10th-year starting point.[55] This last panel of the table demonstrates that, across all fields, there is a strong correlation between work environment 10 and 15 years after graduation. We also see the same result shown in Table 6 that women who began in family-friendly jobs are much less likely to leave the labor force.

Table 7: **Work Transitions Between Years 10 & 15**

	MD	**JD**	**MBA**	**MA**	**None**
10th Year:					
% Working in a non-family-friendly position	58	63	80	44	74
% Working in a family-friendly position	42	37	20	56	26
15th Year:					
% Working in a non-family-friendly position	52	56	53	32	43
% Working in a family-friendly position	45	30	22	53	31
% At home	3	14	25	15	26
Sample Size	64	73	60	68	35
15th-Year Work Environment:					
Working in a non-family-friendly position at 10th:					
% Working in a non-family-friendly position	89	67	54	60	58
% Working in a family-friendly position	5	17	15	30	8
% At home	5	15	31	10	35
Working in a family-friendly position at 10th:					
% Working in a non-family-friendly position	0	37	50	11	0
% Working in a family-friendly position	100	52	50	71	100
% At home	0	11	0	18	0

Looking more closely at the results for those who began in non-family-friendly jobs, we see another interesting pattern. Among JDs, women are equally likely to shift to a family-friendly job as to leave the labor force, while among MBAs, they are instead twice as likely to quit. Similarly, among MAs, women are three times as likely to shift work environment as quit, whereas among women with no graduate degree we find the opposite. Comparing the outcomes for JDs and MBAs, these results suggest that women who selected a JD face a larger set of family-friendly job alternatives, or that, for MBAs, the characteristics of the family-friendly options are especially unattractive.[56]

[55]Note that some women who begin in family-friendly positions shift to non-family-friendly jobs by their 15th year (in larger proportions than those who quit). Thus, by our definition, choosing a family-friendly job is not a one-way valve, at least among this population of women.

[56]Because maintaining a career presence becomes more difficult with the second child (as suggested by our results in Table 5), we also compared this pattern for women transitioning from one child to two or more

Although limited by small sample sizes, we can look to the career paths of women who quit versus those who shift jobs for insight on the types of jobs more commonly leading to each choice. For instance, considering why the choices of women with no graduate degree more closely follow those of MBAs, we see that only 27 percent of those who stay were working in finance, consulting, or industry, compared to 70 percent of those who quit. We also see that among the stayers, the proportion working in finance falls from 15 to 9 percent, while the proportion working in nonprofits rises from 15 to 21 percent. Among MBAs, too, among those who stay, the proportion working in nonprofits grows from 4 to 11 percent.

Among JDs, we find that the pre-birth occupational distribution is almost equal for those who leave the labor force and those who stay. Among those who continue working, however, we see a shift away from big firms and government jobs (32 to 23 percent and 22 to 14 percent, respectively), and towards education and other nonprofits (5 to 13 percent and 7 to 13 percent). For the MAs, as discussed above, half or more work in nonprofit or public sector jobs at the 10th, regardless of their labor supply choice at the 15th, although we do see that those who stay shift more towards jobs in education (22 to 29 percent).

6 Interpreting Our Results

Our results thus far provide suggestive evidence that work environment plays a role in explaining the variation in labor force participation rates across women with different advanced degrees. To explore this link more directly, we now turn to other sources of evidence on the differences in work environments across the career paths considered here. As the roughest measure, we begin with a comparison of Census data on usual weekly work hours, addressing the feasibility of reducing work intensity once time at home becomes more valuable with the shift into parenthood. We then turn to existing research for insight into other elements that may factor into the ability to sustain career momentum after children.

between years 10 and 15. The results overall are surprisingly similar to those in Table 7. The only exception are MBAs, where we find that among those who have already opted to stay in a non-family-friendly job after one child, a larger proportion remain in a similar environment after two or more.

6.1 Census Evidence on Work Hours Across Career Paths

Using the 5 percent sample of the 2000 Census, Table 8 compares work hours for women in three of the career paths considered here: medicine, law, and management and finance.[57] To provide a rough comparison for our sample of Harvard women, we compare work patterns for married women aged 28 to 35 with no children living in the household, to those aged 32 to 40 with at least one child under age five. We first include all such women, and then focus on those whose earnings are at or above the 10th percentile of the 10th-year earnings of our Harvard sample.[58]

Table 8: **Usual Work Hours Before and After Children**

	No Kids (Ages 28-35)		**At Least One Kid ≤ 5 (Ages 32-40)**		
	Weekly Hours (s.d.) [N]	% < 40 Hours [N]	% Out of Labor Force [N]	Weekly Hours (s.d.) [N]	% < 40 Hours [N]
	(1)	(2)	(3)	(4)	(5)
All:					
Doctors	53.9 (18.3) [932]	11.3 [932]	9.2 [1787]	42.9 (16.7) [1609]	32.4 [1609]
Lawyers	48.6 (10.7) [955]	7.0 [955]	20.4 [1522]	39.4 (13.7) [1196]	31.7 [1196]
Managers & Finance	46.3 (9.7) [1251]	7.4 [1251]	21.7 [1990]	40.8 (12.2) [1529]	22.0 [1529]
Earnings ≥ 10th Percentile of Harvard Women:					
Doctors (≥$66,300)	50.3 (13.0) [253]	8.2 [253]	-	46.7 (13.6) [717]	19.5 [717]
Lawyers (≥$51,500)	51.3 (8.9) [477]	4.1 [477]	-	44.7 (10.2) [623]	14.9 [623]
Managers & Finance (≥$60,900)	50.3 (8.2) [497]	1.9 [497]	-	46.0 (8.8) [704]	8.2 [704]

NOTES: Data from 2000 Census 5% sample.

[57] As above, we include dentists, optometrists, veterinarians, and pharmacists in medicine. Management and finance includes those who hold a masters, and who work in management occupations (excluding categories such as construction or farming) and finance.

[58] We use 10th-year earnings (data for 1998-2001), to line up with the 2000 Census. Despite this criterion, however, the mean earnings of the Census subsamples remain much lower than those for our sample. (Among women with no children yet, by our estimates the Harvard doctors earn $154,800, compared to $119,800 among the Census sample; for lawyers $139,900 versus $87,800; and for managers, $103,200 versus $100,700.) The similarity in results between our findings and those shown in Table 8, however, suggests that the phenomena leading to these systematic differences in labor force participation do not hold exclusively for the Harvard-educated women.

The first two columns of Table 8 report average work hours and the proportion working less than full-time for the population of women with no children. The next three columns then report data for the women with at least one child under age five. Column 3 reports the proportion in the labor force, and, for those working, Columns 4 and 5 report the weekly hours worked, and the proportion working fewer than 40.[59]

Looking at the first panel of Table 8, which reports data for the full sample of women, Column 3 documents a similar pattern to that found in our sample: mothers who are doctors are less likely to have exited the labor force. Fewer than 10 percent of doctors are no longer working, compared to more than 20 percent of lawyers and managers.

The next column shows that among working mothers, doctors in fact have the highest mean weekly hours, although this reflects the largest drop compared to the sample of childless women. The variance of weekly hours is also highest among doctors, and almost a third are working less than full-time. A similarly large 32 percent of lawyers are working fewer than 40 hours per week, compared to only 22 percent of managers and women in finance.

The second panel of Table 8 shows this same pattern among the subset of high-earning women. Within this sample, average hours are more comparable across occupations, although again the variance is highest for doctors. And among mothers, a larger proportion of doctors are working less than full-time.[60]

If we consider the capacity to work part-time as one factor that improves the work environment for mothers, these data align with our results in Table 4, with MDs working in the most family-friendly environment, and MBAs in the least.[61] Furthermore, taking the

[59]For those out of the labor force, the Census occupation data reflects information for those who have worked in the previous five years, and should therefore capture many who left the labor force at motherhood. Note that because the second panel restricts women based on own earnings, we can capture only those who are currently working.

[60]Because we do not observe part-time status among our Harvard sample, our imputed salaries assume full-time work, and may therefore overstate annual earnings (and may do so to a different extent across fields). Since we use the 10th percentile of these potentially-overstated earnings as our sampling criterion, the Census subsample likely reflects an underestimate of the proportion of women working part-time.

[61]Note that since our data contain a binary measure of labor force participation, we are likely including many part-time workers, which may be an important factor in observing higher work rates among the MDs.

comparison between lawyers and managers, although among this Census sample a similar proportion leave the labor force, among those working, lawyers appear to have greater access to part-time work schedules. This result may therefore explain our finding that among women previously working in non-family-friendly work environments, JDs are more likely to switch jobs at motherhood, whereas MBAs are more likely to quit.

6.2 Additional Evidence on Family-Friendliness Across Careers

There are a number of studies in the sociology literature that focus on job characteristics central to "family friendliness", factors that may influence the attractiveness of women's work environments for those combining career with family. Much of this literature focuses not only on variation in formal work-family policies, such as the availability of flex- and part-time schedules, but also on perceived barriers to their use because of negative long-term career consequences (*e.g.*, Eaton, 2003; Blair-Loy and Wharton, 2002).

For instance, in high-education careers where productivity is hard to measure, long hours can become its signal, making the use of part-time schedules especially harmful to career advancement (Wax, 2004). In a recent example from the economics literature, Bertrand *et al.* (2008) find very large wage penalties for reductions in hours worked among MBA women. A number of studies also discuss the relationship between the use of part- or flex-time schedules and the nature of the work (Berg, Kalleberg and Appelbaum, 2003), especially its predictability (Swiss and Walker, 1993; Blair-Loy and Wharton, 2004) and a woman's control over her own schedule (Boulis, 2004).

Hewlett *et al.* (2005) provide evidence on variation in these factors across women working in a subset of the high-education career paths considered here: medicine, academia, law, and business.[62] This survey of 2,500 "highly qualified" U.S. women – those with a graduate degree or a college degree with honors – assesses the factors involved in women's decisions to leave the labor force. The top panel of Table 9, which reports a subset of their

[62]Reflecting the makeup of the committee sponsoring the survey, including representatives from Goldman Sachs, Lehman Brothers, and Ernst & Young, the study focuses especially on women in finance and banking.

results, lists factors that speak to the perceived costs of taking advantage of family-friendly policies in each of these fields, and their subsequent take up.

Table 9: **Evidence on Variation in Work Environment**

	Medicine	**Academia**	**Law**	**Business**	**Finance & Banking**
	(%)	(%)	(%)	(%)	(%)
Variation in Family-Friendly Environment:					
Perceived Barriers to Using Available Work Balance Options:					
Reduced Hours	30	36	25	42	56
Flexible Hours	29	23	22	33	45
Part-time senior positions	35	32	46	36	75
Unspoken rule that those who used available options would not be promoted	24	20	24	32	41
Labor Supply Choices to Accommodate Work Balance:					
Worked part-time	37	32	30	26	12
Worked reduced hours (> PT)	38	25	27	26	30
Variation in Career Identity (ψ):					
Chose career opportunities to provide meaningful work	83	81	53	64	67
Among Those Who Left Work, Reason:					
Career not satisfying/enjoyable	30	36	59	52	49
Felt stalled in career	21	33	53	26	16
Wanted to change careers	0	3	0	14	4
At Re-entry Into Labor Force, Intend to Change:					
Industry/Sector	19	14	55	51	95
Profession/Field	30	25	37	47	97

NOTES: Data from Hewlett *et al.* (2005).

These results suggest that women in business, and especially those in finance, perceive greater barriers to using available work-family policies. Whereas only 20 to 25 percent of women in other fields see use of these options as a barrier to promotion, 30 to 40 percent of those in the business world see them as such.[63] Similarly, among workers in a financial services firm, Blair-Loy and Wharton (2002) report high rates of worry over the harmful career effects of using available work-family policies. By comparison, Wood *et al.* (1993) find that use of such policies among law school graduates bore no relationship with future promotion rates. In terms of the actual take up of these policies, Table 9 shows that women in medicine are the most likely to have worked part-time, while women in business, and especially those in finance or banking, are the least likely.

[63]From the data reported we cannot determine if these differences are statistically significant.

Boulis (2004) and Swiss and Walker (1993) similarly discuss women in medicine and law selecting into specialties to attain a controllable work schedule, such as primary care among doctors and avoiding litigation-heavy fields among lawyers. Swiss and Walker also find that many women who left the labor force, especially among MBAs, would have preferred to work part-time, but lacked the opportunity.

As we noted above, however, women working in jobs coded as "family friendly" may be remaining in the labor force because of other attributes of their work environment that happen to be correlated with family friendliness. For example, women who work for non-profits might derive more satisfaction from their work than other women, independent of their job's family friendliness.

The second panel of Table 9 shows evidence of this effect. For instance, Hewlett *et al.* find that a much larger percentage of those in medicine and academia reported making career choices to provide "meaningful work". Similarly, among women who took time off from work, they find that 50 percent of those in business cited "career not satisfying/enjoyable" as a primary reason, compared to only 30 percent of those in medicine. Those in law, however, were the *most* likely to cite this reason, and also the most likely to feel stalled in their career.

Consistent with this, among our Harvard sample, women with MDs are most likely to still be practicing medicine — all but three (98 percent) who are still in the labor force are working as doctors. By comparison, roughly 15 percent of JDs and PhDs appear to be in jobs that do not draw on their graduate training.[64]

For those out of the labor force, Hewlett *et al.* also find that women in business and law were more likely to intend to change their industry or field, including a striking 95 percent of those who had worked in finance and banking. Swiss and Walker similarly find that MBAs

[64]We coded women not practicing as PhDs if they appeared to hold a job that did not require the degree, such as small business owners or novelist. (Note also that our category of those with PhDs includes a larger group than just women in academia, as in Hewlett *et al.*) We do not report a similar metric for MBAs because, unlike other advanced degrees, they do not train for a particular vocation. This aspect of the business degree may partially explain why fewer women remain in the labor force, if having a less well-established career path with more decision points makes it easier to drop out completely.

anticipating returning to work refused to return to their original job.[65]

In sum, because these data provide evidence for the importance of both family friendliness and career identity in explaining women's labor supply choices, we cannot rule out either explanation for driving the variation observed in our sample of Harvard women. For instance, although these data suggest that the medical profession may be inherently more attractive to women seeking satisfying and fulfilling employment, they also show that doctors work in a more family-friendly environment.

Comparing these data for those in law versus business, however, is more telling. For instance, we see that in most cases lawyers show equal or greater dissatisfaction with their careers as women in business, suggesting relatively low values of ψ. And as reported by Bertrand *et al.* (2008), they face smaller penalties for time off than MBAs. Yet we also see that lawyers work in a more family-friendly environment, with lower barriers to the use of flexible work schedules. Thus given our observation that among Harvard women JDs are less likely to quit at motherhood than MBAs, this suggests that this result arises from the difference in availability of family-friendly alternatives, rather than from variation in the satisfaction provided by their careers.

7 Conclusion

Our results provide insight into the labor supply decisions of a group of highly educated women, a majority of whom delayed fertility 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 work, at least temporarily, at the transition into motherhood.

More strikingly, however, we find that this propensity varies dramatically across career paths. In particular, we find that MDs work more than everyone else, and MBAs less. This holds, even when we consider a very rich set of observable characteristics, some of which

[65]This may reflect variation in the desire to re-enter these fields, thus reflecting variation in ψ. But it may as easily measure the ability to return after an absence.

we expect to be correlated with unobservable taste factors important in both the labor supply decision and selection across careers. Furthermore, even after controlling for these factors, adding a variable that captures elements of a woman's work environment predicts the propensity to continue working after motherhood.

These results suggest that systematic variation in policies and professional norms across high-education career paths may be an important factor in explaining female labor force participation rates; namely, a woman's work environment can play a role in "pushing" her out of the labor force at motherhood. In particular, women with MDs, and to a lesser extent JDs and PhDs, may face more appealing work choices at motherhood than either MBAs or women with no additional schooling. Thus our analysis suggests that a higher proportion of women might choose to remain in the more inflexible career paths given further shifts in policy or social norms to allow maintained career progression at motherhood.

References

[1] Arthur, Michelle M. and Alison Cook. 2003. The Relationship Between Work-Family Human Resource Practices and Firm Profitability: A Multi-theoretic Perspective. *Research in personnel and human resource management*, Vol. 22: 219-252.

[2] Arthur, Michelle M. and Alison Cook. 2004. Taking Stock of Work-Family Initiatives: How Announcements of "Family-Friendly" Human Resource Decisions Affect Shareholder Value. *Industrial and Labor Relations Review*, 57(4): 599-613.

[3] Baker, Joe G. 2002. The Influx of Women into Legal Professions: An Economic Analysis. *Monthly Labor Review*, August 2002: 14-24.

[4] Batt, Rosemary and P. Monique Valcour. 2003. Human Resources Practices as Predictors of Work-Family Outcomes and Employee Turnover. *Industrial Relations*, 42(2): 189-220.

[5] Belkin, Lisa. 2003. The Opt-Out Revolution. *New York Times*, October 26, 2003.

[6] Berg, Peter, Arne L. Kalleberg, and Eileen Appelbaum. 2003. Balancing Work and Family: The Role of High-Commitment Environments. *Industrial Relations*, 42(2): 168-88.

[7] Berger, Joseph. 2007. Exploring Ways to Shorten the Ascent to a PhD. *New York Times*, October 3, 2007.

[8] Bertrand, Marianne, Claudia Goldin, and Lawrence F. Katz. 2008. Dynamics of the Gender Gap for Young Professionals in the Financial and Corporate Sectors. Draft. September 30, 2008.

[9] Blair-Loy, Mary and Amy S. Wharton. 2002. Employee's Use of Work-Family Policies and the Workplace Social Context. *Social Forces*, 80(3): 813-845.

[10] Blair-Loy, Mary and Amy S. Wharton. 2004. Organizational Committment and Constraints on Work-Family Policy Use: Corporate Flexibility Policies in a Global Firm. *Sociological Perspectives*, 47(3): 243-267.

[11] Blau, Francine D., and Lawrence M. Kahn. 2005. Changes in the Labor Supply Behavior of Married Women: 1980-2000. NBER Working Paper #11230.

[12] Boulis, Ann. 2004. The Evolution of Gender and Motherhood in Contemporary Medicine. *Annals of the American Academy of Political and Social Science*, 596: 172-206.

[13] Boushey, Heather. 2005. Are Women Opting Out? Debunking the Myth. Center for Economic and Policy Research Briefing Paper.

[14] Clifton, Thomas J. and Edward Shepart. 2004. Work and Family Programs and Productivity: Estimates Applying a Production Function Model. *International Journal of Manpower*, 25(7-8): 714-728.

[15] Dorsey, E. Ray, David Jarjoura, and Gregory W. Rutecki. 2003. Influence of Controllable Lifestyle on Recent Trends in Specialty Choice by US Medical Students. *Journal of the American Medical Association*, 290(9): 1173-1178.

[16] Drago, Robert and Douglas Hyatt. 2003. Symposium: The Effect of Work-Family Policies on Employees and Employers. *Industrial Relations*, 42(2): 139-144.

[17] Eaton, Susan C. 2003. If You Can Use Them: Flexibility Policies, Organziational Commitment, and Perceived Performance. *Industrial Relations*, 42(2): 145-167.

[18] Fernandez, Raquel and Alessandra Fogli. 2005. An Empirical Investigation of Beliefs, Work and Fertility. NBER Working Paper #11268.

[19] Flyer, Frederick, and Sherwin Rosen. 1997. The New Economics of Teachers and Education. *Journal of Labor Economics*, 15(1): S104-S139.

[20] Fogli, Alessandra and Laura Veldkamp. 2008. Nature or Nurture? Learning and the Geography of Female Labor Force Participation. NBER Working Paper #14097.

[21] Fortin, Nicole M. 2005. Gender Role Attitudes and Women's Labour Market Outcomes Across OECD countries. *Oxford Review of Economic Policy*, 21: 416-438.

[22] Goldin, Claudia. 2006. The Quiet Revolution that Transformed Women's Employment, Education and Family. *American Economic Review*, 96(2): 1-21.

[23] Goldin, Claudia and Lawrence F. Katz. 2008. Transitions: Career and Family Life Cycles of the Educational Elite. *American Economic Review: Papers & Proceedings*,98(2): 363-369.

[24] Goldin, Claudia and Maria Shim. 2004. Making a Name: Women's Surnames at Marriage and Beyond. *Journal of Economic Perspectives*, 18 (Spring): 143-60.

[25] Heckman, James. 1974. Shadow Prices, Market Wages, and Labor Supply. *Econometrica*, 42(4): 679-694.

[26] Hewlett, Sylvia Ann. 2005. Off-ramps and On-ramps: Keeping Talented Women on the Road to Success. *Harvard Business Review*, March 2005.

[27] Hewlett, Sylvia Ann, Carolyn Buck Luce, Peggy Shiller, and Sandra Southwell. 2005. The Hidden Brain Drain: Off-Ramps and On-Ramps in Womens Careers. *Harvard Business Review Research Report*, March 2005.

[28] Hochschild, Arlie. 1997. *The Time Bind: When Work Becomes Home and Home Becomes Work.* New York: Metropolitan Books.

[29] Johnson, Nancy Brown and Keith G. Provan. 1995. The Relationship Between Work/Family Benefits and Earnings: A Test of Competing Predictions. *Journal of Socio-Economics*, 24(4): 571-584.

[30] Joint Economic Committee (Majority Staff). 2008. Equality in Job Loss: Women are Increasingly Vulnerable to Layoffs During Recessions. July 22, 2008.

[31] Judiesch, Michael K. and Karen S. Lyness. 1999. Left Behind? The Impact of Leaves of Absence on Managers' Career Success. *Academy of Management Journal*, 42(6): 641-651.

[32] Juhn, Chinhui and Kevin M. Murphy. 1997. Wage Inequality and Family Labor Supply. *Journal of Labor Economics*, 55(1, part 1): 72-97.

[33] Mincer, Jacob and Haim Ofek. 1982. Interrupted Work Careers: Depreciation and Restoration of Human Capital. *The Journal of Human Resources*, 17(1): 3-24.

[34] Mosisa, Abraham and Steve Hippie. 2006. Trends in Labor Force Participation in the United States. *Monthly Labor Review*, October: 35-57.

[35] National Center for Education Statistics. 2007. *Digest of Education Statistics.* Accessed at: http://nces.ed.gov/programs/digest/d07/ch_3.asp.

[36] Nielsen, Helena S., Marianne Simonsen, and Mette Verner. 2004. Does the Gap in Family-friendly Policies Drive the Family Gap? *Scandinavian Journal of Economics*, 106(4): 721-744.

[37] Oyer, Paul. 2008. The Making of an Investment Banker: Macroeconomic Shocks, Career Choice, and Lifetime Income. *Journal of Finance*, 63(6): 2601-2628.

[38] Preston, Anne E. 1990. Women in the White-Collar Nonprofit Sector: The Best Option or the Only Option? *Review of Economics and Statistics*, 72(4): 560-568.

[39] Russo, Eugene. 2004. Fast Track: PhDs. *Nature*, Vol 431, Sept. 16th, 2004.

[40] Schneer, Joy A. and Frieda Reitman. 1997. The Interrupted Managerial Career Path: A Longitudinal Study of MBAs. *Journal of Vocational Behavior*, 51(3): 411-434.

[41] Stone, Pamela and Meg Lovejoy. 2004. Fast-Track Women and the "Choice" to Stay Home. *Annals of the American Academy of Political and Social Science*, 596: 62-83.

[42] Story, Louise. 2005. Many Women at Elite Colleges Set Career Path to Motherhood. *New York Times*, September 20, 2005.

[43] Swiss, Deborah J., and Judith P. Walker. 1993. *Women and the work/family dilemma: how today's professional women are finding solutions.* New York: J. Wiley.

[44] Tomlinson, Jennifer. 2004. Perceptions and Negotiations of the "Business Case" for Flexible Careers and the Integration of Part-Time Work. *Women in Management Review*, 19(8): 413-420.

[45] Wallis, Claudia. 2004. The Case for Staying Home. *Time Magazine*, March 22, 2004.

[46] Wax, Amy L. 2004. Family-Friendly Workplace Reform: Prospects for Change. *Annals of the American Academy of Political and Social Science*, 596: 36-61.

[47] Wood, Robert G., Mary E. Corcoran, and Paul N. Courant. 1993. Pay Differences Among the Highly Paid: The Male-Female Earnings Gap in Lawyers' Salaries. *Journal of Labor Economics*, 11(3): 417-441.

Data Appendix

A Married Women's Budget Constraint with Minimum Hours Requirement

The underlying utility maximization problem leading to Equations (1) and (2) in Section 2 assumes the two relevant corner solutions in the married women's labor supply model are $h = \{0, T\}$ (see Figure A-1a). By comparison, as shown in Figure A-1b, under the assumptions in Section 2 there is now a third corner solution, $h = h_j^{min}$.

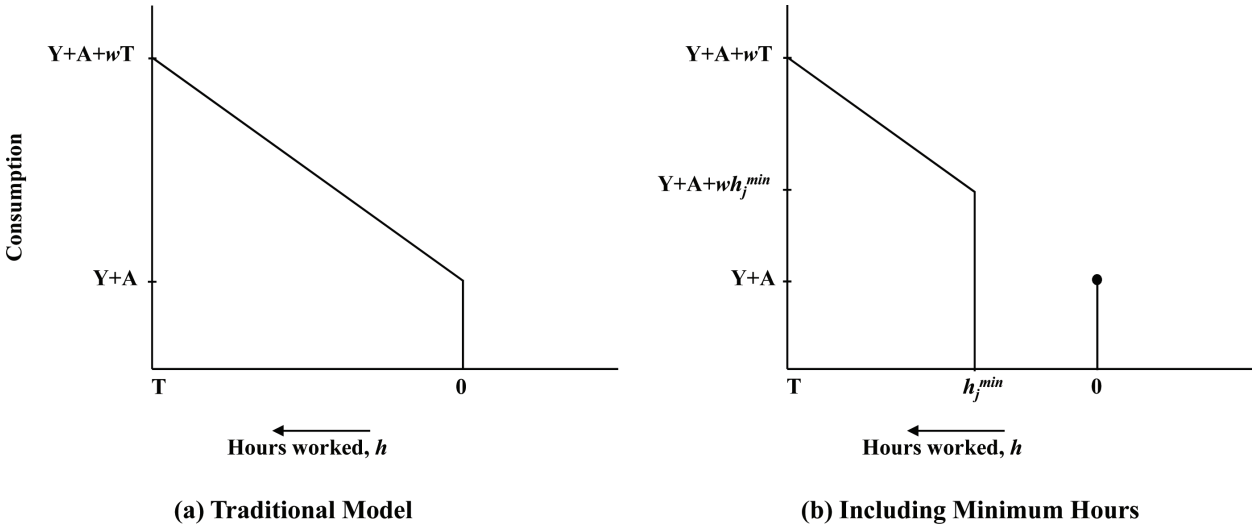
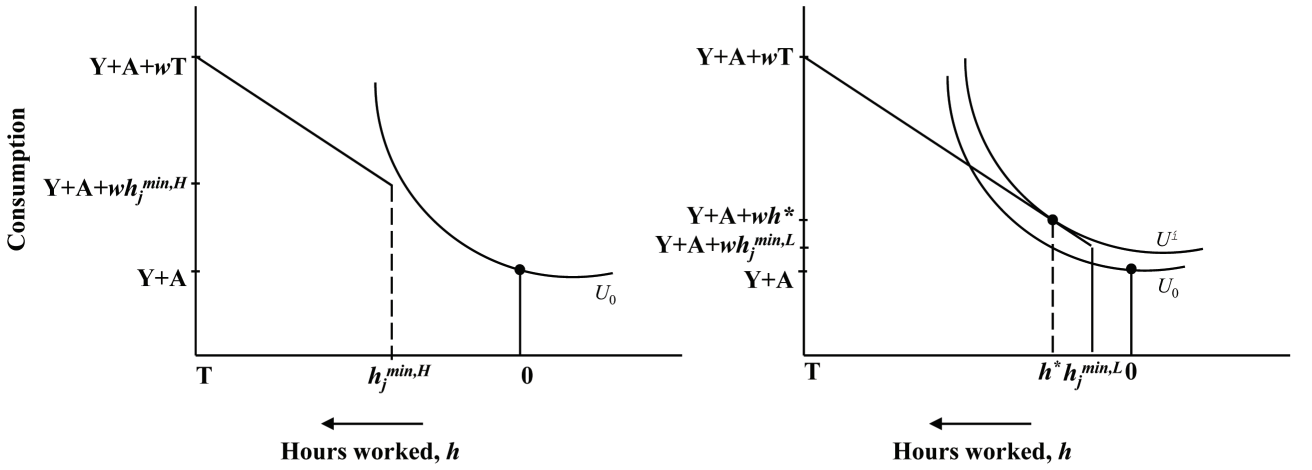


Figure A-1: Budget Constraint for the Married Women's Labor Supply Model

Given such a minimum hours requirement, Figure A-2a shows the labor supply choice of a given mother who works in a field j with a high minimum, $h_j^{min,H}$. Under these conditions, the mother would prefer not to work, providing a household utility level of U_0, and consumption equal to $C_0 = Y + A$, her husband's earnings plus their non-earned income. If, however, the minimum hours requirement falls to $h_j^{min,L}$, as shown in Figure A-2b, this same woman will instead choose to work h^* hours, achieving household utility of $U' > U_0$ and household consumption of $C' = Y + A + wh^*$.

B Data and Variable Definitions

The graduating classes of 1988 through 1991 included 6,764 students, of which 41 percent were female. This sample size reflects those individuals listed in either their 10th or 15th anniversary reports, which includes anyone for whom the alumni association had a current or previous address. (For those who do not respond to the survey, the report lists only the name and address.) Since we concentrate on career choices made in response to parenthood, we focus on the 3,456 who responded to the 15th-year (51 percent of the sample overall,



(a) High Minimum Hours Requirement **(b) Low Minimum Hours Requirement**

Figure A-2: Mother's Labor Supply Choice Given Minimum Hours Required

with a larger 55 percent of women), when the graduates are approximately 37.[66] (Of those observed at their 15th, 62 percent have had at least one child, compared to only 27 percent at their 10th.)

Of these 3,456 graduates, 1,522 (44 percent) are women. And of these, we focus on the 934 who are married and have had their first child at the time of the 15th anniversary survey.[67] For 728 of these women (78 percent), we can supplement these data with additional information from their 10th anniversary survey. Furthermore, for those with their first child between their 10th and 15th years (424 women, or 58 percent of those observed at both the 10th and 15th), this provides a before and after snapshot of labor supply behavior at parenthood.

For the purpose of our analysis, we define a woman's labor supply based on her self-reported occupation, supplemented by information provided in her narrative. Note that we define 'at home' status based on *current* reported employment. Thus if a mother reports that she recently went back to work after two years off, or that she anticipates leaving her job when her next child is born, she is defined as 'at work'.[68] We also code as working those

[66]This number includes 84 individuals captured because their spouse – a Harvard graduate in one of the four years covered – provided information for both. (We also use spouse data to supplement details missing from the self-reported information.) For those married to members of a different class, this means that the information reflects a period shortly before or after the 15th year.

[67]We exclude the 27 mothers who are unmarried at the time of the 15th.

[68]See Goldin & Katz (2008) for insight into average lengths of non-employment spells due to children. In comparison to their Harvard & Beyond survey, our labor force participation rate is both higher than the 60 percent of women reported to be working full-time/full-year, and lower than the 90 percent categorized as not having 'no employment'. This result is unsurprising, since in most cases we cannot distinguish between part- and full-time work, and because we define as 'at home' women who report their primary (but not necessarily exclusive) activity as 'mother' or its equivalent.

women who report that they are currently on maternity leave, but code as 'at home' those women who report that they are 'on leave' from their past position.

For a small number of women, we also infer that they are at home if they provide detailed information for their spouses' occupation, but none for their own. Or if they listed two occupations, such as "Attorney, Mom", we assumed the second reflected her current situation and the first her occupation before leaving the labor force. Our results overall suggest that 78 percent of Harvard graduate women are working 15 years after graduation.

Despite this rich professional data, we lack information on salaries. We therefore had a career consultant build imputed salaries, for both mothers and their spouses, based on self-reported education, location, occupation, and firm.[69] In particular, he used sources such as the Bureau of Labor Statistics' Occupational Employment Statistics, information from the Chronicle of Higher Education, and online sources such as CareerJournal.com, PayScale.com, Vault.com, and Indeed.com. For example, to determine the salary of an assistant U.S. attorney, he used salaries reported on a Justice Department website for attorneys with similar years of experience. All salaries are updated to year 2000 dollars using the Consumer Price Index for all urban consumers (U.S. city averages for all items).

Because these salary estimates are based on occupation-specific averages, one worry is that they will systematically understate the salaries received by this population of Harvard graduates. Yet if we compare our mean imputed salaries to the mean 2005 full-time/full-year salary for women in the Harvard & Beyond sample (Goldin and Katz, 2008), our estimates are in fact larger: $114,500 versus $99,500 (in year 2000 dollars). (Note, however, that the Harvard & Beyond value reflects the mean salary received across cohorts graduating in the 1970s, 1980s and 1990s.[70]) Thus the gender-neutral basis of our estimates may be offsetting any systematic under-estimation of salaries for this highly educated population, and may in fact slightly overstate their earnings.

This effect, however, will go in the opposite direction for the estimates of spouses' salaries. Comparing mean spouses' salaries for Harvard women married to Harvard men, our estimate is much lower than the 2005 mean salary reported for Harvard men in the Harvard & Beyond sample: $124,100 versus $165,300 (both in year 2000 dollars). Because the latter similarly includes men from all three cohorts, since the experience curve is steeper

[69]Note that while the surveys specifically ask for information on the graduate's occupation and firm, they ask only about the spouse's occupation. (Many graduates provide their spouse's firm regardless.) Because of this, and because many graduates provide richer occupational detail for themselves than their husbands, our salary estimates are based on more detailed information for the female graduates than for their spouses.

[70]It is unclear whether this suggests that this number over- or under-states the earnings received by the 1990 cohort. If there is a strong earnings gradient in experience, mean 1990 cohort salaries may be lower; but if recent cohorts have greater representation among high-paying positions, 1990 salaries may be higher.

for men than for women, this likely overstates the earnings received by the youngest cohort.

Another worry is that the level of underestimation may vary across degrees. For instance, Bertrand *et al.* (2008) find significantly higher earnings for MBAs among a recent cohort of graduates from the Chicago Graduate School of Business. Using data for those 8 years out of graduate school (approximately 15 years after college, given their average age at entry), their median female and male annual earnings are $130,400 and $176,700, respectively (in year 2000 dollars). By comparison, our median earnings for MBA women is $110,600 (for those working), and for all spouses holding an MBA, is $116,700.

Taken alone, this likely underestimation of own-salaries would strengthen our result that MBA women are less likely to work. Yet given the high correspondence of graduate degrees across spouses, the greater worry may be the larger underestimation of their spouse's salaries. (This may explain some of the importance of controlling for spouse's graduate degree in our results in Section 4.) Thus this potential underestimation of earnings for husbands holding MBAs may help explain the especially low labor force participation rates observed among our sample of MBA women, although given the size of the level differences, and the fact that they remain after controlling for spouse's graduate degree, it seems highly unlikely that it would explain the full effect.

Our main building block for estimating 15th-year potential salaries for those women out of the labor force (or for whom we otherwise lack 15th-year imputed salaries), are 10th-year earnings.[71] Because we lack 10th-year imputed salaries for 37 percent of our sample, we therefore begin by predicting 10th-year salaries based on graduate degree (interacted by top-10 graduate program status for MDs, JDs and MBAs, and by broadly-defined undergraduate major for MAs and women with no graduate degree), years experience since completing graduate school, and region.

In addition, because we expect 10th-year potential salaries to be lower for those out of the labor force at the time of the 10th than for those who were working but did not respond to the survey, we cut the sample based on a woman's predicted probability of working (built from all controls excluding the salary estimates), and estimate salaries separately within each half of the distribution.[72] We then build estimated 15th-year salaries based on these imputed and estimated 10th-year values, allowing different growth gradients from the 10th to the 15th by graduate degree (as interacted above), and again splitting the sample by predicted probability of working (at the time of the 15th).

[71] For 10 percent of those working, we lack 15th-year salaries because insufficient data was provided.

[72] This is similar to the methodology used by Blau & Kahn (2005) and Juhn & Murphy (1997).

Lastly, for other variable definitions:

- For women with more than one graduate degree, we categorize the professional degrees (JD, MBA or MD) as the primary degree, or define the primary degree based on its alignment with their occupation. For instance, women with an MD/PhD who are practicing doctors are categorized as an MD.[73] When building these categories, we group dentist, veterinarians, optometrists and pharmacists (requiring a PharmD) with MDs, and define an LLM, masters of law, as a JD for those practicing law with no additional law degree.

- For defining a match between undergraduate major and graduate degree, for MDs we define a match for students who studied biology as undergraduates; for MBAs, economics and organizational behavior; and for JDs, social studies and political science. (Appendix C.1 documents the high correlation between these undergraduate and graduate fields.) For MAs and PhDs we can specify a match between graduate and undergraduate training only for those who report their graduate field of specialization.

- We define gender, as well as race and ethnicity, as best estimated from yearbook photos and from the graduates' names.

- Using Peterson's *Private Secondary Schools*, we use the yearbook information on the high school attended to distinguish which graduates attended a private school.

- For region we include groupings for the northeast, the middle Atlantic, the south excluding the DC area (DC, Virginia, Maryland, and Delaware), the DC area, the midwest, the west excluding California, California, and those living outside of the US. (As the results in Section 5 use a smaller sample, we use slightly broader region definitions in those specifications.)

- For estimating average schooling length, as reported in Table 1, for PhDs we assume an average length of 8 years for those in the humanities, 7 years in the sciences, 10 years in education, and 6 years in economics (Russo, 2004; Berger, 2007). We assign a length of 8 years for those with an unknown field, but, as with all degrees, we bound the length to have begun at the year of college graduation. For professional non-business masters we assume 2 years, except for architecture degrees (3 years) and British degrees (1 year). For those with an MA or MS in an undefined field, where some of these degrees will reflect 2-year programs and others longer, unfinished PhDs, we assume an average length of 2.5 years.

[73]Note that among our sample, only 14 percent have a primary degree of a PhD, whereas 19 percent of the 1990 cohort in the Harvard & Beyond sample hold a PhD. (The rates for MDs, MBAs, and JDs are surprisingly equal.) Some of this difference may be driven by women with multiple degrees, especially MD/PhDs, who for our purposes are grouped under the other degree.

- The tuition information included in Table 1 for MBAs, JDs and MDs reflect averages across 13 top programs. Information for MDs comes from the Association of American Medical Colleges, *Tuition First Year Medical Students 2001-2002*, for MBAs from *Business Week* online, (*e.g.*, http://www.businessweek.com/bschools/01/full_time_profiles /chicago.htm), and for JDs from the Law School Admission Council. We assume that PhDs on average pay no tuition, recognizing that some pay tuition while others are paid stipends. For non-business MAs we assume an MBA-level tuition for those in professional programs, and no tuition for those potentially in PhD programs.

C Sample Selection

The external validity of our analysis of the variation in labor supply patterns across women in different high-education career paths relies in part on the representativeness, among Harvard graduates, of the women who respond to the 15th-year anniversary survey. We therefore begin in Section C.1 by comparing the background characteristics, available from the graduation yearbooks, of those who do and do not respond. We focus first on women overall, and then on women in the primary 'feeder' undergraduate majors leading to specific graduate degrees.

Second, given our focus on the labor supply choices of mothers, a specific concern is whether 'at-home' status is systematically related to reporting rates. For example, stay-at-home moms may have more or less free time available to respond to the survey than their working counterparts; alternatively, they may be reluctant to report that they have left the labor force or excited to share their decision. In Section C.2 we assess these two possibilities using dual Harvard couples, comparing the propensity to report an at-home mom when the respondent is the husband versus the wife. Lastly, in Sections C.3 and C.4 we consider whether there are systematic differences within our sample between those who have had children by 15 years after graduation and those who have not, and among the mothers, by whether they have children by 10 years after graduation.

Overall, we find some variation between these subsets of women, both in terms of who responds to the surveys and who has a child by the 15th year. We also find that this variation differs across women in different graduate programs. As a check, we therefore build a predicted probability of being included in our final sample – those women who respond to the 15th year anniversary survey and are married and have had a child by that point – based on characteristics observable at the time of graduation from college.[74] We find that

[74]To build this we use a slightly augmented list of factors observable from the yearbook relative to the controls in Table 4. We include graduating class, college house, an expanded measure of race (white, black, Asian, Hispanic, and other), and a more detailed listing of region in high school and undergraduate major.

women included in our sample have a mean predicted probability of 0.40 of meeting these criteria, which varies very little across graduate degree types (from 0.39 for PhDs to 0.41 for MBAs). Furthermore, if we include this predicted probability as a control in Section 4, it has no effect on the labor supply variation across degrees, and is itself completely uncorrelated with labor supply status.

C.1 Sample Selection into the 15th-Year Anniversary Report

Table A-1 reports mean background characteristics available from the graduation yearbooks, comparing those women who are and are not observed in the 15th-year survey. The first columns compare this for all Harvard graduate women, and the following for the subsets of women who completed an undergraduate degree in biology, economics, or political science.[75]

Looking at the first set of columns, there is clear evidence that the women observed at the 15th year are a non-random sample of all Harvard graduates. In particular, if we use these background characteristics to predict who will respond to the survey, a χ^2 test of their predictive power is highly statistically significant.[76] Comparing across background characteristics, the most striking difference is by race: respondents are much more likely to be white.

Because our analysis focuses on the comparison of women who choose different graduate programs, an important question is whether selection into the sample varies systematically among women of different education types. Unfortunately a direct comparison is infeasible because we cannot observe the graduate education of those women who do not respond. However as an indirect test, we can compare the response rates among Harvard graduates in the undergraduate majors that are the primary feeders for three of the graduate degrees considered: MDs, JDs and MBAs. (Because masters and doctoral degrees are granted across all fields, we have no similar means to compare reporting propensities for MAs and PhDs, or for those who get no additional schooling.)

For instance, among respondents who have an MD, 38 percent hold an undergraduate degree in biology. Similarly, among observed biology majors, 66 percent go on to get an MD. Thus taking biology majors as a proxy for future MDs, we can consider whether their self-selection into the 15th-year sample varies from other graduates. We similarly focus on economics majors as a proxy for future MBAs, and political science majors as a proxy for future JDs. Among observed MBAs, 23 percent studied economics, and 44 percent of

[75] The data exclude the 18 percent of women who we could not match between the anniversary surveys and yearbooks, reflecting those who opted not to be included in their yearbook, or people whose names changed sufficiently that we could not match them across data sets.

[76] Although not listed in Tables A-1, A-2, and A-3 for lack of space, we also include graduation class in these χ^2 calculations, although in each case their inclusion has relatively little effect on the results.

Table A-1: **Characteristics of Responders vs. Non-Responders at 15th-Year Survey**

	All Women			Biology Majors (potential MDs)			Economics Majors (potential MBAs)			Political Science Majors (potential JDs)		
Characteristic:	Respond		Do Not Respond	Respond		Do Not Respond	Respond		Do Not Respond	Respond		Do Not Respond
Race:												
White	0.80	**	0.69	0.66	*	0.52	0.76	+	0.62	0.86	**	0.58
Asian	0.12	**	0.17	0.23	+	0.35	0.15		0.22	0.06	+	0.14
Other	0.08	**	0.14	0.10		0.13	0.08		0.16	0.07	**	0.26
Region in High School:												
New England	0.24		0.25	0.20		0.22	0.33		0.25	0.31	*	0.17
Middle Atlantic	0.27		0.25	0.26		0.25	0.26		0.20	0.22		0.27
DC Region	0.06		0.06	0.06		0.03	0.04		0.02	0.04		0.06
South	0.10		0.09	0.09		0.11	0.08		0.07	0.10		0.08
Midwest	0.13		0.12	0.14		0.11	0.14		0.22	0.14		0.09
West (excluding CA)	0.04		0.04	0.08		0.07	0.04		0.00	0.06		0.05
California	0.12		0.12	0.13		0.15	0.09		0.04	0.11		0.17
Outside of US	0.04	**	0.07	0.05		0.05	0.03	**	0.20	0.02	*	0.10
Private High School	0.33	+	0.37	0.23		0.32	0.28		0.27	0.27		0.31
Major:												
Arts	0.04	+	0.06	-		-	-		-	-		-
English	0.22		0.20	-		-	-		-	-		-
Cultural Studies	0.09	*	0.12	-		-	-		-	-		-
Anthropology	0.07	**	0.04	-		-	-		-	-		-
History	0.11		0.10	-		-	-		-	-		-
Political Science	0.07		0.08	-		-	-		-	-		-
Social Studies	0.07		0.07	-		-	-		-	-		-
Economics	0.08	*	0.06	-		-	-		-	-		-
Psychology	0.09		0.09	-		-	-		-	-		-
Biology	0.10		0.10	-		-	-		-	-		-
Other Sciences	0.05		0.07	-		-	-		-	-		-
Small Major	0.12		0.12	-		-	-		-	-		-
Sample size:	1,337		932	128		95	109		55	94		77
Proportion observed:	0.59			0.57			0.66			0.55		
χ^2 **test of joint sig:**	0.00**			0.32			0.05+			0.02*		

NOTE: + significant at 10%; * at 5%; ** at 1%

observed economics majors get an MBA; among JDs, 15 percent studied political science, and 44 percent of political science majors complete a JD.[77]

The foot of Table A-1 compares the 15th-year response rates for all female graduates to the response rates for women in these three majors. As we see, potential MBAs are the most likely to respond. Their response rate is significantly higher than all other majors combined (at the 5 percent level), and than either potential MDs or JDs (at the 10 percent and 5 percent levels, respectively).[78] Yet this higher response rate does not translate into a more representative sample. We instead find that as with potential JDs, among potential MBAs, background characteristics can predict who will respond (significant at the 5 percent level), whereas among potential MDs the response rate appears more random.

In combination, these results show two things. First it is clear that our responding sample is not randomly drawn from the full pool of Harvard graduates. In particular, our analysis is based on a sample that under-represents minorities. Furthermore, because results from our observed sample suggest that Harvard minority women tend to work at higher rates, all else equal our sample may therefore include a higher proportion of at-home mothers than among the full population of female Harvard graduates.[79]

Our second result is that the level of selection likely varies across women who choose different career paths. For instance, based on the three degrees that we can match to specific undergraduate majors, we see that the observed sample of potential MDs is less strongly selected than the sample of either potential MBAs or potential JDs. Beyond the difference in reporting rates by race that is evident across all women, it is not obvious how these selection patterns will affect our overall results.

C.2 Sample Selection on Labor Supply Status

Another worry given our focus on women's labor supply patterns is that mothers who are out of the labor force may respond to the survey at systematically lower or higher rates. Similarly, response rates themselves may be uncorrelated with labor supply status, but at-home status may be under-reported. For instance, women who are currently at home may report their previous occupation, or may leave the field blank.

[77] Among all observed JDs, a larger 23 percent studied English. Yet among observed English majors, although 24 percent complete a JD, this is followed closely by 23 percent who get an MA, and 23 percent who complete no graduate degree. For that reason we do not define an English undergraduate degree as a feeder for a law degree.

[78] This might reflect the nature of the business world relative to other career paths, if MBAs are more likely to view the anniversary surveys as a networking mechanism.

[79] This may be tempered somewhat by the lower response rates among those who attended a private school, a characteristic that is instead associated with lower labor force participation among the observed sample.

We consider these possibilities by comparing reported rates of at-home mothers among Harvard couples.[80] First, we consider couples where we observe both spouses. If at-home mothers are under-reporting that they have left the labor force, but their spouses are not, then a higher reported rate from the husbands suggests that our data reflect an underestimate of the proportion of mothers who have left the labor force.

Second, we consider Harvard couples where only one spouse responds. If we assume that men's response rates to the survey are uncorrelated with their wives' labor supply status, then this comparison allows us to consider both possible sources of bias. If the mean reported rate of at-home mothers among husband-responding households is *higher* than the mean reported rate among wife-responding households, this suggests that at-home mothers systematically under-respond to the 15th year survey. But if the opposite holds, this suggests at-home mothers are instead over-represented in our sample.

Focusing on parents observed 15 years after graduation, there are 158 Harvard couples for whom we observe responses for both spouses. Among these couples, 24.7 percent of the wives report being at home, whereas only 13.8 percent of the husbands report that their wives are at home.[81] (The level difference across couples with wives in different graduate degrees varies, but the pattern of equal or higher reported at-home rates by the wives holds in all groups.)

This result is inconsistent with Harvard wives under-reporting their at-home status. There is instead evidence that husbands tend to provide less rich information for their wive's occupation. (Among all respondents there is a systematic propensity to provide richer information for one's own occupation than for one's spouse, although this tendency is stronger among men than among women.) Yet if we infer a lack of a wife's reported occupation as an implicit response that she is at home, this raises the husband-reported rate by only 2 percentage points to 15.7 percent. Therefore, even by this upper-bound measure, there is no evidence of under-report rates for at-home status.

Next we consider the reported at-home rates among dual-Harvard households in which we observe only the husband or only the wife.[82] Among the wife-respondent households we see that 31.7 percent report that she is at home. By comparison, between 14.4 percent and 28.9 percent of husband's report that their wife is at home (with the smaller number reflecting

[80] Among married Harvard graduate women for whom we know their spouses' undergraduate institution, 36 percent are married to Harvard men. (We assume that reporting patterns will be similar among those married to non-Harvard men.)

[81] These reflect self-reported values, thus we exclude from this measure inferred information, or information that was updated using the data from one spouse for the other.

[82] We see 201 such households: 104 wives and 97 husbands.

the directly reported data, and the larger the inferred data if all non-responses reflect a wife at home.[83]) Thus again there is no evidence that at-home mothers *under*-respond to the survey.

It is less clear whether this comparison provides evidence that at-home mothers *over* respond. On the one hand, the 31.7 percent wife-reported rate is significantly higher than the lower-bound 14.4 percent husband-reported rate (at the 1 percent level), although the same does not hold using the upper-bound 28.9 percent rate.[84] If we use the 10.9 percentage-point difference in report rates across spouses from the same household as a 'back of the envelope' correction for the under-reporting of husbands (comparing the 24.7 percent rate reported by the wives to the lower-bound 13.8 percent reported by the husbands), this suggests that the remaining 6 percentage point difference observed (31.7 percent versus 25.4 percent) may reflect a slight over-representation of at-home wives. Overall, we therefore find no evidence that at-home mothers are under-represented, and weak evidence that they may be slightly over-represented.

C.3 Selection into Parenthood

We next consider the possibility that the characteristics of women in our sample who become parents by 15 years after graduation are systematically different from those who do not, and that these differences vary across education groups. If this is the case, it may be that some of the pattern we see in labor force participation across groups is driven by variation in the type of women who become mothers.

To consider this, Table A-2 compares background and 15th-year characteristics of mothers and non-mothers, separately by each education group.[85] Across all education groups, the most common difference is again race: a larger proportion of parents are white. Comparing across groups we also see the largest number of differences among MBAs. Even though a relatively large 68 percent have children, background characteristics can predict parental status 15 years after graduation.[86] By comparison, in all other groups we cannot reject that mothers and non-mothers are equivalent at traditional significance levels.

[83] By graduate degree, the sample sizes become too small to make any meaningful comparisons.

[84] A small part of this difference reflects the systematic difference in age structure in these households, since men tend to marry women who are slightly younger than themselves. This translates into slightly fewer children by the 15th year among husband-reported households (1.9 vs. 2.1). Running a probit to allow for differences in the number and age structure of kids, we find a 15.1 percentage-point difference in reported at-home rates if we use the lower-bound husband-reported rate, and no difference if we use the upper-bound.

[85] The foot of the table notes the proportion of each group that has had a child by 15 years after graduation. Notice that these percentages vary slightly from those in Table 3 because here we include women of either marital status, but exclude those who we cannot match to a yearbook record.

[86] We do not include the 15th-year characteristics in the test of joint significance because they may be endogenous to motherhood.

Table A-2: **Characteristics of Parents vs. Non-Parents by Graduate Degree Type**

	MD			PhD			JD			MBA			MA			No Degree		
	Kids		None	Kids		None	Kids		None	Kids		None	Kids		None	Kids		None
Race:																		
White	0.76	**	0.58	0.88	+	0.78	0.82		0.77	0.78		0.70	0.88		0.86	0.87	**	0.73
Asian	0.17		0.24	0.11		0.12	0.13		0.11	0.14		0.17	0.07		0.05	0.06	+	0.13
Other	0.07	**	0.19	0.01	*	0.09	0.05	*	0.13	0.08		0.13	0.05		0.08	0.06	*	0.14
Region in High School:																		
New England	0.23		0.17	0.16		0.17	0.23		0.21	0.29		0.33	0.33	*	0.21	0.27		0.22
Middle Atlantic	0.27		0.31	0.23		0.28	0.24		0.24	0.27		0.29	0.26		0.33	0.27		0.34
South (including DC)	0.13		0.15	0.21		0.17	0.24		0.18	0.17		0.11	0.13		0.17	0.08	+	0.16
Midwest	0.13		0.19	0.18		0.17	0.15		0.12	0.13	+	0.05	0.08		0.13	0.11		0.09
West (including CA)	0.19		0.15	0.13		0.15	0.11		0.17	0.12	+	0.22	0.19		0.14	0.20		0.16
Outside of US	0.06		0.03	0.09		0.05	0.03		0.07	0.02		0.00	0.02		0.03	0.06		0.03
Private High School	0.32		0.27	0.33		0.28	0.35		0.29	0.41		0.35	0.36		0.31	0.35		0.30
Undergraduate Major:																		
Arts	0.01		0.00	0.04		0.03	0.02		0.02	0.05		0.06	0.08		0.06	0.06		0.09
English	0.13		0.07	0.22		0.22	0.26		0.24	0.15		0.10	0.23	*	0.35	0.27	+	0.38
Cultural Studies	0.04		0.07	0.12		0.08	0.10		0.06	0.08	+	0.16	0.12		0.15	0.09		0.06
Anthropology	0.11		0.17	0.04		0.05	0.02		0.03	0.02	**	0.11	0.16	**	0.05	0.06		0.09
History	0.11		0.07	0.08		0.10	0.15		0.15	0.11		0.11	0.07		0.09	0.12		0.06
Political Science	0.02		0.03	0.02		0.07	0.17		0.15	0.08		0.05	0.03		0.05	0.05		0.05
Social Studies	0.02		0.00	0.03	*	0.10	0.09	+	0.16	0.11	+	0.03	0.06		0.06	0.07		0.09
Economics	0.03		0.00	0.02		0.06	0.07		0.06	0.27		0.21	0.04		0.05	0.11		0.06
Psychology	0.10		0.08	0.11		0.06	0.08		0.08	0.11		0.08	0.13	*	0.05	0.10		0.05
Biology	0.39		0.44	0.12		0.08	0.01	*	0.05	0.03		0.03	0.03		0.02	0.02		0.03
Other Sciences	0.04		0.07	0.20		0.13	0.02		0.02	0.01	*	0.06	0.04		0.04	0.04		0.04
Region at 15th Year:																		
New England	0.30		0.20	0.19		0.10	0.15		0.12	0.25	+	0.14	0.28		0.26	0.28		0.22
Middle Atlantic	0.15		0.19	0.19		0.24	0.25		0.30	0.23	+	0.35	0.24		0.26	0.18		0.27
South (including DC)	0.17		0.12	0.13		0.21	0.25		0.23	0.11		0.08	0.13		0.14	0.14		0.11
Midwest	0.13		0.08	0.17	*	0.06	0.10		0.05	0.08		0.05	0.05		0.01	0.08	*	0.01
West (including CA)	0.21	*	0.37	0.23		0.23	0.19		0.19	0.18	*	0.32	0.22		0.19	0.23	+	0.33
Outside of US	0.04		0.02	0.08		0.07	0.03		0.06	0.11		0.05	0.09		0.12	0.07		0.05
Top-10 Program	0.35		0.33	-		-	0.45		0.46	0.69		0.68	-		-	-		-
Sample size:	150		59	95		86	182		103	131		63	152		95	142		79
Proportion parents:	0.72			0.52			0.64			0.68			0.62			0.64		
χ^2 **test of joint sig:**	0.41			0.27			0.27			0.01**			0.12			0.13		

NOTE: $^+$ significant at 10%; * at 5%; ** at 1%

Lastly, to consider whether there is any evidence of selection on ability into parenthood, we compare the proportion of MDs, JDs, and MBAs who attended top-10 graduate programs. We find that even among MBAs, who are otherwise statistically significantly different, there is no difference in ability across parental status, as reflected by this admittedly noisy measure. In particular, among all three education groups, the proportion of mothers and non-mothers who went to a top-10 graduate program are surprisingly equal.

C.4 Selection into First-Time Parenthood Between the 10th & 15th Years

Given our focus in Section 5 on mothers who have their first child between their 10th and 15th years after graduation, we consider whether this group varies significantly from those with their first child by the 10th, and if that difference in turn varies across women with different graduate degrees. Note, however, that the main emphasis in Section 5 is to compare labor force participation rates across women in family-friendly and non-family-friendly work environments. Thus even if there is selection into our subsample of mothers, our results should maintain external validity if these women experience the effects of a family-friendly work environment in a similar way to the full population of highly educated mothers.

Table A-3 begins by comparing the background characteristics between these early and late mothers, including only those observed in both their 10th and 15th anniversary reports. As we see, there are fairly few significant differences between these women, and these factors cannot predict who will have their first child by the 10th year. (Even if we group all women, background factors cannot predict who will have their first child by their 10th year.)

For women with an MD, JD, or MBA, we also compare the proportion who attended a top-10 graduate program. What we find is a strong and significant difference among the MBAs. (By comparison, we see no significant difference in top-10 attendance rates among MDs and JDs.) Whereas only 59 percent of early-mother MBAs attended a top-10 program, fully 80 percent of later mothers did so. Because 97 percent of MBAs had their first child after finishing their schooling, this suggests that women from higher prestige schools, who may have systematically gone on to higher-pressure careers, are more likely to delay having children.

Comparing the JDs to the MBAs, if we accept top-10 status as a measure of ability, this means that our comparison in Section 5 focuses on a relatively high-ability group of MBAs. This suggests that all else equal, these women should face a *higher* opportunity cost of leaving the labor force. And yet as shown above, these MBAs are in fact more likely to quit than the JDs, lending greater weight to the conclusion that it is especially difficult for women in the business world to balance career and family obligations.

Table A-3: **Characteristics of Parents by 10th vs. Parents by 15th**

	MD			**PhD**			**JD**			**MBA**			**MA**			**No Degree**		
	10th		15th	10th		15th	10th		15th	10th		15th	10th		15th	10th		15th
Race:																		
White	0.84		0.71	0.96		0.86	0.84		0.83	0.71	+	0.85	0.85		0.87	0.88		0.91
Asian	0.10		0.21	0.04		0.12	0.09		0.14	0.12		0.12	0.11		0.06	0.05		0.05
Other	0.06		0.08	0.00		0.02	0.07		0.03	0.17	*	0.03	0.04		0.06	0.07		0.02
Region in High School:																		
New England	0.27		0.21	0.19		0.18	0.25		0.24	0.24		0.37	0.37		0.30	0.23		0.20
Middle Atlantic	0.27		0.27	0.15		0.26	0.30	+	0.17	0.24		0.25	0.17		0.30	0.30		0.27
South (including DC)	0.08		0.12	0.12		0.26	0.23		0.23	0.20		0.14	0.11		0.13	0.14		0.09
Midwest	0.14		0.14	0.19		0.18	0.12		0.17	0.17		0.09	0.11		0.08	0.11		0.16
West (including CA)	0.16		0.23	0.27	**	0.06	0.09		0.14	0.12		0.14	0.22		0.18	0.18		0.23
Outside of US	0.08		0.03	0.08		0.06	0.02		0.05	0.02		0.02	0.02		0.01	0.05		0.05
Private High School	0.29		0.30	0.19		0.36	0.35		0.32	0.44		0.38	0.28		0.43	0.33		0.36
Undergraduate Major:																		
Arts	0.00		0.02	0.00		0.06	0.02		0.03	0.05		0.06	0.02	+	0.10	0.05		0.07
English	0.10		0.17	0.27		0.16	0.25		0.29	0.10		0.18	0.15		0.25	0.25		0.34
Cultural Studies	0.02		0.05	0.04		0.10	0.11		0.10	0.10		0.06	0.17		0.10	0.11		0.07
Anthropology	0.24	**	0.05	0.08		0.02	0.00		0.03	0.05	+	0.00	0.17		0.18	0.04		0.11
History	0.14		0.09	0.08		0.08	0.16		0.16	0.10		0.12	0.07		0.06	0.12		0.09
Political Science	0.00		0.03	0.00		0.00	0.25	+	0.13	0.07		0.08	0.04		0.01	0.04		0.07
Social Studies	0.02		0.02	0.04		0.02	0.05		0.07	0.10		0.12	0.04		0.09	0.11		0.09
Economics	0.04		0.02	0.00		0.04	0.05		0.09	0.27		0.28	0.02		0.04	0.16	+	0.05
Psychology	0.08		0.12	0.12		0.14	0.09		0.06	0.15		0.06	0.24	**	0.08	0.05		0.11
Biology	0.31		0.41	0.15		0.14	0.00		0.01	0.02		0.03	0.00		0.04	0.02		0.00
Other Sciences	0.04		0.05	0.23		0.24	0.02		0.02	0.00		0.00	0.04		0.05	0.07	+	0.00
Region at 15th Year:																		
New England	0.39	+	0.24	0.27		0.20	0.21		0.11	0.24		0.32	0.33		0.24	0.30		0.25
Middle Atlantic	0.12		0.18	0.27		0.12	0.28		0.21	0.29		0.20	0.20		0.25	0.21		0.23
South (including DC)	0.16		0.14	0.12		0.12	0.26		0.25	0.15	*	0.03	0.11		0.14	0.14		0.14
Midwest	0.18	+	0.08	0.12		0.16	0.07		0.11	0.12		0.05	0.04		0.05	0.07		0.05
West (including CA)	0.10	**	0.32	0.15		0.32	0.16		0.23	0.07	*	0.28	0.26		0.22	0.19		0.25
Outside of US	0.04		0.02	0.08		0.06	0.02		0.05	0.07		0.08	0.07		0.09	0.05		0.09
Top-10 Graduate Program	0.31		0.39	-		-	0.46		0.44	0.59	*	0.80	-		-	-		-
Sample Size:	49		66	26		50	57		87	41		65	46		79	57		44
Proportion Mother by 10th:		0.43			0.34			0.40			0.39			0.37			0.56	
χ^2 **test of joint sig:**		0.52			0.48			0.76			0.85			0.68			0.60	

NOTE: + significant at 10%; * at 5%; ** at 1%