The Opt-Out Continuation: Education, Work and Motherhood from 1984-2008

Tanya Byker

March 23, 2011

Abstract: There has been considerable debate in the recent literature about whether there is an increasing trend in highly educated women dropping out of work to care for children — an opt-out revolution. I use unique features of the of Survey of Income and Program Participation--a large nationally representative sample, longitudinal structure, monthly labor force outcomes, and repeated panels--to conduct a dynamic analysis of opting-out that is currently missing in the literature. I use three-year event studies to compare labor force outcomes of women who gave birth in the 1980's, 1990's and 2000's. I find substantial and sustained opting-out of mothers in all education categories over the last three decades. But is this a revolution? Three decades of behavior suggest that little has changed—-it is an opt-out continuation. Given the substantial increases in women's college completion, the absence of change is just as puzzling and important.

University of Michigan Department of Economics and Population Studies Center. I thank Martha Bailey, Charlie Brown, Mary Corcoran, Brad Hershbein, Matt Rutledge, and Jeff Smith for helpful comments and guidance.

"The Opt-out Revolution" was the provocative headline of Lisa Belkin's 2003 New York Times article that told the stories of highly educated women who opt-out— leave their jobs and stay home to care for their young children. Belkin's claim of a revolution in opting-out sparked a debate in the popular media as well as in the academic literature. There are many sides to this debate which centers on women's interrelated choices about education, work and motherhood. The sides square off on economic principles ranging from efficiency to welfare. One strand of the debate wonders if mothers *chose* to leave the workplace as Belkin suggests, or if they are *pushed out* by discriminatory workplace environments. Research investigating the family friendliness of the workplace tackles this issue (Herr and Wolfram 2010). Among those who consider opting-out a choice, there are some who claim it is a dangerous choice-- one that is stalling or reversing the gains made by the women's movement. Opting-out, the argument goes, signals women's lack of commitment to work and leads to statistical discrimination for those who remain (Correll, Benard, and Paik 2007, Gardella 2010.) Regarding efficiency, the combination of a "reversal of the college gender gap" (Goldin, Katz, and Kuziemko 2006) with an opt-out revolution might suggest a misallocation of societal resources if we use the traditional calculation of education as an investment in future earnings. The welfare impact on children of mothers' work behavior raises controversy everywhere from the blogosphere to academic journals. A recent Pew poll reported that only ten percent of mothers of young children thought a mother working full-time is "best for children" (Pew Research Center 2007.) This sentiment has found support in the economics literature in the form of a study that estimates a negative effect of early maternal employment on child health and development (Berger, Hill, and Waldfogel 2005.)

The debate over opting-out potentially relates to economic theories of gender specialization within the family, assortative mating, household bargaining, returns to education, and workplace discrimination. While the sociology literature has provided evidence about why the women who opt-out do so[1], within the economics literature it is still largely undecided whether there is enough of an opting-out phenomenon to warrant an explanation. There are several open empirical questions about opting-out: How does labor-force participation change when women give birth? If women leave the labor force, how long do they stay out? Has this pattern changed over time? Do the trends vary by education and occupation? While much of the opting-out debate has focused on "highly-educated" women, these are important questions at all levels of education.

This paper will address these open questions using nationally representative longitudinal data across three decades with comparable questions on the month of childbirth, *monthly* labor-force outcomes, education, marital status and occupation. The 1984 - 1986, 1996, and 2004 panels of the Survey of Income and Program Participation (SIPP) allow me to construct a large sample of women who gave birth in the 1980s, 1990s and 2000s and compare outcomes across the last three decades by education and parity. Using these panels of mothers and an event-study methodology (Jacobson, LaLonde, and Sullivan 1993) I can describe monthly labor-force outcomes including labor-force participation, hours of work, and earnings for these women and their spouses (if present) in the 12 months before to 24 months after they gave birth.

[1] Blair-Loy, Mary. 2003. *Competing Devotions: Career and Family among Women Executives.*; Stone, Pamela. 2007. *Opting Out? Why Women Really Quit Careers and Head Home.*; Hochschild, Arlie. 1997. *The Time Bind: When Work Becomes Home and Home Becomes Work.*

My results offer a new dynamic perspective on opting-out across the educational distribution since the 1980s. I find substantial and sustained opting-out of mothers in all education categories over the last three decades; I find no evidence of an opt-out *revolution*. While there are important differences in mothers' labor-force outcomes from the 1980s compared to today, the similarities are most striking. Rather than a *revolution*, I find evidence of an opt-out *continuation*. When I compare work outcomes for married mothers to their husbands I find particularly stark evidence of the lack of change in the relationship between work and motherhood in US households over the last twenty five years. In light of women's advances in educational attainment relative to men, this result raises many of the same economic puzzles as a revolution.

I. Open Questions About Opting-Out

The economics literature on opting-out has proceeded primarily along two lines. The first uses nationally representative data to establish the facts that would confirm or, more often, refute Belkin's claims. Titles such as "Are Women Opting-Out? Debunking the Myth," hint at the skepticism Belkin's claims face (Boushey 2005.) Boushey and Antecol (2010) use, respectively, the Current Population Survey (CPS) and the decennial Census to contrast labor-force participation of mothers with children under five or six with participation rates for women without children. This so-called "child penalty" is treated as a measure of opting-out and the authors compare this cross-sectional metric at discrete points in time from 1980 to 2000.[2] Both studies conclude that for women in all education categories the child-penalty fell considerably

[2] Boushey's analysis also includes 2004. Antecol extends the analysis to include a measure of labor force attachment that takes account of hours worked.

from around 35 percent in 1980 to 22 to 27 percent 1990 (depending on education category) and remained at essentially the same level into the 2000s. Although Antecol does find small increases in the child-penalty over the decade of the 1990s for certain narrowly defined groups--white college educated women in specific male-dominated fields--both authors conclude that there is little evidence of a widespread opt-out revolution.

The second line of research uses proprietary data from elite graduate programs to track the work behavior of MBA and JD's over time in an attempt to understand why these highly educated women lag behind the earnings of their male peers in the decades after graduation. Wood, Corcoran and Courant (1993) study JDs from the University of Michigan; Bertrand, Goldin and Katz (2010) study MBA's from the University of Chicago. Both papers document that, despite nearly identical earnings upon graduation, 15 years post-graduation women's earnings lag behind their male fellow graduates by 40 to 60 percent. Both studies conclude that the primary driver of the earnings gap is a deficit in job experience due to time spent out of work to care for children. Bertrand et al. claim that opting-out, while it occurs, seems closely linked to having a very high earning husband and conclude that the opting-out phenomenon has little relevance for women from typical households. Particularly if we are concerned about women joining the ranks of CEOs and politicians, the results of these studies of graduates of elite professional schools are important and relevant. But the fact that in 2010, 37 percent of women aged 25 to 35 had at least a college degree calls for an analysis of opting-out for a broader category of women including, in particular, the 26 percent of all women age 25 to 35 with only bachelor's degrees.[3]

[3] Source: IPUMS - Current Population Survey (March 2010).

The New York Times article that sparked the opting-out debate offered largely anecdotal evidence of women leaving the labor force to care for children. Anecdotes themselves cannot prove a widespread phenomenon exists. However, the stories that Belkin relays suggest that the approach taken by the economics literature to address opting-out may fail to detect important trends in mothers' work behavior. For example, one woman tells of working through the early years of her first child's life, but deciding to take time off with the birth of a second child. There were also stories of women leaving work at a firm for two years before returning to work as a consultant on a more flexible schedule. If either of these stories represents common occurrences, judging the extent of opting-out by comparing women without children to all women with children under five or six seems like a blunt measure that could greatly underestimate the real evidence. These anecdotes suggest that separating first births from subsequent births could be important, and that measuring the length of time out of the labor force could be an important metric to compare and contrast changes over time in mothers' work behavior.

A simple breakdown of the analysis performed by Boushey and Antecol into finer sub-groups of mothers hints that a closer look at dynamic trends in opting out is warranted. In Table 1, I break down mothers' labor-force participation into first and subsequent births and by the age of the youngest child measured in the March CPS from 1984 to 2008.[4] There have been notable changes in work behavior over time, but there are also categories of population where there has been little change. First, labor-force participation for mothers with more than one child at home is substantially lower than for first-time mothers. This fall in participation from first to

[4] I use the following approximation of first versus subsequent births: I consider children under two in a household with only one child to be a first birth. Children under two in a household with more than one child are counted as subsequent births. This will not be an accurate account of first births if a mother has another child that does not live with her.

subsequent births was greater in the 1980s—more than 20 percent—but continued in the 1990s and 2000s as well, though the decrease was smaller at closer to 10 to 20 percent. Second, in the 1980s mothers with higher order births dropped out of the labor force in substantially higher percentages in the first year of their children's lives than in the later decades. On the other hand, there was almost no change in participation behavior from 1984 to 2004 for first time mothers with children under two. So that while there was an almost nine percentage point change in labor-force participation of all mothers with children under five from 1984 to 2004, the difference for first time mothers with two year-olds was less than two percentage points. This highlights the final, and perhaps most important, trend--the labor-force participation of mothers with children under two is substantially different from the labor-force participation of all mothers with children under five in every decade. The same is true of women with at least a college degree as seen in panel B of Table 1.

Table 1 shows that we fail to detect important trends if we use the single measure of labor-force participation of all mothers with children (even "young" children) compared to women without children as metric for opting-out. It is clear that taking an average over all women with children under five conflates important similarities and differences in trends over the last 30 years. For example, it could be the case that women in the 1980's stayed out of work longer and/or had more children. But if they had similar opting-out behavior on a per child basis in the child's first and second years, then the existing measures of opting-out would simply show a decrease over time. We would fail to distinguish differences in fertility behavior from similarities and differences in work behavior. These are exactly the trends I am able to look at in much greater detail with SIPP's longitudinal data. This dissection of existing cross-sectional measures of opting-out reconciles the seeming contradiction of previous evidence with my current findings.

Table 1. Labor-Force Participation of Mothers age 25-45

Panel A: All Education Levels

	First Births - age of child				Subsequent Births - age of child				Any children
	less than 1	1 year old	2 years old	2 and under	less than 1	1 year old	2 years old	2 and under	under 5
1984	0.61	0.64	0.69	0.65	0.39	0.45	0.48	0.44	0.53
1996	0.73	0.77	0.72	0.74	0.52	0.57	0.59	0.56	0.64
2004	0.64	0.65	0.71	0.67	0.53	0.57	0.56	0.55	0.62
2008	0.67	0.71	0.66	0.68	0.55	0.61	0.60	0.58	0.64
Δ 84 to 04	0.03	0.01	0.02	0.02	0.14	0.11	0.08	0.11	0.09
Δ 84 to 08	0.06	0.07	-0.03	0.04	0.17	0.15	0.11	0.14	0.11

Panel B: Women with at Least a College Degree

	First Births				Subsequent Births				Any children
	less than 1	1 year old	2 years old	2 and under	less than 1	1 year old	2 years old	2 and under	under 5
1984	0.68	0.71	0.80	0.72	0.51	0.56	0.56	0.55	0.64
1996	0.75	0.81	0.77	0.78	0.63	0.67	0.68	0.66	0.71
2004	0.68	0.72	0.74	0.71	0.61	0.65	0.62	0.63	0.68
2008	0.76	0.73	0.74	0.75	0.65	0.66	0.62	0.65	0.71
Δ 84 to 04	0.00	0.01	-0.06	-0.01	0.10	0.09	0.06	0.08	0.04
Δ 84 to 08	0.08	0.02	-0.06	0.03	0.13	0.11	0.06	0.10	0.07

Source: IPUMS – CPS March Annual Demographic File.

II. Event-Study Methodology for Estimating Opting-Out in Longitudinal Data, 1984-2008

A. Methodology – Event Study

The cross-sectional studies mentioned above measure opting-out by comparing mothers to women without children. Using longitudinal data, an event study allows me to measure opting-out by comparing women's outcomes after birth to their *own* behavior prior to birth. Because I have multiple survey years with monthly data, this flexible estimation strategy produces a dynamic picture of the pattern of outcomes as they change in the months before and after birth. In order to estimate how labor-force outcomes change around the event of birth, I pool information on all women who give during a given SIPP panel. I then estimate the following regression model by least squares

$$(1) \quad y_{it} = \alpha_i + \sum_{j=-12}^{24} D_{it}^{j}\delta_j + \gamma_t + \epsilon_{it}$$

where y_{it} is the outcome of interest, α_i are individual fixed effects and γ_t are year fixed effects. The D_{it}^{j} are a set of dummy variables, one for each month from 12 months before to 24 months after a woman gives birth. For example, $D_{it}^{j} = 1$ if in period t, woman i gave birth j months earlier (or if j is negative, j months later.) The dummies thus jointly represent a timeline indexed to the date a woman gives birth and make it possible to estimate average outcomes for women who are j months before (or after) birth even if these women gave birth in different calendar months. I leave out D_{it}^{-12} so that the δ_j coefficients map out a time-path of changes in outcomes relative to outcomes a year before the birth. For example, if y_{it} is labor-force participation, then δ_6 represents the average difference in labor-force participation of women who are six months

after birth compared to their participation one year before birth.[5] The δ_j's provide a detailed monthly measure of opting out for the two years after a woman gives birth. Including the 12 months prior to birth makes it possible to see if women experience changes in outcomes in the months leading up to birth. Extending the event study window back to a year prior to birth also provides a reference point prior to pregnancy to judge the extent of opting-out.

The SIPP panels are three to four years in length. As a result, using all of the births that occur in each panel will mean that not all women in my sample have information for the full 12 lead and 24 lag months of the event study window since women give birth at different points over the course of the panel. The individual fixed effects specification in equation (1), however, gives consistent estimates of the δ_j's for an unbalanced panel as long as the reason why a woman has missing information is random relative to the $\epsilon_{it}'s$. Aside from attrition, whether I have data for a woman in any month j only depends on when during the panel she gave birth. In other words, all I require for consistency is that conditional on giving birth during the panel and any time constant characteristics, *when* over the course of the panel that birth falls, is random. Given that I am using three to four year panels, this assumption seems reasonable. It seems very unlikely that women would time their births relative to the census bureau's SIPP panel schedule. And while we may be worried that over time, age at first birth for different cohorts has shifted and that a one or two year difference in time of birth is relevant, by using fixed effects, we control for mothers' birth cohort. Another potential concern is that women may time births

[5] In the case of the binary labor force participation outcome, I estimate a linear probability model. I calculate variance using a Huber/White heteroskedasticy robust estimator clustered at the individual mother level. This allows for arbitrary covariance over time within individual women, and allows for heteroskedasticity across units, which is essential since the linear probability model inherently has heteroskedastic errors.

relative to the business cycle. This may be a legitimate concern and for this reason I include year fixed effects in some specifications.

I estimate equation (1) separately by i) education group, ii) parity, and iii) decade in order to draw comparison across these three dimensions. We might imagine that other characteristics of the mother are relevant to her outcomes—i) race, ii) marital status, iii) age when she gave birth, iv) quantile of husband's earnings, and v) occupation. It is not feasible to present results separately for each sub-group, and since I am using individual fixed-effects model, I cannot estimate effects for these largely time-invariant characteristics by including them linearly in equation (1). I can however identify heterogeneous effects of time-invariant characteristics by introducing interactions of these characteristics with the time dummies into equation (1). For parsimony, I refrain from presenting results of a specification with interaction of all 35 relative time dummies. Instead, I define six-month intervals: -11to -6 months, -5 to 0 months, …, +19 to +24 months and introduce six related dummies $F_{it}^1, \dots, F_{it}^6$. I can then estimate the following equation

$$(2) \quad Y_{it} = \alpha_i + \sum_{j=-12}^{24} D_{it}^j \delta_j + \sum_k E_i^k (F_{it}^1 \phi_{1k} + F_{it}^2 \phi_{2k} + \cdots + F_{it}^6 \phi_{6k}) + \epsilon_{it}$$

where E_{it}^k is an indicator for whether woman *i* is a member of demographic group *k*. The δ_j's now give the profile of outcome changes for the omitted or reference demographic group. Then the ϕ_{hk}'s coefficients give the difference between the k^{th} demographic group's change in outcome in interval h relative to one year before birth compared to the reference group's relative outcome change in the same interval. I estimate versions of equation (2) that simultaneously include interactions for education, race, marital status, husband's income, age at birth, parity, and

occupation. Such estimates show how outcome patterns differ by these characteristics controlling for other factors that impact outcomes. For example I can show how the pattern of labor-force participation differs between white and black mothers controlling for differences in education, marital status, education etc.

B. Data – Survey of Income and Program Participation

The Survey of Income and Program Participation (SIPP) allows me to compare the *dynamic* labor-force outcomes of a *nationally representative* sample of mothers across *multiple decades*. The SIPP offers an advantage over other nationally representative datasets like the CPS or Census because its panel structure allows me to observe women before and after they give birth *by month*, in most cases for multiple years. Because the information is longitudinal, these data are similar to those used by Bertrand et al. and Wood et al. in that they are able to track individual women over time. They are richer, however, because they allow consideration of non-elite women and contain monthly data for much larger sample sizes ranging from 20,000 households for the 1984 panel and 45,000 households for the 1996, and 2004 panels.[6] These large sample sizes contain sufficient numbers of births for women born from the 1950s to the 1980s to document statistically significant trends over time. Furthermore, the sample sizes allow me to examine trends by detailed education categories and to break out first births versus subsequent births within these categories.

[6] These sample sizes are also considerably larger than other panel data sets like the National Longitudinal Surveys and the Panel Study of Income Dynamics (PSID) and contain considerably more observations for relevant cohorts.

My sample consists of women ages 18 to 45 who give birth during one of the SIPP panels. I exclude women giving birth earlier than age of 18 (I am not currently focused on the experience of early teen mothers whose outcomes may be very different and may not have had any labor-force experience.) Boushey (2005) and Antecol (2010) present results for women aged 25-44. Since I specifically focus on birth events for women by educational attainment, extending the population to include women 18 to 25 makes my results more realistic for women with less than a college degree as they tend to have children younger. For example, looking at outcomes around first birth for women age 25-45 with only a high school diploma will give a distorted picture of the high school graduate population since most women in this education category have first births before the age of 25. Adding mothers from 18 to 25, however has a very minor affect on the sample of college educated women giving birth and as such should not affect comparability with previous work on opting out among women with at least a college degree.[7]

Although the SIPP core waves do not provide information on when a woman gives birth, I construct this date by matching own children using family relationship variables and the month and date of birth of each member of the household. A birth occurs when a newborn child (identified as the mother's own) appears in the household record. If there are no other own children in the household when a woman gives birth, I code it as a first birth; otherwise I code it as a subsequent birth. In the case that a mother has a child (children) who lives outside of the household when she gives birth, she will be mischaracterized as a first-time mother, but this seems likely to be a rare occurrence. In some cases a woman will give birth more than once during a SIPP panel. Given the length of the panel, especially for women who give birth early in the panel, this is not unusual. In the results that follow, I use the first recorded birth as the

[7] See the Table 2.B and 2.C for a comparison of the mother samples for ages 18 to 45 versus 25 to 45.

reference event for my analysis. The fact that a woman has another child may naturally affect her outcomes, but the choice to have another child may be jointly determined with other labor-force outcomes.[8] When categorizing women by time-varying demographic characteristics such as age or educational attainment, I use the mother's status in the month of birth as the reference level. Table 2 gives summary statistics for the women in the SIPP panels and for my sample of women who give birth.

The primary outcome variable of interest is labor-force participation in a given month. This measure is coded 1 if the woman is "with a job" at least one week of the month, including months when she is absent from work without pay or on layoff or "not with a job" all month but on layoff or looking for work. She is coded as out of the labor force (zero) if she responds that she had "no job all month, no time on layoff and no time looking for work." Note that women who are "on leave" under the Family and Medical Leave Act are coded as labor-force participants.

Several of the women in Belkin's article mention cutting back on the intensive margin, and the Pew report discussed above finds that 60 percent of working mothers in 2007 said their ideal work situation would be part-time (up from 48 percent in 1997.) Rather than leaving the labor force completely, women may "opt-out" by reducing their hours worked. For this reason, the second outcome variable is usual hours worked in the month. The SIPP core survey asks respondents how many hours they typically worked per week during the month in categories of

[8] I can also treat each birth as a separate event and enter the woman multiple times into the analysis once for each birth. This seems acceptable if one birth is a first birth and the next a subsequent since the analysis is run on first and subsequent births separately. If both births are of higher order, this seems potentially questionable, since the same woman then appears twice in the same regression. Sensitivity to this specification will be tested and included in future work.

Table 2. Summary of SIPP Panels and Birth Sample

A: Summary Information on 1984-86, 1996, 2004 SIPP Panels

	2004 Panel		1996 Panel		Pooled 1984-86		1984	1985	1986
Waves	12		12				9	8	7
Dates	Feb 04-Jan 08		Apr 96 - Mar 00		Oct 83 - Apr 88		Oct 83 - Jul 86	Feb 85 - Aug 87	Jan 86 - Apr 88
Households[1]	43540		36730		45105		19878	13747	11480
Women									
age 25 to 45	18509		17953		21477		9361	6676	5440
age 18 to 45	25317		24102		31316		13838	9686	7792
Births									
All	3,428		3,567		3,696		1,633	1,101	962
25 to 45	2,341		2,366		2,190		933	669	588
18 to 45	3,293		3,399		3,535		1,552	1,051	932
First	1,351	46.5%	1,491	43.9%	1,908	54.0%			
Subsequent	1,942	53.6%	1,908	56.1%	1,627	46.0%			

B: Demographic Characteristics of Birth Sample (mothers age 18-45)

	2004 Panel		1996 Panel		1984-86 Panels	
Race [2]						
White	2,112	64.1%	2,224	0.6543	2,926	0.8608
Black	387	11.8%	449	0.1321	473	0.1392
Hispanic	510	15.5%	559	0.1645		
Other	284	8.6%	167	0.0491		
Marital Status						
Married Sps present	2,263	68.7%	2,443	71.9%	2,835	80.2%
Separated, Div, Wid	210	6.4%	256	7.5%	241	6.8%
Never Married	820	24.9%	700	20.6%	459	13.0%
Education[3]						
Less than HS	425	12.8%	554	16.3%	325	9.2%
HS Diploma	844	32.5%	1051	30.9%	1,428	40.4%
Some College[4]	1075	31.7%	976	28.7%	1,192	33.7%
Bachelors	658	16.5%	663	19.5%	370	10.5%
Graduate	291	8.8%	155	4.6%	220	6.2%
Masters	213	6.5%	114	3.4%		
Professional	45	1.4%	25	0.7%		
PhD	33	1.0%	16	0.5%		
College Plus	949	28.8%	818	24.1%	590	16.7%

C: Demographic Characteristics of Birth Sample (mothers age 25-45)

Education[3]						
Less Than College	1,424	67.4%	1,585	67.0%	1,640	74.9%
Bachelors	630	26.9%	628	26.5%	333	15.2%
Graduate	287	12.3%	153	6.5%	217	9.9%
College Plus	917	39.2%	781	33.0%	550	25.1%

1. The number of households and number of women in the full panel based on the total number that appear in the survey (as opposed to the number appearing ing in wave 1.)
2. The 1980's panels do not give information on hispanic origin.
3. Ambiguity in 1980s coding of education variables makes it impossible to make clear distinction between some college, bachelors and graduate degree. So, for example, it is unlikely that the percentage of women with graduate degrees fell from the 1980s to 1990s.

zero hours (not working), less than 35 hours, or 35 or more hours.[9] Women who were "with a job" but were absent without pay or on layoff are coded as "not working" (zero hours) though they would be coded as in "in the labor force" in the labor-force participation measure. This hours variable allows me to look for women staying with a job but taking a leave around the time of birth—often considered evidence of increased family friendliness in the workplace.

I also use respondent reports of monthly earnings for women and their husbands, if present, as well as occupation based on 4 digit Standard Occupation Codes in my analysis. One of the advantages of the SIPP is consistency of coding across the panels. Variable names and definitions are nearly identical for the 1996 and 2004 panels. Variables in the 1980's panels are also very consistent with the later panels with a few minor exceptions (for example occupation codes and hours variable noted above). These matters are discussed in the data appendix. In the eighth of twelve waves of the 2004 panel the Census Bureau dropped half of the households in the survey for budgetary reasons. The households that were dropped were chosen randomly and in the data appendix I discuss that the pattern of my results is not sensitive to this reduction. The data appendix also discusses weighting issues that are implicit in a large long-term nationally representative panel data set.

[9] In the 1980's panels this question was asked for the four-month reference period rather than for each month.

III. Results: The Opt-Out Continuation.

The event study methodology lends itself well to a graphical presentation of results so that the time path of outcomes from the year before to two years after birth is easily visualized. By plotting the δ_j coefficients estimated in equation (1) we can see the time-path of *changes* in outcomes relative to one year before birth. The contour of *levels* of outcomes--such as labor force participation--over the timeline is also interesting and relevant particularly when we compare trends across decades or between education categories. These level plots are easily constructed by adding the δ_j's to the "constant" which in the individual fixed effects regression is an average of the estimated individual fixed effects. In a specification that does not use year fixed effects, the constant is an estimate of average labor force participation for all women in the left out time period - one year prior to giving birth. For this reason when results are displayed in levels, I show results from estimates that do not include year-fixed effects.

A. i) Estimates of Opting-Out by Parity and Education, 2004 SIPP

Figure 1 displays estimates of opting-out for women aged 18 to 45 who gave birth from 2004 to 2008 using the 2004 SIPP panel. The four quadrants of Figure 1 plot estimates of the level of labor-force participation in the three years around birth by parity and education. Heteroskedasticity robust standard errors clustered at the mother level are used to construct 95-percent point-wise confidence intervals that account for the standard errors of the estimates of constant and the δ_j coefficients (and their covariance.) Figure 1.A presents labor-force participation for first and subsequent births of all women who gave birth during the panel. This summary quadrant shows that there was substantial and sustained opting-out of the labor force starting as early as one year before birth and lasting at least two years after both first and

subsequent births; and that the estimates of these drops are highly statistically significant. For first births, labor-force participation fell from 81 percent one year before birth to around 65 percent in the year after birth—a drop of 20 percent—and hovered around 68 percent 24 months after birth. Labor-force participation a year before subsequent births was around 10 percentage points lower than participation a year before first births, but the relative rates of opting-out were quite similar for the first and subsequent births, at least at this aggregate level of all women in the sample.

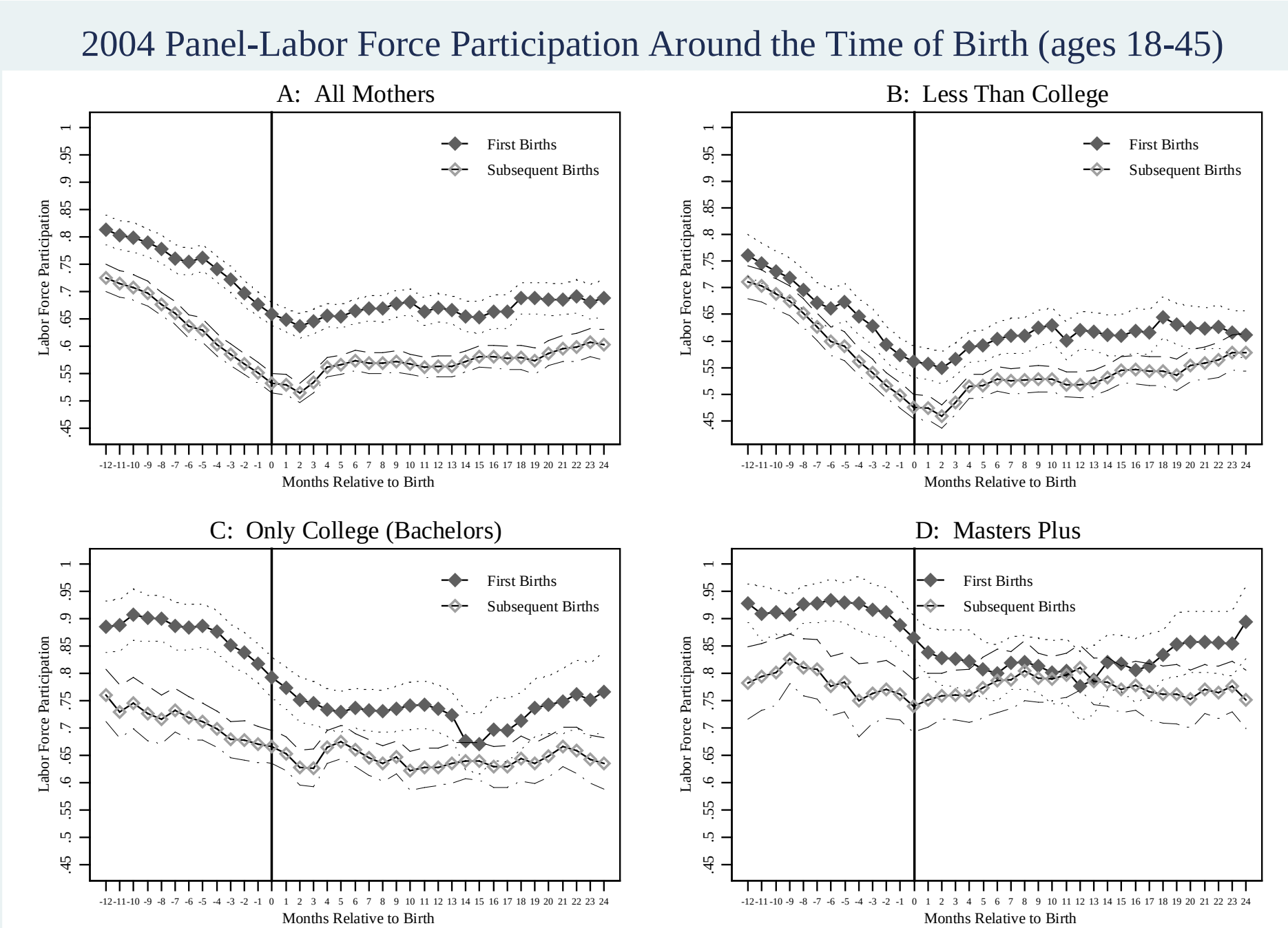
The remaining three quadrants of Figure 1 show that there is considerable heterogeneity in opting-out behavior across education groups. Figure 1.B presents estimates for women who had less than a bachelor's degree when they gave birth. The figure shows that these women had a steeper fall in participation than the overall average and that the decline started as early as a year before birth. Appendix Figure 1, extends the event study window further back to show that labor-force participation for less than college educated women was rising two years before first births and that the decline we see in Figure 1.B. is a reversal of that trend starting almost exactly one year before birth. For subsequent births, the extended event study shows that participation was relatively flat from months -24 to -12 and started to fall one year before birth.

Turning to Figures 1.C and 1.D, which show results for women with bachelors and advanced degrees, note first that the base level of labor-force participation prior to birth is rising in education. The next notable difference in behavior for these more educated women is that they wait longer to leave the labor force prior to birth. The decline does not begin until four months before birth for bachelor's women with first births and only two months before for women with at least a master's in contrast to the less-educated women who started leaving the labor force as early as a year before birth. This suggests more attachment to the labor force prior

to birth for women with at least a college degree. Despite waiting longer to opt-out, these more educated women also experience statistically significant substantial, sustained drop in labor force participation around birth. The college-only women experiencing first births saw labor-force participation fall from around 90 percent in months -12 to -6 to around to around 73 percent in the 6 to 12 months after birth—an almost 20 percent decline. By 24 months after birth participation rates for this group remained at 76 percent--still 15 percent lower than a year before birth. The extended event study figure in the appendix shows that this lower level of participation persists into the fourth year after birth; though the estimates this long after birth are not as precise, they are statistically significantly different than participation rates prior to birth. The master's-plus women opt-out at lower but still substantial rates, with participation falling for first-time mothers from above 90 percent to around 80 percent during the year after first births, and returning close to pre-birth levels by the end of the second year after birth.

The declines in labor force participation start earlier in the case of subsequent births for both the bachelors and at-least-masters women. The rates of decline are less steep after subsequent births, particularly for women with at least a masters, but occur from base levels of participation that are more than 10 percentage points lower than a year prior to first births. The result is that college educated women two years after subsequent births have participation rates close to 25 percentage points below those for college educated women a year prior to first births. For women with at least a master's degree, labor-force participation two years after subsequent births was around 20 percentage points below the level of participation of similarly educated women before first births.

Figure 1.


2004 Panel-Labor Force Participation Around the Time of Birth (ages 18-45)
A: All Mothers
B: Less Than College
C: Only College (Bachelors)
D: Masters Plus
First Births
Subsequent Births
Labor Force Participation
Months Relative to Birth

A. ii) Is there heterogeneity in opting out by other demographic and occupational categories? Evidence from SIPP 2004

The results presented in Figure 1 show that while prolonged opting-out occurs at all education levels, women's behavior varies considerably across education categories. In order to investigate further how patterns of labor force participation vary by women's characteristics, I estimate equation (5) controlling for: i) marital status, ii) quantile of husband's earnings if there is a husband present, iii) race, iv) age at birth, and v) occupation in addition to vi) education and vii) parity. I estimate (5) simultaneously including interactions with all of these characteristics as well as separately for each category. Table 3 shows how patterns of opting-out vary before and after birth for these different demographic and occupational categories. The reference group for each category is as follows: i) married, ii) husband's earnings in the 50-75th percentile, iii) white, iv) 25 – 30 years old when giving birth, v) teacher or librarian, vi) only a bachelors degree, vi) first birth. The first two columns of Table 3 give the level of labor force participation for each demographic group 12 months before birth and the fraction of each category made up by each group. For example black women are 11 percent of the sample and had labor force participation of 76 percent a year prior to birth compared to white women who made up 61 percent of the sample and had participation of 79 percent a year prior to birth. The next six columns show the temporal pattern by six month intervals of opting-out for each group relative to the reference group accounting for only one demographic category at a time. The final six columns show the pattern of opting-out including controls for all of the demographic categories. The coefficients give the difference between the k^{th} demographic group's percentage point change in labor-force participation over the interval relative to one year before birth compared to the reference group's relative change in that interval. Since we know that labor-force participation falls for all

demographic groups relative to the year before birth, positive coefficients imply relatively less opting-out in a given interval either due to lower rate of leaving or higher rate of returning to work. Negative coefficients imply more opting-out in the interval compared to the reference group.[10]

The results in Table 3 can be interpreted in the following way; black women's rate of opting-out was not statistically significantly different from that of white women in the two six-month intervals prior to birth. In the year after birth, black women's labor force participation was closer to pre-birth levels than white mothers' by 5.6 percentage points in the first six months and 6.8 points in the six to 12 month post-birth period, implying that black mothers opted-out at lower rates and/or returned to work more quickly, though these coefficients are not significant. In the second year after birth we see that this trend continue,s and in months 13 to 18 black women's change in participation relative to a year prior to birth is 8.3 percentage points higher than white women's relative change in the same interval and is significantly different at a 10 percent level, implying substantially faster rate of return to work in the second year after giving birth. However, when we control for other factors, such as education, occupation and marital status that may affect work behavior, this difference between black and white women falls to 5.7 percentage points and is no longer significant. This suggests that other characteristics that are correlated with race, such as marital status and education are driving part of the differences in behavior, rather than race per se. Hispanic women tend to opt-out more than white women, though few of the coefficients are significant. One exception is a negative seven percentage

[10] Note that women who did not work in the year prior to birth could still be in the labor force if they were on leave or looking for work which explains "opting-out" prior to birth for women who did not work prior to birth in the bottom row of Table 3. Also note that 23 percent of women who did not work at all in the year prior to giving birth were in the labor force at some point in the two years after birth.

point coefficient on opting-out in months 13 to 18 after birth controlling for all other demographic characteristics. This might imply a cultural preference for mothers to stay home with children.

Table 3 also shows significant differences in patterns of opting-out by marital status. In the second year after birth, separated, divorced and never married women are participating significantly closer to their pre-birth levels than are married women. Looking at their opting-out trends in the previous periods, it appears they both left work at lower rates and returned to work more quickly than married women. Controlling for other characteristics increases the estimates of the differences between married and unmarried women, implying that other factors affecting participation such as race and occupation are correlated with mother's marital status. Among married women, those whose husbands earned below the median or above the 75th percentile opted-out relatively more than the reference group of women whose husbands' earnings were in the 50 to 75th percentile (of earnings among husbands whose wives gave birth.) In the regression that controls only for marital status, the coefficients for high-earning husbands are not significant, while three are for the low earning husbands.

Turning to age at birth, we see that women who gave birth when they were younger than 25 had similar opting-out trends to women who were 25 to 30 in the year prior to birth, but returned to work more quickly 6 months post-birth, though the significance of this result falls when we control for other characteristics. Women who gave birth when they were 31 to 36 years old dropped out less than women aged 25 to 30 and at two years after birth were 6 percentage points closer to their pre-birth levels than the younger mothers. This result holds, though the estimates are slightly smaller and less significant after controlling for other characteristics. This

finding may suggest that women who waited longer to have children were more attached to work and therefore opted-out less.

The occupation categories listed in the final section of Table 3 are defined as the last occupation listed prior to birth for any woman who worked in the 12 months before giving birth. Women who did not work at all prior to giving birth are put in the final occupation category and we see that more than 20 percent those who did not work prior to birth were working two years after giving birth. Within the professional occupations (in the table these are all occupations listed up through healthcare practitioners), the sample sizes are small enough that it may be difficult to attain significantly different trends between categories. The sign and magnitude of the coefficients, however, hint at different trends within professional occupations. The reference occupation is teacher or librarian, which are traditionally female professions. We see that women in management, business and finance, had greater change in participation than teachers and librarians in all six intervals (though none of these coefficients are significant.) Lawyers seemed to return at lower rates in the two years after birth, while healthcare practitioners returned at higher rates.[11] Engineers and architects appear not to opt-out at all. Among non-professional jobs the over-all trend is toward more opting out compared to teachers and librarians, and this may reflect the differences seen in Figure 1 comparing less to more educated women.

[11] Healthcare practitioners include doctors, dentists, physical therapists, veterinarians, speech therapists and registered nurses.

Table 3 : Changes in Labor Force Participation By Mother's Characteristics - 2004 SIPP Panel

Reference group:
White, married, husband whose earnings is in 50-75th %ile, firstbirth, age 25-30, bachelors dgr only, in occupation of education and Library

			Without other controls						With other controls					
	lfp in mnth -12	% of group	-12 to -7	-6 to -1	1 to 6	7 to 12	13 to 18	19 to24	-12 to -7	-6 to -1	1 to 6	7 to 12	13 to 18	19 to24
Education:														
Bachelors only	0.81	0.21												
Less than college	0.72	0.69	-0.044***	-0.100***	-0.069***	-0.022	0.006	-0.004	-0.036**	-0.049**	-0.060**	-0.050*	-0.021	-0.045
			(0.015)	(0.020)	(0.023)	(0.024)	(0.026)	(0.027)	(0.017)	(0.024)	(0.026)	(0.028)	(0.030)	(0.032)
Masters Plus	0.89	0.10	-0.001	0.013	0.031	0.056*	0.063*	0.041	0.011	0.029	0.002	-0.002	-0.005	0.009
			(0.026)	(0.031)	(0.033)	(0.034)	(0.035)	(0.041)	(0.014)	(0.020)	(0.021)	(0.023)	(0.024)	(0.026)
Birth Order:														
First birth	0.81	0.42												
Subsequent birth	0.72	0.57	0.016	0.033*	0.010	0.010	-0.001	0.000	0.011	0.029	0.002	-0.002	-0.005	0.009
			(0.014)	(0.019)	(0.021)	(0.022)	(0.024)	(0.025)	(0.014)	(0.020)	(0.021)	(0.023)	(0.024)	(0.026)
Race:														
White	0.79	0.61												
Black	0.76	0.11	0.010	-0.008	0.056	0.068	0.083*	0.073	0.009	0.015	0.060	0.050	0.057	0.052
			(0.036)	(0.040)	(0.039)	(0.041)	(0.045)	(0.046)	(0.036)	(0.040)	(0.040)	(0.041)	(0.045)	(0.047)
Hispanic	0.67	0.19	-0.001	-0.065*	-0.045	-0.012	-0.030	-0.006	-0.001	-0.040	-0.046	-0.031	-0.069*	-0.053
			(0.030)	(0.034)	(0.036)	(0.038)	(0.038)	(0.040)	(0.031)	(0.035)	(0.037)	(0.038)	(0.039)	(0.040)
Other	0.71	0.08	-0.009	0.010	0.054	0.045	0.051	0.070	0.001	0.020	0.043	0.022	0.014	0.027
			(0.057)	(0.054)	(0.055)	(0.059)	(0.062)	(0.064)	(0.052)	(0.050)	(0.051)	(0.055)	(0.058)	(0.060)
Marital Status:														
Married-Husband's earnings:														
50-75 pctl	0.80	0.18												
<25 pctl	0.74	0.16	-0.022	-0.079***	-0.049	-0.052	-0.032	-0.001	-0.003	-0.035	-0.017	-0.041	-0.022	0.007
			(0.021)	(0.029)	(0.032)	(0.035)	(0.037)	(0.039)	(0.021)	(0.029)	(0.033)	(0.035)	(0.036)	(0.039)
25-50 pctl	0.80	0.17	-0.031	-0.089***	-0.093***	-0.093***	-0.048	-0.031	-0.017	-0.063**	-0.072**	-0.085***	-0.039	-0.021
			(0.019)	(0.027)	(0.031)	(0.032)	(0.035)	(0.037)	(0.019)	(0.026)	(0.030)	(0.032)	(0.034)	(0.036)
>75 pctl	0.75	0.19	-0.009	-0.004	-0.007	-0.023	-0.008	0.000	-0.024	-0.032	-0.050*	-0.066**	-0.051	-0.054
			(0.019)	(0.025)	(0.029)	(0.031)	(0.033)	(0.036)	(0.019)	(0.026)	(0.029)	(0.032)	(0.034)	(0.036)
Sprtd/Divorced	0.77	0.06	0.003	-0.063	0.011	0.027	0.099*	0.114**	0.030	-0.011	0.062	0.066	0.129**	0.148***
			(0.034)	(0.042)	(0.045)	(0.049)	(0.052)	(0.054)	(0.035)	(0.042)	(0.046)	(0.049)	(0.052)	(0.054)
Never Married	0.71	0.24	0.002	-0.060**	-0.002	0.040	0.069**	0.078**	0.042*	0.010	0.053	0.066*	0.083**	0.105**
			(0.022)	(0.029)	(0.031)	(0.033)	(0.034)	(0.036)	(0.025)	(0.033)	(0.035)	(0.037)	(0.039)	(0.042)
Age at Birth:														
25-30	0.82	0.35												
under 25	0.65	0.27	-0.009	-0.036	0.006	0.064**	0.085***	0.077**	-0.017	-0.020	0.011	0.052*	0.064*	0.047
			(0.020)	(0.026)	(0.028)	(0.030)	(0.032)	(0.034)	(0.021)	(0.027)	(0.029)	(0.031)	(0.033)	(0.035)
31-36	0.76	0.27	0.031**	0.062***	0.048**	0.035	0.040	0.060**	0.033**	0.051**	0.033	0.015	0.022	0.054*
			(0.016)	(0.021)	(0.024)	(0.026)	(0.028)	(0.030)	(0.016)	(0.023)	(0.025)	(0.027)	(0.029)	(0.030)
over 36	0.79	0.12	0.013	0.009	0.011	0.007	-0.000	-0.003	0.015	0.004	0.001	-0.003	-0.006	0.001
			(0.021)	(0.028)	(0.032)	(0.033)	(0.036)	(0.037)	(0.022)	(0.029)	(0.033)	(0.034)	(0.037)	(0.038)
Occupation:	(note levels of lfp by occupation are calculated among women who worked in the 12 month prior to birth)													
Educ & Library	0.96	0.07												
Management	0.93	0.04	-0.052	-0.040	-0.017	-0.025	-0.030	0.005	-0.042	-0.029	0.005	0.004	-0.003	0.031
			(0.035)	(0.049)	(0.050)	(0.056)	(0.056)	(0.058)	(0.036)	(0.050)	(0.052)	(0.058)	(0.058)	(0.059)
Business, Finance	0.95	0.03	-0.006	-0.018	-0.041	-0.040	-0.084	-0.089	0.002	-0.008	-0.021	-0.012	-0.053	-0.061
			(0.028)	(0.045)	(0.056)	(0.068)	(0.072)	(0.070)	(0.030)	(0.046)	(0.057)	(0.069)	(0.073)	(0.070)
Computer, Math	0.95	0.02	-0.100**	-0.035	0.012	0.041	0.094**	0.071	-0.103**	-0.048	0.006	0.061	0.124***	0.094*
			(0.046)	(0.059)	(0.053)	(0.052)	(0.043)	(0.052)	(0.046)	(0.058)	(0.054)	(0.055)	(0.047)	(0.057)
Architecture & Engineering	1.00	0.01	-0.016	0.028	0.136***	0.112***	0.052	0.056	-0.012	0.013	0.137***	0.122***	0.074	0.075
			(0.019)	(0.028)	(0.041)	(0.036)	(0.061)	(0.073)	(0.023)	(0.031)	(0.045)	(0.043)	(0.070)	(0.079)
Sciences	0.96	0.01	-0.071	-0.044	-0.038	0.044	0.017	0.022	-0.075	-0.074	-0.049	0.040	0.016	0.016
			(0.044)	(0.084)	(0.088)	(0.078)	(0.073)	(0.075)	(0.047)	(0.086)	(0.090)	(0.079)	(0.075)	(0.077)
Community & Social Services	0.98	0.01	-0.009	-0.010	0.043	0.002	0.049	0.073	-0.010	-0.020	0.027	-0.011	0.038	0.061
			(0.044)	(0.050)	(0.053)	(0.067)	(0.057)	(0.078)	(0.045)	(0.051)	(0.054)	(0.069)	(0.058)	(0.079)
Legal	1.00	0.01	0.002	0.015	0.019	0.021	-0.060	-0.091	0.002	0.011	0.023	0.022	-0.047	-0.072
			(0.031)	(0.055)	(0.070)	(0.072)	(0.100)	(0.119)	(0.033)	(0.057)	(0.070)	(0.071)	(0.095)	(0.116)
Art, Design, Ent, Sports & Media	0.74	0.01	0.014	0.064	0.056	-0.010	-0.027	0.047	0.023	0.067	0.075	0.019	0.006	0.084
			(0.055)	(0.063)	(0.077)	(0.086)	(0.086)	(0.094)	(0.054)	(0.063)	(0.078)	(0.087)	(0.086)	(0.095)

Healthcare Practitioners	0.94	0.05	-0.011 (0.028)	-0.004 (0.042)	0.021 (0.051)	0.054 (0.054)	0.026 (0.056)	0.044 (0.055)	-0.007 (0.028)	-0.004 (0.042)	0.030 (0.051)	0.070 (0.054)	0.043 (0.056)	0.065 (0.055)
Service	0.83	0.16	-0.059** (0.025)	-0.119*** (0.036)	-0.118*** (0.040)	-0.092** (0.043)	-0.108** (0.045)	-0.066 (0.048)	-0.040 (0.026)	-0.077** (0.038)	-0.097** (0.042)	-0.090** (0.046)	-0.121** (0.047)	-0.069 (0.051)
Clerical	0.88	0.16	-0.045* (0.023)	-0.041 (0.033)	-0.050 (0.037)	-0.032 (0.041)	-0.044 (0.043)	-0.046 (0.047)	-0.027 (0.025)	-0.003 (0.035)	-0.021 (0.039)	-0.012 (0.042)	-0.035 (0.044)	-0.028 (0.048)
Sales	0.83	0.11	-0.052* (0.028)	-0.144*** (0.039)	-0.132*** (0.043)	-0.083* (0.046)	-0.095* (0.049)	-0.084 (0.054)	-0.035 (0.029)	-0.108*** (0.040)	-0.117*** (0.045)	-0.084* (0.049)	-0.107** (0.051)	-0.085 (0.056)
Blue Collar	0.81	0.07	-0.109*** (0.039)	-0.221*** (0.053)	-0.210*** (0.056)	-0.163*** (0.060)	-0.207*** (0.062)	-0.229*** (0.068)	-0.091** (0.040)	-0.169*** (0.054)	-0.175*** (0.057)	-0.141** (0.061)	-0.200*** (0.063)	-0.215*** (0.070)
Agriculture & Other	0.77	0.01	-0.052 (0.139)	-0.068 (0.148)	0.003 (0.151)	-0.018 (0.108)	-0.006 (0.135)	0.153 (0.164)	-0.021 (0.139)	0.006 (0.147)	0.086 (0.153)	0.074 (0.111)	0.079 (0.138)	0.233 (0.170)
Did not work prior	0.10	0.23	-0.054** (0.024)	-0.069** (0.034)	0.048 (0.037)	0.133*** (0.040)	0.172*** (0.042)	0.221*** (0.046)	-0.032 (0.026)	-0.021 (0.037)	0.086** (0.040)	0.159*** (0.044)	0.188*** (0.045)	0.246*** (0.049)

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

B. Has Opting-out Changed Over the Last Twenty Five Years?

Belkin's opt-out "revolution" implies that women's behavior changed dramatically over time. I test this claim by comparing women's opting-out behavior between the 1980s, 1990s and 2000s. I estimate equation (1) separately by education group and parity for each decade using the 1984-1986, 1996, and 2004 SIPP panels. While there are notable changes in behavior over the past twenty five years, the similarities are more striking than the differences. I will begin by comparing the pattern of changes in labor force participation around birth for all women by education groups across the three decades. Then I will focus on married women and compare their labor-force attachment to their husbands' to look for potential changes in decision making about household labor supply over time.

B. i) Comparing Rates of Opting-Out in the 1980s, 1990s and 2000s

Figure 2 includes eight subsections that compare the δ_j coefficients across decades from separate estimations of equation (1) including year-fixed effects for each parity, education group and SIPP panel. Confidence intervals are omitted to make the figures legible, but are available upon request and are summarized in the following discussion. Figure 2 plots the monthly changes in labor force participation relative to participation one year prior to birth and the legend for each subsection gives this reference level of participation for each respective group. Figure 2.A and 2.B summarize changes in opting-out behavior for all women having first and subsequent births. Figures 2.C through 2.H show results for each education category. Figure 2.A shows that prior to first births women dropped out of the labor force at a faster rate in the 1980s than in the later decades. By the month after first births labor-force participation in the 1980s had fallen by 30 percentage points, while the drop was 25 percentage points in the 1990s and only 17 percentage

points in the 2000s. Women in the 1980s returned to work at faster rates than women in the later decades, however, so that one year after first births, the percentage point changes compared to a year prior to birth are not statistically significantly different across the three decades. Figure 2.B shows that following similar percentage point declines in the year before birth, women in the 1980s returned to work at higher rates than the later women in the two years after subsequent births. Note, however, that participation rates in the 1980s one year prior to those births was 10 percentage points lower than in the later decades so that the level of labor force participation two years after subsequent births was not statistically significantly different across the decades at around 60 percent.

As seen in Figures 2. C through 2.F these general trends of sharper drops followed by steeper recoveries in the 1980s compared to the 1990 and 2000s are echoed in the experiences of less-than-college-educated women and also for women with bachelor's degrees, though the magnitudes and base level of participation prior to birth differ across these two education groups. Figure 2.E presents estimates of opting-out for women with only a bachelor's degree around first births. From 12 to four months before birth the pattern of opting out is almost identical across the decades. From around four months prior to birth to six months after birth there is a divergence in behavior, with women in the 1980s dropping out at significantly higher rates, falling to 32 percentage points below pre-birth levels compared to only 25 percentage points in the 1990s and 15 points in the 2000s. This steeper fall is followed by a steeper rise, and by eight months after birth the relative change in labor force participation is almost identical across the three decades. Though they are somewhat noisier in the later months, the patterns are not statistically significantly different for the 80s, 90s and 2000s. The opting-out patterns, and level of pre-birth participation for college-only women with subsequent births are very similar over

the three decades, with the only notable differences being a delay in leaving the labor force prior to birth in the 1990s and again higher initial rates of opting out in the 1980s. One potential mechanism that could explain the sharp dip and recovery of women in the 80s compared to later decades could be an increase in family friendly flexibility in the workplace. If women in the later decades wanted to take several months off after giving birth and they were given the flexibility to stay with their current job but take an extended leave, they would remain in the labor force in contrast to women who were not offered this type of flexibility or job security around birth in previous decades. We can look for evidence of this when we compare hours worked for women in the 1980s to women in the later decades. If the percentage of women working zero hours is more similar than the percentage of women who left the labor force, then this could be evidence of more women in the later decades taking leaves of absence rather than leaving the labor force entirely if they hope to return to work in the first year after giving birth.

The estimates for master's plus women are somewhat less precise due to smaller sample sizes, but it is at this education level that we see the biggest changes in behavior over time. Figure 2.G shows that following almost identical lack of opting-out from 12 to two months prior to first births, women in the 1980s opted-out around 10 percentage points more than in the later decades, though labor force participation also fell in the in the 1990s and 2000s bouncing around seven to 15 percentage points below the year prior to birth. Figure 2.H shows that estimates of opting-out after subsequent births were greater in the 1990s than in the 1980s and 2000s.

Figure 2.

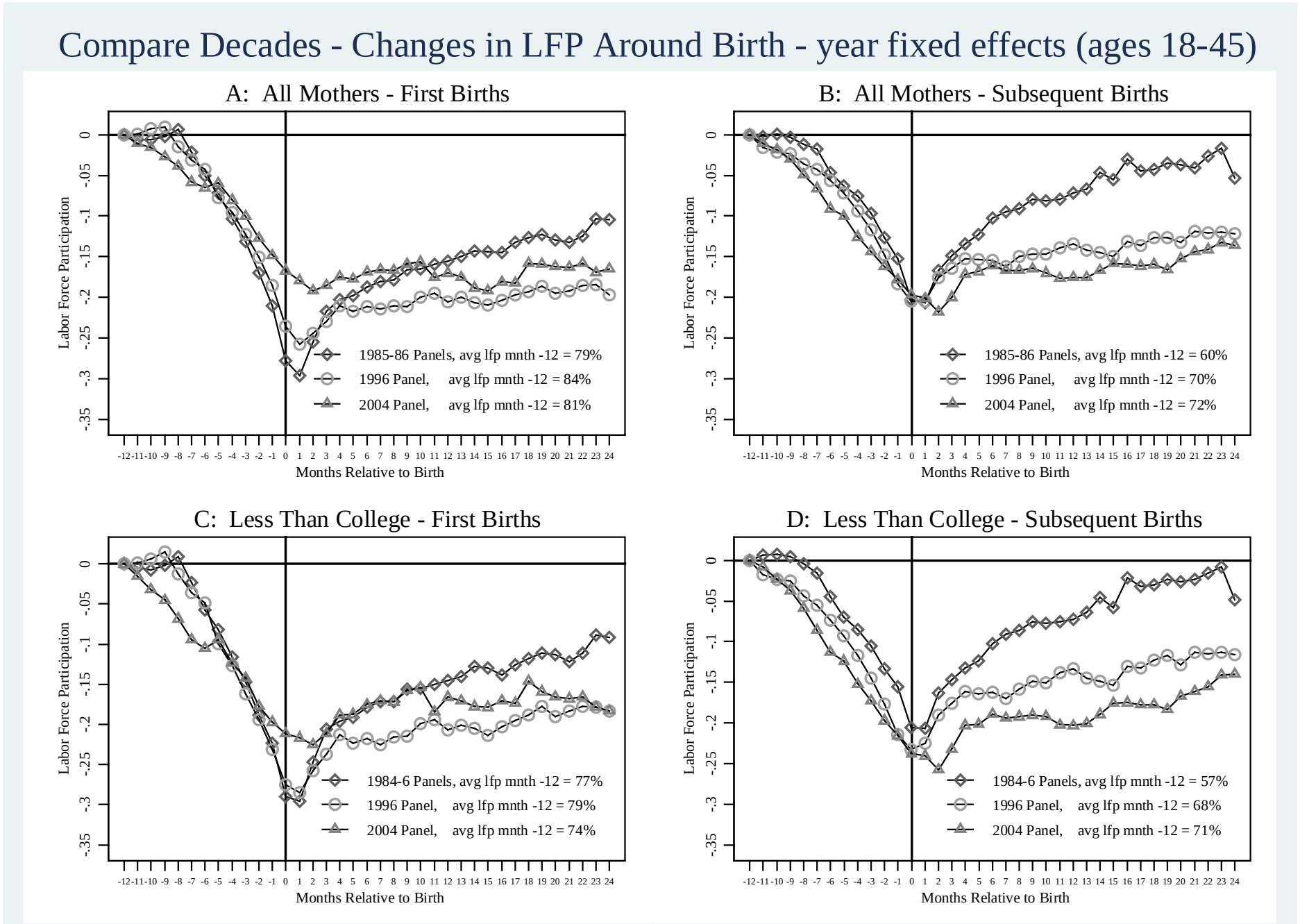
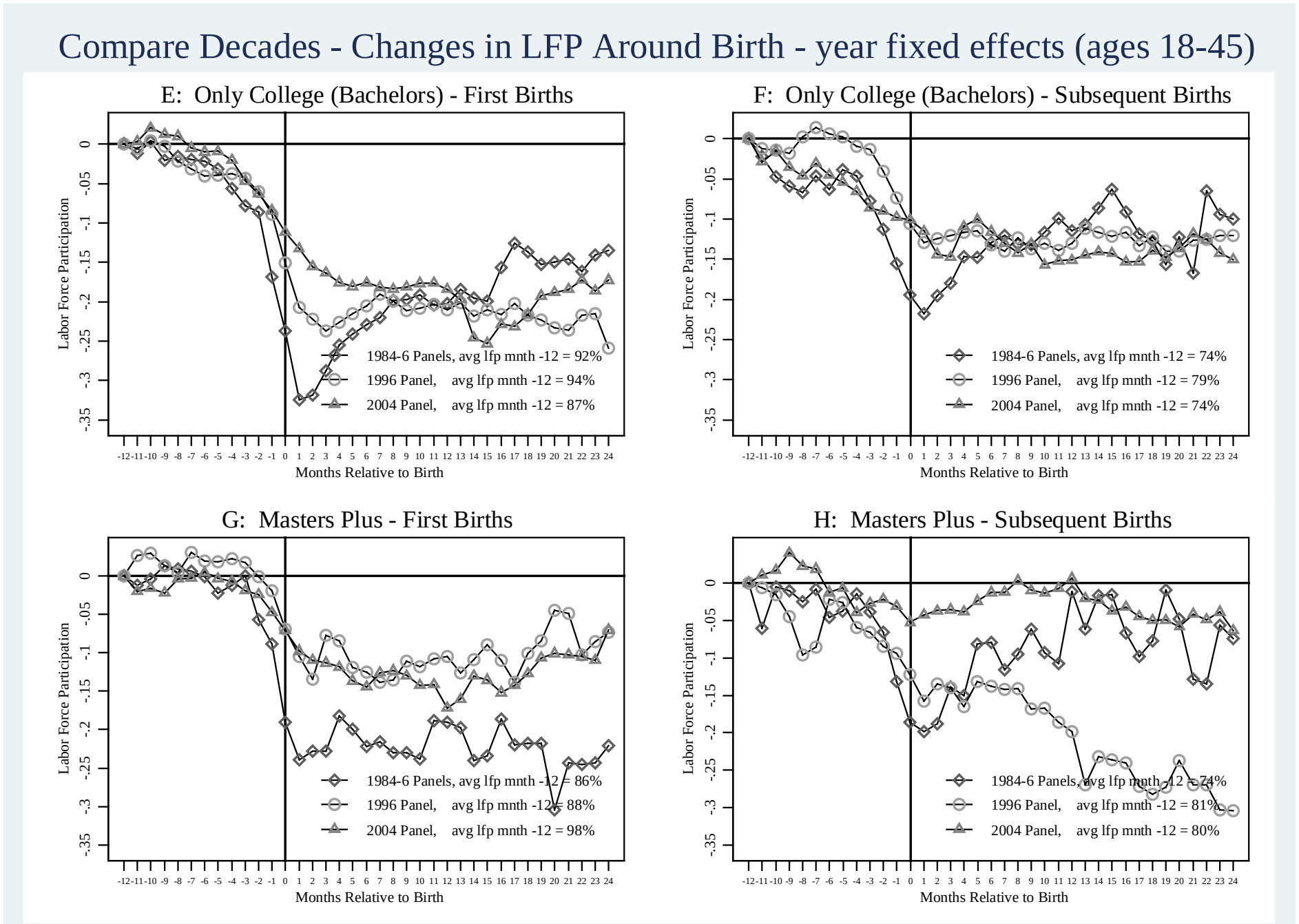

Compare Decades - Changes in LFP Around Birth - year fixed effects (ages 18-45)
A: All Mothers - First Births
Labor Force Participation
0
-.05
-.1
-.15
-.2
-.25
-.3
-.35
-12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Months Relative to Birth
1985-86 Panels, avg lfp mnth -12 = 79%
1996 Panel, avg lfp mnth -12 = 84%
2004 Panel, avg lfp mnth -12 = 81%
B: All Mothers - Subsequent Births
Labor Force Participation
Months Relative to Birth
1985-86 Panels, avg lfp mnth -12 = 60%
1996 Panel, avg lfp mnth -12 = 70%
2004 Panel, avg lfp mnth -12 = 72%
C: Less Than College - First Births
Labor Force Participation
Months Relative to Birth
1984-6 Panels, avg lfp mnth -12 = 77%
1996 Panel, avg lfp mnth -12 = 79%
2004 Panel, avg lfp mnth -12 = 74%
D: Less Than College - Subsequent Births
Labor Force Participation
Months Relative to Birth
1984-6 Panels, avg lfp mnth -12 = 57%
1996 Panel, avg lfp mnth -12 = 68%
2004 Panel, avg lfp mnth -12 = 71%

Figure 2.


Compare Decades - Changes in LFP Around Birth - year fixed effects (ages 18-45)
E: Only College (Bachelors) - First Births
1984-6 Panels, avg lfp mnth -12 = 92%
1996 Panel, avg lfp mnth -12 = 94%
2004 Panel, avg lfp mnth -12 = 87%
F: Only College (Bachelors) - Subsequent Births
1984-6 Panels, avg lfp mnth -12 = 74%
1996 Panel, avg lfp mnth -12 = 79%
2004 Panel, avg lfp mnth -12 = 74%
G: Masters Plus - First Births
1984-6 Panels, avg lfp mnth -12 = 86%
1996 Panel, avg lfp mnth -12 = 88%
2004 Panel, avg lfp mnth -12 = 98%
H: Masters Plus - Subsequent Births
1984-6 Panels, avg lfp mnth -12 = 74%
1996 Panel, avg lfp mnth -12 = 81%
2004 Panel, avg lfp mnth -12 = 80%
Labor Force Participation
Months Relative to Birth

B. ii) Labor-force Participation of Married Mothers and Their Husbands – Trends in Household Labor Supply Over Time

Figure 3 consists of eight subsections that plot levels of labor force participation by education, parity and decade for women who were married with a spouse present at the time they gave birth. The plots also show labor-force participation of the husbands of the women who give birth. The education categories are based on the women's level of education in the month that she gave birth. These plots for married mothers echo most of the differences in levels of labor-force participation and opting-out rates across the dimensions discussed in previous sections, although as shown in Table 3, married women opt-out somewhat more than separated, divorced and never married women though they participate more prior to first births. The additional information in these figures is what we learn about household labor supply decisions and the striking lack of change in the relative behavior of husbands and wives over the last twenty five years. By placing the level plots for first births horizontally beside level plots for subsequent births, it is possible to visualize a hypothetical birth/work history for households moving from first births to subsequent births. This highlights how the lack of recovery in women's labor force participation after first births means that subsequent opting-out starts from this lower level of participation.[12]

Prior to first births labor-force participation of husbands and wives in all categories look very similar. The only slight exception is prior to first births for less than college educated households in the 1980s. As first births approach, a divergence begins as an apparent trend towards traditional gender-specific specialization in market versus home production begins. As seen in Figure 3.C, this trend is most pronounced for the less than college category where both

[12] Note there is only one legend for each page of figure 3 since the legend is the same for each subsection of the figure. Plots for the 1980s are denoted by a diamond, the 1990s by a circle and the 2000s by a triangle. The symbol for husbands in each respective decade is hollow and the wives symbol is solid.

husbands and wives are initially participating at lower rates than in households with more educated wives. As women leave the labor force as the birth approaches, husbands seem to be entering at a similar rate. For households with less-than-college educated wives, this trend is reversed in the second year after birth when a slight recovery in mothers' participation seems to be matched by a slight decrease in participation of fathers. Two years after first births the gap between mothers' and fathers' participation is close to 30 percentage points in all three decades and two years after subsequent births the gap increases to 35 to 40 percentage points for this education category as shown in Figure 3.D.

Turning to women with bachelors and advanced degrees, Figure 3.E through 3.H show that beyond differences previously noted, traditional gender roles in household labor supply persist, particularly in households where the mother has only a college degree when she gave birth. Husbands' labor supply is only slightly higher than their college educated wives a year prior to birth and trends up to between 95 and 100 percent over this year. It stays at this level over the next two years and essentially is flat for the year prior to and two years after subsequent births for husbands of both bachelors and masters-plus mothers. The household gap in labor-force participation two years after both first and subsequent births between husbands and wives with at least a master's degree has shrunk somewhat from around 25 percentage points in the 80s and 90s to around 15 percent in the 2000s. This is not the case for households where the mother has only a college degree. From the point of almost identical labor force participation a year prior to first births, the gap between husbands and wives participation grows to more than 30 percentage points two years after subsequent births in these households. This gap has hardly changed at all in the last twenty five years.

Figure 3.

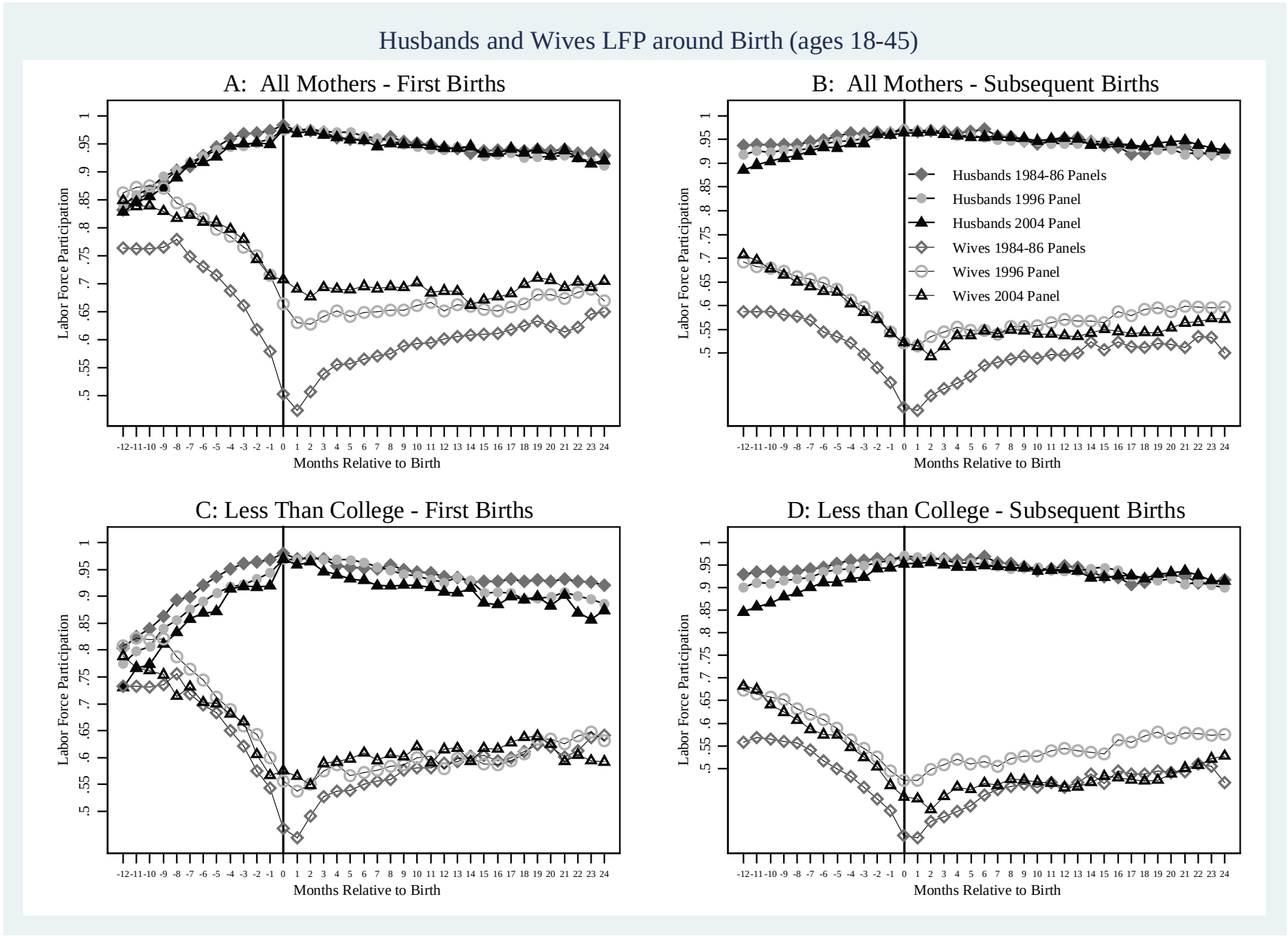
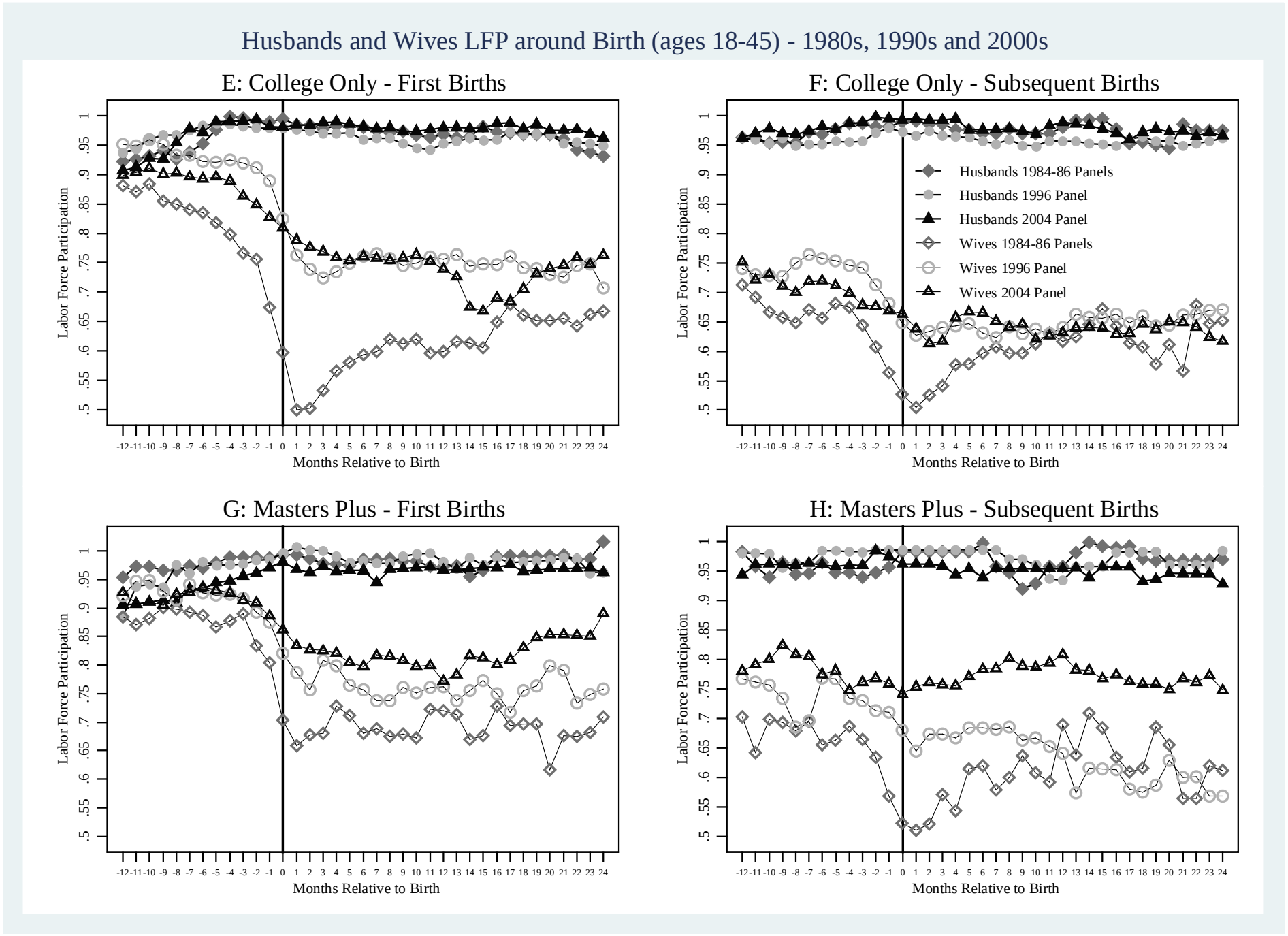

Husbands and Wives LFP around Birth (ages 18-45)
A: All Mothers - First Births
B: All Mothers - Subsequent Births
C: Less Than College - First Births
D: Less than College - Subsequent Births
Labor Force Participation
Months Relative to Birth
Husbands 1984-86 Panels
Husbands 1996 Panel
Husbands 2004 Panel
Wives 1984-86 Panels
Wives 1996 Panel
Wives 2004 Panel

Figure 3.


Husbands and Wives LFP around Birth (ages 18-45) - 1980s, 1990s and 2000s
E: College Only - First Births
F: College Only - Subsequent Births
G: Masters Plus - First Births
H: Masters Plus - Subsequent Births
Labor Force Participation
Months Relative to Birth
Husbands 1984-86 Panels
Husbands 1996 Panel
Husbands 2004 Panel
Wives 1984-86 Panels
Wives 1996 Panel
Wives 2004 Panel

C. Is There Evidence of Opting-Out on the Intensive Margin?

While opting-out usually refers to women exiting the labor force, women may choose instead to reduce their work hours when they have children. The Pew report discussed above found that a majority of working mothers in 2007 said their ideal work situation would be part-time, suggesting that we might expect to see an increase in the proportion of women working part time in the years after giving birth. An event study where the outcome is number of hours worked allows me look for evidence of opting-out along the intensive margin. I am also able to look for evidence of changes in leave-taking by comparing the estimates of proportion of women out of the labor force with the proportion working zero hours. Figure 4 presents results from the 2004 panel and figure 5 compares hours worked in the 1980s, 1990s and 2000s. These figures show the proportion of mothers in each month who were working either i) full time—35 or more hours per week, ii) part time—1 to 34 hours per week, or iii) not working—zero hours.[13] For brevity I present results for all women and women with only a college degree (the profiles for women with less than a college degree and with at least a master's are available upon request.)

C. i) Hours worked in 2004 by parity and education

Figure 4 shows that while there is an increase in the proportion of women who work part time after giving birth in the 2000s, the increase is surprisingly small given the sentiments expressed in the Pew polls. Figure 4.A and 4.B show that for all women giving birth during the 2004 panel, from the point a year prior to first births, the proportion of part-time rises from 15 percent to 16 to 18 percent in the first and second years after first births. Prior to subsequent births the proportion of all women working part time starts at 20 percent; and after a slight dip around

[13] Note there is only one legend for each page of figure 5 since the legend is the same for each subsection of the figure.

birth, the proportion rebounds to 20 percent and remains at that level for at least the next 24 months.

The story for women with bachelor's degrees is similar as seen in Figure 4.C. and 4.D. Prior to first births around ten percent of women with bachelor's degrees work part time; the level rises to around 20 percent in the year after birth and to around 25 percent in the second year after birth. This second up-tick in part time work in the second year coincides with a fall in full time work around month 14 after birth. This is the trend we would see if some women realized, after a year of trying to work full time with a new baby, that they felt the need to cut back. The year prior to subsequent births, 25 percent of women with bachelors are working part time, and aside from a dip right around birth, the proportion remains essentially flat for the next two years. While the proportion working part time more than doubles from the year prior to first births to two years after subsequent births, the level of part time work remains low. Over the same timeline labor-force participation for college-only women falls from nearly 90 percent to around 65 percent—opting-out on the extensive margin is more prevalent than cutting back on the intensive margin.

C. ii) Comparing hours worked over the last 25 years

Figure 5 compares hours worked in the 1980s and 1990s to the results from the 2000s. For all women, as shown in Figure 5.A and 5.B, it is difficult to distinguish between the proportions working part time over the three panels. These estimates show that there has been almost no change in the profile of part time work around birth for the overall population in the last twenty five years. The results for women with bachelor's degrees, shown in Figure 5.C and 5.D, suggest a small decrease from the 1980s to the 1990s and 2000s in the proportion of women with

only a college degree working part time after giving birth. Prior to first births the proportion working part time is close to 10 percent in all three decades; however after birth, the proportion rises to around 25 percent in the 1980s and to around 20 percent in the 90s and 2000s. Prior to subsequent births 35 percent of college-only women were working part time in the 1980s compared to 22-25 percent in the 90s and 2000s. After dips around birth, the proportions remain flat at pre-birth levels until around 18 months after birth when the 1980s proportion falls to join the 90s and 2000s around 25 percent.

Comparing hours worked to labor-force participation can provide suggestive evidence of trends in leave-taking around birth. If I subtract the proportion of women who are out of the labor force from the proportion who are working zero hours in a given month, I can calculate the proportion of women who are in the labor force but are not currently working. This number obviously includes women who are unemployed and looking for work or are out of work for illnesses. However, if I were to see an increase around the time of birth in the proportion of women who are in the labor force but not working positive hours, this might suggest that women are staying with their jobs and taking maternity leave. In calculations not shown here, I find that there is substantial increase in the proportion of college-only women in the labor force working zero hours from 4 months before to 4 months after both first and subsequent births using data from the 2004 panel. At one month after first births, 10 percent of college educated women were in the labor force, but not working positive hours, up from just under two percent in this category a year prior to birth. There is a similar increase for college-only women from two months before to 4 months after births using the 1996 panel—from less than two percent prior to birth to over eight percent one month after birth. There is no increase in women in the labor force working zero hours, however using the 1984 panel. This suggests that part of the difference in

participation behavior in the first six months after birth between 1980s and the later decades discussed above, may be explained by increased flexibility afforded by leave-taking in the later decades. This is only a crude measure of leave-taking, but these findings suggest that further investigation is warranted.

IV. Conclusion

I find no abrupt increase in opting-out over the past three decades. My results indicate we are not experiencing an opt-out revolution. However, a substantial percentage of women continue to leave the labor force when they give birth. The rate of labor force participation remains low for at least two years after first and subsequent births for women in all education categories-- a pattern similar to opting-out for mothers in the 1990s *and* 1980s. The comparison of monthly profiles of labor-force participation and hours worked around birth show remarkably little change over the last twenty five years. Far from closing the case on opting-out, finding evidence of an opt-out continuation suggests a need for more research to understand the causes of the phenomenon and to investigate the efficiency and welfare implications of opting-out.

At least two aspects of my initial findings suggest directions for future research. When I focus on married women and compare their labor-force participation to their husbands I find that traditional gender roles in household specialization persist for women at all levels of education. While the labor-force participation gap may be narrowing for women with advanced degrees, within the much larger category of women with only bachelor's degrees this is not the case. These results about household labor supply decisions suggest investigating issues of marriage

markets and household bargaining. Finally, despite recent polls indicating that 60 percent of working mothers would prefer to work part time, I find that in the 2000s less than 36 percent of mothers in the labor force after giving birth are working part time. Many more women either work full time or leave the labor force. Yet the same Pew poll found that 33 percent of at-home mothers also thought it would "be ideal" to work part time. Is the shortfall between this reported preference for part time work and the actual percentage of women working part time due to a lack of attractive part time options? Studying differences among occupations in flexibility of work hours may shed light on the mechanisms that lead women to opt-out.

Figure 4

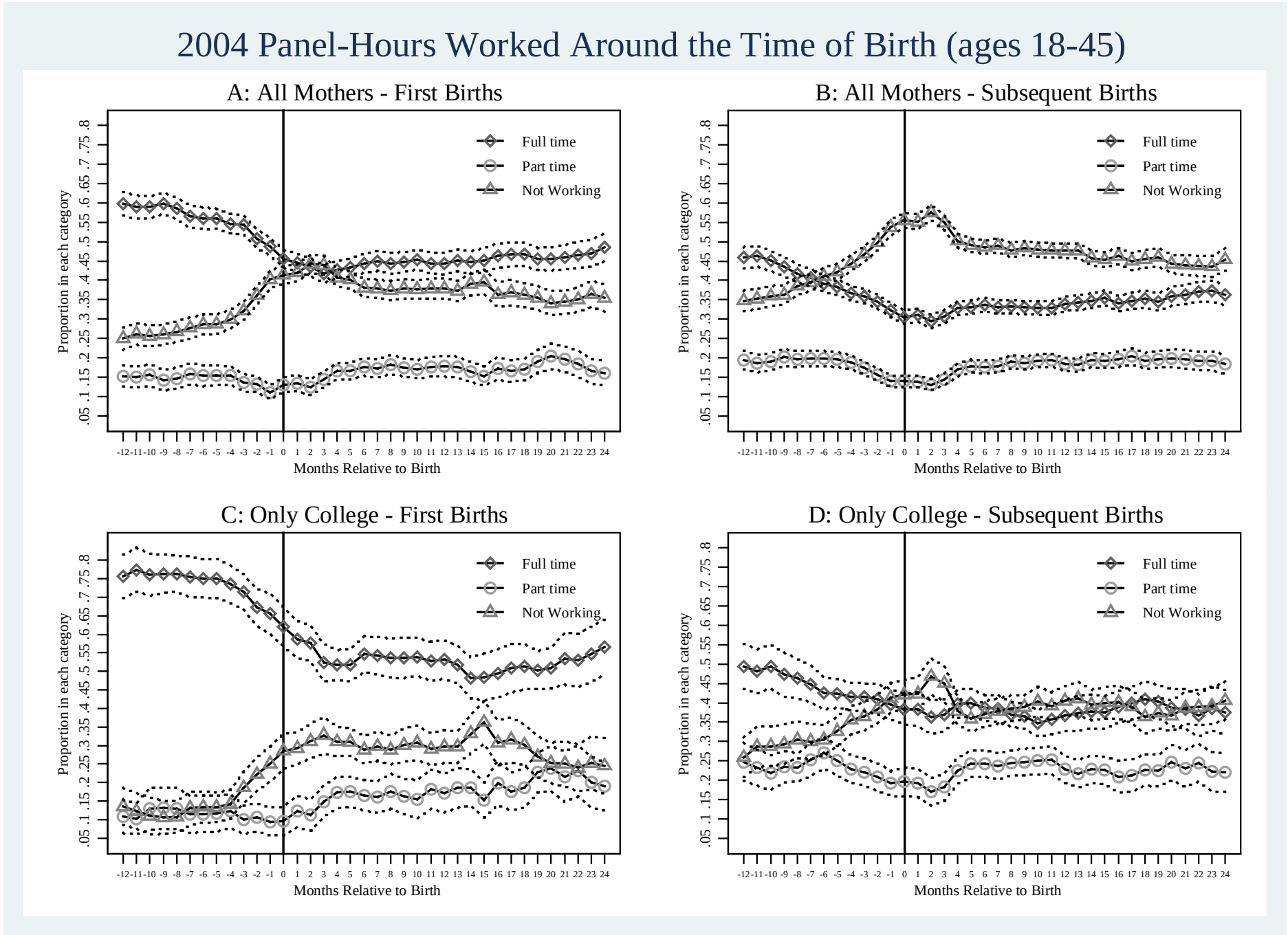

2004 Panel-Hours Worked Around the Time of Birth (ages 18-45)
A: All Mothers - First Births
B: All Mothers - Subsequent Births
C: Only College - First Births
D: Only College - Subsequent Births
Full time
Part time
Not Working
Proportion in each category
.05 .1 .15 .2 .25 .3 .35 .4 .45 .5 .55 .6 .65 .7 .75 .8
-12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Months Relative to Birth

Figure 5

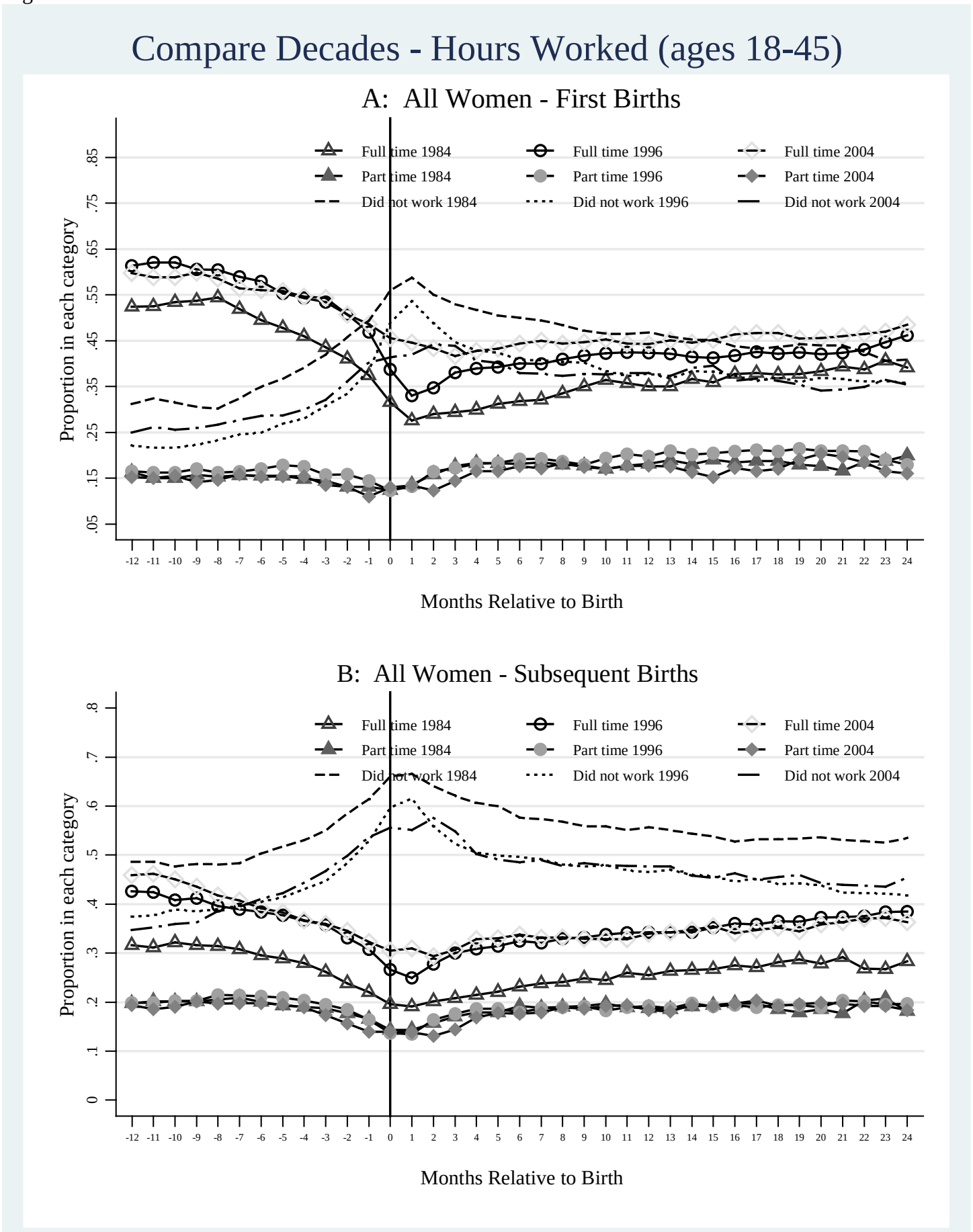
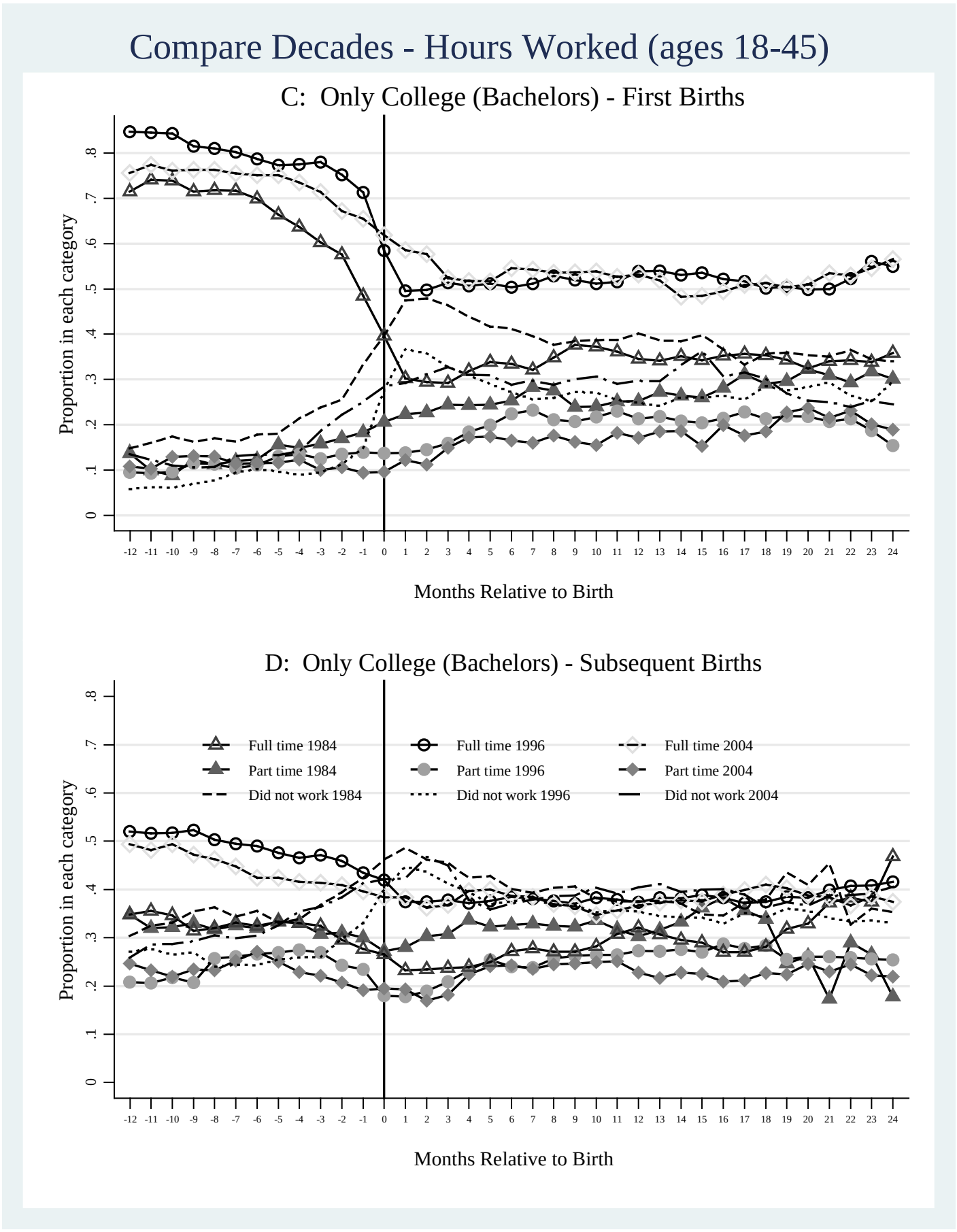

Compare Decades - Hours Worked (ages 18-45)
A: All Women - First Births
Full time 1984
Part time 1984
Did not work 1984
Full time 1996
Part time 1996
Did not work 1996
Full time 2004
Part time 2004
Did not work 2004
Proportion in each category
.05
.15
.25
.35
.45
.55
.65
.75
.85
-12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Months Relative to Birth
B: All Women - Subsequent Births
Full time 1984
Part time 1984
Did not work 1984
Full time 1996
Part time 1996
Did not work 1996
Full time 2004
Part time 2004
Did not work 2004
Proportion in each category
0
.1
.2
.3
.4
.5
.6
.7
.8
-12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Months Relative to Birth

Figure 5


Compare Decades - Hours Worked (ages 18-45)
C: Only College (Bachelors) - First Births
Proportion in each category
0
.1
.2
.3
.4
.5
.6
.7
.8
-12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Months Relative to Birth
D: Only College (Bachelors) - Subsequent Births
Full time 1984
Part time 1984
Did not work 1984
Full time 1996
Part time 1996
Did not work 1996
Full time 2004
Part time 2004
Did not work 2004
Proportion in each category
0
.1
.2
.3
.4
.5
.6
.7
.8
-12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Months Relative to Birth

References

Antecol, Heather. 2010. "The Opt-Out Revolution: A Descriptive Analysis." IZA Discussion Paper No. 5089

Bailey, Martha. 2010. "The Impact of U.S. Family Planning Programs on Fertility and Mortality: Evidence from the War on Poverty and Title X." Working Paper.

Belkin, Lisa. 2003. "The Opt-Out Revolution," *New York Times Magazine*. October 26, 23-32.

Berger, Lawrence M, Jennifer Hill and Jane Waldfogel. 2005. "Maternity leave, early maternal employment and child health and development in the US" *The Economic Journal*, 115(501): 29-47.

Bertrand, Marianne, Claudia Goldin and Lawrence Katz. 2010**.** "Dynamics of the Gender Gap for Young Professionals in the Corporate and Financial Sectors." *American Economic Journal: Applied Economics*, 2(3): 228-255.

Blair-Loy, Mary. 2003. *Competing Devotions: Career and Family among Women Executives*. Cambridge, MA: Harvard University Press.

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

Hochschild, Arlie. 1997. *The Time Bind: When Work Becomes Home and Home Becomes Work.* New York: Henry Holt.

Correll, Shelly J., Stephen Benard and In Paik. 2007. "Getting a Job: Is There a Motherhood Penalty?" *American Journal of Sociology*, 112(5):1297-1338.

Gardella, Adriana. 2010. "Where is the Female Steve Jobs?" *New York Times*. October 4: http://boss.blogs.nytimes.com/2010/10/04/where-is-the-female-steve-jobs/

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

Goldin, Claudia, Lawrence F. Katz and Ilyana Kuziemko. 2006. "The Homecoming of American College Women: The Reversal of the College Gender Gap." *The Journal of Economic Perspectives*, 20(4): 133-156.

Herr, Jane Leber and Catherine Wolfram. 2009. "Opt-Out Rates at Motherhood Across High-Education Career Paths: Selection Versus Work Environment," NBER Working Paper No. w14717.

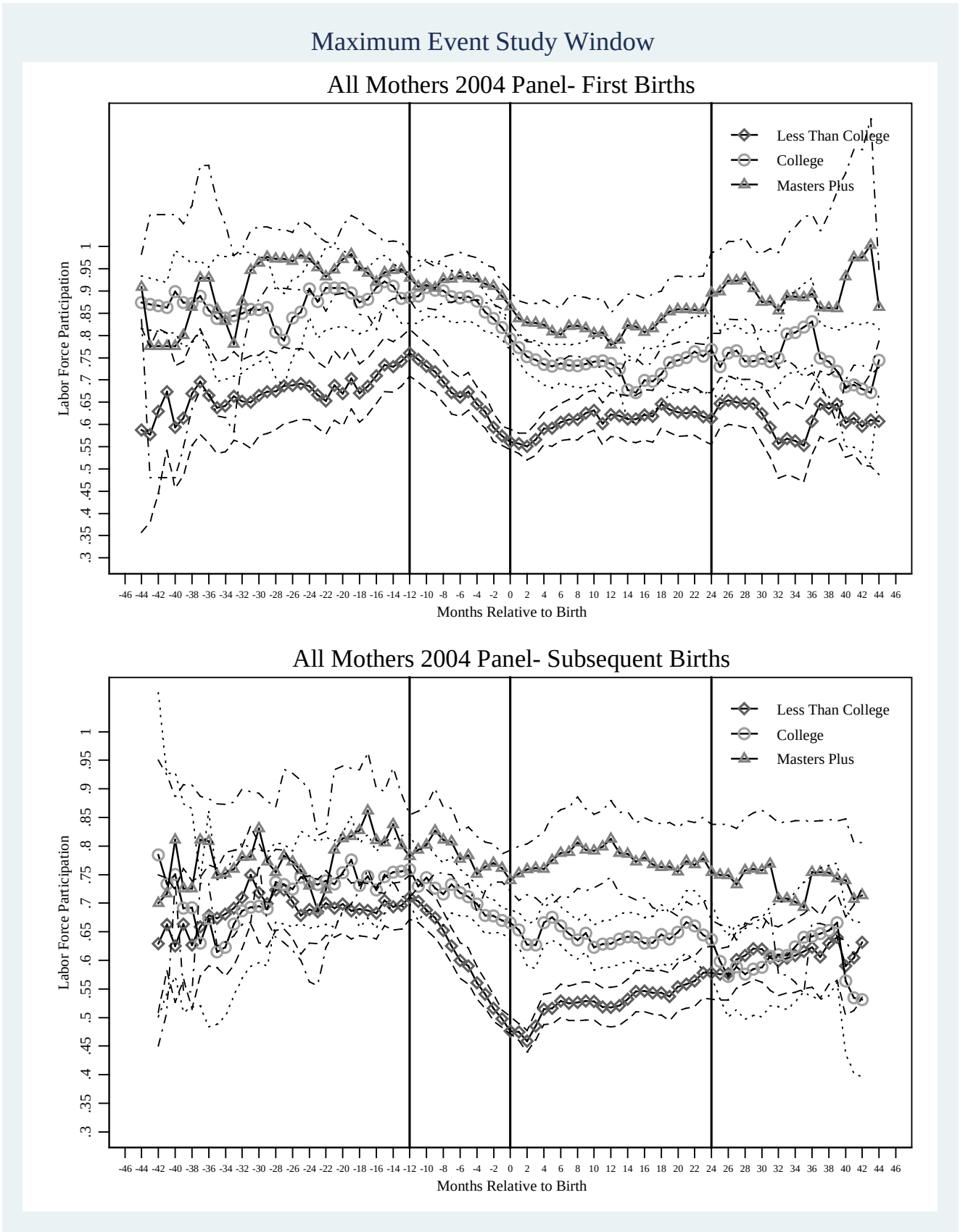
Jacobson, Louis S., Robert LaLonde and Daniel G. Sullivan. 1993. "Earnings Losses of Displaced Workers," *American Economic Review,* 83(4): 685-709.

Stone, Pamela. 2007. *Opting Out? Why Women Really Quit Careers and Head Home.* Berkeley, CA: University of California Press.

Taylor, Paul, Cary Funk, and April Clark. 2007. "From 1997 to 2007: Fewer Mothers Prefer Full-Time Work." Social & Demographic Trends Report. Washington, D.C.: Pew Research Center.

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

Appendix Figure 1. (Vertical lines indicate the -12 to 24 month window of the event study presented in the paper.)



V. Data Appendix

Unlike the Census or CPS, the SIPP is a panel survey that follows people not physical addresses over time. Members of originally sampled households are followed even if they leave their original residence, or even original household, unless they enter the military, are institutionalized or leave the country. People who enter households of original members are added to the survey sample. Because the SIPP is a nationally representative panel of up to 45,000 household and has a dynamic sample structure it is important to be attentive to issues of sampling, movement, attrition and non-response. The census bureau (which conducts the SIPP) provides weights that incorporate 1) a base weight that reflects the probability of selection from a sample unit – PSUs are determined based on the most recent US decennial census, 2) adjustments for movers in and out of the sample, 3) non-response adjustments, and 4) adjustments to correct for departures from know population totals. Regarding the fourth adjustment, there was only oversampling of subpopulations in the 1990 and 1996 panels. The Census Bureau also oversampled the low-income population for the 1996 Panel, using 1990 decennial census information. Finally, in the eighth of twelve waves of the 2004 panel, half of the households were dropped for budgetary reasons. The dropped households were selected randomly, however as will be discussed below, this is cause for caution in the later tails of the 2000s analysis.

The SIPP data files contain multiple weights that could potentially be used for the current analysis. Elements 2) – 4) above are assessed every month of the survey and each person is assigned a weight for each month. I choose to assign a single weight to each woman in my birth sample rather than allowing her weight to change over time. The first reason is practical--

Stata's panel regression commands do not allow a unit's weight to change over time. This choice also makes sense theoretically when using the data as a panel because I want each woman to have a certain "relevance" to the population that does not change over time. I have tested the sensitivity of the analysis to various choices of weight. Since my analysis is pegged to the event of giving birth I can select the woman's weight in the month that she gives birth. I have also experimented with the starting weight and the final weight of the panel for each woman. The census bureau also provides a single longitudinal weight for every person for whom data were collected for every month of the panel. Particularly in the case of the 2004 panel, the existence of longitudinal weights only for those present in every month is particularly restrictive since half of the sample was dropped. Since we still have close to three years of data for the dropped households, it seems "wasteful" to lose these observations.

I have conducted a series of tests of the sensitivity of my results to the use of no weights versus the various weighting choices, including limiting the sample to those women who have longitudinal weights. Ultimately, the choice of weights has a minimal impact on the results aside from the case of the 2004 panel. In the case of the 2004 panel, the results are not very different if I use no weights, start, birth, or final month weights. However, using the longitudinal weights shifts the level of labor force participation up across the entire time line by about seven percent, but leaves the general trend intact. When look at the results in levels, I see that the trend is almost identical to the results without weights except in the last year of the study. This clearly relates to the reweighting that took place after the sample was cut in wave 8. Delving into the 2004 sample we find that the sample that remained in was more likely to be in the labor force, than those that were removed from the sample. It also makes sense that natural attrition might come from those not in the labor force. The fact that the longitudinal weights do not correct for

this, suggests that they may not be accounting for all the necessary demographic dimensions in creating the weights. In a series of figures in the appendix, I show that the difference between using no weights, birth month weights and the longitudinal weights is almost completely eliminated if I restrict the sample to women who were in the labor force six months before birth. This suggests that the longitudinal weights underweight non-participants.

A final technical consideration relates to the change in SIPP structure and coding over time. The original plan in 1984 was for a panel of approximately 20,000 households to begin each year and run for three years each resulting in partially overlapping panels. By the 1990's the census bureau decided to launch larger panels every three to four years without overlap. The structure of the SIPP data files changed from a person wave format in the 1980's to a person month format in 1990 and most variable names change with the 1996 panel and remained consistent thereafter. For the most part, these changes do not pose any consistency problems in comparing the early to later panels, only careful file transformation and variable cross-walks. There are several considerations that should be noted about the 1980's versus the later panels. First, to create a similar size sample of births over a similar time span to those I collect in the 90s and 2000s, I pool together the 1984, 1985 and 1986 panels. Next, there are a few variables that have more detailed response choices in the later panels than they did in the 1980's. One notable example is the variable for educational attainment. The SIPP follows the change for this variable from 1980 to 1990 Census with the later variable providing much more accurate information on educational attainment beyond high school. Similarly detailed information is available in the SIPP topical modules in the 1980's but since the education module is early in the panel this may not accurate reflect the educational attainment of women who gave birth later in the panels. This leads to some ambiguity in distinguishing between some college, a bachelor's degree and a

graduate degree in the 1980's panels. There is also a complication that in the 1980's panels, children are given a parent location variable rather than separate mother and father variables. In the vast majority of cases this variable points to a female for newborn children. In cases where the newborn is linked to a man, but he has a spouse present, I link this birth to that spouse and consider her the mother.