

## To Work or Not to Work: The Economics of a Mother's Dilemma

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**Abstract:** Utilizing linked vital statistics, administrative employer, and state welfare records, the analysis in this paper investigates the determinants of a woman's intermittent labor force decision at the time of a major life event: the birth of a child. The results indicate that both direct and opportunity labor market costs of exiting the workforce figure significantly into that decision. Further, the analysis reveals the importance of including information about the mother's prebirth job when making inferences about the role various demographics play in the intermittent labor force decision.

JEL classification: J22, J13, J17, D01, D91

Key words: labor supply behavior, intermittent, labor market exit, labor leisure choice model

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## **I. Introduction and Background**

A vast literature quantifies the labor market penalty associated with a worker exhibiting intermittent labor force attachment. The penalty is typically measured in terms of lower wages accruing to workers who move frequently in and out, or who spend extended amounts of time out, of the labor market (Hotchkiss and Pitts 2005). A number of different hypotheses have been suggested to explain the intermittent wage penalty. It is typically assumed to be market-based and result from both employer and employee preferences and barriers to reentry into the market. While the presence of the penalty is fairly widely accepted, the source of the penalty has not been definitively identified, nor is it clear whether workers consider the penalty as a potential cost upon reentry in making the decision to exit.

The presence of this labor market penalty for intermittent behavior is particularly germane to the labor market experience of women, as they are much more likely than men to exhibit intermittent labor market behavior. Indeed, not only has intermittent labor market attachment been shown to lead to lower future wages, but it has also been shown to contribute significantly to observed wage differentials between men and women (Hotchkiss and Pitts 2007). One of the common events in a woman's life that is most likely to lead to an out-of-labor force spell is the birth of a child. Even more vast than the intermittent wage penalty literature is the literature documenting the important role that children play in the labor supply decisions of women (for example, see Blau and Kahn 2007 and Cohany and Sok 2007). Young children, in particular, are theorized to significantly increase the reservation wage of women, making mothers more likely to exit the labor force.

This paper links these two bodies of research by exploring whether a woman considers the potential costs of exiting the workforce when deciding whether to stop working after the birth

of a child. The costs are measured in terms of both opportunity costs and the future direct costs associated with a spell of labor market intermittency. The analysis makes use of a unique combination of administrative data to explore more dimensions of the labor force participation decision than has previously been possible. Birth records from vital statistics are combined with matched employer-employee administrative data over the period 1994-2002. These data provide a census of working mothers in the state of Georgia in this time period and contain detailed information on individual human capital, health, and labor market characteristics. The goal is to measure the extent to which the marginal costs and marginal benefits, and particularly, the potential labor market costs, guide the decision to exit upon the birth of a child.

The bulk of the literature on the question of women returning to work after having a child is focused on the specific policy impact of the availability of paid maternal or paternal leave (for example, see Burgess et al. 2008; Mogstad and Pronzato 2007; Ondrich, et al. 1996; Pronzato 2007; Rønsen and Sundström 2002; Joesch 1997; Waldfogel, et al. 1999; Kenjoh 2005; Gustafsson, et al. 1996; Pylkkänen and Smith 2004; and Ruhm 1998). These studies sometimes disagree about the importance of leave policies in affecting labor supply decisions, but they (and others) nearly unanimously agree that one of the strongest predictors of post-birth labor market participation is pre-birth labor market participation and intensity of that participation. The consensus is that more attached women (higher earnings, longer hours, etc.) are more likely to return to work and to return to work more quickly after giving birth (Joesch 1994, Klerman and Leibowiz 1994, Pronzato 2007); also those who more educated (with more education reflecting higher opportunity costs of absence from the labor market) are more likely to return to work (Kenjoh 2005). The analysis in this paper joins this latter literature by focusing on the role that direct and indirect labor market costs play in women's labor supply decisions; it improves upon

the previous literature in its exhaustiveness in measuring those costs and its ability to control for competing influences that determine a woman's reservation wage.

The unique contribution of this paper is the bringing together of various administrative data that provides detailed mother and child information for the population of women giving birth in Georgia between 1994 and 2002, geographic information related to where the mothers live through the Public Use Microsample of the Census, and detailed pre- and post-birth employment experience of the mothers as well as detailed information about the women's employers. The results indicate that women are assessing the relative costs and benefits of exiting the labor market upon the birth of a child, and that labor market experience and employer characteristics are particularly important in affecting labor supply decisions of women. In fact, we find that the estimated impact of demographic characteristics of the mother is substantially biased upward when these experience and employer characteristics are omitted.

In order to illustrate the inherent trade-off between higher current marginal utility of leisure and potential future labor market costs, this paper first presents the decision to exit the labor market in the context of a simple two-period life-cycle labor supply model. The theoretical model provides a framework to support the empirical analysis, which is a standard probability analysis of the decision to exit the labor market upon the birth of a child.

## **II. Theoretical Model**

A woman is assumed to choose levels of consumption ( $C_t$ ) and leisure ( $L_t$ ) that allow her to maximize the present value of her lifetime utility over two periods, subject to a budget constraint. The two time periods are the present (time period zero) and the future (time period

one).<sup>1</sup> The wage ( $W_t$ ) the woman earns in the future is a decreasing function of the amount of leisure she chooses today, thus incurring a wage penalty in the future as a result of present leisure consumption. The period one (future) wage penalty is market-based and could derive from employer preferences, barriers to reentry into the market, and/or human capital depreciation. Time is normalized so that the amount of leisure consumed in a period corresponds to the proportion of overall time during the period spent on leisure, the price of consumption is normalized to unity, credit markets are perfect with a borrowing and lending rate of  $r$ , and the rate of time preference is equal to  $\rho$ . Following Heckman and MaCurdy (1980) and MaCurdy (1981), the utility function is specified with contemporaneous strong separability:

$$\max_{L_t, C_t} \sum_{t=0}^1 \beta^t U(C_t, L_t) = \sum_{t=0}^1 \beta^t [g(C_t) + k(L_t)]$$

s. t.  $A_0 = \sum_{t=0}^1 \gamma^t [C_t - (1 - L_t)W_t]$  (1)

and  $0 < L_t \leq 1$

where  $\beta^t = 1/(1 + \rho^t)$  and  $\gamma^t = 1/(1 + r^t)$ . In addition,  $W_1 = W_1(L_0)$  where  $\partial W_1 / \partial L_0 < 0$  (period one wages are a decreasing function of the amount of time spent in leisure in period zero).<sup>2</sup> Women are assumed not to choose to spend 100 percent of their time working.

Conditions for an optimum require:

$$\frac{\partial g}{\partial C_t} = \lambda_0 (\gamma / \beta)^t \quad \forall t$$
 (2)

$$\mathcal{L}_{L_0} = \frac{\partial k}{\partial L_0} - \lambda_0 \left[ W_0 - \gamma(1 - L_1) \frac{\partial W_1}{\partial L_0} \right] \begin{cases} = 0 & \text{if } L_0^* < 1 \\ \geq 0 & \text{if } L_0^* = 1 \end{cases}$$
 (3)

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<sup>1</sup> Time period zero begins when the mother makes the decision to remain working or exit the workforce after the birth of a child.

<sup>2</sup> Lower returns to labor market activity in period one, reflected here through lower wages, may also manifest themselves in greater difficulty re-entering the labor market. This assumption reflects long-standing empirical evidence of the presence of a penalty associated with labor market intermittency. For example, see Polachek and Siebert (1993), Jacobsen and Levin (1995), Stratton (1995), Baum (2002), and Hotchkiss and Pitts (2005).

$$\mathcal{L}_{L_1} = \beta \frac{\partial k}{\partial L_1} - \lambda_0 \gamma W_1 \quad \begin{cases} = 0 & \text{if } L_1^* < 1 \\ \geq 0 & \text{if } L_1^* = 1 \end{cases} \quad (4)$$

$$A_0 = \sum_{t=0}^1 \gamma^t [C_t - (1 - L_t)W_t] \quad (5)$$

where  $\mathcal{L}$  is the Lagrangian and  $\lambda_0$  is the Lagrange multiplier associated with the budget constraint (or, the marginal utility of wealth in period zero).

If  $L_1^* = 1$  (the woman does not work in the future), then there are no labor market costs associated with choosing to exit the labor market now and constraint (3) becomes

$(\partial k / \partial L_0) - \lambda_0 W_0 \geq 0$ ; there is no longer an inter-temporal trade-off as a result of the choice of leisure in the present. However, if the woman does work in the future, this leads to an interior solution in period one ( $L_1^* < 1$ ) and constraint (4) becomes:

$$\lambda_0 = \frac{\beta}{\gamma W_1} \frac{\partial k}{\partial L_1}. \quad (6)$$

Substituting (6) into constraint (3) and letting  $k_{L_t} = \frac{\partial k}{\partial L_t}$  ( $t = 0, 1$ ) yields:

$$k_{L_0} - \frac{\beta k_{L_1}}{\gamma W_1} \left[ W_0 - \gamma (1 - L_1) \frac{\partial W_1}{\partial L_0} \right] \geq 0. \quad (3')$$

If the woman exits the workforce in the present period, then  $L_0^* = 1$  and constraint (3') becomes (re-arranging terms):

$$k_{L_0} \geq \beta \frac{k_{L_1}}{W_1} \left[ \frac{W_0}{\gamma} - (1 - L_1) \frac{\partial W_1}{\partial L_0} \right]. \quad (3'')$$

In words, this constraint indicates that in order for exiting the labor market upon the birth of a child (in period zero) to be the optimal choice for a woman, the marginal utility of leisure consumed in period zero has to be greater than the wages foregone (and interest lost on those wages) by not working in period zero  $\left(\frac{W_0}{\gamma}\right)$ , plus the cost of today's leisure on tomorrow's wages

$\left(\frac{\partial W_1}{\partial L_0}\right)$ ,<sup>3</sup> scaled by the amount of work in period one  $(1 - L_1)$ . This is represented in terms of the dollar value of the marginal utility of leisure consumed in period one  $\left(\frac{k_{L_1}}{W_1}\right)$  discounted back to period zero  $(\beta)$ . The empirical challenge is to identify individual, labor market, and job characteristics that affect the marginal utilities of leisure in the present and the future and the cost of today's exit decision on tomorrow's labor market outcome (reflected in equation 3" through  $\partial W_1 / \partial L_0$ ). While equation (3") is not the only constraint that must be satisfied for optimization, it is the one that directly reflects the inter-temporal labor market trade-off a woman faces in deciding whether to exit the labor force upon the birth of her child and, therefore, the one most relevant for the empirical analysis that follows.

### III. Empirical Model

The propensity for a woman to exit the workforce at the time of birth can be expressed in terms of the theoretical model in the previous section. The following observed indicator variable is defined for each woman (omitting the subscript  $i$  for ease of exposition):

$$e = \begin{cases} 1 & \text{if } k_{L_0} - \frac{\beta k_{L_1}}{\gamma W_1} \left[ W_0 - \gamma(1 - L_1) \frac{\partial W_1}{\partial L_0} \right] > 0 \\ 0 & \text{otherwise} \end{cases} \quad (7)$$

Assuming linearity and conditioning on working prior to birth, estimates for the following reduced-form stochastic equation are obtained via maximum likelihood probit:

$$\Pr(e_i = 1 | \text{working prior to birth}) = \alpha_0 + X_i' \alpha_1 + Y_i' \alpha_2 + Z_i' \alpha_3 + \varepsilon_i. \quad (8)$$

The probability of exiting the workforce after birth is determined by demographic, human capital, and geographic characteristics,  $X_i$ ; health characteristics of the woman and her child,  $Y_i$ ; and the characteristics of pre-birth firm and industry,  $Z_i$ , which are the focus of this paper.

Details of the regressors included in each of these vectors are in the next section. The

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<sup>3</sup> Recall that  $\partial W_1 / \partial L_0 < 0$ .

specification in equation (8) is modified to include time dummy variables to control for cyclical determinants of exit decisions. In addition, separate estimations are performed for women giving birth to their first child and women undergoing a subsequent birth, as these differential experiences have been found to induce distinct behavioral responses from women (Rosen and Sundstrom 2002).

The variables included in  $Z_i$  correspond to the firm and industry in which the woman was most recently employed prior to the birth of her child. One concern is that industry characteristics as determinants of a woman's exit decision might be endogenous. A woman might choose a specific industry anticipating intermittent labor market activity. However, Desai and Waite (1991) present evidence that women do not choose their occupation based on the expected ease of re-entry after exiting for child bearing and rearing. We would expect the potential for endogeneity of industry choice to be even weaker than endogeneity of occupational choice. Nonetheless, to mitigate this potential for bias, many demographic characteristics are included to help control for individual heterogeneity. Industry dummy variables are also included to draw any endogeneity bias away from the impact that specific characteristics of those industries might have on the exit decision. In addition, the industry characteristics of interest are those associated with the timing of the exit decision, and because these characteristics change over time, any remaining bias is expected to be negligible. Regrettably, there is no indicator for whether a woman has access to maternity benefits, but many of the employer characteristics and worker characteristics included in the analysis, such as firm size and industry and worker labor market experience, are associated with the likelihood that the firm offers maternity benefits (see Lovell et al. 2007 and Averett and Whittington 2001).

Factors affecting the individual's reservation wage, such as the demographic

characteristics included in  $X_i$ , and the health characteristics and welfare information, included in  $Y_i$ , will also impact the exit decision. Life style choices, such as smoking and prenatal care, also included in  $Y_i$ , are expected to tell us something about the rate of time preference and could also be related to exit decisions.

The overall health of the economy at the time of birth may also affect the mother's decision. A strong labor market increases the opportunity cost of being absent and should thus decrease the probability of exiting; this is the typical empirical relationship found between labor market strength and labor supply decisions (for example, see Hotchkiss and Robertson 2006). However, a strong labor market may also increase the confidence of the mother about finding a job when she returns to the job market, thus increasing her chances of exiting. Thus, the impact of a strong labor market cannot be determined *a priori*. The seasonally adjusted quarterly unemployment rate for the state is included to capture this relationship. Year dummy variables are also included separately in order to capture changes in exit decisions over time not explained by observed characteristics. Year dummies are also interacted with education and marriage indicators since some recent literature suggests that the relationship between these demographic characteristics and labor supply decisions has changed over the time period in this analysis (for example, see Bradbury and Katz 2005; Cohany and Sok 2007; and Hotchkiss, et al. 2010).

Geographic characteristics of the woman's county of residence are included as controls for differences in employment opportunities and resources available for working mothers, such as quality child care.

#### **IV. Data**

This paper utilizes Vital Statistics birth records from the State of Georgia for the period 1994 to 2002 linked with three sets of state administrative records and the Public Use

Microsample of the Census (PUMS). The first two, the Employer File and the Individual Wage File, are compiled by the Georgia Department of Labor for the purposes of administering the state's Unemployment Insurance (UI) program. The third data set contains Welfare Recipient Data from the Georgia Department of Human Resources. All the data used in the analysis are highly confidential and strictly limited in their distribution.

An obvious question is whether data from Georgia are sufficiently representative to be able to draw conclusions that could be generalized to the U.S. population of women. We have some evidence showing that the behavior of women in Georgia is comparable to that of women in the U.S. as a whole. As can be seen in Figure 1, the labor force participation rates among women in Georgia, while more volatile, exhibit the same pattern of increase through the mid-1990s, flatten out, then decline beginning in 1999. In addition, Figure 2 shows that the shares of total births by women with a high school or college degree are also comparable in GA and the U.S. These figures give us some confidence that the behavior and changes in behavior identified among women in Georgia are at least comparable to those of women in the rest of the U.S.

[Figures 1 and 2 here]

There may be additional concern about the ability to generalize the results in this paper to women outside of Georgia if women in Georgia faced maternity policy (restrictions or benefits) different from women in other states. In the United States, the over-arching Federal legislation governing leave from employment is the Family Medical Leave Act of 1993 (FMLA). The FMLA requires employers to provide up to 12 weeks in a calendar year of unpaid leave in the event of the birth of a child (or other similar or medical events).<sup>4</sup> This legislation covers women in all states equally. Some states provide for medical (including for birth of a child) leave that is

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<sup>4</sup> All public agencies and all private-sector employers of 50 or more workers for 20 weeks in the current or preceding calendar year are covered by the FMLA.

more generous than the FMLA.<sup>5</sup> California, New Jersey, and Washington are the only states that mandate paid maternity leave. California, Connecticut, Rhode Island, and District of Columbia extend the length of time employees are covered by the FMLA. District of Columbia, Kentucky, Maine, Minnesota, New Jersey, Oregon, and Vermont extend FMLA coverage to employers with fewer than 50 workers.

The vital statistics birth records contain demographic information for the mother and father, including age, race, education, and marital status, as well as information on behavior during pregnancy, adverse outcomes, comorbid conditions, and complications associated with either the mother or the infant. The Welfare Recipient data provides information on the level of TANF/AFDC benefits received in a quarter.

The Employer File provides an almost complete census of firms in non-farm sectors, covering approximately 97 percent of non-farm workers, with records on all UI-covered firms. The establishment level information includes the number of employees, the total wage bill and the NAICS classification of each establishment.<sup>6</sup> The Individual Wage File contains quarterly earnings information for all of those workers.<sup>7</sup> Regrettably, this data set contains no information about the worker's demographics (e.g., education, gender, race, etc.), thus making it impossible to draw a control group of women not giving birth. There is no specific information about the worker's job (e.g., hours of work, weeks of work, or occupation). The worker's earnings and

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<sup>5</sup> Details of state legislation is obtained from "State Family and Medical Leave Laws that Differ from the Federal FMLA," from the National Conference of State Legislatures (accessed 18 August 2010) <<http://www.ncsl.org/Portals/1/documents/employ/fam-medleave.pdf>>.

<sup>6</sup> White et al. (1990) provide an extensive discussion about the use of these employment data, commonly referred to as the Quarterly Census of Employment and Wages (QCEW), or ES-202 data.

<sup>7</sup> Included in earnings are pay for vacation and other paid leave, bonuses, stock options, tips, the cash value of meals and lodging, and in some states, contributions to deferred compensation plans (such as 401(k) plans). Covered employer contributions for old-age, survivors, and disability insurance (OASDI), health insurance, unemployment insurance, workers' compensation, and private pension and welfare funds are not reported as wages. Employee contributions for the same purposes, however, as well as money withheld for income taxes, union dues, and so forth, are reported even though they are deducted from the worker's gross pay.

employer information can be tracked over time and linked to the vital records data using an individual identifier.

A woman is defined as being in the workforce if she worked in any of the four quarters prior to the birth quarter. This definition of workforce participation is designed to capture women who are forced to take time out of their job due to pregnancy related issues and to remove issues of seasonality from the data. A woman is defined as exiting the workforce if she is not working in the second quarter after the birth quarter.<sup>8</sup> The earnings used to proxy for specific human capital are the highest quarterly earnings among the four quarters preceding the birth quarter, again in order to minimize any impact of pregnancy related illnesses. Georgia labor market experience and current job tenure are calculated using data on the three years prior to the occurrence of birth. Construction of these variables over a longer period of time is not possible due to data limitations.<sup>9</sup> The number of jobs worked in a quarter in the year preceding birth is constructed as the maximum number of jobs held in any quarter in the year prior to birth and is designed to capture the woman's attachment (or lack thereof) to any particular job.

If there is a high level of turnover in the industry, which might suggest low reward for job tenure, then the woman would expect the future cost for absence to be minimized. If an industry is creating jobs, then the opportunity cost for exiting the workforce would increase, as it is expected that a growing industry would also be experiencing future high wage growth due to higher demand for workers. Likewise, the cost for exiting an industry that is experiencing high

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<sup>8</sup> For example, if a woman gave birth in Quarter 4 of 2000 the pre-birth labor force status would be based on Quarter 4 of 1999 and the first three quarters of 2000 and the exit decision would be based on her labor market status in Quarter 2 of 2001. While the overall incidence of exit varies based on when an exit is defined, the pattern of exit rates over time are unaffected by when exit is defined (from two to five quarters from birth).

<sup>9</sup> As the employment data is limited to employment information for the State of Georgia, individuals who moved to Georgia in the three years prior to birth could have lower levels of labor market experience recorded than was actually incurred. Job tenure holds a special place in the analysis as it is expected to help proxy for the availability of maternity benefit, which may affect the exit decision, and it may also be related to whether a woman is expecting to return to the same employer post-absence. Considerations surrounding the return-to-work decision are the subject of a separate paper.

levels of job destruction would be lower due to a higher degree of uncertainty about future employment and lower expected future wage growth. Regressors are included to capture these effects of industry and firm dynamics on the woman's exit decision.

Job creation in the woman's pre-birth employment industry is measured by the share of jobs in that industry created due to the opening of a new firm or the expansion of an existing firm in the year prior to the exit decision. Conversely, job destruction is measured by the share of jobs in the woman's pre-birth employment industry that were lost due to closure or contraction of a firm in the year prior to the exit decision. The industry turnover rate is measured by the share of employees in the woman's pre-birth employment industry who were not employed by the same employer in the previous year.<sup>10</sup> A firm is considered to have just been born if there was employment in the last four quarters that was preceded by four quarters of zero employment. A firm is considered to be dying if within the next year there are four consecutive quarters of zero employment. A firm is considered to be contracting if the employment in the current quarter is less than employment in that quarter in the previous year and vice versa for expanding.

The prenatal care measure is captured by the number of prenatal care visits and the square of the number of prenatal care visits to capture the nonlinearity due to higher usage by at-risk mothers. The smoking and alcohol dummy variables are equal to one if the mother indicated the use of tobacco or alcohol during pregnancy. In addition, controls for infant health and medical risk factors for the mother, independent of pregnancy, are also included. The unemployment rate is the quarterly seasonally adjusted unemployment rate for the state of Georgia, obtained from the Bureau of Labor Statistics. County-level characteristics are obtained from Public Use Microsample of the Census and are included as controls for differences in

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<sup>10</sup> Job loss, job creation and the turnover rate are the average of the four quarters preceding the exit decision.

employment opportunities and resources available for working mothers, such as quality child care.

After excluding observations with missing data, the analysis is performed on 636,928 women who were in the Georgia workforce prior to giving birth for the years 1994-2002. The data were separated for analysis on the basis of whether this was a first birth (FB) for the mother, or a subsequent birth (SB) for the mother. The FB analysis includes 293,249 women and the SB analysis includes 343,679 women who had previously chosen to be a working mother and then gave birth to their second (or more) child. Because of our requirement that a woman be working at some point during the year prior to giving birth, we are likely to be excluding women from the SB analysis who have two births close together. Of course, this would be more of a concern if the U.S. (or Georgia) provided for family leave longer than 12 weeks. Nonetheless, all women included in both the FB and SB analysis have had some labor market activity in the year preceding the birth of their child.

The data means are presented in Table 1. Overall, approximately one-third of the women chose to exit the labor force upon the birth of a child. The average age was 25 for the FB and 28 for the SB birth group. FB mothers were less likely to be black than SB mothers (30.1 versus 40.5 percent), more likely to have 4 or more years of college (30.1 versus 20.7 percent), and had lower levels of AFDC/TANF benefits (\$26.91 versus \$75.29 per quarter, on average for the full sample), as would be expected. The racial difference in the two samples is due both to the fact that black mothers are more likely to continue to work after the birth of a child and that they have more children on average.

[Table 1 here]

Sixty-three percent of the FB sample and 65.1 percent of the SB sample were married,

with 21.5 and 19.0 percent of FB and SB, respectively, being single with a father named on the birth certificate. For the approximately 84 percent of observations with a father named (whether married or not), the average age of the father was 28.2 for FB and 30.7 years for SB. As with the mothers, a much larger share of the fathers are black in SB than in FB while the average education of the father is lower for SB than FB.

There does not appear to be any systematic differences in the industry and firm characteristics for the two groups. The average firm has approximately 2500 workers and 27 establishments. The median quarterly earnings are \$3,733.28 for FB and \$4,319.87 for SB. Over the three years prior to giving birth, both groups have almost nine quarters of experience, have changed labor market status an average of three times, have just over five quarters of job tenure, and have held an average of approximately 1.4 jobs per quarter.

## **V. Results**

The first set of results are probit estimates of equation (8) using the FB sample of women (column 2 in Table 2). The second set of results corresponds to estimation of the same model, but uses only SB mothers; in this case the analysis examines the impact of an additional child on the work decision, given that the woman has already chosen to be a working mother (column 3 in Table 2). The expectation is that factors influencing the decision to exit the labor market for these women will be different than for FB mothers. All estimates are obtained conditional on the woman having been employed in any quarter during the year prior to giving birth.

[Table 2 here]

As previously discussed, the covariates used in estimation can be divided into roughly three categories: industry characteristics that reflect the potential opportunity and direct cost of absence from the workforce, demographic and human capital characteristics of the mother and

father, and medical factors corresponding to the mother and the child. Results for each of these categories are discussed in turn, based on average marginal effects.

#### A. Industry and Firm Characteristics

Industry and firm characteristics have estimated effects that line up with prior expectations. Women employed in industries with higher levels of job creation over the past year are less likely to exit the workforce after the birth of a child regardless of whether it is the first or subsequent birth. A ten percentage point increase in the share of jobs created in a quarter in the mother's industry of employment lowers the probability of exit by 0.2 percentage points for FB and 0.5 percentage points for SB. This suggests that rapidly growing industries signal higher opportunity costs of leaving, both in terms of current earnings and future earnings. Job destruction has the opposite effect; women employed in industries where jobs are being destroyed are more likely to leave the workforce, with the effect once again being slightly larger for the women who already have children. The results are similar at the firm level; working in a firm that has just been born within the last year decreases the probability of exiting while working in a firm that is dying or contracting increases the probability of exiting.

Industries with larger numbers of establishments are associated with higher probabilities of exit for both the FB and SB samples, likely indicating a greater expectation of finding a job in the future. However, larger average firm size within the industry and larger firm size are associated with lower probabilities of exit; perhaps suggesting that larger firms are better able to make accommodations for working mothers.

#### B. Human Capital and Demographic Characteristics

The woman's own labor market experiences are very important in determining exit. The impact on workforce exit of multiple labor market changes in the year preceding the woman's

pregnancy is substantial and very precisely estimated. A one unit increase in the variable, from two job changes to three, for example, increases the probability of exit by approximately two percentage points. This seems reasonable, as a higher number of job changes could indicate both a lack of attachment to particular jobs as well as confidence in the ability to find other jobs, both of which would lower the marginal cost of any given exit decision. The effect of tenure on the current job is also as anticipated; an additional quarter of tenure on the current job lowers the probability of exit by just over half a percentage point. More job tenure means a higher level of firm-specific human capital, the return to which would be lost upon exit.

Women holding multiple jobs in a quarter are much less likely to exit the workforce. For example, increasing the number of jobs by one lowers a woman's exit probability by over six percentage points for both FB and SB mothers. Holding multiple jobs prior to the birth of a child most probably signals a poverty effect, which would tend to increase the marginal cost of an exit.

The woman's own quarterly wage from the year prior to the birth of the child has the expected negative impact on the probability of exit. Higher paid women face higher opportunity costs and therefore a higher penalty for leaving the workforce. The results indicate that a \$1000 increase in quarterly wages is associated with about half a percentage point decrease in the probability of workforce exit.

Some of the most interesting results relate to the impacts of the mother's and the father's educational attainments. These coefficients are estimated very precisely and are similar in both of the models. A woman who has not completed high school is about two percentage points more likely to exit work than women with high school diplomas, likely reflecting the lower opportunity cost experienced by the lowest educated workers. Women with educational attainment above the high school level have much lower probabilities of leaving the workforce.

The impact of the father's education level differs sharply from that of the mother. If the infant's father has not completed high school, the mother's probability of exit is almost two percentage points lower than for fathers with a high school diploma, holding constant the educational level of the mother. On the other hand, if the infant's father has four or more years of college, the woman is substantially more likely to exit, by nearly ten percentage points for the FB sample and by over seven percentage points for SB. Note that these results pertain to the almost 85 percent of the sample that has a father named on the birth certificate. The model also includes marital status; being married raises the probability of exit by almost 6 percentage points for FB mothers but has no significant effect in the SB sample.

Medicaid status has a strong positive impact on the probability of the mother's exit from the workforce; the effect is around five percentage points for both groups. This result could reflect opportunity cost – if one's best option is a low-paying job, the costs of child care can outweigh the gains from working. Another possible interpretation is that the incentive to work is lower if one faces the loss of medical benefits for the new infant. Similarly, women with higher TANF (or AFDC, in the earlier years) benefits immediately after giving birth are more likely to exit the workforce, all else equal, but only very marginally.

The demographic and economic characteristics of the women's geographic locations also influence their decisions regarding exit from the workforce after the birth of a child. The percent of the mother's county of residence that is urban and the county median income are both included to measure these influences. These variables both have positive impacts on the probability of exit. Holding the percent urban constant, higher median income probably indicates greater general prosperity; hence women are more likely to exit the workforce. Women who live in more urbanized areas possibly face greater and more varied re-entry employment

opportunities, whether they are first time mothers or working mothers; this lower marginal cost of an exit means that they are more likely to choose to exit the workforce. The overall unemployment rate has only a very small and imprecisely estimated impact on labor force exits; this probably results from the inclusion of the woman's own employment and employer characteristics.

### C. Health Characteristics

The set of variables that capture aspects of the infant's and the mother's health and behavior yield some interesting findings. Mothers are more likely to exit the workforce if their infant is premature or low birth weight, with somewhat stronger effects for SB women. However, once birth weight and gestation length are controlled for, congenital anomalies such as downs syndrome or heart problems have only small and insignificant impacts on returning to the workforce. The mother's health problems have no impact on her exit decision, so that presumably if the mother was able to work prior to the birth of the child with the health conditions, birth does not alter behavior. Another plausible explanation is that the need for group health insurance is offsetting the increased opportunity cost of work.

Birth certificate data contain two self-reported variables that indicate whether the mother used alcohol or tobacco products during the pregnancy. Both variables have positive and precisely estimated coefficients for SB mothers. Alcohol use increases the probability of exit by about 3.4 percentage points and the use of tobacco increases the probability of exit by 0.6 percentage points. Because both tobacco and alcohol use during pregnancy are strongly discouraged, the fact that these women reported this behavior suggests that they have a high rate of time preference. This, in turn, suggests that they might tend to discount any costs associated with leaving the workforce. For the FB sample, the effects of alcohol and tobacco use are very

small and are not significantly different from zero.

## **VI. Importance of Accounting for Health and Job Characteristics**

A primary contribution of this paper is the ability to link detailed health and employer characteristics to the labor supply decisions of women. In order to illustrate the marginal contribution of this information, both models are re-estimated without the novel regressors. Coefficients on two variables typically of particular interest, education and marital status, are compared across the two models to determine how health and employer related characteristics contribute to the understanding of women's labor supply decisions. These results are presented in Table 3. Column one of each table presents the results for the traditional labor supply model that includes demographic and geographic characteristics, local economic conditions, the age, education, and race of the father as a proxy for spousal income, other income, and year effects. The health characteristics of the mother and child are added in column 2 and the characteristics of the mother's pre-birth industry, firm, and employment are added in column 3.

[Table 3 here]

In general, the exclusion of the characteristics of the mother's pre-birth industry, firm, and employment leads to an overstatement of the effect of education and marriage on the exit decision. The negative effect of four or more years of college education in the FB declines only slightly from a negative 9.0 to a negative 8.8 with the inclusion of the health characteristics. However, the inclusion of the pre-birth employment-related characteristics results in a relatively large decline to a negative 6.6 percentage points. The impact of having less than a high school education, however, dropped from an estimated 7.2 percentage point increase in exit probability to only a 2.1 percent increase when employment characteristics are included. A similar trend

holds in the SB sample, with the marginal impact of a college degree dropping from -11.2 percentage points to -7.5 percentage points.<sup>11</sup>

The coefficients on the married dummy and the single-father named dummy show the similar result of the effects being overstated in the models that exclude employment conditions. There was a slight increase in the effect of marriage with the inclusion of the health variables but then substantial declines once employment-related conditions are included. The pattern for single-father named is similar, with the effect in the final model dropping to virtually zero for both groups. In general it appears that the inclusion of the employment-related variables allows for a better separation of the effect of education and marital status from the effect of human capital.

## **VII. Conclusion**

Consistent with much of the previous literature on labor supply decisions of women after giving birth, the primary conclusion from the analysis in this paper is that women appear to be responding rationally to the costs and benefits associated with the decision to exit the labor market at the birth of a child. In other words, after controlling for a myriad of demographic, human capital, health, and labor market characteristics, women appear to be accurately assessing the potential opportunity and direct labor market costs of their exit decision.

In general, the results provide fairly consistent evidence that the higher the marginal utility of not working (higher reservation wage), the higher the probability of observing a woman exit the labor market. For example, health concerns of the child, such as low birth weight and premature birth increase the exit probability. Being married and having a husband with more education also leads to a higher reservation wage and greater likelihood of exiting. In addition,

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<sup>11</sup> The parameter estimates are statistically different from one another based on a standard chi squared test.

higher rates of time preference, as demonstrated through smoking and alcohol use during the pregnancy, leads to a greater probability of exiting.

The analysis has also provided more detailed evidence than has been previously available in the literature concerning the impact of pre-birth employment characteristics on the decision to exit the labor market. Industries with lower levels of job creation and higher levels of job destruction offer lower opportunity costs to leaving employment. Women employed in industries with these characteristics (and firms with similar characteristics) are estimated to be more likely to exit the labor market after the birth of a child. In addition, higher earning women face a higher opportunity cost to exiting, and these women are less likely to exit. Factors that reduce the risk of not finding a job upon reentry, such as employment in a relatively large industry or firm, are associated with higher estimated probabilities of exit. These result suggests the presence of powerful tools if policy makers desired to affect labor supply decisions of women. While specific policy goals are left to a different forum, the tools are clear. Any measures designed to alter the cost of exiting will be effective in influencing decisions toward that end.

Further analysis showed that exclusion of regressors accounting for characteristics of the mother's pre-birth industry, firm, and employment results in an overstatement of the importance of education and marriage on the exit decision, even after controlling for the health of the mother and infant. This is notable as much focus has been placed on the role these characteristics play in the labor supply decisions of women.

## References

- Averett, Susan L. and Leslie A. Whittington. "Does Maternity Leave Induce Births?" *Southern Economic Journal* 68(2) (2001): 403-17.
- Baum, Charles. "The Effect of Work Interruptions on Women's Wages." *Labour* 16 (March 2002): 1-36.
- Blau, Francine D. and Lawrence M. Kahn. "Changes in the Labor Supply of Married Women: 1980-2000". *Journal of Labor Economics* 2007, 25, 393-438.
- Bradbury, Katharine and Jane Katz. "Women's Rise: A Work in Progress." *The Federal Reserve Bank of Boston Regional Review* 14(3) (Q1 2005): 58-67.
- Burgess, Simon; Paul Gregg, Carol Propper and Elizabeth Washbrook. "Maternity Rights and Mothers' Return to Work." *Labour Economics* 15 (2008) 168-201.
- Cohany, Sharon R. and Emy Sok. "Trends in Labor Force Participation of Married Mothers of Infants." *Monthly Labor Revie.* V 130, No.2 pp. 9-16.
- Desai, Sonalde and Linda J. Waite. "Women's Employment during Pregnancy and After the First Birth: Occupational Characteristics and Work Commitment." *American Sociological Review*, 1991, Vol. 56 (August: 551-556).
- Golden, Claudia. 2006. "Working it Out." *New York Times*. March 15, sec. A.
- Gustafsson, Siv S.; Cécile M.M.P. Wetzels, Jan Dirk Vlasblom and Shirley Dex. "Women's Labor Force Transitions in Connection with Childbirth: A Panel Data Comparison between Germany, Sweden and Great Britain." *Journal of Population Economics* (1996) 9:223-246.
- Heckman, James J. and Thomas E. MaCurdy. "A Life Cycle Model of Female Labour Supply." *Review of Economic Studies* 47 (1) (January 1980): 47-74.

- Hotchkiss, Julie, L. and M. Melinda Pitts. "The Role of Labor Market Intermittency in Explaining Gender Wage Differentials" *American Economic Review Papers and Proceedings* June, 2007, 97(2), 417-421.
- Hotchkiss, Julie L. and M. Melinda Pitts. "Female Labor Force Intermittency and Current Earnings: A Switching Regression Model with Unknown Sample Selection" *Applied Economics* March 2005; 37: 545-60.
- Hotchkiss, Julie L.; M. Melinda Pitts; and Mary Beth Walker. "Assessing the Impact of Education and Marriage on the Labor Market Exit Decisions of Women." *Federal Reserve Bank of Atlanta Working Paper #2010-2* (February 2010).
- Hotchkiss, Julie L., and John C. Robertson. "Asymmetric Labor Force Participation Decisions over the Business Cycle: Evidence from U.S. Microdata." *Federal Reserve Bank of Atlanta Working Paper 2006-8* (July 2006).
- Jacobsen, Joyce P. and Laurence M. Levin. "Effects of Intermittent Labor Force Attachment on Women's Earnings." *Monthly Labor Review* (September 1995): 14-9.
- Joesch, Jutta M. "Children and the Timing of Women's Paid Work after Childbirth: A Further Specification of the Relationship." *Journal of Marriage and Family* 56(2) (May 1994): 429-440
- Joesch, Jutta M. "Paid Leave and the Timing of Women's Employment Before and After Birth." *Journal of Marriage and Family* 59 (November 1997): 1008-1021.
- Kenjoh, Eiko. "New Mothers' Employment and Public Policy in the UK, Germany, the Netherlands, Sweden, and Japan." *Labour* 19 (Special Issue) 5-49 (2005).
- Klerman, Jacob Alex and Arleen Leibowitz. "The Work-Employment Distinction among New Mothers." *The Journal of Human Resources* 24(2) (1999): 277-288.

- Lovell, Vicky; Elizabeth O'Neill; and Skylar Olsen. "Maternity Leave in the United States: Paid Parental Leave is Still Not Standard, Even Among the Best U.S. Employers." *Institute for Women's Policy Research Fact Sheet*, IWPR #A131 (August 2007).
- MCurdy, Thomas E. "An Empirical Model of Labor Supply in a Life-cycle Setting." *Journal of Political Economy* 89(6) (December 1981): 1059-85.
- Polachek, Solomon William and W. Stanley Siebert. *The Economics of Earnings*, (Cambridge University Press) 1993.
- Mogstad, Magne and Chiara Pronzato. "Are Single Mothers Responsive to Policy Changes? The Effects of Limiting Out-of-Work Benefits on Employment, Education, and Poverty." Mimeo Research Department, Statistics Norway. Undated.
- Ondrich, Jan; C. Katharina Spiess and Qin Yang. "Barefoot and in a German Kitchen: Federal Parental Leave and Benefit Policy and the Return to Work after Childbirth in Germany." *Journal of Population Economics* (1996) 9:247-266.
- Pylkkänen, Elina and Nina Smith. "Career Interruptions Due to Parental Leave – A Comparative Study of Denmark and Sweden." Department of Economics, Aarhus School of Business Working Paper 04-1 (2004).
- Pronzato, Chiara. "Return to Work After Childbirth: Does Parental Leave Matter in Europe?" Institute for Social & Economic Research Working Paper 2007-30 (November 2007).
- Rønsen, Marit and Marianne Sundström. "Family Policy and After-Birth Employment among New Mothers – A Comparison of Finland, Norway and Sweden." *European Journal of Population* 18: 121-152 (2002).
- Ruhm, Christopher J. "The Economic Consequences of Parental Leave Mandates: Lessons from Europe." *The Quarterly Journal of Economics*, February 1998.

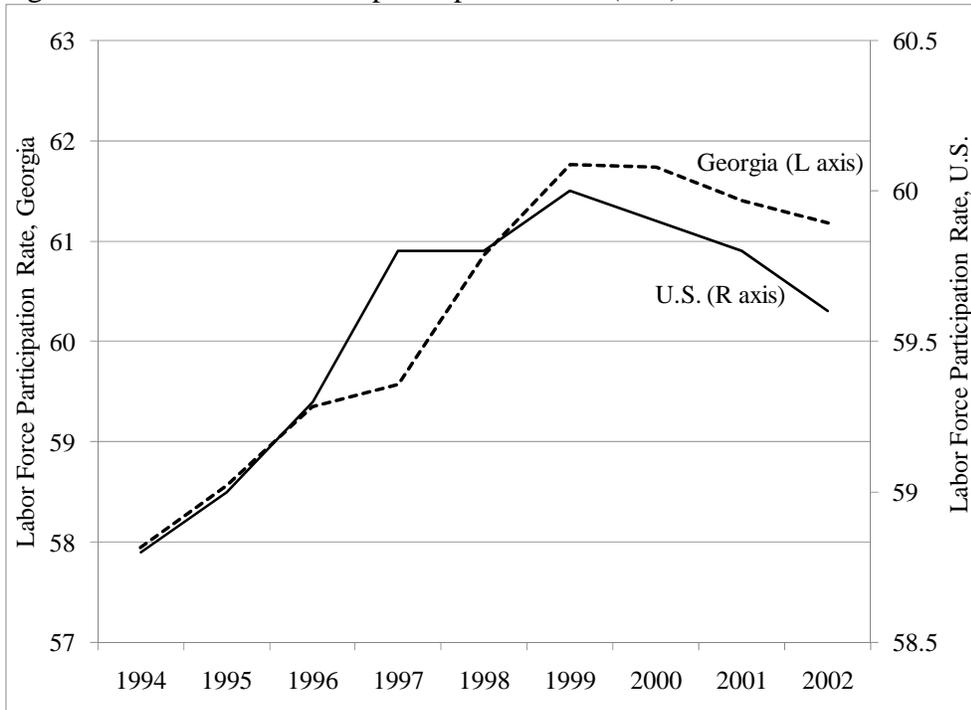
Waldfogel, Jane; Yoshio Higuchi and Masahiro Abe. "Family Leave Policies and Women's Retention After Childbirth: Evidence from the United States, Britain, and Japan."

*Journal of Population Economics* (1999) 12: 523-545.

Stratton, Leslie. "The Effect of Interruptions in Work Experience Have on Wages." *Southern Economic Journal* (April 1995): 955-70.

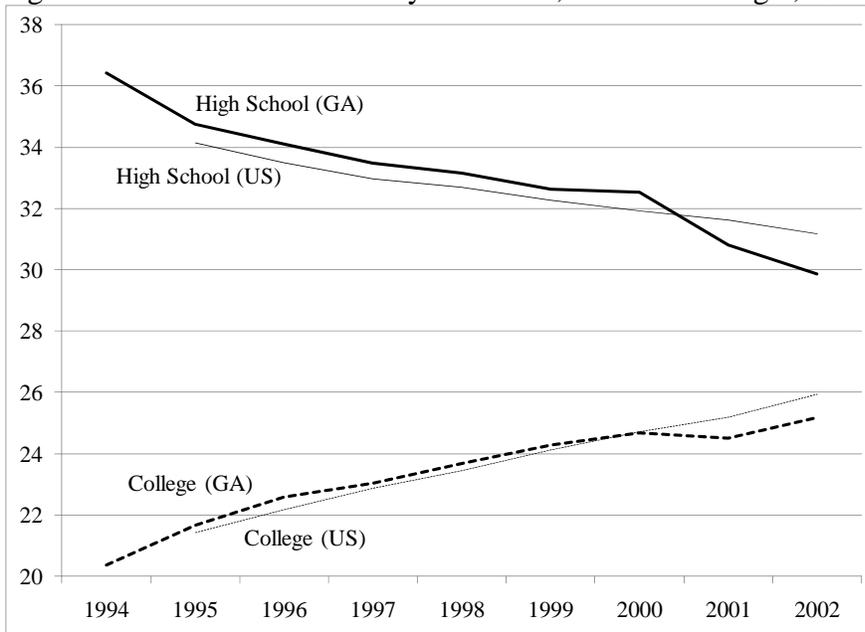
White, Sammis B.; John F. Zipp, William F. McMahon, Peter D. Reynolds; Jeffrey D. Osterman; and Lisa S. Binkley. 1990. "ES202: *The Data Base for Local Employment Analysis.*" *Economic Development Quarterly* 4 (August): 240-53.

Figure 1. Female labor force participation rates (16+) in the U.S. and in Georgia, 1994-2002.



Source: Current Population Survey; March of each year for Georgia, monthly average for U.S.

Figure 2. Share of total births by education, U.S. and Georgia, 15-49 year olds, 1995-2002.



Source: US. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics, Division of Vital Statistics, Natality public-use data 1995-2002, on CDC WONDER On-line Database, November 2005. <http://wonder.cdc.gov/natality-v2002.html> (accessed 12 August 2010).

Table 1. Sample means (std. dev.)

<b>Variables</b>	<b>First Birth Sample</b>	<b>Subsequent Birth Sample</b>
<b>N</b>	293,249	344,356
<b>Exit</b>	0.3269 (0.46919)	0.3347 (0.4719)
<b>Industry and Firm Characteristics</b>		
Share of Jobs Destroyed per Quarter	0.1610 (0.0631)	0.1628 (0.0644)
Share of Jobs Created per Quarter	0.1887 (0.0641)	0.1876 (0.0653)
Number of Establishments	61.6499 (58.8026)	58.6157 (57.0502)
Number of Employees per Establishment	18.0343 (29.9336)	19.7240 (31.6685)
Turnover	1.8514 (0.5769)	1.8539 (0.5894)
Average Industry Wage/1000 (\$)	7.0771 (3.6585)	6.9521 (3.4839)
<b>Firm Characteristics</b>		
Firm Size	25.3607 (56.3693)	25.2073 (57.3266)
Just Born	0.0259 (0.1589)	0.0255 (0.1575)
Dying	0.0096 (0.0976)	0.0130 (0.1133)
Contracting	0.3276 (0.4693)	0.3417 (0.4743)
Expanding	0.4816 (0.4997)	0.4678 (0.4990)
<b>Job Characteristics</b>		
Quarterly Earnings/1000 (\$)	6.1244 (12.6651)	5.2767 (10.1176)
Labor Market Experience	8.9751 (3.4239)	8.8196 (3.4230)
Number of Labor Market Status Changes	2.7373 (2.1742)	2.8489 (2.2827)
Current Job Tenure	5.3753 (4.0228)	5.4325 (4.1184)
Number of jobs per Quarter	1.4233 (0.6740)	1.3735 (0.6464)
<b>Mother's Characteristics</b>		
Age	25.1940 (5.6267)	27.7710 (5.6253)
Black	0.3013 (0.4588)	0.4047 (0.4908)
Hispanic	0.0220 (0.1468)	0.0285 (0.1664)
Less than High School Education	0.1401 (0.3471)	0.1779 (0.3824)

1-3 Years of College Education	0.2312 (0.4216)	0.2319 (0.4220)
4 or More Years of College Education	0.3013 (0.4588)	0.2070 (0.4052)
Married	0.6300 (0.4828)	0.6506 (0.4768)
Single - Father Named	0.2150 (0.4108)	0.1902 (0.3924)
Medicaid Recipient	0.3913 (0.4880)	0.4365 (0.4959)
AFDC/TANF Benefit Level	26.9142 (131.4023)	75.2915 (243.6732)
<b>Father's Characteristics (if named)</b>		
Father's Age	28.2454 (6.2867)	30.6742 (6.3715)
Father Black	0.2582 (0.4376)	0.3510 (0.4773)
Father Hispanic	0.0264 (0.1604)	0.0368 (0.1884)
Father Less than High School Education	0.1241 (0.3297)	0.1533 (0.3603)
Father 1-3 Years of College Education	0.2106 (0.4078)	0.2018 (0.4013)
Father 4 or More Years of College Education	0.3076 (0.4615)	0.2275 (0.4192)
<b>Geographic Characteristics</b>		
Percent of County that is Urban 2000	0.5220 (0.4426)	0.4989 (0.4456)
Median County Income/1000 (\$) 2000	44.6790 (11.2108)	43.4262 (11.0595)
Seasonally Adjusted Quarterly Unemployment Rate	4.3091 (0.4974)	4.2974 (0.5031)
<b>Infant Health Outcomes</b>		
Less than 32 Weeks Gestation	0.0196 (0.1387)	0.0171 (0.1297)
Any Congenital Anomaly	0.0107 (0.1031)	0.0101 (0.1000)
Single Birth	0.9854 (0.1198)	0.9841 (0.1251)
Birth weight less than 2500 grams	0.0851 (0.2790)	0.0713 (0.2573)
<b>Mother's Health and Behavior</b>		
Any Complication of Labor and Delivery	0.3488 (0.4766)	0.2495 (0.4327)
Mother Used Tobacco During Pregnancy	0.0737 (0.2612)	0.1118 (0.3152)
Mother Used Alcohol During Pregnancy	0.0068 (0.0821)	0.0093 (0.0961)
Number of Prenatal Care Visits	12.5324 (3.9286)	11.8988 (4.0949)
Number of Previous Live Births Now Living		1.5489 (0.9002)
Cardiac Disease	0.0025	0.0021

	(0.0498)	(0.0454)
Diabetes (non-gestational)	0.0180 (0.1328)	0.0204 (0.1413)
Renal Disease	0.0008 (0.0276)	0.0008 (0.0275)
Acute or Chronic Lung Disease	0.0018 (0.0428)	0.0019 (0.0433)
Chronic Hypertension	0.0060 (0.0773)	0.0072 (0.0848)

Table 2. Maximum likelihood estimates of the probability of exiting the labor force at time of birth; standard errors in parentheses, marginal effects in brackets.

Variables	First Birth Sample	Subsequent Birth Sample
<b>Constant</b>		
<b>Industry Characteristics</b>		
Share of Jobs Destroyed per Quarter	0.0984*** (0.0236) [0.0316]	0.1352*** (0.0215) [0.0422]
Share of Jobs Created per Quarter	-0.0578** (0.0293) [-0.0186]	-0.1508*** (0.0270) [-0.0471]
Number of Establishments/100	0.0008*** (0.0002) [0.0002]	0.0005** (0.0002) [0.0001]
Average Number of Employees per Establishment	-0.0021*** (0.0006) [-0.0007]	-0.0011** (0.0005) [-0.0003]
Turnover	-0.0233 (0.0202) [-0.0075]	-0.0129 (0.0188) [-0.004]
Average Industry Wage/1,000 (\$)	-0.0028 (0.0031) [-0.0009]	0.0015 (0.0030) [0.0005]
<b>Firm Characteristics</b>		
Firm Size (Number of Employees/100)	-0.0007*** (0.0001) [-0.0002]	-0.0005*** (0.0001) [-0.0002]
Just Born	-0.1168*** (0.0185) [-0.0361]	-0.1643*** (0.0175) [-0.0492]
Dying	0.5957*** (0.0267) [0.2054]	0.5083*** (0.0219) [0.1691]
Contracting	0.1088*** (0.0107) [0.0353]	0.0925*** (0.0101) [0.0292]
Expanding	0.0078 (0.0103) [0.0025]	-0.0142 (0.0098) [-0.0044]
<b>Job Characteristics</b>		
Quarterly Earnings/1,000 (\$)	-0.0163*** (0.0003) [-0.0052]	-0.0144*** (0.0003) [-0.0045]
Labor Market Experience	-0.0808*** (0.0010) [-0.0260]	-0.1015*** (0.0010) [-0.0317]
Number of Labor Market Changes	0.0652*** (0.0017) [0.0209]	0.0690*** (0.0015) [0.0215]
Current Job Tenure	-0.0192*** (0.0011) [-0.0062]	-0.0168*** (0.0010) [-0.0052]

Number of jobs per Quarter	-0.1915*** (0.0044) [-0.0615]	-0.2123*** (0.0042) [-0.0663]
<b>Mother's Characteristics</b>		
Age	0.0863*** (0.0050) [0.0071]	0.1084*** (0.0044) [0.0072]
Age Squared	-0.0013*** (0.0001)	-0.0016*** (0.0001)
Black	-0.0991*** (0.0109) [-0.0316]	-0.1204*** (0.0108) [-0.0375]
Hispanic	-0.0841*** (0.0199) [-0.0269]	-0.1236*** (0.0184) [-0.0385]
Less than High School Education	0.0617*** (0.0088) [0.0207]	0.0631*** (0.0074) [0.0205]
1-3 Years of College Education	-0.0514*** (0.0075) [-0.0169]	-0.0836*** (0.0068) [-0.0265]
4 or More Years of College Education	-0.2396*** (0.0208) [-0.0754]	-0.2634*** (0.0219) [-0.0804]
Married	0.1946*** (0.0564) [0.0581]	0.0586 (0.0554) [0.0173]
Single- Father Named	0.0520 (0.0532) [0.0159]	-0.0542 (0.0524) [-0.0165]
Medicaid Recipient	0.1581*** (0.0073) [0.0514]	0.1630*** (0.0064) [0.0515]
AFDC/TANF Benefit Level	0.0005*** (0.0000) [0.0001]	0.0002*** (0.0000) [0.0001]
<b>Father's Characteristics</b>		
Father's Age	0.0075** (0.0035) [0.0013]	0.0141*** (0.0032) [0.0014]
Father's Age Squared	-0.0001 (0.0001)	-0.0002*** (0.0000)
Father Black	-0.2949*** (0.0121) [-0.0915]	-0.2815*** (0.0115) [-0.0863]
Father Hispanic	-0.0974*** (0.0198) [-0.0316]	-0.1657*** (0.0177) [-0.0521]
Father Less than High School Education	-0.0569*** (0.0096) [-0.0173]	-0.0534*** (0.0082) [-0.0161]
Father 1-3 Years of College Education	0.0634*** (0.0082) [0.0198]	0.0561*** (0.0075) [0.0173]

Father 4 or More Years of College Education	0.2878*** (0.0090) [0.0938]	0.2291*** (0.0088) [0.0727]
<b>Geographic Characteristics</b>		
Percent of County that is Urban 2000	0.1343*** (0.0110) [0.0431]	0.0596*** (0.0103) [0.0186]
Median County Income/1,000 (\$) 2000	0.0005** (0.0003) [0.0002]	0.0596*** (0.0103) [0.0186]
Seasonally Adjusted Quarterly Unemployment Rate	-0.0253 (0.0161) [-0.0081]	0.0296** (0.0150) [0.0092]
<b>Infant Health Outcomes</b>		
Less than 32 Weeks Gestation	0.1137*** (0.0202) [0.0373]	0.1416*** (0.0197) [0.0452]
Any Congenital Anomaly	0.0106 (0.0243) [0.0034]	0.0219 (0.0234) [0.0069]
Single Birth	-0.3822*** (0.0211) [-0.1300]	-0.3423*** (0.0188) [-0.1122]
Birth weight less than 2500 grams	0.0312*** (0.0103) [0.0101]	0.0691*** (0.0103) [0.0218]
<b>Mother's Health and Behavior</b>		
Any Complication of Labor and Delivery	-0.0084 (0.0054) [-0.0027]	0.0045 (0.0055) [0.0014]
Mother Used Tobacco During Pregnancy	-0.0017 (0.0100) [-0.0005]	0.0175** (0.0078) [0.0055]
Mother Used Alcohol During Pregnancy	0.0165 (0.0308) [0.0053]	0.1064*** (0.0242) [0.0338]
Number of Prenatal Care Visits	-0.0016 (0.0019) [0.0003]	-0.0034** (0.0016) [-0.0002]
Number of Prenatal Care Visits Squared	0.0001** (0.0001)	0.0001** (0.0001)
Number of Previous Live Births Now Living	--	-0.0122*** (0.0029) [-0.0038]
Cardiac Disease	0.0143 (0.0512) [0.0045]	0.0244 (0.0519) [0.0076]
Diabetes (non-gestational)	0.0132 (0.0194) [0.0042]	-0.0295* (0.0170) [-0.0091]
Renal Disease	0.0254 (0.0901) [0.0081]	0.0336 (0.0838) [0.0105]
Acute or Chronic Lung Disease	-0.0461	-0.0209

	(0.0592) [-0.0145]	(0.0538) [-0.0064]
Chronic Hypertension	-0.0083 (0.0342) [-0.0026]	0.0408 (0.0285) [0.0127]

Notes: \*\*\* significantly different from zero at the 99 percent confidence level; \*\* significantly different from zero at the 95 percent confidence level; \*significantly different from zero at the 90 percent confidence level. Three digit industry dummy variables, year dummies, and year\*education and year\*marriage interactions are also included as controls.

Table 3. Maximum likelihood estimates of the probability of exiting the labor force; standard errors in parentheses, marginal effects in brackets.

<b>First Birth Sample</b>	<b>[1]</b>	<b>[2]</b>	<b>[3]</b>
Less than High School Education	0.1938*** (0.0084) [0.0722]	0.1858*** (0.0085) [0.0690]	0.0612*** (0.0089) [0.0205]
1-3 Years of College Education	-0.0675*** (0.0072) [-0.0240]	-0.0650*** (0.0072) [-0.0231]	-0.0511*** (0.0075) [-0.0168]
4 or More Years of College Education	-0.2656*** (0.0088) [-0.0903]	-0.2599*** (0.0088) [-0.0883]	-0.2081*** (0.0212) [-0.0661]
Married	0.3874*** (0.0518) [0.127]	0.4002*** (0.0518) [0.1307]	0.2457*** (0.0545) [0.0770]
Single - Father Named	0.2192*** (0.0512) [0.0688]	0.2251*** (0.0512) [0.0702]	0.0522 (0.0539) [0.0157]
<b>Subsequent Birth Sample</b>			
Less than High School Education	0.1846*** (0.0072) [0.0685]	0.1697*** (0.0072) [0.0627]	0.0627*** (0.0074) [0.0204]
1-3 Years of College Education	-0.1012*** (0.0065) [-0.0358]	-0.0973*** (0.0065) [-0.0343]	-0.0834*** (0.0069) [-0.0264]
4 or More Years of College Education	-0.3364*** (0.0085) [-0.1124]	-0.3255*** (0.0085) [-0.1087]	-0.2437*** (0.0125) [-0.0747]
Married	0.3311*** (0.0511) [0.1099]	0.3460*** (0.0512) [0.1142]	0.1007* (0.0539) [0.0313]
Single - Father Named	0.1735*** (0.0507) [0.0554]	0.1730*** (0.0508) [0.0548]	-0.0498 (0.0535) [-0.015]
Health Characteristics		Y	Y
Industry, Firm, and Employment Characteristics			Y

Notes: \*\*\* significantly different from zero at the 99 percent confidence level; \*\* significantly different from zero at the 95 percent confidence level; \* significantly different from zero at the 90 percent confidence level. [1] includes characteristics of the mother and father, geographic characteristics and year dummies; [2] adds in mother's health and behavior and infant health outcomes; [3] adds in industry, firm, and job characteristics plus 3-digit industry dummies.