Impact of First-Birth Career Interruption on Earnings: Evidence from Administrative Data

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Abstract: This paper uses unique administrative data to expand the understanding of the role women's intermittency decisions play in the determination of their wages. We demonstrate that treating intermittency as exogenous significantly overstates its impact. The intermittency penalty also increases in the education level of the woman. The penalty for a woman with a high school degree with an average amount of intermittency during six years after giving birth to her first child is roughly half the penalty for a college graduate. We also demonstrate the value of using an index to capture multiple dimensions of the intermittency experience, and we illustrate the importance of firm dynamics in the determination of a woman's wage.

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I. Introduction

A vast literature quantifies the labor market penalty associated with a worker who

exhibits 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, relative to those with continuous labor

market experience (for example, see Hotchkiss and Pitts 2005, 2007).[1] An equally vast

literature documents the important role that the presence of children plays in the labor

supply decisions of women (e.g., Blau and Kahn 2007; and Cohany and Soc 2007) and

what factors are important in women's labors supply decisions, specifically after giving

birth (e.g., Joesch 1994; Klerman and Leibowitz 1994; Kenjo 2005; and Pronzato 2007).

This paper marries these literatures by making use of some unique data sources to

investigate the labor market consequences of labor supply decisions made by a woman at

or shortly after the first birth of a child.

This paper makes four primary contributions to the literature. First, the analysis

exploits differences in pre-birth and post-birth employer characteristics to be able to

control for individual fixed effects expected to affect the woman's decision to be

intermittent. In addition, the ability to be able to control for detailed employment

characteristics is important as wages have been shown to vary significantly across firm

and industry characteristics (for example, see Cardoso 2000; Gannon et al. 2005; and

Hotchkiss et al., 2004). The second contribution of the analysis is the uncovering of

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[1] Also see Baum (2002), Jacobsen and Levin (1995), Stratton (1995), Sorenson (1993), and Mincer and Ofek (1982).

important variations across education level in both the penalty for intermittency and in the importance of accounting for endogeneity of the intermittency decision. The third primary contribution is the demonstration of the usefulness of using an index to capture multiple dimensions of a woman's intermittency experience; the index is less co-linear with other important wage determining characteristics, such as firm tenure, than each of its components individually. Finally, this research provides evidence on the importance of the demand side characteristics when examining issues of labor force attachment. Indicators such as the rate of turnover in the industry and the health of the firm of employment significantly alter the penalty for intermittency attachment.

II. Empirical Methodology

The analysis in this paper compares earnings of women with varying degrees of labor market intermittency in the sixth year after the birth of her first child. Since the analysis is restricted to women who are working both before and six years after the birth, we have a relatively homogenous sample of women who are, at least, loosely attached to the labor market.[2] The analysis makes use of a unique data set that combines vital statistics birth information with employment data. Vital Statistics birth records containing information on women giving birth in the state of Georgia between 1994-2002 are combined with matched employer-employee administrative data through 2008. These data provide a census of working mothers in the state of Georgia in this time period.

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[2] Since Kahn et al. (2014) find that selection into the labor market is most strongly influenced by children when women are young, we re-estimate the model on a sub-sample of older women (age $\geq$ 34) and find similar results to those reported here. The wage penalty is larger, but varies similarly across education levels. This suggests that generalizability is not severely compromised by focusing only on women attached to the labor market. Results available upon request.

A. The Earnings Equation

We assume that a woman's current (log) wages are determined as follows:

$$lnW_{i,t} = \beta_0 + X'_{i,t}\beta_1 + X'_i\beta_2 + \delta D_{i,t}ILFP_i + \varepsilon_{i,t} \qquad (1)$$

where $lnW_{i,t}$ is the log of a woman's real quarterly earnings, $X_{i,t}$ reflect current

employment characteristics, such as characteristics of the woman's employer, her tenure

with the employer, and various characteristics of the employer's industry; X_i reflect

demographic characteristics, such as education, age, race, and health of mother an child

at the time of giving birth; $D_{i,t}$ is equal to one if the woman has a child in the current time

period (rendering the intermittency decision relevant), zero otherwise; $ILFP_i$ is the

woman's intermittency experience during the five years after giving birth; and $\varepsilon_{i,t}$

contains unobserved current random determinants of the wage, plus unobserved random

components present at the time of giving birth. In other words, $\varepsilon_{i,t} = v_i + \xi_{i,t}$. Of

course, there is every reason to expect that a woman's intermittency decision ($ILFP_i$) will

be correlated with random factors at the time of giving birth (v_i), rendering $ILFP_i$

endogenous.

The timing of events in this model makes the standard instrumental variables (IV)

approach infeasible. The standard approach would require us to include future outcomes

(employment characteristics six years after giving birth) in the estimation of the

intermittency decision, which we believe fundamentally occurs at the time of, or shortly

after, giving birth. Alternatively, we transform the data by taking differences, which has

the effect of sweeping away the fixed effect component of the error term. Doing this also

sweeps away all other time-invariant characteristics. Since education, race, and health

factors of the infant and the mother are observed only at the time of birth, any potential

influence of these characteristics on wage determination will be captured by the fixed effect. The model will be estimated separately by education level to determine any variation in penalty along that characteristic. $ILFP_i$, however, remains as a regressor since $D_{i,t}$ is equal to one post-birth, but is equal to zero pre-birth, for all women.[3] In addition, all of the employment characteristics ($X_{i,t}$) remain as the difference between post-birth and pre-birth employment characteristics. The final estimating equation becomes:

$$\Delta lnW_{i,t} = \Delta X'_{i,t}\beta_1 + \delta ILFP_i + \Delta \xi_{i,t} . \tag{2}$$

Being able to interpret the results from this estimating strategy as causal depends on the endogeneity of a woman's intermittency decision being time invariant (swept away with differencing). Since we are modeling the woman's intermittency decision as one that takes place at a single point in time (after having just given birth to her first child), satisfaction of this assumption is trivial. As a robustness test, we do allow additional births in the intervening six year period to enter as a regressor (for a subset of the sample for which this information is available), with no appreciable effect on the results. Any other characteristics of the woman that change over time are not available, and we believe, in any case, that there is a very strong fixed component to unobservables, such as health status and productivity. It should also be noted that the results in this paper are, strictly, only generalizable to maternally-motivated spells of intermittency, although we haven't found any evidence that one "type" of intermittency should be expected to affect labor market outcomes differently than any other type of intermittency.

The employment characteristics included in the estimation include the woman's tenure with the employer; firm size; firm age; number of establishments the firm has;

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[3] Of course, in six years it is possible that the woman has given birth to a second, or third, child. We repeat the estimation on a reduced sample controlling for the number of siblings and obtain operationally equivalent results. Results of this robustness analysis are detailed below.

whether the firm is new, dying, contracting, or expanding; and the degree of labor market competition in the firm's industry and county. The model also contains several variables which measure labor demand factors that would be expected to affect the woman's individual earnings, such as the total employment in the industry, number of establishments in the industry, the level of turnover in the industry, and the average industry quarterly earnings.[4] In addition, the quarter of observation is included to control for seasonal variation in observed wages and the seasonally adjusted quarterly unemployment rate is included to control for economic conditions. Three digit NAICS industry fixed effects are also included -- these effects are identified by women who change industry of employment from pre- to post-birth, but are included to capture any industry specific determinants of wages that do not vary over time. These regressors are all measured as the difference between the value six years after giving birth and its pre-birth value.

B. Measuring Intermittency

An index of intermittency furing the five years after giving birth is constructed for each woman by combining the number of spells of absence from the labor force and the proportion of time spent absent from the labor force, which captures the average length of the spells of absence, weighted by the proportion of time in the labor force that was accrued since the last spell (this index was developed by Hotchkiss and Pitts 2005):

$$I_i = \left[\frac{n_i}{N_i}\left(\frac{1}{T_i}\sum_{j=1}^{n_i}L_{ij}\right)\right]^{\omega_i}, \tag{3}$$

where T_i = the total amount of time between the birth and observed earnings for person i;

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[4] Labor market competition is measured by a county/industry specific Hirfendahl-Hirschman Index (Hirschman 1964), which measures the degree of employment concentration (across firms) in the firm's industry and county. The higher is the index the more concentrated is employment and, hence, less competition in the labor market.

n_i = the number of spells of absence since birth for person i;
L_{ij} = the length of spell j for person i; and
ω_i = the percent of work life accumulated since last spell of absence for person i.

The number of spells (n_i) is scaled by the maximum number of periods observed in the data set between the birth year and year six (N_i); this ensures that each component of the index ranges between zero and one -- in this sample, the maximum number of spells observed is eight. Since we are using the earnings in year six after birth for each woman in the sample, the total amount of time since giving birth is the same for all observations, 20 quarters. As the number of spells and/or the length of a spell increases, the measure of intermittency increases. As the time since the last intermittent spell increases, the measure of intermittency decreases. Combining these factors allows the multi-dimensional nature of intermittent behavior to be captured in a single measure, which is likely more reflective of the way employers view intermittent behavior in making hiring and pay decisions. In other words, it is the combination of factors rather than the distinct components that matters to employers. In addition, whereas each of the components are highly co-linear with other wage-determining characteristics, such as firm tenure, the index is less so, allowing us to control for both the full nature of a woman's intermittency experience, plus other important employment factors. The importance of this feature of the index will be illustrated below.

III. Data

This paper utilizes Vital Statistics birth records from the State of Georgia for the period 1994 to 2002 linked with the Employer File and the Individual Wage File compiled by the Georgia Department of Labor for the purposes of administering the

state's Unemployment Insurance (UI) program. All the data used in the analysis are highly confidential and strictly limited in their distribution.

Although 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, all of this information is swept away with the fixed effect when the data are differenced. However, these vital statistics data give us the observations essential for the analysis, namely the population of women giving birth between 1994 and 2002, and the important education indicator that will allow us to perform the analysis by education status.

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.[5] The Individual Wage File contains quarterly earnings information for all of those workers.[6] 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 also no specific information about the worker's job (e.g., hours of work, weeks of work, or occupation). The worker's earnings and employer information

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[5] 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.

[6] 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.

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

Because the UI Individual Wage file contains a firm rather than establishment identifier, a choice of which NAICS code to assign to each worker who was employed by a multi-establishment firm is required. Following the Department of Labor convention, a 6-digit NAICS code is assigned based on the largest share of the firm's total employment. The NAICS code for that industry is used to estimate industry dummy variables at the three-digit level. Women working in the agricultural and mining industries are dropped due to poor coverage and industry size. In addition, nominal quarterly earnings are converted to real values using the 2005 chain weighted PCE index.

A woman is included in the sample if she worked in any of the four quarters prior to the birth quarter (establishing her connectivity to the labor market) and worked in any of the quarters in the 6th year after the birth of her first child (providing a post-birth employment observation). Pre-birth earnings are calculated as the highest quarterly earnings in four quarters preceding the birth quarter. Current earnings are the highest earnings in any quarter in the 6th year after the year of birth. Using yearly maximum earnings for current and pre-birth earnings minimizes any impact of pregnancy related illnesses (for pre-birth earnings) and seasonal factors (for both). Other current job or employer characteristics relate to the employer/job in which the woman earned that highest pay.

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 is a quarter of zero employment followed by three 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.

Competition the firm faces in its industry/county is proxied for using a Hirfendahl-Hirschman Index (Hirschman 1964), which measures the degree of employment concentration (across firms) in the firm's industry and county. The higher is the index the more concentrated is employment and, hence, less competition in the labor market. Average firm turnover in the industry is measured by the share of employees in the industry who were not employed by the same employer in the previous year.

A. Data Limitations

While these administrative data are quite rich in many respects, allowing us to observe characteristics about the mother and her employer that have previously been unobserved, they do suffer some limitations. First of all, the sample is limited to birth mothers who we are able to match to the Georgia Wage Files. However, of the over 460,000 women giving birth to their first child in this time period, 70 percent were matched to an employer in the year prior to the birth year.[7] Also, employment is defined only based on whether a woman is observed to be employed in the state of Georgia by an employer covered by UI -- employment outside of the state of Georgia (or in uncovered employment) will not be observed, so if the woman returns, that absence will be counted as a spell of intermittency. This also means that results are generalizable only to women in covered employment; this represents the vast majority of workers, however. Finally, there are no measures of hours of work. Quarterly earnings reflect both wages and hours, so if, for example, women with more intermittency are also more likely to work part-time,

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[7] We have no way of knowing how much of the non-matched 30 percent is the result of imprecise matching or the result of the mother simply not being in the workforce.

then any measured penalty will be over-estimated when interpreted as a wage penalty.

B. The Sample

After excluding observations with missing data, the analysis is performed on 191,125 women who were in the Georgia workforce prior to giving birth to their first child some time between 1994-2002 and were employed in the 6th year after the birth of the child. Heeding warnings of Bollinger and Chandra (2005), we do not eliminate outliers, although doing so does not affect the results.

Sample means are presented in Table 1. Overall, roughly two-thirds of the currently employed women have some absence from the work force during the five years after the birth of their first child. Among these women with at least some intermittency, the average value of the intermittency index is 0.55, the average number of spells with no work is 2.4, the average percent of time since the birth of the child with no work is 32 percent, and the average percent of the time since the birth of the first child that has occurred since the last spell of absence is 29 percent.

[Table 1 about here]

On average, women with no intermittency spells earn roughly 16 percent more than women who have some measure of intermittency. Women with some spell of intermittency tend to be slightly younger, are more likely to be black or Hispanic, are less likely to be married at the time of giving birth, and are likely to be less educated than women with no spell of intermittency. In her job six years after giving birth, the average woman has just over one and a half years of tenure with her employer. Of course, those with a spell of intermittency have much less tenure than those with no intermittency.

Figure 1 provides an initial glimpse as to the expected relationship between current earnings and past labor market intermittency across educational attainment. Among all education groups, average quarterly earnings are lower at higher levels of intermittency. However, it is not clear from the raw data that there is much difference in the relationship between intermittency and earnings across educational groups. For example, the most dramatic drop in wages come at the highest values of intermittency, but is roughly the same percentage drop across all education groups.

[Figure 1 about here]

IV. Results

Table 2 contains results from both the OLS estimation, where the intermittency index is treated as exogenous, and the fixed-effects estimation. The table also contains fixed-effects estimates from specifications where the intermittency index is replaced by each of its components, number of periods of absence, proportion of time out of the workforce, and percent of time since the last spell of absence.

[Table 2 about here]

Focusing first on the OLS (exogenous) estimation results, we see that the woman's characteristics perform as expected in explaining her earnings six years after giving birth to her first child. Earnings increase at a decreasing rate with age and increase with education. Most of the employment characteristics have a similar relationship across the OLS and fixed effects estimation. Greater tenure with her employer increases a woman's earnings; women earn more at larger firms with fewer establishments; and women earn more in larger industries and in industries with greater

average earnings.[8] In addition, firm dynamics operate similarly across specifications, with the exception of contraction -- women at new and expanding firms have higher earnings than women not at expanding or new firms and women at dying firms earn less than firms not dying.[9]

In the OLS specification, women employed by firms in more competitive labor markets (lower HHI), earn more. This relationship is reversed (and weakened) in the fixed-effects estimation, suggesting that there is some selection of higher earning women into more competitive labor markets. The impact of the total number of establishments in the woman's industry also reverses, becoming negative in the fixed-effects estimation; this suggests that higher earning women select into firms with a greater number of establishments. These selection effects, of course, disappear when the woman's fixed-effect is swept away by differencing the data. And, while a higher unemployment rate is associated with *higher* earnings in the OLS estimation, that relationship turns negative, as is more consistent with *a piori* expectations, in the fixed-effects estimation. Working in a contracting firm, as mentioned above, also changes sign from positive to negative. In addition, while working in an expanding firm maintains the same sign across specifications, the magnitude declines dramatically. This suggests that individual characteristics are more highly correlated with whether a woman works in an expanding or contracting firm more than the whether she works in a new or dying firm.

Turning now to the intermittency penalty, the top row of Table 2 indicates that the assumption of exogenous intermittency leads to an over-estimate of the penalty for intermittency. Based on the instrumented intermittency index, a woman experiences

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[8] See Hotchkiss et al. (forthcoming) for the consistency with earlier wage determination literature.
[9] These results are consistent with Hotchkiss et al. (2004) who find that new employment with an expanding firm results in greater earnings gains than new employment with a contracting or dying firm.

roughly 18 percent lower earnings if she goes from zero intermittency to the sample

average (for I>0) of 0.55. However, assuming intermittency is exogenous suggests that

an average level of intermittency reduces earnings by 51 percent.[10] Estimates on each of

the components illustrates how important the construction of an index that takes into

account all dimensions of a woman's intermittency is. Theoretically, more periods of

absence, a greater proportion of time absent, and the shorter amount of time since her last

spell should all work to reduce earnings. Indeed, an increase of ten percentage points in

the proportion of time spent out of the labor force lowers a woman's earnings by two and

a half percent, and increasing the amount of time since the last spell of intermittency by

ten percentage points increases a woman's earnings by nearly two percent.

Nonetheless, the results in Table 2 suggest that a greater number of periods of

absence *increases* a woman's earnings. As would be expected, however, each of these

components is highly co-linear with a worker's tenure with her employer. Re-estimating

the model without tenure produces larger impacts of intermittency (and each of its

components) and results in the expected negative impact of the number of periods.[11]

Combining the components into an index allows us to account for all dimensions of a

woman's intermittency as well as other important employment characteristics while

mitigating any confounding influences of multi-collinearity.

These fixed-effects results are in the ballpark of estimates of the impact of labor

market intermittency on earnings found by others (for example, see Mincer and Ofek

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[10] Since the data do not contain information about hours worked earnings penalties estimated here combine any incidence of lower wages with lower hours. This will only be a concern is women likely to exhibit greater intermittency are also more likely to work fewer hours. Consequently, earnings estimates reported in this paper should be considered upper bound estimates of a wage penalty.

[11] Parameter estimates for the model excluding tenure are -0.4715, -0.0371, -0.4418, 0.3530 for the intermittency index, number of periods of absence, total percent of time absent, and percent of time since last spell, respectively. All estimates are statistically significant at the 99 percent confidence level.

1982; Sorensen 1993; Jacobsen and Levin 1995; and Hotchkiss and Pitts 2005). For example, Shapiro and Mott (1994), who also looked at wages of women following the birth of their first child, find that women who return immediately to work experience a wage premium of roughly 19 percent. In contrast, Spivey (2005) finds that after controlling for labor market experience, there is very little impact of additional measures of non-employment. Here we see that not only does the amount of time absent (inverse of experience) matter but also the number of periods and the amount of time since last spell all contribute significantly, both collectively and separately, to the determination of a woman's earnings.

A. The Intermittency Penalty across Education Status

While many others have documented a significant negative relationship between a woman's education level and her level of labor market intermittency (for example, see Kenjoh 2005), Table 3 illustrates that the intermittency penalty also differs significantly across education status. A woman with less than a high school education and an average (for her education cohort) amount of intermittency faces a penalty of 14 percent lower earnings compared to a woman with the same education with continuous employment after the birth of her first child. By contrast, a woman with at least a college degree faces a penalty of 36 percent.

[Table 3 about here]

Across all education levels, it is the low earning women who select into intermittency. In other words, the unobserved component of a woman's wage determination (which is swept away as the fixed effect) is negatively correlated with her wage; when it is removed by differencing, the negative contribution of intermittency is

reduced. In addition, it appears as though intermittency and unobserved characteristics are most negatively correlated at the lowest education levels. Whereas in the model where intermittency is treated as exogenous there doesn't appear to be much difference in the contribution of intermittency to wage determination at different education levels (the coefficients are roughly the same), the penalty increases with education in the fixed effects model.[12]

B. Robustness

A complication of this data set and timing of events in the analysis is that the women in the sample could have experienced a subsequent birth in the intervening time period between the birth of the first child and year six. In addition, Troske and Voicu (2013) find that labor market outcomes vary by a woman's number of children. While data limitations prevent the inclusion of sibling data for all years, for first births between 1994-1996 it is possible to identify subsequent births that occur before year six. Thinking about the possibility of additional births in the intervening six years since a woman's first birth as a potential omitted variable, we re-estimated the model for this subset of years with and without an additional regressor indicating whether there were any additional births. In the wage equation, this regressor is equal to zero pre-first birth and equal to total number of children six years later.

The coefficient on the number of children in the intervening years is statistically significant -- each additional birth reduces a woman's wage by roughly three percent. However, inclusion of this additional regressor leaves the estimated impact of intermittency on her wage unchanged. The parameter estimate (and std. err.) is -0.3342

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[12] Results from Miller (2011) suggest that the timing of fertility decisions within one's career impacts the penalty and that the benefit of delaying fertility also varies by education level. Other than controlling for age, we do not account for the specific timing of fertility decisions by education status.

(0.0136) excluding the number of children, and is -0.3333 (0.0136) including number of children as a regressor.[13] Note that these estimates are also very close to that reported for the full sample of women in Table 2 (-0.3229). All of the results across education levels are also robust to the inclusion of this additional regressor.

V. Implications

This paper contributes to the understanding of the role labor market intermittency plays in the determination of women's wages. We find that women with an average amount of intermittency during five years after the birth of her first child experience earnings that are roughly 18 percent lower than a woman with no intermittency. We also show how useful the construction of an index to account for multiple dimension of intermittency is in order to isolate the effect of intermittency from other highly co-linear employment characteristics, such as tenure.

The importance of controlling for the endogeneity of the intermittency decision, which we do through a fixed-effects estimation procedure, is also demonstrated. Whereas the intermittency penalty appears to be similar across educational levels when treated exogenously (roughly 51 percent), the penalty increases with education in the fixed-effects estimation. This difference is fairly dramatic with the penalty for those with a college degree being more than two times larger than the penalty for a woman with a high school degree. Education does not insulate women from the penalties associated with intermittency, and, in fact, makes it even worse. Of course, this likely has a lot to do with the fact women in the control group (those with no intermittency) at higher education levels earn significantly more than women in the lower-education control

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[13] These estimation results are available upon request.

groups.

The ability of this analysis to control for the endogeneity of the women's intermittency decision is a direct result of observing these women in the labor market over an extended period of time, and having access to detailed information about the women's employers both before and after giving birth. We believe that the quality and reliability of the estimates of the impact of intermittency on women's wages presented here derives directly from the ability to use administrative data and from not having to rely on survey responses or samples of the population. The data also illustrate how important firm and industry dynamics, such as whether a firm is expanding or contracting, or the degree of worker turnover in an industry, are in the determination of a woman's wage. As such, these factors also likely play a role in a woman's assessment of the cost of her intermittency decisions.

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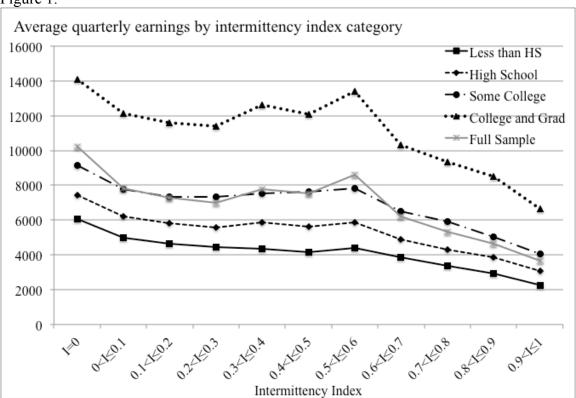
Figure 1.

Average quarterly earnings by intermittency index category

Table 1. Sample means (standard deviations in parentheses).

Variable	Full Sample	Intermittency Index=0	Intermittency Index>0
Real quarterly earnings	8157.079	9035.324	7762.917
	(4094.27)	(3902.826)	(4116.887)
Intermittency Index	.3819	0	.5533
	(.3768)		(.333)
Number of periods of absence	1.6849		2.4411
	(1.3913)		(.979)
Proportion of time spent out of the LM	.2191		.3174
	(.2563)		(.2529)
Percent of time since last spell	.5067		.2853
	(.4034)		(.2784)
Demographics at time of birth			
Age	24.8374	26.7555	23.9766
	(5.6391)	(5.4055)	(5.5285)
Black=1	.3578	.3264	.3718
	(.4793)	(.4689)	(.4833)
Hispanic=1	.0191	.0145	.0212
	(.1369)	(.1196)	(.144)
Less than HS=1	.1454	.0535	.1866
	(.3525)	(.225)	(.3896)
High school=1	.3499	.3137	.3662
	(.477)	(.464)	(.4818)
Some college=1	.2353	.2603	.2241
	(.4242)	(.4388)	(.417)
College or grad school=1	.2693	.3725	.223
	(.4436)	(.4835)	(.4163)
Married=1	.5824	.6972	.5309
	(.4932)	(.4595)	(.499)
Current employer characteristics (six years after birth)			
Tenure with employer	6.5668	14.3447	3.076
	(9.0341)	(11.7117)	(4.1652)
Employer Size (# wrkrs, 000)	3.0116	3.3423	2.8632
	(7.2408)	(7.0855)	(7.3046)
Employer # of establishments	3.0554	3.0374	3.0634
	(7.6291)	(7.4111)	(7.7249)
Employer birth=1	.0319	.0212	.0367
	(.1757)	(.1441)	(.188)
Employer death=1	.0013	.0007	.0016
	(.0361)	(.0263)	(.0398)
Employer contracting=1	.3539	.3667	.3481
	(.4782)	(.4819)	(.4764)
Employer expanding=1	.5592	.5589	.5594
	(.4965)	(.4965)	(.4965)
Employer age	44.7201	45.1111	44.5445
	(19.4753)	(16.6651)	(20.61)
Competition in industry/county	.4925	.521	.4797
	(.3606)	(.3593)	(.3604)
Ind. total no. of establishments (000)	7.292	6.6222	7.5926
	(7.6288)	(7.4886)	(7.672)
Industry total employment (0000)	14.8744	13.9479	15.2902
	(11.8774)	(11.2954)	(12.1066)

Variable	Full Sample	Intermittency Index=0	Intermittency Index>0
Average firm turnover in industry	80.5661	82.76	79.5814
	(8.4651)	(6.7713)	(8.9505)
Average industry quarterly earnings	9.6511	10.6936	9.1832
	(4.4887)	(4.3942)	(4.4518)
Unemployment rate (%)	4.6293	4.5137	4.6811
	(.7039)	(.5964)	(.7412)
Observations	191125	59206	131919

Notes: Earnings are deflated by the 2005 chain weighted PCE. Standard deviations in parentheses.

Table 2. Estimation of log quarterly earnings in year six after birth of first child, treating intermittency as exogenous versus fixed-effects estimation.

	Intermittency Index		Components of Intermittency Index		
	OLS Estimation (exogenous index)	Fixed-effects estimation	Number of Periods of Absence	Proportion of time out of Georgia Work Force Since Birth of First Child	Percent of Time since last spell of Intermit-tency
Variables		$\left[\left(\frac{n_i}{8}\right)\left(\frac{1}{20}\sum_{j=1}^{n_i} L_{ji}\right)\right]^{\omega_i}$	(n_i)	$\left(\frac{1}{20}\sum_{j=1}^{n_i} L_{ji}\right)$	(ω_i)
Intermittency Index	**−0.9249*****	**−0.3229*****	**0.0184*****	**−0.2539*****	**0.1704*****
	(0.0068)	**(0.0079)**	**(0.0021)**	**(0.0108)**	**(0.0077)**
Tenure with employer	0.0067***	0.0139***	0.0216***	0.0180***	0.0163***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0004)
Employer Size (# wrkrs, 000)	0.0082***	0.0055***	0.0058***	0.0057***	0.0057***
	(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Employer # of establishments	−0.0011***	−0.0015***	−0.0013***	−0.0014***	−0.0014***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Employer birth=1	0.0603***	0.0233*	0.0360***	0.0282**	0.0247*
	(0.0149)	(0.0127)	(0.0127)	(0.0127)	(0.0127)
Employer death=1	−0.3290***	−0.3704***	−0.3323***	−0.3717***	−0.3544***
	(0.0563)	(0.0266)	(0.0267)	(0.0267)	(0.0267)
Employer contracting=1	0.0855***	−0.0104	0.0046	−0.0070	−0.0042
	(0.0096)	(0.0070)	(0.0071)	(0.0071)	(0.0071)
Employer expanding=1	0.1035***	0.0126*	0.0243***	0.0156**	0.0170**
	(0.0094)	(0.0067)	(0.0067)	(0.0067)	(0.0067)
Employer age	0.0003***	0.0002	0.0002	0.0001	0.0002*
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Competition in industry/county (HHI)	−0.1149***	0.0136*	0.0141*	0.0151**	0.0138*
	(0.0073)	(0.0075)	(0.0076)	(0.0076)	(0.0076)
Ind total number of establishments (000)	0.0039*	−0.0070***	−0.0056***	−0.0063***	−0.0068***
	(0.0024)	(0.0015)	(0.0015)	(0.0015)	(0.0015)
Industry total employment (0000)	0.0192***	0.0036***	0.0022*	0.0030***	0.0031***

Variables	Intermittency Index		Components of Intermittency Index		
	OLS Estimation (exogenous index)	Fixed-effects estimation $\left[\left(\frac{n_i}{8}\right)\left(\frac{1}{20}\sum_{j=1}^{n_i} L_{ji}\right)\right]^{\omega_i}$	Number of Periods of Absence (n_i)	Proportion of time out of Georgia Work Force Since Birth of First Child $\left(\frac{1}{20}\sum_{j=1}^{n_i} L_{ji}\right)$	Percent of Time since last spell of Intermittency (ω_i)
	(0.0015)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
Average firm turnover in industry	−0.0078***	−0.0085***	−0.0066***	−0.0078***	−0.0078***
	(0.0003)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Average industry quarterly earnings	0.0425***	0.0099***	0.0143***	0.0117***	0.0117***
	(0.0011)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
Unemployment rate (%)	0.0138***	−0.0324***	−0.0388***	−0.0372***	−0.0344***
	(0.0036)	(0.0023)	(0.0023)	(0.0023)	(0.0023)
Age	−0.0026				
	(0.0035)				
Age squared	0.0003***				
	(0.0001)				
Black=1	−0.0274***				
	(0.0049)				
Hispanic=1	0.0837***				
	(0.0149)				
Less than HS=1	−0.1571***				
	(0.0069)				
Some college=1	0.1434***				
	(0.0056)				
College or grad school=1	0.5175***				
	(0.0065)				
Married=1	0.0657***				
	(0.0067)				
Father named=1	0.0374***				
	(0.0063)				

	Intermittency Index		Components of Intermittency Index		
	OLS Estimation (exogenous index)	Fixed-effects estimation	Number of Periods of Absence	Proportion of time out of Georgia Work Force Since Birth of First Child	Percent of Time since last spell of Intermit-tency
Variables		$\left[\left(\dfrac{n_i}{8}\right)\left(\dfrac{1}{20}\displaystyle\sum_{j=1}^{n_i} L_{ji}\right)\right]^{\omega_i}$	(n_i)	$\left(\dfrac{1}{20}\displaystyle\sum_{j=1}^{n_i} L_{ji}\right)$	(ω_i)
Constant	8.8398***	0.5465***	0.3165***	0.4496***	0.3087***
	(0.5112)	(0.0097)	(0.0100)	(0.0094)	(0.0089)
Number of Observations	191,125	191,125	191,125	191,125	191,125
R-squared	0.3831	0.1276	0.1205	0.1226	0.1223

Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Regressions include a full set of three digit NAICS industry fixed effects and quarter fixed effects. Industry/county competition is proxied by an industry/county specific Hirfendahl-Hirschman Index (Hirschman 1964), which measures the degree of employment concentration (across firms) in the firm's industry and county. The higher is the index the more concentrated is employment and, hence, less competition in the labor market. Earnings are deflated by the 2005 chain weighted PCE.

Table 3. Fixed-effects estimation of log quarterly earnings in year six after birth of first child, by education of the mother; OLS and fixed effects estimates.

	Coeff. on Intermittency Index (Std error)		
	Exogenous	Fixed-effects	Average intermittency index (if >0)
Full Sample	-0.9249***	-0.3229***	0.5533
	(0.0068)	(0.0079)	(0.3330)
Less than high school	-0.9852***	-0.2244***	0.6451
	(0.0189)	(0.0242)	(0.3291)
High school	-0.8638***	-0.2948***	0.5493
	(0.0104)	(0.0127)	(0.3386)
Some college	-0.8305***	-0.4074***	0.5210
	(0.0134)	(0.0158)	(0.3290)
College and graduate degree	-0.9787***	-0.7023***	0.5152
	(0.0149)	(0.0155)	(0.3162)

Notes: See notes to Table 3.