Mother's Employment by Child Age and its Implications for Theory and Policy

April 12, 2016

Robert Kaestner, University of Illinois at Chicago and NBER
Darren Lubotsky, University of Illinois at Chicago and NBER
Javaeria Qureshi, University of Illinois at Chicago

Abstract
We study the timing of mothers' decision to work following the birth of their children. We document a steady increase in employment that begins after the birth of their children and continues at least until their youngest child is sixteen years old. We go on to assess the causes of this pattern. Our evidence indicates that the rising employment profile is not caused by falling childcare costs, differences in wage opportunities, non-labor income, or a variety of other observable characteristics. Instead, our evidence is consistent with women's reservation wages falling as the value of staying at home declines.

JEL Codes: J13, J16, J22

I.   Introduction

A wide range of policies aim to increase employment rates among low-skilled people, particularly mothers because of their relatively low rates of employment and their relatively high use of social welfare benefits. The Earned Income Tax Credit, for example, is the largest cash transfer program for low-income Americans, but benefits are conditional on employment and are particularly large for families with children. Similarly, the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (i.e., welfare reform) had features that made receipt of benefits conditional on employment and employment-related activities such as job search. There are also an array of tax deductions and direct subsidies at the federal and state levels to subsidize child care expenses to encourage parents to work. Commensurate with the extent of policy in this area, there is a large academic literature on the effects of these programs on employment rates, most of which show that mothers' employment rates are responsive to incentives to work.[1]

Despite the many policies focused on their employment, mothers' employment rates are significantly below those of fathers' and of childless women. While it is well known that maternal employment is relatively low compared to other demographic groups, what is less widely known is that mothers' employment rates change significantly and with a marked pattern as their children age. Figure 1 shows mothers' employment rates in the week prior to each survey by the age of her child separately for each decennial Census from 1970 to 2010.[2] In 1970, 18 percent of mothers with a child less than one-year old worked and 46 percent of mothers with a sixteen years old worked. The gradient is less steep, but still present, in 2010. Employment rates rise from 59 percent among mothers who have a child less than one year old to 72 percent among mothers of a sixteen year old. The increase in maternal employment as children age is surprisingly smooth; it is not driven by rapidly increasing employment rates in the first few years after a child is born or sharp increases after a child is school age.

The pattern of employment observed in Figure 1 indicates that most mothers will eventually work and that by the time their youngest child is age 16 their rates of employment will be much

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[1] A few examples of this literature are: Meyer and Rosenbaum (2001) for an analysis of the EITC; Kaushal and Kaestner (2001) for an analysis of welfare reform; and Baker et al. (2005) for an analysis of child care subsidy. See Blau and Currie (2006) for a review of literature on effects of child care costs on maternal labor supply.

[2] Mothers who have multiple children will appear in the data underlying this figure multiple times. The interpretation of a point in the figure is the average employment rate among mothers who have a child of a particular age. Our data and sample construction are described in more detail in Section 2. We use the 2008-2012 5-year American Community Survey (ACS) and refer to it as 2010 or the "2010 ACS".

closer to that of fathers and childless women. However, the steady rise in employment as their children age is an important feature of mothers' labor market behavior that has not been adequately documented or studied, either from a theoretical or empirical standpoint.

The pattern of maternal employment displayed in Figure 1 motivates our analysis. First, we provide a detailed description of how mothers' employment rates change as their children age: how this pattern has changed between 1970 and 2010, and whether the pattern differs by socioeconomic characteristics. Then, using a basic model of labor supply, we investigate whether several of the most cited theoretical determinants of labor supply can explain the rising employment profile in Figure 1. In particular, we assess whether rising employment rates are due to changes in household composition including the number of children and mothers' marital status; changes in mothers' non-labor income including the earnings of her spouse; changes in the composition of women entering employment at different ages, as measured by their education and wage opportunities; and changes in child care costs as children age.

An additional contribution of our analysis is a new assessment of the effect of child care costs on mothers' employment. There is a broadly-held, popular perception that child care costs greatly inhibit mothers' employment.[3] The academic literature, however, is actually quite mixed as to whether child care cost are a substantial barrier to employment, and is generally hampered by a number of empirical problems. We build on a strand of this literature that assesses whether mothers' employment rates rise when their children become eligible for public school. Intuitively, the test of whether the availability of free public school affects mothers' labor supply is whether mothers' labor supply is "unusual" at age five or age six vis-à-vis the trend in employment as children age.

Our analysis indicates that education, marital status, number of children, and non-labor sources of income do not explain any of mothers' rising employment rates as children age. These observable characteristics are correlated with determinants of labor supply such as wage opportunities, and preferences for, and the productivity of, time spent at home, among other things. We also find that, conditional on observed determinants of wages, mothers who are employed when their youngest child is under three years old earn significantly higher (residual) wages than mothers who do not work until their child is older. Importantly, though, we find no relationship between (residual) wages and the age of the youngest child at which the mother re-enters employment after the child is three years old. This again suggests that the decision about when to return is largely

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[3] See, for example, the articles by Quart (2013) and DeSilver (2014).

unrelated to wage opportunities among women who remain out of the market for at least three years. We find that the availability of free public school is associated with a one to two percentage point increase in mothers' employment when children turn six years old with the effect being larger in 1970 and 1980 than in later years. However, even in 1970, when the effect on mother's employment is the largest, this effect is only 2.3 percentage points from a base employment rate of 40 percent, or a six percent effect. Overall, the inability to explain the rising employment pattern with standard explanations suggested by economic theory poses an important challenge and also suggests that the labor force participation behavior of mothers is driven by idiosyncratic factors not commonly part of the theoretical or policy discussions.

II. Mothers' employment rises steadily as children age

While it is widely recognized that employment rates among mothers with young children are lower than those of mothers with older children and childless women, the pattern of mothers' labor supply over a wide range of child ages is not well studied.[4] Virtually all studies of mothers' labor supply group mothers by a few categories based on their children's ages, for example, whether the mother has a child under age six or between the ages six to seventeen. In fact, to the best of our knowledge, there are no published studies that show the entire pattern of mothers' employment from birth through adolescence. Here we provide this information.

The data for our analysis comes from the 1970, 1980, 1990, and 2000 United States decennial censuses and the 2010 ACS.[5] Our sample includes all mothers who have a child aged zero to 16 in the household. We limited the sample of mothers to those aged 22 to 56 and who were aged 14 to 48 when they gave birth to their children. Employment is measured in the week prior to the survey, which for the 1970 to 2000 Censuses is April 1. The ACS is a year-round survey and the actual timing of the survey within the year is unknown. The averages underlying the figures in this section are presented in an appendix.

Figure 1 shows the unadjusted, average employment rates for mothers in this sample separately for each survey year. In each year there is a smooth, positive increase in mothers'

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[4] An early exception is Gronau (1974) who estimates the effect of children, by their age and mother's education, on mother's value of time and employment.

[5] Specifically, in 1970 we pool the 1% Form 1 State sample, the 1% Form 2 State sample, the 1% Form 1 Metro sample, and the 1% Form 2 Metro sample. Each of these is a one percent random sample of the population. In 1980 and 1990 we use the 5% State samples. In 2000 we use the 5% sample. As noted previously (footnote 2), we use the 2012 5-year American Community Survey, which pools 1% samples from 2008 through 2012 and refer to it as 2010. Data were acquired from IPUMS-USA (Ruggles et al 2015).

employment as her children age. The rise in employment is clearly present both in early years after a child is born and in years after a child is enrolled in school. In 1970, the employment rate rises by 28 percentage points as the child goes from age zero to 16. Only 12 of the 28 percentage point rise occurs by age six. Nine percentage points of the rise occur between ages 10 and 16, when children are becoming increasingly independent and require less childcare. Although the overall increase in employment is smaller in 2010, it is still the case that nearly half of the rise occurs after children are 10 years old.

Another distinctive feature of Figure 1 is that the change in mothers' employment between a child's birth and age 16 has diminished over time. In 1970, mothers' employment increases by over 28 percentage points. In 2010, employment increases by 12 percentage points. This pattern reflects the fact that employment rate of new mothers has been rising over time, from 18 percent in 1970 to 59 percent in 2010.

A final feature of the figure is that the increase in maternal employment as children age does not change noticeably at any particular age, even as children transition into school age when childcare costs fall dramatically with the availability of free public school. If the "free" child care associated with school enrollment is an important contributing factor to the overall rise in mothers' employment, we would expect to see sharp employment changes beginning with mothers of five and six year olds because about half of five year olds are enrolled in kindergarten and nearly all six year olds are enrolled in either kindergarten or first grade. Later analyses focus in more detail on whether there is evidence for a break in the trend increase in mothers' employment when children begin school.

These broad patterns of mothers' employment by age of child are also present when we stratify the sample by mothers' education and marital status. Figure 2 shows average employment rates in 1970 and 2010, separately for women who have at least some college education (though not necessarily a degree) and for women who have a high school degree or less education. The gradient in child age is present both for higher and lower educated women. In 2010, the employment rates converge slightly when children are under 10 years old, which reflects the fact that better educated women are more likely to work when their children are younger and less educated women enter the labor market more gradually. Figure 3 shows employment rates in 1970 and 2010 by marital status. While there is a faster rise in employment at earlier ages for unmarried women than married women in 2010, the gradient and smooth increase is present for married and unmarried women in both years.

Our focus thus far on employment (the extensive margin) conceals some changes in the intensive margin of hours of work. Figure 4 shows averages of three measures of employment in 2010: whether a mother reports that her usual weekly hours are 40 or greater (full-time employment); whether she reports working 20 hours or greater; and whether she is employed at any hours (which is the definition used in Figures 1 through 3). Employment at 40 or more hours per week rises from 37 to 45 percent, while employment at 20 or more hours rises from 55 to 67 percent. Also, there is little convergence between the part-time- and full-time employment lines indicating that while some mothers enter the labor market first at part-time and then switch to full-time, such switching is not that prevalent.

Finally, in Figure 5 we compare mothers' employment rates by the age of her youngest child to average employment rates by the age of her older children, and find that the same, general pattern holds for both groups of children. The employment rate of mothers whose youngest child is three years old is 63 percent. The employment rate of mothers who have a three year old, but also have a younger child, is only 51 percent. Since mothers' employment rates tend to rise with child age, conditional employment rates are higher for the youngest child than for older children[6]. For completeness, in our empirical analyses in Sections IV and V we examine employment relative to the age of each child and to the age of the youngest child.

The shape of the maternal employment profiles in Figures 1 through 5 provide a set of facts to be explained. Specifically, maternal employment increases steadily at about the same rate throughout the range of children ages, and this general pattern is observed for mothers with different education levels and marital status, and mothers in each period from 1970 to 2010. There is also considerable growth in maternal employment after children start school and only modest evidence of a break in the age profile of maternal employment at school entry ages. Most importantly, the steady increase in employment with child age suggests that the causal determinants of maternal employment are changing relatively continuously throughout childhood.

One issue that cannot be ascertained using the Census data is whether the pattern of employment in Figures 1 through 5 reflects differences in the timing of permanent returns to employment or whether there is substantial churning in and out of employment with a general

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[6] Mothers' employment rates for all children are a weighted average of the employment rates by the age of the youngest child and the age of older children. The employment profile for all children lies in between, and is flatter than, these two employment profiles because it places more weight on the youngest child at younger ages and more weight on the older children at older ages.

upward trend. This distinction is important for identifying potential causes of the pattern of rising employment rates of mothers by age of child. If churning is important, it implies that the causal factors work to both increase and sometimes decrease employment. Changes in family structure could potentially produce such a pattern, but the pattern would seem inconsistent with, for example, wage opportunities or childcare costs driving the employment pattern. If the pattern of rising employment is due to an increasing proportion of mothers making permanent returns to work, then the causal factors are likely to change in only one direction.

To differentiate between these two possibilities, we supplement our analyses of the 1970 through 2010 decennial Census/ACS data with an analysis of data from the Panel Study of Income Dynamics (PSID). The PSID is a longitudinal study that began in 1968 and surveyed individuals, their families, and their offspring annually through 1997 and biennially since then. We selected a sample of 10,769 women who are aged 22 to 56 at the time of a survey round, classified as either a household head or wife, and had at least one child. Employment in the PSID is measured as a respondent having worked any positive hours in the year.[7] Figure 6 shows average maternal employment rates by child age, stratified by time period. The pattern is largely similar to what we found in the Census/ACS samples. In particular, mothers' employment rates tend to rise steadily as their children age and this rise has become less steep over time.

To shed light on whether mothers' employment is persistent or intermittent, Figure 7 graphs employment rates of mothers by the age of the youngest child, separately for three groups of women: those who worked when their youngest child was between one and three years old; those who did not work at all when their child was between one and three, but returned to work when the child was between four and seven; and those who did not return to work until their child was between eight and 16 years old. Employment rates tend to be high for each group once they re-enter the labor market. For the first group, employment rates are steady at about 86 percent. Among those who enter when their children are between four and seven, employment rates after their child is seven are fairly steady around 77 percent. That is, once they re-enter the market, in any given year about three-quarters work. While there may be some amount of labor market churning, when mothers re-enter the labor market they largely stay in it.

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[7] In the PSID we exclude the year when the child is born since we cannot separately identify employment before and after the child's birth during that year. We also use the full sample of families in the PSID, though our broad conclusions are similar if we restrict the sample to the Survey Research Sample. We do not use weights in our analysis, though this also does not affect our conclusions.

III. A framework to understand why mother's employment changes as children age

In this section, we present a model of mothers' labor supply that highlights the roles of childcare costs, wages, and the reservation value of not working, and we use the model to interpret both the descriptive patterns presented in the previous section and also frame our investigation of the roles of child care costs and wages. In our model, a mother works if the wage net of childcare costs and other costs of employment is greater than her reservation value of not working. We assume that the mother only uses child care if she works. The reservation value reflects a mother's desire for leisure, time with her children, and her productivity in home production. So one reason that mothers' employment may rise as her children age is that her productivity at home declines, which is an effect first explored in Gronau (1974). A second reason employment may rise is because childcare costs fall as children age. Both of these changes increase the probability that she works.

In our model, women make a one-time choice about when (and if) to enter the labor market following the birth of a child, which is consistent with the evidence presented in Figure 6. If a woman works, she earns a wage of w_i and pays childcare costs c_t. Women are indexed by i; time and the child's age is indexed by t. For simplicity, we assume that wage opportunities vary across women, but are fixed over time.[8] We assume that, conditional on the child's age, childcare costs are the same for all women. We also assume that a woman has one child. Finally, we focus our theoretical discussion on the extensive labor supply margin (the decision of whether or not to work at all). In our empirical work below we also examine the choice of hours of work.

According to the model we have set up, a mother enters the labor market if the net wage, $w_i - c_t$, is greater than a reservation value of γ_{it}. This reservation value reflects heterogeneity across women in their productivity at home, including taking care of children, and their preferences for not working. We assume that the reservation value falls as children get older ($\gamma_{is} \geq \gamma_{it}$ for $s < t$) because mothers' productivity at home falls as children become relatively more independent and market goods arguably become better substitutes for maternal time, for example, because of specialized production (e.g., education). As children age, they also spend more time away from their parents in school, after-school activities, camp, and other things. These activities may reduce the

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[8] To the extent that human capital among mothers who do not work depreciates, mothers whose skills depreciate more rapidly will tend to reenter the labor market sooner than mothers who possess skills that depreciate more slowly. One reason more educated mothers re-enter the labor market when their children are younger is that their human capital may depreciate more quickly.

value that mothers place on staying out of the labor force since less of that time is spent with their children as they age. The reservation value may also change over time because of changes in family structure. We also assume that childcare costs are falling as children age ($c_s \geq c_t$ for $s < t$). This reflects the fact that minimum staffing ratios fall as children age and also reflect that costs fall sharply once children are eligible for free public school.[9]

Figure 8 illustrates the timing of employment for four hypothetical women that vary in their wage opportunities (w_i) and their reservation value of not working (γ_{it}). The horizontal axis measures child's age. The vertical axis measures $w_i - c_t$, the wage less child care costs. For the purposes of illustration, we assume that childcare costs are slowly falling as children age, but fall discontinuously at age five when children begin kindergarten. Thus, $w_i - c_t$ increases discontinuously at age five. In the figure, women A and B have high wages and women C and D have lower wages. The downward sloping lines illustrate productivity at home. Woman A and C have higher productivity than women B and D. Each woman enters the labor market when $w_i - c_t = \gamma_{it}$ and remains in the market thereafter.

The choices of these four hypothetical women illustrate how the model explains differences in the timing of return to work by mothers. Women A and B have the same wage opportunities, but woman A is more productive at home than is woman B and thus chooses to remain out of the labor market longer. Women A and C are equally productive at home, but woman A has a higher wage opportunity and thus enters the labor market earlier than woman C. The model also implies that a decrease in childcare costs will increase mothers' employment.[10] Clearly, when c_t falls, $w_i - c_t$ increases and thus the age at which $w_i - c_t = \gamma_{it}$ will be earlier. One implication of this is that a discontinuous drop in childcare costs such as that which occurs around age five or six should be reflected in an unusually large proportion of mothers returning to work at that time.

We use the model to guide our empirical analyses. The model predicts that variation in wage opportunities, childcare costs, productivity at home, and the strength of preferences not to work in

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[9] For example, using data from the 1997 National Survey of America's Families, Giannarelli and Barsimantov (2000) report that 60 percent of parents whose youngest child is under five pay for childcare, compared to 37 percent of parents whose youngest child is 5-12. Conditional on paying for care, they report that the average monthly cost of care for a child under five is $325 and the average monthly cost of care for children 5-12 is $224. Also see "Who's Minding the Kids? Child Care Arrangements 2011" (Laughlin 2013) for figures on the costs of child care.

[10] This statement ignores any income effect that results from a decrease in the price of childcare, which would reduce labor supply.

the market will create variation across women in when they choose to work. Although we did not explicitly model non-labor income, it should be clear from traditional theory that non-labor income (such as assets or wage income of a spouse) generates an income effect and reduces the probability that women with greater non-labor income will work. However, the task of assessing the explanatory power of these factors is difficult because we do not observe wage opportunities for non-workers, mothers' productivity at home, preferences, or child care costs. Therefore, we use proxy variables for these theoretical determinants, such as education, marital status, race, and geographical location. Moreover, some of these variables may be correlated with more than one of the theoretical determinants, so it is not possible to directly link the effect of a proxy variable to the theoretical factor. Nevertheless, these proxy variables are correlated with the theoretical variables of interest and are strongly correlated with employment. In the case of child care, we assess whether mothers' employment rates change discontinuously when children turn five or six. Studying the responsiveness of employment to children's school enrollment eligibility provides a means to evaluate the importance of child care costs at ages five and six and whether these costs can explain the rise in mothers' employment between ages five and sixteen.

IV. Do demographic and socioeconomics characteristics explain the increase in mothers' employment as children age?

To assess whether demographic and socioeconomic factors explain the pattern of maternal employment we use a regression model of mothers' employment on fixed effects for her age and the age of her child and then add other variables to the model to assess whether the child age effects change. Specifically, for each year, we estimate the following regression model:

$$(1) \quad Employed_{it} = Child's\ age_{it} + Mother's\ age_{it} + X_{it}'\gamma_t + e_{it}$$

where $Employed_{it}$ is an indicator of whether the mother of child i is employed in year t in the week prior to the survey. $Child's\ age_{it}$ is a set of indicator variables for the child's age in year t and ranges from zero to 16. $Mother's\ age_{it}$ is a set of indicators for the mother's age in year t. X_{it} represents other variables, such as mothers' education or non-labor income, that we will add to model.

To economize on space, we only report the coefficients on age 5, 10, and 16 indicators. Table 1 shows results where the sample includes all children (and thus mothers who have multiple

children appear in the data multiple times).[11] Table 2 shows results from a sample of the mother and only her youngest child. Each panel shows results from a different Census year. The covariates in Column 1 are mother age, child age, and (in Table 1) an indicator that the child is the mother's youngest. Column 2 adds controls for educational attainment (indicators for whether the mother does not have a high school degree, has a degree, has some college, or has a college degree), indicators for mothers' race and Hispanic ethnicity, and state fixed effects. Column 3 replaces the education, race, and state controls with indicators for her marital status (whether she is separated, divorced, married, or single) and number of children in the household. Column 4 replaces the marital status and number of children controls with mothers' non-labor income, which is defined as total family income minus the mother's wage and salary income. Finally, Column 5 controls for all of these factors together.

The pattern of results in Tables 1 and 2 point to several conclusions. Controlling for mothers' age in column 1, and for mothers' education, race/ethnicity, and state of residence in column 2, produces larger employment gradients than those in the unconditional means in Figure 1, especially in the earlier years of our data. For example, in 1970, the unconditional employment rate of mothers of 16 year olds was 28 percentage points higher than that of mothers of children less than one year old. Column 1 of Table 1 indicates that controlling for mothers' age and whether the child is the youngest raises this difference to 47 percentage points. Controlling for education, race/ethnicity, and state raises this to 48 percentage points. In 2010 the increase in unconditional employment rates is 17 percentage points. The increase in the employment rate conditional on mothers' age and whether the child is the youngest is 18 percentage points. Controlling further for mothers' education, race/ethnicity, and state of residence raises this to 26 percentage points.

Marital status and number of children explain some of the child age effects. In 2010, for example, controlling for marital status and the number of children reduces the gradient from 18 percentage points (column 1) to nearly 13 percentage points (column 3). Controlling for non-labor income (but not education, race, state, marital status, or the number of children) reduces the gradient to 4 percentage points. The number of children and non-labor income do little, if anything to explain the gradient in the earlier years. They also have less explanatory power in 2010 in Table 2, when the sample is restricted to each mother's youngest child.

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[11] The standard errors in Table 1 are clustered by mother.

When all of the variables are simultaneously included in the model, the gradient in child age is largely unaffected. The coefficients in columns 1 and 5 are virtually identical in all five time periods. These controls are all highly statistically significant predictors of mothers' employment, but cannot account for the pattern of rising employment with children's age.[12] The comparison between Tables 1 and 2 shows that the relationship between child's age and mothers' employment is virtually identical when we include all of her children in the analysis.

As noted, it is difficult to directly test whether mothers' wage opportunities can explain the rising employment profile because we only observe wages for workers. Figure 2 documented that in 2010 employment is less closely tied to child's age at the youngest ages among higher educated workers, which may suggest some role for differences in wage opportunities to explain the employment patterns. To shed additional light on differences in wages between women who re-enter the labor market at different points in their children's life, we use the PSID to calculate the first year that a woman is employed after her youngest child is born. We then run a regression of the log hourly earnings during that first year that a mother worked on indicators for the child's age, mother's age, year, state, number of children, her education, race/ethnicity, and whether she is married. Figure 8 plots the coefficients on the child age indicators along with the 95 percent confidence interval. The omitted child age is one.[13]

The pattern in Figure 9 is quite striking: women who do not work when their youngest child is one, but do work when that child is two, have residual wages that are about 19 percent below those of women who work when their youngest child is one. The residual wage differential is larger for women who remain out of the labor market for more than a year. Women who do not work when their child is one or two, but work when the child is three, earn 25 percent less than women who work when their child is one. The lower residual wage of later entrants is remarkably stable among women who return to work when their child is between three and fifteen.[14] This disadvantage could reflect a wage penalty for women who are out of the labor market or could reflect permanent differences in human capital between women who choose to enter the labor market at different points in their children's lives (though the latter explanation is inconsistent with

[12] For example, the R-squared for the regression models in Table 1 for 1970 go from 0.05 in Column 1 to 0.09 in Column 5. For 2010 they go from 0.02 in Column 1 to 0.11 in Column 5.
[13] We drop observations when the child is less than one since our measure of whether a mother worked during the year would not distinguish between employment before or after the child's birth.
[14] These PSID estimates are not sensitive to the particular controls we used, to stratifying the analysis by time period, by using all children (not just the youngest), or to using a balanced sample of mothers who appear in most or all years.

our estimates above that mothers' education, or observed human capital, does not explain the association between employment and child's age). In any case, the fact that the child age effects are essentially flat after children are three years old suggests that variation in wage opportunities does not explain mothers' rising employment rates, especially after the first few years after birth.

V. Could falling childcare costs explain the rise in mothers' employment?

Childcare costs tend to fall as children age, both because the per-unit cost of care in formal childcare settings tends to fall and because fewer children need child care as they age. Childcare costs fall dramatically when children begin school. If childcare costs affect mothers' labor supply decisions, then we would expect to see an increase in mothers' employment, relative to trend, when children begin school. We assess whether, in fact, mothers' employment rates increase discontinuously when children are five or six years old and are eligible for free public school.

Our analysis of the effect of childcare costs on employment contributes to a large, but quite unsettled literature. In their extensive reviews of the literature at the time, Blau (2003) and Blau and Currie (2006) reported a range of estimates of the elasticity of mothers' employment with respect to the price of child care of between 0.06 to -1.26 (Blau 2003) and 0.06 to -3.60 (Blau and Currie 2006). While the range of estimates reported in these studies includes mostly negative numbers, the presence of positive estimates and the large range of estimates is a cause of concern and reflect the substantial sensitivity of estimates to choices about data and methods (Blau 2003). It is fair to conclude that the evidence base at the time of the Blau (2003) and Blau and Currie (2006) reviews was not sufficiently reliable to make strong causal statements beyond, perhaps, concluding that child care costs likely reduce labor supply of mothers. More recent studies that relied on arguably more credible research designs that stem from policy changes or experiments also yield mixed evidence.[15]

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[15] For example, Havnes and Mogstad (2011) examined the effect of an increase in subsidized child care in Norway in the 1970s and found no effect of this policy on mothers' labor supply. Lundin, Mörk, and Öckert (2008) find that a policy that placed a cap on childcare prices in Sweden had no effect on mothers' labor supply. Michalopoulos et al. (2010) reported that a child care subsidy for near-poor women in Cook County (Chicago), Illinois in 2004-05 had no effect on mothers' labor supply. Fitzpatrick (2010) studies the introduction of universal pre-kindergarten in Georgia and Oklahoma and finds no effect on maternal employment. Some recent studies find that a reduction in child care costs raises mothers' employment rates. Cascio (2009) studied the introduction and expansion of free kindergarten in the United States during the 1960s and 1970s and estimates that this type of free child care was associated with a 12% increase in employment of single mothers with young children. Baker et al. (2008) and Lefebvre and Merrigan (2008) reported that a $5 per day child care subsidy in Quebec in the late 1990s was associated with a 15 percent increase in mothers' labor force participation, mostly among married mothers. Other recent work that finds

Our approach to assessing the importance of child care costs is related to those used by Gelbach (2002) and Fitzpatrick (2012) who study the effect of public school enrollment on mothers' labor supply. Both of these studies used instrumental variables approaches that exploit exogenous variation in school enrollment by age. Gelbach uses the 1980 decennial Census and instruments children's enrollment status with their quarter of birth. Fitzpatrick (2012) builds on Gelbach's method by noting that a child's quarter of birth is potentially correlated with other factors that influence mothers' labor supply. She uses a restricted-access version of the 2000 decennial Census that contains children's exact day of birth and uses a regression discontinuity design to compare employment rates among mothers whose children are born on opposite sides of the cutoff. While the RD approach is seemingly the most promising method to measure the effect of school enrollment on mothers' employment, as a practical matter the standard errors from this approach are large and unable to reliably detect substantial effect sizes.

Since our goal is to assess whether the discontinuous change in child care costs that happens when children are age-eligible for school can explain much of the overall relationship between children's age and mothers' employment, we are interested in the reduced-form relationship between a child reaching school age and mother's employment (not the effect of school enrollment on employment). This reduced-form effect is important and interesting for two reasons: first, this effect allows us to assess whether child care costs are potentially important drivers of the general upward trend in mothers' employment as children age. If child care costs significantly affect employment, there should be a discrete change in employment among mothers across these ages once we control for the general upward trend in employment as children age. Second, it answers the policy-relevant question of what would the effect be of a child care subsidy given to parents of five year olds.

To obtain estimates of the effect of a child's age-eligibility for public school on mothers' employment, we estimate regression models of the following form, separately by year:

$$Employed_{it} = \beta_{0t} + \beta_{1t}(Age_{it} = 5) + \beta_{2t}(Age_{it} = 6) + \beta_{3t}(Age_{it} \geq 7)$$
$$+\beta_{4t}f(Age_{it}) + X'_{it}\beta_{5t} + \varepsilon_{it} \qquad (2)$$

where $Employed_{it}$ is a measure of employment for the mother of child i in year t, such as an indicator that the mother was employed in the week prior to the survey. $(Age_{it} = 5)$, $(Age_{it} = 6)$, and $Age_{it} \geq 7)$ are indicators that the mother's child is age 5, 6, or seven or older. $f(Age_{it})$ is a quartic in the child's age and captures in a flexible way the general rise in mother's employment as children age. We note that our conclusions are not sensitive to using a different polynomial specifications for age, for example, quadratic or cubic. The variable, X_i is a vector of other characteristics of the mother and includes dummy variables indicating she has less than a high school degree, a high school degree, some college, or a Bachelor's degree or more; dummy variables for whether the mother is white, black, Hispanic, or other race/ethnicity; dummy variables indicating whether the mother is married, separated-divorced-widowed, or never married; and dummy variables indicating the number of own children in the household (1, 2, 3, and 4 or more). The coefficients β_{1t} and β_{2t} capture the difference in mothers' employment when children are five (relative to four) and six (relative to five) over and above the employment rate that would be predicted by the quartic in child's age.[16]

Table 3 shows the estimates of the deviation from trend in mothers' employment when her child is age five and six, separately for the years 1970, 1980, 1990, 2000, and 2010. Panel A reports results for our full sample that includes all children (thus mothers who have multiple children appear in the data one time for each child). The age five coefficient in 1970 is 0.0016 and has a standard error of 0.0020. The age six effect is 0.0169 with a standard error of 0.0028. That is, employment among mothers who have a six-year-old child is 1.7 percentage points higher relative to the quartic trend in child's age. In square brackets, below each coefficient and standard error, is the average employment rate of mothers who have a six-year-old. In 1970, this mean is 30.6 percent so the 1.7 percentage point effect is quite small relative to the overall employment rate. Generally, the age five and six effects are quite small in magnitude, both in absolute levels and relative to the overall employment rates, and are not always statistically different from zero.

Since younger children require more childcare (and more expensive childcare), the age of the youngest child plausibly exerts a stronger effect on mothers' employment decisions than the ages of her older children. Thus, in Panel B of Table 3 we estimate equation (2) using only the youngest child in a family. Indeed, the effects of the youngest child being five or six years old are larger, but

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[16] In models that include all of a mother's children (which are reported in Table 3, Panel A), we also condition on an indicator that the child is the mother's youngest. The standard errors in these models are clustered at the mother level.

the overall magnitude and pattern of results remains remarkably unchanged. In particular, in 1970 the age-five effect is 1.2 percentage points. The age-five effects in 1980 through 2010 are small and not statistically different from zero. The age-six effect in 1970 is to raise employment by 3.3 percentage points, with a standard error of 0.4 percentage points. This effects falls to 0.8 percentage points in 2000, and in 2010 is not statistically different from zero.

Importantly, the effects of being eligible for public school are small relative to the underlying employment rate and are falling over time. The employment rate of mothers whose youngest child is six goes from 39.5 percent in 1970 to 68.6 in 2010. So while the age-six effect in 1970 increased the employment rate by about eight percent relative to its level (i.e. 3.25/39.5), by 2010 the effect was half of a percent relative to its level. These small effects of being age-eligible for public school, and hence free childcare, indicate that falling childcare costs are unlikely to explain the employment gradient with respect to children's age.

The decline in these reduced-form effects across time is consistent with the rising enrollment rates of four and five year olds in nursery and preschool. Table 4 shows preschool and school enrollment rates by age and year.[17] Tabulations in Panel A indicate that enrollment among four-year olds, who are almost exclusively in nursery or preschool, increases from 19.4 percent in 1970 to 69.6 percent in 2010. Enrollment among five year olds increases from 61.2 percent in 1970 to 91.3 percent in 2010.

Tables 5 through 7 explore the effects of the youngest child becoming age-eligible for public school on mothers' employment in more detail. Table 5, Panels A and B reports results in which the dependent variable is an indicator that a mother is employed and reports that she usually works twenty or more, or forty or more, hours in a typical week.[18] These estimates are generally negative and very small in magnitude. The effect of a child being five on whether his or her mother works at least 20 hours a week is -0.61 percentage points in 1980 (with a standard error of 0.029) and -0.56 percentage points in 2010. The age six effects are generally slightly smaller and not always statistically different from zero. The age-five effects on whether the mother works forty or more hours a week are -0.77 percentage points in 1980 and -0.91 in 2010. The age-six effects are noticeably larger and range from a -1.1 percentage points in 1970 to -1.6 percentage point effect in 2010. Note that these

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[17] The decennial Census and ACS record whether a child is enrolled in school, including nursery and preschool. It does not contain information on whether a child attends a daycare center or has another source of care outside of the home.

[18] Hours per week is only reported in the 1980 and later Census/ACS files.

effects are negative, which indicates that some mothers reduce their hours of work when their children become age-eligible for public school, while those who enter the labor market do so at less than twenty hours per week.

The availability of free public school has a larger effect on low-educated mothers' employment rates, which is consistent with the lower rates of preschool and nursery school enrollment among 4 and 5 year olds for this sample (see Table 4). Panel A of Table 6 shows that the employment effect on lower-educated mothers of a child being six years old goes from about 2.5 percentage points in 1970 to 0.9 percentage points in 2010. These effects are all statistically different from zero, but small relative to the baseline employment rates. The effects go from about 6.4 to 1.6 percent of the baseline employment rates. Panel B shows that the age six employment rates among women with some education beyond high school range from 0.013 in 1970 to 0.003 in 2010; four of the five estimates are not statistically different from zero.

Finally, Table 7 shows employment results stratified by mother's marital status. Panel A shows that the age six effect among married women goes from 2.4 percentage points in 1970 to 1.1 in 2010, or from about 6.4 to 1.6 percent of the baseline employment rate among this group. Results for women who are not married are in Panel B and show noticeably smaller effects that are generally not statistically different from zero and are sometimes negative. The larger effects among married mothers is consistent with the lower preschool/nursery school enrollment rate of their children, especially in 1970 and 1980.

VI. Conclusions

The pattern of employment in Figures 1 through 5 is striking and to the best of our knowledge has not been previously identified. The steady, generally steady increase in employment as children age, which is evident in 1970 through 2010 (although with a shift in scale) and for mothers with different levels of education, marital status and other characteristics, calls for explanation. Our analysis suggests that standard, theoretical explanations of differences in labor supply are not particularly important.

We found that adjusting for several observed characteristics, such as non-earned income, race, education, marital status and number of children had relatively little effect on the pattern of maternal employment by age of child. These characteristics are known to be correlated with wages, costs of child care, and other determinants of labor supply, and in the case of non-earned income is an observed determinant of labor supply, suggesting that these determinants of labor supply are not

particularly important explanations for the timing of women's return to work. We do find that women with higher residual wages return to work relatively soon after their child is born, but there is no relationship between residual wages and the timing of work after children are about three years old.

We also showed that the availability of public schooling and free child care at ages 5 and 6 had, at best, minor effects on labor supply even for women with no younger children. In 1970, only 19 percent of four year olds were enrolled in preschool and yet mothers' employment rates change very little (relative to the trend) when these children entered school. Second, the effects are generally becoming smaller over time because the fraction of children in preschool or nursery school has been rising. These results indicate that by the time children are five or six years old, childcare costs are generally not an important barrier to employment. Further evidence that child care costs are not that important is found in the significant growth in maternal employment subsequent to school entry and throughout the child's teenage years when the costs of childcare are relatively low and when few children are observed in childcare even among mothers that work (Giannarelli and Barsimantov 2000; Laughlin 2013). Maternal employment also increases smoothly prior to school entry while childcare costs are relatively constant, which again suggests that childcare costs are not a particularly important explanation for rising employment rates.[19]

So what does explain the pattern? The fact that observable variables explain none of the rising employment pattern suggests that the pattern is caused by changes in women's valuation of non-market time, productivity at home, and idiosyncratic shocks to tastes that are correlated with the age of their children. For example, as young children age, they require less intensive supervision. Older children increasingly spend less time at home and more time with friends, playing sports, or participating in other activities. Moreover, market alternatives to mothers' care are increasingly available. Although it is difficult to measure these factors, our results imply that they are important determinants of mothers' employment decisions. They may, in fact, be more important determinants than wages and child care costs, two of the traditional targets of public policies to raise employment of low-skilled mothers.

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[19] One explanation for our results is that that the effects are small because there are already many childcare subsidy programs in place for low-income families, but this was clearly not the case in the early years before some of the major childcare subsidy programs were implemented. Another explanation is that childcare costs are small relative to other costs and benefits of working.

In terms of public policy, our evidence suggests that additional public policies focused on child care costs are unlikely to have significant effects on mothers' employment. This conclusion is consistent with that reached by Blau and Currie (2006) about the magnitude of the elasticity of labor supply with respect to child care costs and is consistent with the evidence related to welfare reform that the primary determinants of employment were the work requirements and time limits and not the subsidies for child care (Grogger et al. 2002; Blank 2006). Our results also suggest that significant wage subsidies will also have limited effects, which is consistent with estimates of the wage elasticity of labor supply that are close to zero (McClelland and Mok 2012).[20]

To summarize, in this paper, we have documented a marked, and not well-known, pattern of maternal employment by child age. What is remarkable is that the pattern of mothers' return to work is steady and relatively smooth from ages 0 to 16. Given this documented and robust pattern of maternal employment and evidence we presented as to what may explain that pattern, there appears to be a significant gap in our theoretical understanding of the causes of maternal employment. Similarly, the evidence we present underscores the limits of current public policies geared at increasing maternal employment that focus on wage and child care subsidies.

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[20] Wage elasticities of low-income, single mothers tend to be larger. In their survey, McClelland and Mok (2012) report that evidence from the EITC suggest elasticities of between 0.3 and 1.2.

VII. References

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Table 1: Regression estimates of mother's employment by the age of the child

1970	(1)	(2)	(3)	(4)	(5)
Child age 5	0.203	0.213	0.182	0.197	0.201
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 10	0.342	0.356	0.309	0.333	0.334
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 16	0.466	0.483	0.413	0.456	0.449
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
1980					
Child age 5	0.173	0.200	0.147	0.165	0.183
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 10	0.316	0.360	0.274	0.298	0.329
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 16	0.438	0.493	0.371	0.418	0.449
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
1990					
Child age 5	0.116	0.149	0.100	0.108	0.130
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 10	0.200	0.260	0.179	0.185	0.229
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 16	0.276	0.359	0.229	0.256	0.305
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Education, race/ethnicity, and state	No	Yes	No	No	Yes
Marital status and number of children	No	No	Yes	No	Yes
Non-labor income	No	No	No	Yes	Yes

Note: Regression estimates from the 1970 through 2000 decennial Census and the 2012 American Community Survey, as described in the text. Standard errors in parentheses are clustered at the mother level. All models control for mother's age and an indicator that the child is the mother's youngest.

Table 1 continued: Regression estimates of mother's employment by the age of the child

2000					
Child age 5	0.114	0.136	0.091	0.045	0.113
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 10	0.191	0.236	0.162	0.088	0.201
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 16	0.264	0.326	0.213	0.131	0.271
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
2010					
Child age 5	0.053	0.084	0.029	-0.017	0.058
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 10	0.112	0.166	0.080	0.007	0.126
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 16	0.180	0.257	0.125	0.043	0.191
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Education, race/ethnicity, and state	No	Yes	No	No	Yes
Marital status and number of children	No	No	Yes	No	Yes
Non-labor income	No	No	No	Yes	Yes

Note: Regression estimates from the 1970 through 2000 decennial Census and the 2012 American Community Survey, as described in the text. Standard errors in parentheses are clustered at the mother level. All models control for mother's age and an indicator that the child is the mother's youngest.

Table 2: Regression estimates of mother's employment by the age of the youngest child

1970	(1)	(2)	(3)	(4)	(5)
Child age 5	0.211	0.220	0.196	0.205	0.212
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Child age 10	0.368	0.379	0.338	0.360	0.361
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Child age 16	0.488	0.502	0.425	0.481	0.465
	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)
1980					
Child age 5	0.188	0.215	0.165	0.176	0.201
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 10	0.339	0.374	0.293	0.320	0.344
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Child age 16	0.439	0.478	0.354	0.424	0.432
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
1990					
Child age 5	0.128	0.159	0.118	0.120	0.146
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 10	0.217	0.267	0.187	0.201	0.235
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 16	0.278	0.339	0.206	0.261	0.280
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Education, race/ethnicity, and state	No	Yes	No	No	Yes
Marital status and number of children	No	No	Yes	No	Yes
Non-labor income	No	No	No	Yes	Yes

Note: Regression estimates from the 1970 through 2000 decennial Census and the 2012 American Community Survey, as described in the text. Standard errors in parentheses. All models control for mother's age.

Table 2 continued: Regression estimates of mother's employment by the age of the youngest child

2000

Child age 5	0.126	0.148	0.110	0.115	0.131
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 10	0.204	0.239	0.171	0.184	0.206
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 16	0.254	0.299	0.190	0.229	0.244
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)

2010

Child age 5	0.063	0.091	0.044	0.051	0.072
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 10	0.130	0.173	0.092	0.106	0.133
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Child age 16	0.190	0.247	0.116	0.157	0.178
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
Education, race/ethnicity, and state	No	Yes	No	No	Yes
Marital status and number of children	No	No	Yes	No	Yes
Non-labor income	No	No	No	Yes	Yes

Note: Regression estimates from the 1970 through 2000 decennial Census and the 2012 American Community Survey, as described in the text. Standard errors in parentheses. All models control for mother's age.

Table 3: Regression estimates of changes in mothers' employment when children
are aged five or six

Panel A: All children

	1970	1980	1990	2000	2010
Age 5	0.0016	-0.0059**	-0.0012	-0.0040*	-0.0035
	(0.0020)	(0.0020)	(0.0018)	(0.0019)	(0.0019)
	[0.2819]	[0.4261]	[0.5587]	[0.5956]	[0.6066]
Age 6	0.0169***	0.0069*	0.0044	0.0030	-0.0004
	(0.0028)	(0.0028)	(0.0025)	(0.0025)	(0.0025)
	[0.3058]	[0.4506]	[0.5738]	[0.6131]	[0.6174]
N	1,946,988	2,360,864	2,538,922	2,609,623	2,433,574

Panel B: Sample only includes youngest child in family

	1970	1980	1990	2000	2010
Age 5	0.0118***	0.0025	0.0018	0.0002	-0.0020
	(0.0033)	(0.0029)	(0.0026)	(0.0025)	(0.0026)
	[0.3570]	[0.5068]	[0.6335]	[0.6597]	[0.6651]
Age 6	0.0325***	0.0218***	0.0161***	0.0082*	0.0036
	(0.0042)	(0.0037)	(0.0033)	(0.0032)	(0.0033)
	[0.3950]	[0.5423]	[0.6635]	[0.6850]	[0.6861]
N	845,742	1,222,718	1,376,440	1,437,940	1,349,868

Note: Regression estimates from the 1970 through 2000 decennial Census and the
2012 American Community Survey, as described in the text. Standard errors in
parentheses. Standard errors in Panel A are clustered at the mother level. Mean
employment rates in square brackets.

* p<0.05   ** p<0.01   *** p<0.001

Table 4: School enrollment rates by year, age of child, and mother's education

Panel A: Enrollment rates of youngest child, all families

	1970	1980	1990	2000	2010
Age 4	0.194	0.474	0.494	0.656	0.704
Age 5	0.612	0.808	0.781	0.876	0.920
Age 6	0.928	0.990	0.986	0.991	0.995

Panel B: Enrollment rates of youngest child, families in which mother has a high school degree or less education

	1970	1980	1990	2000	2010
Age 4	0.143	0.375	0.372	0.562	0.577
Age 5	0.593	0.765	0.714	0.839	0.881
Age 6	0.927	0.987	0.980	0.988	0.992

Panel C: Enrollment rates of youngest child, families in which mother has some college or more education

	1970	1980	1990	2000	2010
Age 4	0.410	0.659	0.611	0.744	0.778
Age 5	0.770	0.890	0.845	0.912	0.941
Age 6	0.976	0.995	0.988	0.993	0.996

Panel D: Enrollment rates of youngest child, families in which mother is married

	1970	1980	1990	2000	2010
Age 4	0.187	0.465	0.495	0.650	0.711
Age 5	0.607	0.802	0.780	0.873	0.921
Age 6	0.928	0.990	0.986	0.991	0.995

Panel E: Enrollment rates of youngest child, families in which mother is not married

	1970	1980	1990	2000	2010
Age 4	0.261	0.522	0.490	0.679	0.679
Age 5	0.661	0.840	0.784	0.889	0.916
Age 6	0.927	0.990	0.984	0.991	0.995

Table 5: Regression estimates of changes in mothers' employment when children are aged five or six, youngest child

Panel A: Employed and usually work 20 or more hours per week

	1980	1990	2000	2010
Age 5	-0.0061*	-0.0070**	-0.0069**	-0.0056*
	(0.0029)	(0.0027)	(0.0026)	(0.0027)
	[0.4221]	[0.5500]	[0.5883]	[0.6079]
Age 6	-0.0003	-0.0077*	-0.0063	-0.0040
	(0.0037)	(0.0034)	(0.0033)	(0.0034)
	[0.4519]	[0.5742]	[0.6132]	[0.6273]
N	1,222,718	1,376,440	1,437,940	1,349,868

Panel B: Employed and usually work 40 or more hours per week

	1980	1990	2000	2010
Age 5	-0.0077**	-0.0091***	-0.0067*	-0.0091***
	(0.0027)	(0.0026)	(0.0027)	(0.0028)
	[0.2831]	[0.3668]	[0.4108]	[0.4032]
Age 6	-0.0119***	-0.0191***	-0.0196***	-0.0156***
	(0.0034)	(0.0034)	(0.0034)	(0.0035)
	[0.2991]	[0.3795]	[0.4204]	[0.4123]
N	1,222,718	1,376,440	1,437,940	1,349,868

Note: Regression estimates from the 1980 through 2000 decennial Census and the 2012 American Community Survey, as described in the text. Standard errors in parentheses. Mean employment rates in square brackets. Sample only includes youngest child in family.

* p<0.05   ** p<0.01   *** p<0.001

Table 6: Regression estimates of changes in mothers' employment when children are aged five or six, by mothers' education

Panel A: Mother has a high school degree or less education

	1970	1980	1990	2000	2010
Age 5	0.0078*	0.0007	-0.0023	0.0025	0.0008
	(0.0032)	(0.0031)	(0.0033)	(0.0032)	(0.0039)
	[0.3457]	[0.4689]	[0.5558]	[0.5951]	[0.5694]
Age 6	0.0254***	0.0172***	0.0124***	0.0095**	0.0094*
	(0.0036)	(0.0035)	(0.0037)	(0.0036)	(0.0045)
	[0.3852]	[0.5068]	[0.5900]	[0.6207]	[0.5948]
N	601992	763543	632892	650451	455638

Panel B: Mother has some education beyond high school

	1970	1980	1990	2000	2010
Age 5	0.0066	-0.0075	0.0005	-0.0039	-0.0042
	(0.0063)	(0.0044)	(0.0029)	(0.0029)	(0.0027)
	[0.4040]	[0.5885]	[0.7099]	[0.7233]	[0.7186]
Age 6	0.0132	0.0053	0.0096**	0.0044	0.0029
	(0.0071)	(0.0050)	(0.0033)	(0.0032)	(0.0030)
	[0.4339]	[0.6228]	[0.7371]	[0.7491]	[0.7369]
N	156924	343739	625014	656307	775960

Note: Regression estimates from the 1970 through 2000 decennial Census and the 2010 American Community Survey. Standard errors in parentheses. Mean employment rates in square brackets. Sample only includes youngest child in family.

* p<0.05   ** p<0.01   *** p<0.001

Table 7: Regression estimates of changes in mothers' employment when children are aged five or six, by mothers' marital status

Panel A: Mother is married

	1970	1980	1990	2000	2010
Age 5	0.0066*	0.0003	0.0007	0.0016	0.0000
	(0.0030)	(0.0028)	(0.0024)	(0.0025)	(0.0025)
	[0.3346]	[0.4884]	[0.6328]	[0.6398]	[0.6443]
Age 6	0.0241***	0.0153***	0.0152***	0.0128***	0.0112***
	(0.0034)	(0.0032)	(0.0028)	(0.0028)	(0.0029)
	[0.3731]	[0.5203]	[0.6634]	[0.6682]	[0.6685]
N	683607	929180	1029719	1030173	960500

Panel B: Mother is not married

	1970	1980	1990	2000	2010
Age 5	0.0140	-0.0114	-0.0100*	-0.0064	-0.0093*
	(0.0091)	(0.0060)	(0.0049)	(0.0045)	(0.0045)
	[0.5706]	[0.6007]	[0.6364]	[0.7315]	[0.7380]
Age 6	0.0149	0.0075	-0.0086	-0.0081	-0.0125*
	(0.0102)	(0.0066)	(0.0055)	(0.0050)	(0.0051)
	[0.5936]	[0.6473]	[0.6641]	[0.7408]	[0.7474]
N	75309	178102	228187	276585	271098

Note: Regression estimates from the 1970 through 2000 decennial Census and the 2010 American Community Survey. Standard errors in parentheses. Mean employment rates in square brackets. Sample only includes youngest child in family.

* p<0.05   ** p<0.01   *** p<0.001

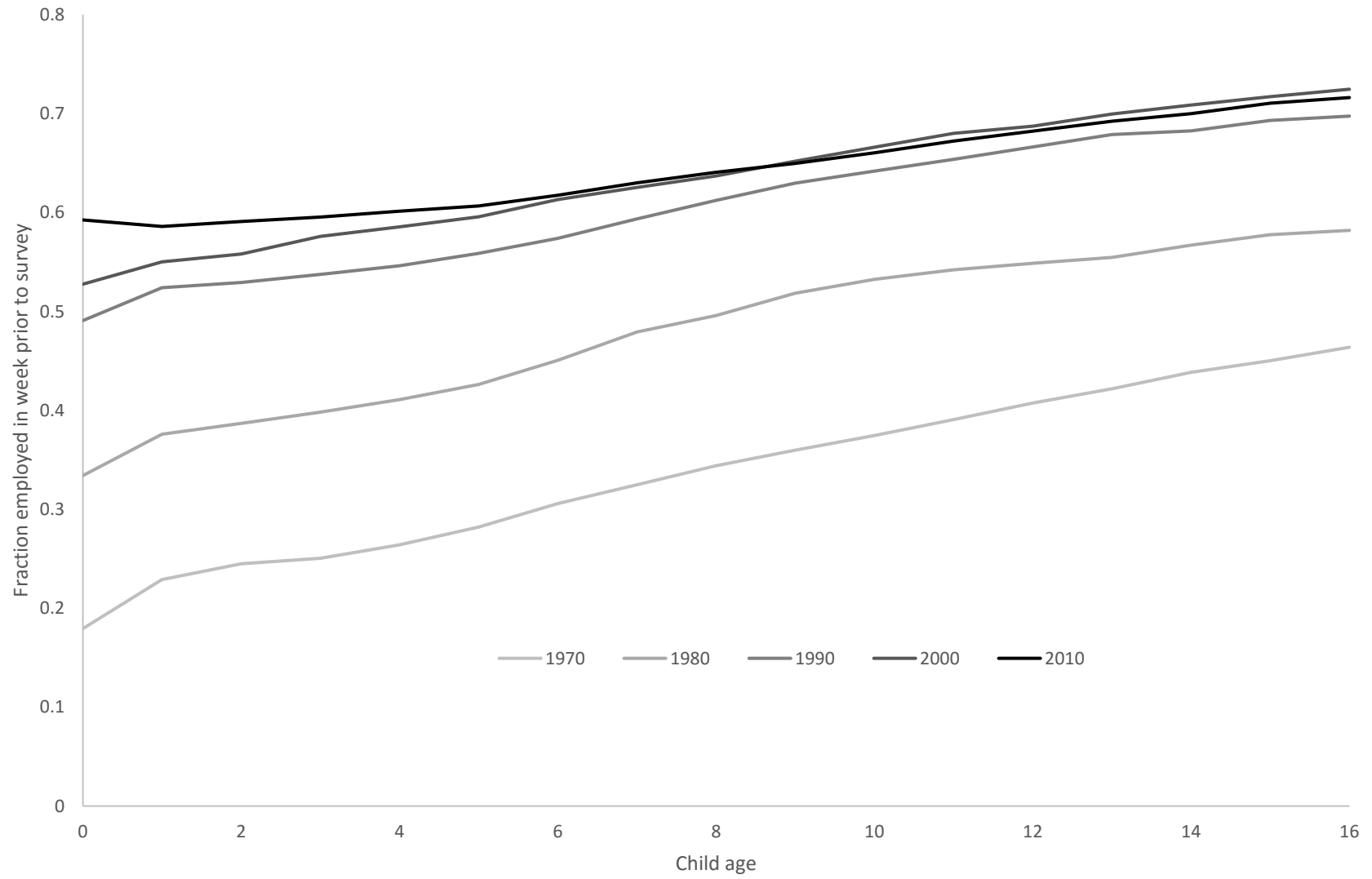Figure 1: Mothers' employment rates by child age, 1970-2010

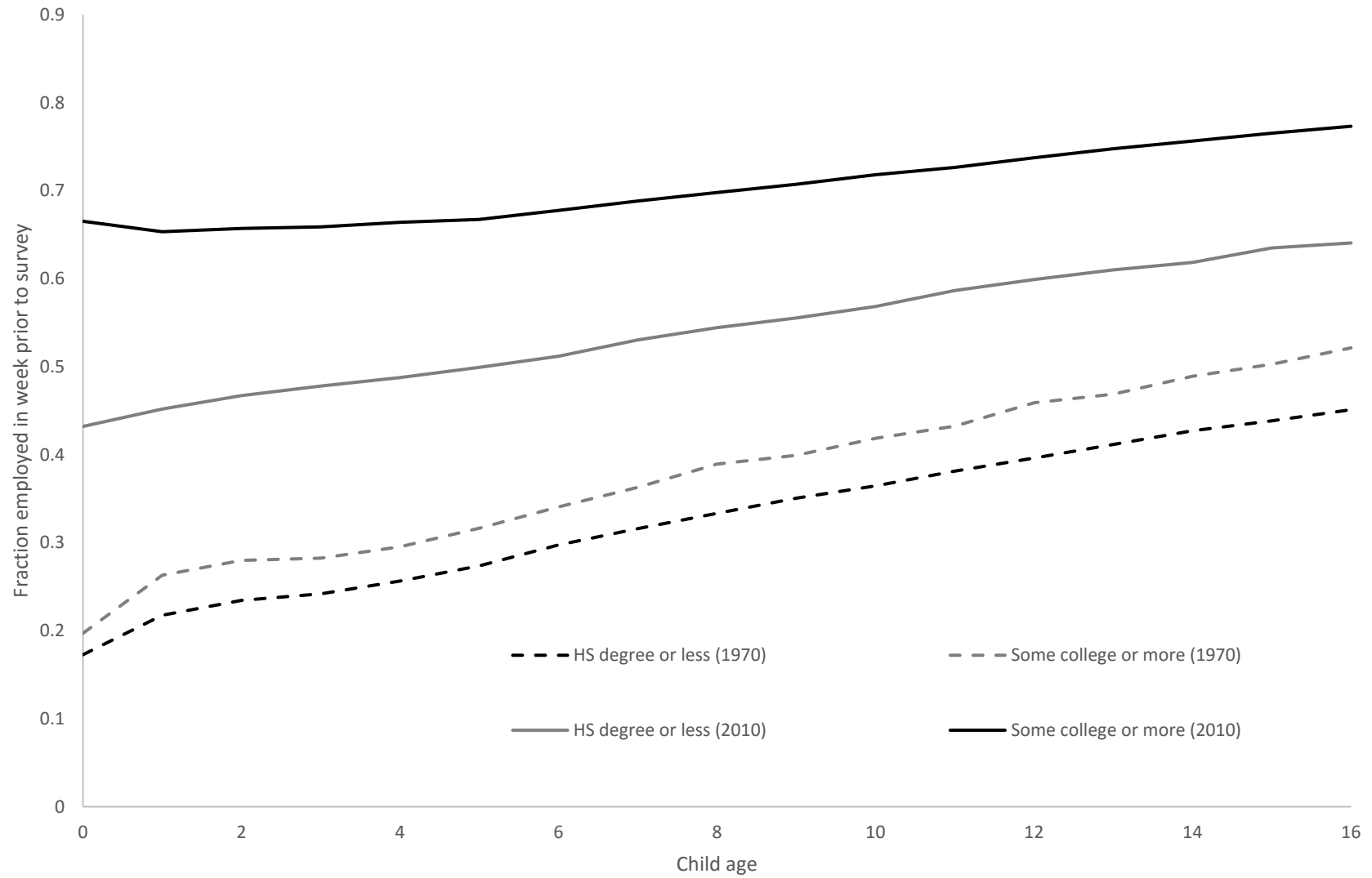Figure 2: Mothers' employment rates by child age and mother's education, 1970 & 2010

Legend:
- – – HS degree or less (1970)
- – – Some college or more (1970)
- —— HS degree or less (2010)
- —— Some college or more (2010)

X-axis: Child age
Y-axis: Fraction employed in week prior to survey

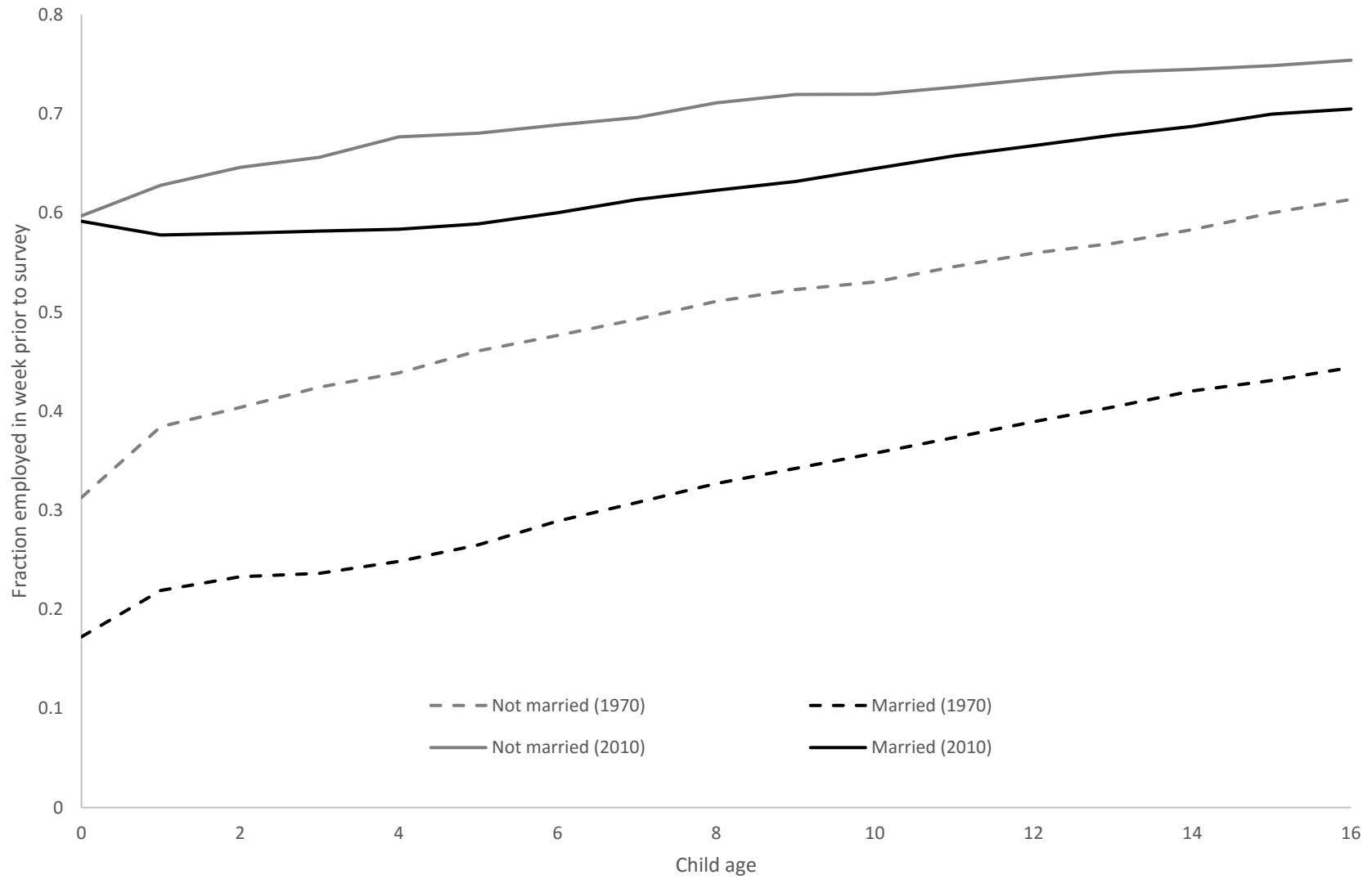Figure 3: Mothers' employment by child age and mother's marital status, 1970 & 2010

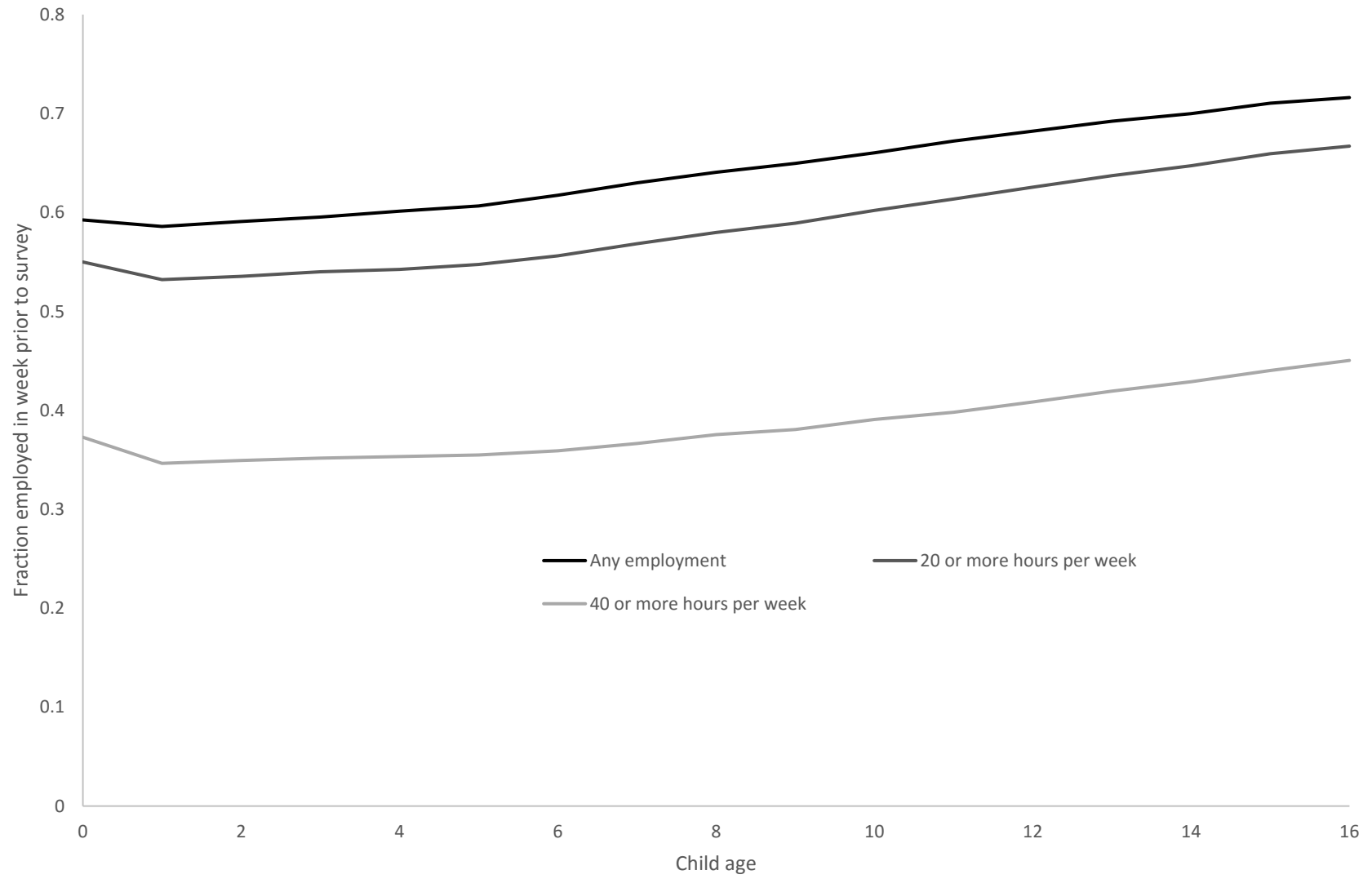Figure 4: Mothers' employment by child age and intensity of employment, 2010

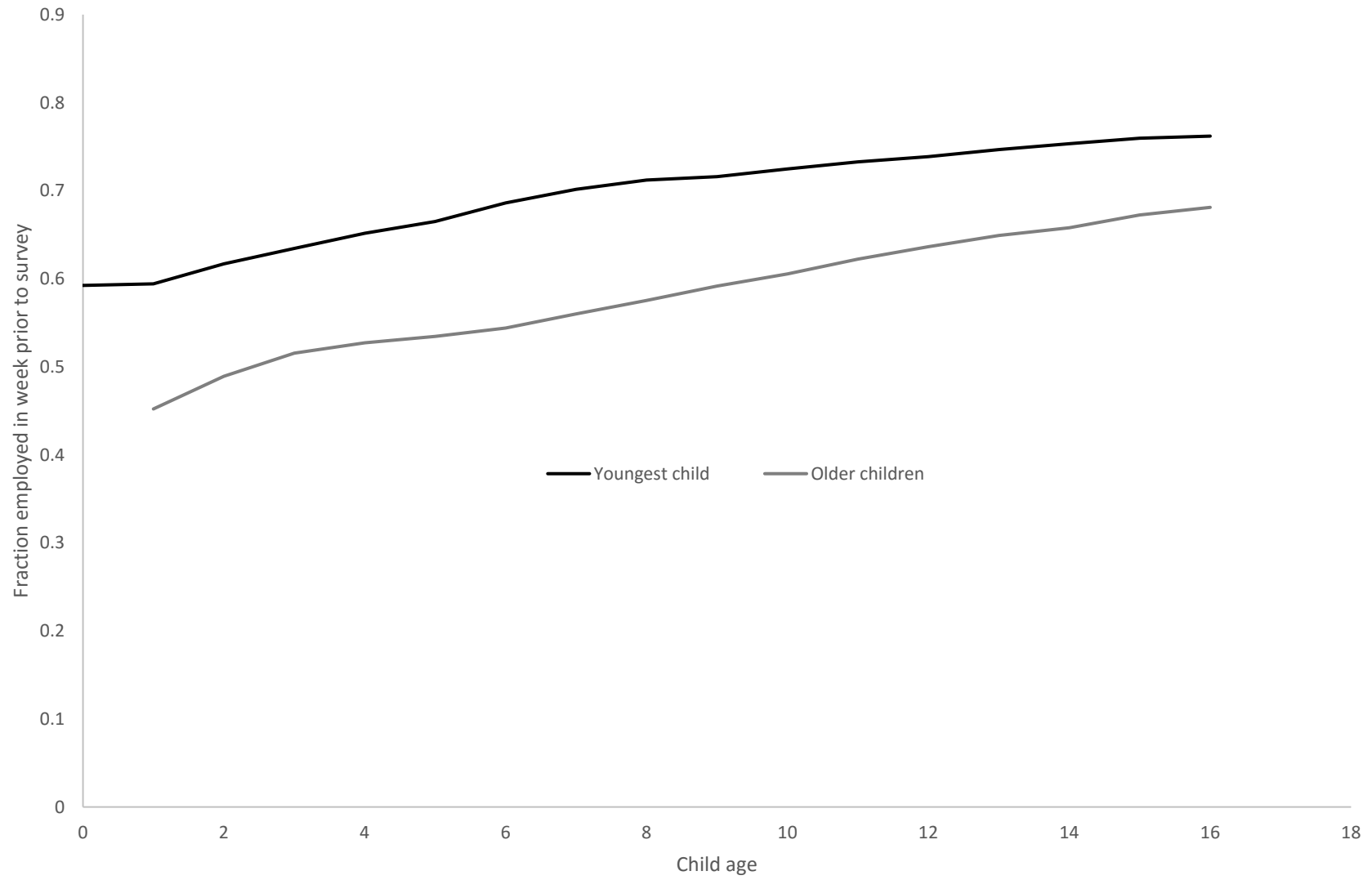Figure 5: Mothers' employment by child age, youngest child & older children, 2010

Figure 6: Mothers' employment rates by age of the youngest child and year, PSID
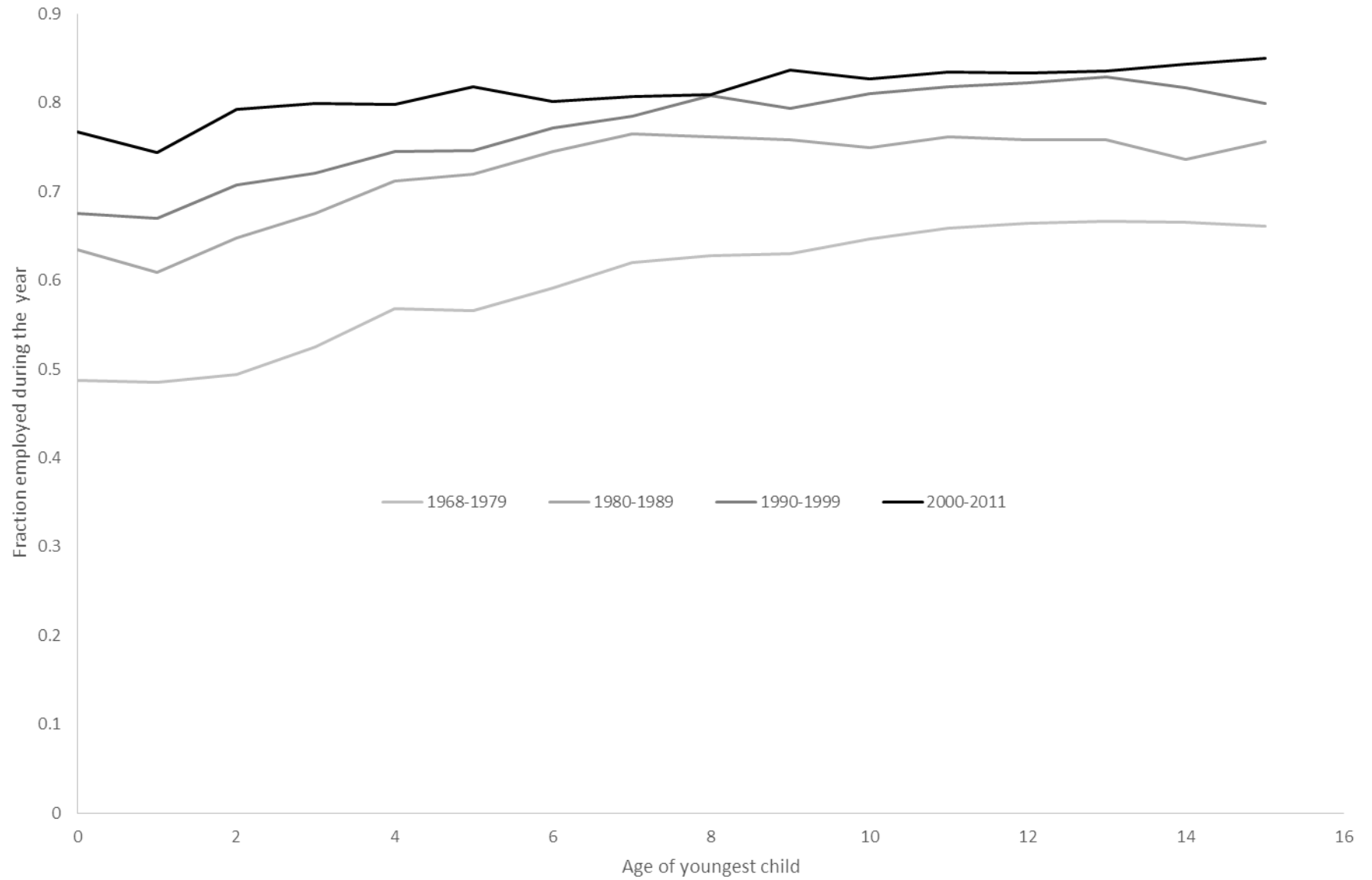
Figure 7: Employment rates of mothers by age of youngest child, by child's age when mother entered the labor market, PSID
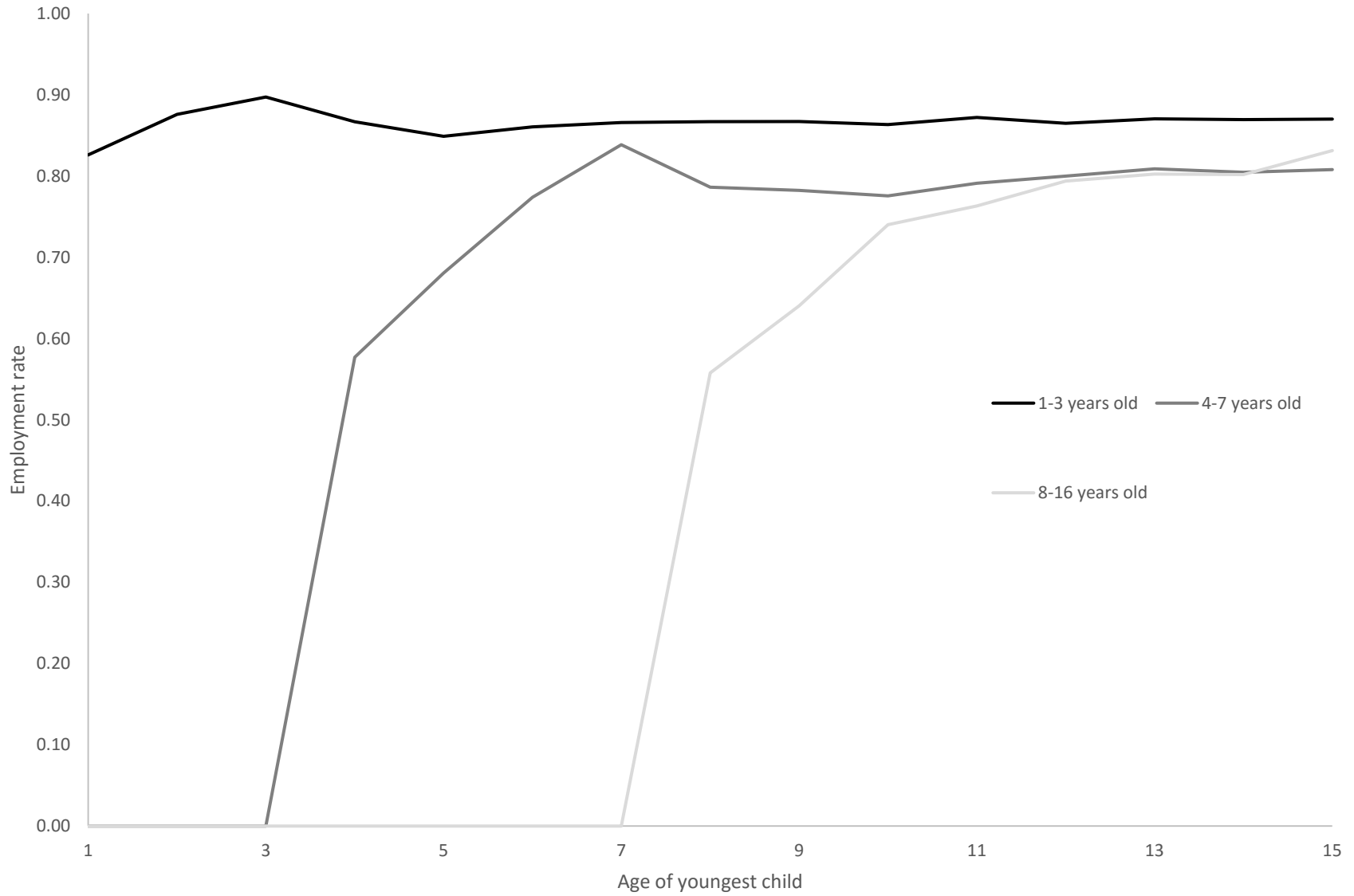
Figure 8: Illustration of the timing of employment for four hypothetical mothers

High productivity at home

High wage

Low wage

A

C

B

D

Low productivity at home
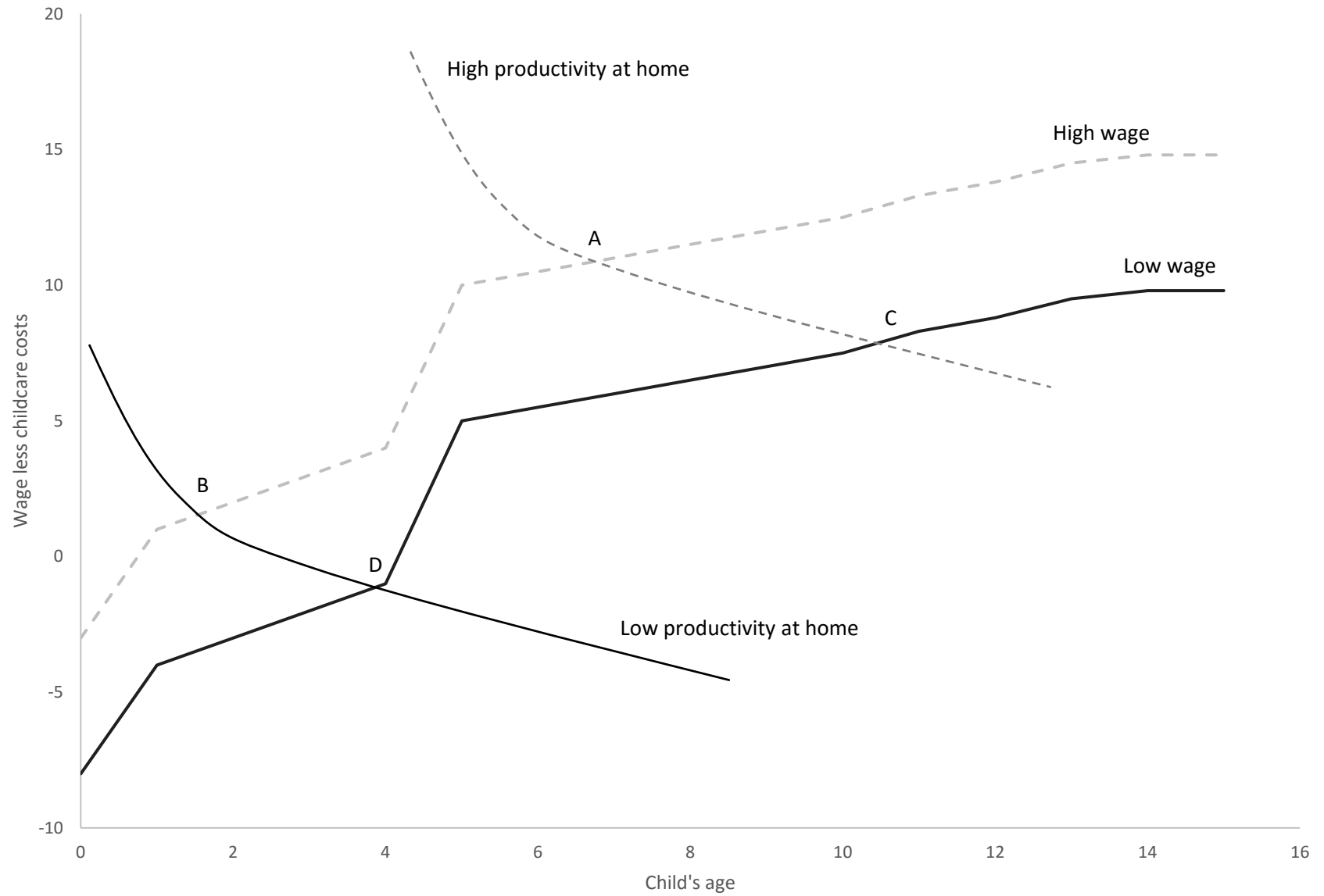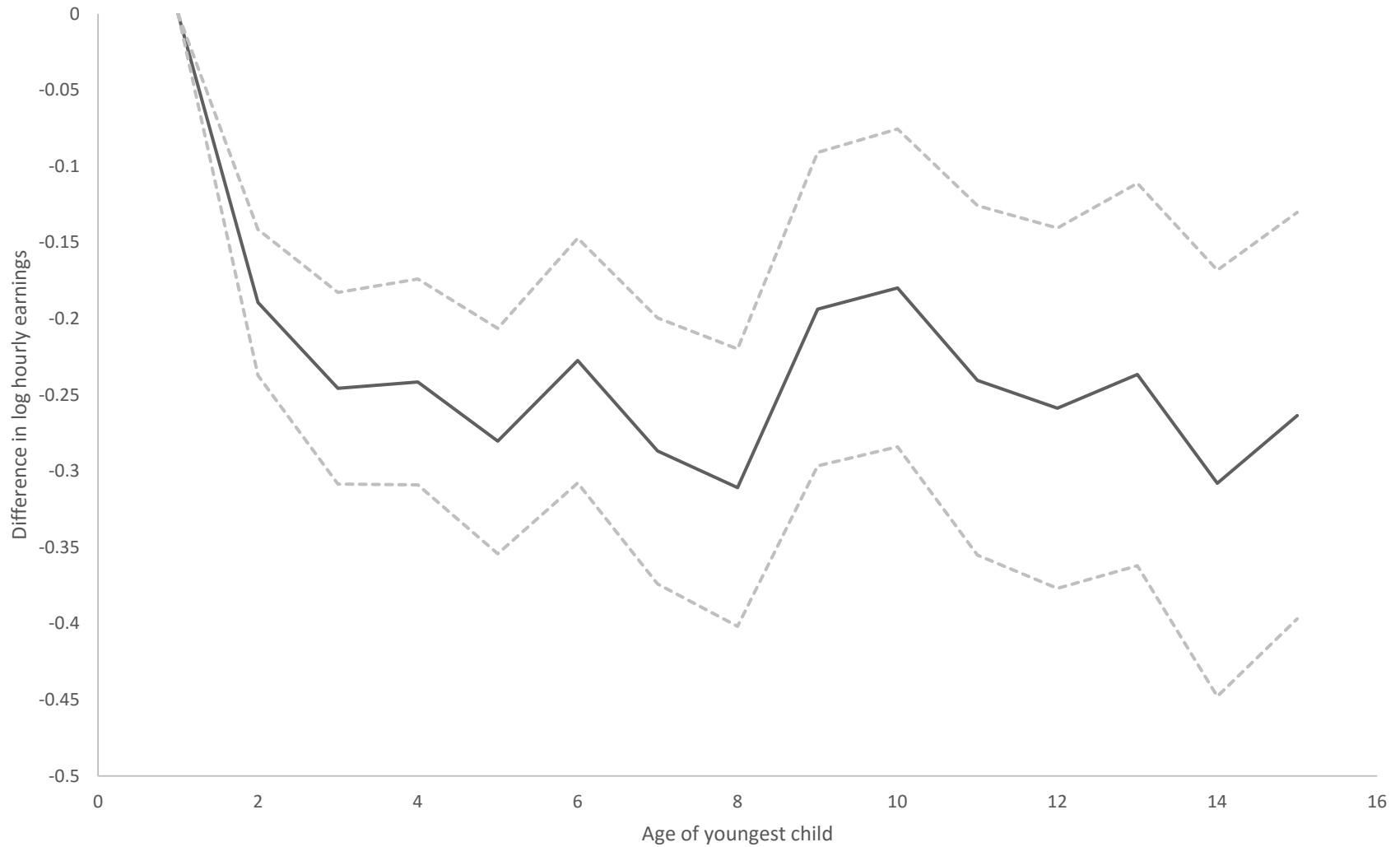
Wage less childcare costs

Child's age

Figure 9: Regression estimates of log hourly earnings differential in the first year that a mother enters the labor market, PSID

Note: solid figure shows the coefficients on the indicators for the age of the youngest child; dashed lines show the 95% confidence

Appendix Table A: Mothers' employment rates by child age, year, and maternal education

Child age	All mothers					HS degree or less		Some college or more	
	1970	1980	1990	2000	2010	1970	2010	1970	2010
0	0.179	0.334	0.491	0.528	0.592	0.173	0.432	0.197	0.665
1	0.229	0.376	0.524	0.550	0.586	0.217	0.452	0.263	0.653
2	0.245	0.387	0.529	0.558	0.591	0.234	0.467	0.280	0.657
3	0.250	0.398	0.537	0.576	0.595	0.242	0.478	0.282	0.659
4	0.264	0.411	0.546	0.585	0.601	0.256	0.488	0.295	0.664
5	0.282	0.426	0.559	0.596	0.607	0.274	0.499	0.316	0.667
6	0.306	0.451	0.574	0.613	0.617	0.297	0.512	0.341	0.677
7	0.325	0.479	0.593	0.625	0.630	0.316	0.530	0.363	0.688
8	0.344	0.496	0.612	0.637	0.641	0.333	0.544	0.389	0.698
9	0.360	0.518	0.630	0.652	0.650	0.351	0.555	0.399	0.707
10	0.374	0.532	0.642	0.666	0.660	0.364	0.568	0.418	0.718
11	0.391	0.542	0.654	0.680	0.672	0.381	0.586	0.432	0.726
12	0.407	0.549	0.666	0.687	0.682	0.396	0.599	0.459	0.737
13	0.422	0.555	0.679	0.700	0.692	0.412	0.610	0.469	0.748
14	0.438	0.567	0.683	0.709	0.700	0.427	0.618	0.489	0.756
15	0.450	0.578	0.693	0.717	0.711	0.438	0.635	0.503	0.765
16	0.464	0.582	0.697	0.725	0.716	0.451	0.640	0.521	0.773

Note: Data is from the 1970 through 2000 decennial Census and the 2012 5-year American Community Survey, as described in the Introduction and footnote 2 in the text.

Appendix Table B: Mothers' employment rates by child age, year, marital status, hours of work, and youngest child

Child age	Married 1970	Married 2010	Not married 1970	Not married 2010	Employed and usual weekly hours greater than 0	Employed and usual weekly hours greater than 20	Employed and usual weekly hours greater than 40	Employment rates by age of youngest child	Employment rates by age of older children
0	0.172	0.592	0.313	0.597	0.432	0.550	0.373	0.592	
1	0.219	0.578	0.384	0.628	0.452	0.532	0.346	0.594	0.452
2	0.233	0.579	0.404	0.646	0.467	0.535	0.349	0.617	0.489
3	0.236	0.582	0.424	0.656	0.478	0.540	0.352	0.634	0.516
4	0.248	0.583	0.439	0.677	0.488	0.542	0.353	0.652	0.527
5	0.265	0.589	0.461	0.680	0.499	0.547	0.355	0.665	0.534
6	0.289	0.600	0.476	0.689	0.512	0.556	0.359	0.686	0.544
7	0.308	0.613	0.493	0.696	0.530	0.568	0.366	0.702	0.560
8	0.327	0.623	0.511	0.711	0.544	0.580	0.375	0.712	0.575
9	0.342	0.632	0.523	0.719	0.555	0.589	0.381	0.716	0.592
10	0.357	0.645	0.530	0.720	0.568	0.602	0.391	0.725	0.605
11	0.373	0.658	0.546	0.727	0.586	0.614	0.398	0.733	0.622
12	0.389	0.668	0.559	0.735	0.599	0.626	0.408	0.739	0.636
13	0.404	0.678	0.569	0.742	0.610	0.637	0.419	0.747	0.649
14	0.420	0.687	0.583	0.745	0.618	0.647	0.429	0.753	0.658
15	0.431	0.700	0.600	0.748	0.635	0.659	0.440	0.760	0.672
16	0.444	0.705	0.614	0.754	0.640	0.667	0.450	0.762	0.681

Note: Data is from the 1970 decennial Census and the 2012 5-year American Community Survey, as described in the Introduction and footnote 2 in the text. Employment rates by usual hours of work and by younger/older child refer to data from the 2012 five-year American Community Survey.