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# The Determinants of Specialization Within Marriage*

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## Abstract

For recent cohorts of American couples, the traditional division of labor between husbands and wives is strongly associated with the presence of children in the household. We define measures of specialization and market intensity in household hours worked and earnings to describe the joint allocation of time and effort by married men and women.  Using longitudinal data from the Panel Study of Income Dynamics, we estimate the changes in these outcomes that follow the birth of a couple's first child, and the association of these changes with parental education, factors related to divorce risk, and birth cohort.  On average, specialization increases and market intensity falls, but we find evidence of considerable heterogeneity in the effects of children on household behavior, including the responses of fathers.  Married couples from later birth cohorts specialize less in response to the birth of their first child, as do couples who eventually divorce.  The gender of the first child has, surprisingly, a significant impact on the market intensity of the parents' response.

## I. Introduction

Economic models of the family have emphasized the traditional division of labor between husbands and wives as a principal source of the gains to marriage. In Becker's original formulation,[1] the family consumes "commodities" that it produces with inputs of market goods and services and the time of family members. If women have a comparative advantage in the provision of home time to commodity production, while men have a comparative advantage in earning the income that purchases market inputs, then family utility will be maximized by specialization in the time allocation of husbands and wives. The assumed female comparative advantage in home time is attributed to the gender gap in market wages and to a productivity advantage in household activities, including the care of children, that derives from biological factors or early training in domestic tasks. For any couple, the initial gains to specialization will be reinforced over time as husband and wife acquire skills specific to the market or domestic sectors.

The optimal degree of specialization in a marriage will depend upon the relative market and home productivities of husband and wife, and the household's ability to substitute market inputs for home time.[2] As real wages have increased in the United States, married women have allocated more time to market work and less to home production, decreasing the degree of marital specialization.[3] The labor supply behavior of men and women with no children is now very similar,[4] but substantial husband-wife specialization persists in families with children.[5] Parenthood reduces the total market intensity of the household by increasing the value of home time relative to market time, and, due to comparative advantage, it is typically the wife who reduces her commitment to the labor market to accommodate the increased demand for parental home time. The

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[1] Becker [1973].

[2] This will depend upon the cost of market inputs relative to the family price of time, and upon the degree of substitution in production.

[3] Blau [1998].

[4] In 1992, 85% of women aged 20 to 54 with no children under 18 worked during the year, while 89% of men worked (Hayghe and Bianchi, 1994).

empirical literature reports substantial negative effects of motherhood on women's hourly wages and annual hours of work, but the effect of fatherhood on men's labor market outcomes has received little attention.

Specialization and variations over time and over populations in the degree of specialization are of interest because of their implications for gender inequality. A sizable portion of the gender gap in the earnings of men and women may be directly attributable to the divergence in the hours of market work and wage rates of husbands and wives due to parenthood.[6] To the extent that men and women anticipate a divergence of time and effort devoted to the labor market due to parenthood, the direct effects will be compounded by feedback effects on pre-parenthood human capital investments. Wives who specialize in home production, because they are investing in marriage-specific human capital, may be disadvantaged in case of divorce. This will directly affect their post-marriage well-being, and, in a bargaining framework, their well-being within marriage as well.

Child-induced changes in the total market work hours of the husband and wife reflect the time/market goods intensity of the household's production of child services. Market intensity will depend upon the relative costs of parental and purchased market child care, and the degree of substitutability between these inputs. Public concern about the implications of declining parental inputs for child quality suggests that the total market intensity of the household's time use may be an interesting outcome.

We have several objectives in this paper. First, we define and estimate measures of the change in specialization (the difference between the work hours or earnings of the husband and wife) and market intensity (the sum of work hours or earnings) associated with parenthood, using longitudinal data from the PSID. Second, we examine the relationship between these changes and a limited set of correlates: the birth cohort of the

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5 73% of married mothers worked during 1992; 95% of fathers worked and 76% of them worked full-time, year-round.
6 Recent documentation of the "family gap" in women's wages can be found in Waldfogel [1997,1998] and England and Budig [1998].

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mother, parental education, and factors related to divorce risk. Our third objective is to estimate the determinants of the change in specialization associated with parenthood, and we propose extensions of this analysis based on more clearly exogenous labor market and marriage market conditions.

We find evidence of joint decisionmaking and considerable heterogeneity in the effects of children on household behavior. On average, the post-child increase in marital specialization is more than 1000 hours per year, or a divergence in the earnings of husband and wife of nearly $12,000 per year. Market intensity falls by 900 hours per year, but total household earnings by only $2,000. Later cohorts in our sample increase specialization less than earlier birth cohorts through smaller responses to the birth by both husbands and wives. Since these changes have offsetting effects, there is no significant difference between the changes in market intensity by the early and late cohorts.

We also find that higher divorce risk is associated with lower levels of specialization. Risk of divorce can be expected to reduce the optimal degree of specialization for a married couple because the costs of divorce are higher for a couple in which the husband and wife have invested in undiversified skill portfolios. We find that couples who divorce within our sample period increase specialization less than those who do not, and that other characteristics associated with divorce risk, such as whether the father lived with both parents as a child, also reduce specialization. The gender of the first child has, surprisingly, a significant impact on the earnings of fathers. This pattern is consistent with the effect of child gender on the risk of divorce,[7] but deserves further study.

Parental education is also strongly associated with changes in hours and earnings after the birth of the first child, but the patterns are somewhat puzzling. As expected, husband's education increases household specialization and moderates the child-induced decline in market intensity. The differences by education level are large, and husbands

who have not attended college experience a decrease in their hours and earnings after the child is born rather than the expected increase. Wife's education is weakly related to reallocations of time after the birth, but has significant positive effects on her own wage rate and her spouse's that increase both specialization and market intensity in earnings.

Section II of this paper reviews the literature regarding the relationship between parenthood, divorce and labor market outcomes, and introduces marital specialization and market intensity as indicators of the joint response to children. Section III discusses the conceptual underpinnings of the analysis. Section IV describes our empirical measures of the changes in specialization and market intensity associated with the first birth and a simple specification for describing heterogeneity in this response. Our longitudinal sample from the PSID is described in Section V, and results are discussed in Section VI. Section VII concludes.

## II.       Parenthood, Divorce, and Specialization:  A Review of the Literature

The most obvious indicator of an increase in household specialization after the birth of a child is divergence between the hours of market work by husbands and wives. The literature on the effect of children on women's market work is enormous and concludes, in general, that there is a strong negative correlation between presence of young children in the household and measures of mother's labor supply.[8] The negative effect of children, particularly small children, on mother's labor supply has declined since 1970, but remains substantial.[9] Studies that instrument for fertility, which is likely to be correlated with tastes for work or labor market opportunities, usually find sharply reduced or even positive effects of childbearing on labor supply, but valid instruments are difficult to find. However, a recent study by Angrist and Evans [1996] uses the sex mix of the first two children and twin births as instruments for a third birth, and finds reduced but still substantial negative effects of fertility at this particular parity on women's labor

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7  Morgan, Lye, and Condron [1988].
8   For a review, see Browning [1992].
9   Leibowitz and Klerman [1995] also find that women's labor supply became more sensitive to their own earnings and less sensitive to those of their husbands over this period.

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supply. Using a large set of instruments that include state and county indicators of the cost of fertility and fertility control, Klepinger et al. [forthcoming] find that adolescent fertility has significant negative effects on teen work experience.[10]

In contrast, little is known about the effects of parenthood on male labor market outcomes. It may be that, since male labor supply has been found to be relatively unresponsive to family variables such as wife's earnings, the household circumstances of men are assumed to be relatively unimportant determinants of their labor market experiences. Some older studies have found that father's labor supply is higher when children are young,[11] but Angrist and Evans find no significant effect of the birth of a third child on various measures of father's labor supply. Thus, increased specialization has been assumed to be a function of the maternal response to childbearing only, and necessarily associated with a reduction in household market intensity.

One consequence of child-induced specialization in the allocation of time is a divergence in the market wage rates of mothers and fathers. It is well-known, from studies in many developed countries, that the wages of women with children are lower, all else equal, than the wages of women without children. The presence of young children in the household is associated with lower participation rates and hours worked for women, so that market productivity may be reduced through a reduction in work experience, loss of specific human capital, atrophy of market skills during a period out of the labor force, and reduced incentive to invest in training generating a payoff that depends upon future work. Becker [1985] has argued that women's productivity may be reduced by children not solely through a human capital effect, but also through a diversion of effort from market activities to home activities as children increase the relative return to the latter.[12] Alternatively, the negative relationship between female wages and children may be due not to a child-caused reduction in productivity, but to the selection of lower-productivity women into childbearing.

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[10]  And significant negative effects on formal education and adult wages as well.
[11]  For example, see Pencavel [1986].
[12]  Reduced market effort may take the form of choosing a job that offers a lower wage but more flexibility.

Recent studies have found that neither selection nor lower observed human capital of mothers, as measured by work experience and tenure, can explain all of the motherhood wage gap.[13] Attempts to control for the selection of low-wage women into motherhood using first-differenced longitudinal data have had mixed results: Korenman and Neumark [1992] find that the apparent direct effect of motherhood on wages disappears with first-differenced estimates,[14] suggesting that women with lower market wages are more likely to have children. Waldfogel [1997] finds a substantial family gap in women's wages that does not fall significantly in fixed-effect and first-difference models, and is not accounted for by losses in work experience. She suggests that very short intervals (one to two years) in previous first-difference estimates may account for the contrasting results. England and Budig [1998] find that differences in experience and seniority fail to explain most of the apparent effect of motherhood on the wages of young women in the NLSY. Using data on sisters to control for unobserved family-specific heterogeneity, Neumark and Korenman [1994] find that motherhood is associated with a significant decline in wages.

In Lundberg and Rose [1998] we examine the effects of parenthood on wages and hours worked for both married men and women. Using a sample of married couples from the PSID, we estimate both fixed and random effects models and find evidence of both selection effects and a causal relationship between parenthood and labor market outcomes. There is negative selection into parenthood for both men and women, and substantial child-related reallocations within the household, including increases in the wages of fathers. With the exception of this paper, the effect of children on male wages has been largely ignored. The wage premium enjoyed by married men, however, has been well-documented, and is attributed partly to the selection of more productive men

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[13]  A review of empirical studies of the "family gap" in the United States and other countries can be found in Waldfogel [1998]. She emphasizes that the family gap in women's wages has been rising in the U.S. during a period of rising relative female wages.
[14]  Although their instrumental variables estimates indicate that children do reduce wages.

into marriage and partly to the increased productivity of men whose household responsibilities have been reduced by the presence of a wife.[15]

On the basis of existing empirical results, we can expect that the arrival of children will be associated with an increase in specialization in marriage—with women reducing hours of market work and experiencing a reduction in wage rates, and men (possibly) increasing both market hours and wages. Although these changes in observed labor supply and in unobserved effort and time devoted to home production must be viewed as part of a joint household response, empirical work has typically failed to explicitly deal with the interrelationship of husbands' and wives' outcomes. One exception is Lundberg [1988] who finds that the presence of young children in the household changes the apparent relationship between husbands' and wives' work behavior: men and women in households with young children exhibit strong interactions in changes in their work hours which are not apparent in households with no children or with only older children. Gray [1997] finds that the marriage wage premium is smaller for men whose wives work. In Lundberg and Rose [1998], we find that the responses of husbands and wives to the birth of their first child appear to be jointly determined. In households in which the wife experiences an interruption in employment, mothers' wages and hours worked fall, while fathers' hours and wages increase. In households in which the mother remains continuously attached to the labor force, however, there is no evidence of a wage decline for mothers, and the hours worked by fathers decrease substantially.

### III. Conceptual Framework

What determines the joint response of husband and wife to the demands of caring and providing for a child? Consider a simple unitary model of the household, in which husband and wife choose their market purchases, child care arrangements, and time use in order to jointly maximize a utility function that depends upon consumption, the leisure

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[15] In studies of the marriage premium in male wages, the effects of children are generally not reported (Korenman and Neumark, 1991 and Gray, 1997) or are reported to be insignificant (Loh, 1996).

times of each, and the value of child services. This model suggests that key determinants will be male and female wage rates, non-labor income, the substitutability of the husband's and wife's leisure time, the price of market child care, and the properties of the child services function, i.e. substitutability between mother's time, father's time, and market inputs in the production of child services. Without a restrictive set of assumptions, such a model generates few testable hypotheses, though we can expect the degree of specialization in time use to depend upon the divergence in market wages, and the total work time of the parents to be decreasing in the price of market child care. To the extent that market wages are endogenous, and respond to child-induced changes in the allocation of time and choice of job characteristics, these implications will be difficult to test. Complete interruptions in market work will result in wage penalties that may differ by occupation and over time.

Since observed wages are likely to be endogenous, we can use education level as a measure of human capital, and a principal determinant of the tradeoff between market and home time. Education will be largely, though not entirely, predetermined with respect to marital allocations of time and effort. We expect couples with more education to allocate more time to market work rather than home time, even after the birth of a child, and specialization to be greater when the education levels of husbands and wives diverge.

In a dynamic version of this model, the probability of marital dissolution should affect the division of labor. A highly-specialized couple will invest in sector-specific skills and face substantial divorce costs when the opportunities for marital exchange disappear. In addition, specialization in home production may entail investments in marriage-specific human capital that will lose value when the couple divorces. We therefore expect to see less specialization among couples whose perceived risk of divorce is higher. There is some evidence of such a relationship for the time allocation of women only: Johnson and Skinner [1986] found that the labor supply of married women rises significantly several years before they divorce, and Gray [1995] finds an increase in women's labor force participation two to three years prior to divorce that is due largely to

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an increase in the percentage of wives working in professional and managerial occupations. The effect of divorce risk on the behavior of husbands has not, to our knowledge, been investigated.

A bargaining model of marital decision-making introduces some additional elements to the analysis of post-child specialization. In a cooperative model of marital bargaining, outcomes and individual well-being will be affected by the threat points of the husband and wife, which in turn depend upon control of income or other resources within the family, or expected well-being in case of divorce.[16] This implies that labor supply decisions of husbands and wives, and, therefore, specialization and market-intensity of responses to parenthood, will depend upon "extrahousehold environmental parameters"[17] such as divorce laws,[18] remarriage market conditions, and welfare generosity. In a dynamic bargaining model, strategic considerations will affect the degree of specialization we expect to see in response to parenthood, since the wife's reduction of market work will reduce her long-run accumulation of market human capital and therefore her well-being in the event of divorce. Wells and Maher [1996] show that "too much" market work and "too little" production of household public goods will occur when husbands are unable to indemnify wives for future losses associated with specialization.

Household labor market behavior is usually analyzed in terms of the individual hours worked and earnings of the husband and wife. These outcomes are seldom treated as elements of a joint household response. An alternative approach is to construct measures of the household's allocation of time and effort that focus on the home production vs. market goods tradeoff faced jointly by the married couple. We present here a simple method of empirically describing the joint changes in time use following the birth of a child in terms of a change in the degree of specialization ($\Delta S$, or the change

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[16] The threat point is determined by the marital partner's best alternative to a cooperative marital equilibrium, which may be internal to the marriage (Lundberg and Pollak, 1993) or external (McElroy, 1990).

[17] McElroy [1990].

in the difference between market hours of the husband and wife) and a change in the
market intensity of the household ($\Delta M$, or the change in the sum of market hours worked
by the couple). If households differ in the time or goods intensity of the resources they
devote to childrearing, this will be reflected by heterogeneity in these measures more
clearly than in standard individual labor supply equations. A joint response diagram
(JRD) illustrates the relationship between these dimensions of the marital response and
individual work hours:
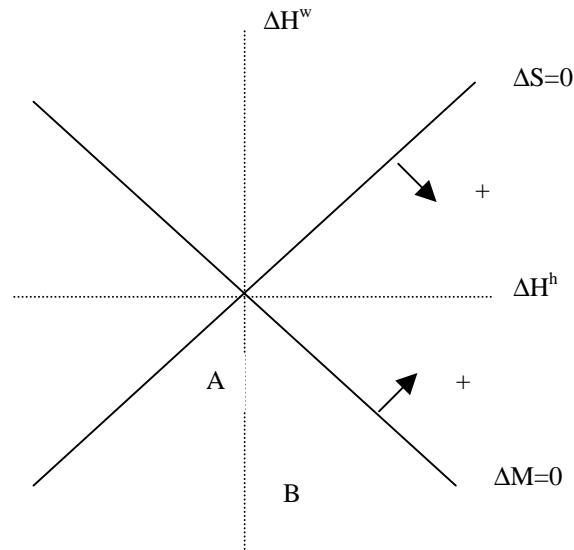


Figure 1

The horizontal axis of the JRD measures the response of husband's hours to parenthood
and the vertical axis measures the response of mother's hours to parenthood. The upward
sloping 45 degree line is the locus of points representing no change in the level of
specialization ($\Delta S = \Delta H^h - \Delta H^w = 0$). Points below (above) the line represent increases
(decreases) in specialization. The downward sloping 45 degree line is the locus of points
representing no change in market intensity ($\Delta M = \Delta H^h + \Delta H^w = 0$). Points below
(above) the line represent decreases (increases) in market intensity. In our previous study
using a pilot sample, we found considerable heterogeneity in household responses to
children, with couples in which the wife is a continuous participant exhibiting a much

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[18]  Gray [1998] has found a significant impact of divorce law changes in the U.S. on married women's
labor supply.

smaller increase in specialization and fall in market intensity (A) than couples in which the wife was not a continuous participant (B).

The principal aim of this paper is to describe the pattern of marital specialization and market intensity that follow the birth of the first child, including responses by both mothers and fathers. Because some part of these responses arise through allocation of effort and the acceptance of compensating wage penalties for jobs that allow for flexibility, we examine the effect of the birth of a child on earnings as well as hours of work.

In summary, we would expect the degree of specialization in a marriage to be related to the prices associated with a marital allocation, including the price of child care and the wage penalties associated with reduced work, and to factors affecting the alternatives to marriage, including divorce risk and the spouses' threat points. In this paper, we examine the effects of a small set of correlates. We would expect that both the level and the child-related change in specialization has fallen over time, as changes in divorce probabilities, divorce laws, female labor force participation, and social norms relating to women's role in the family have changed. Since, over the time period we study, the level of specialization within marriage prior to the birth of the first child is relatively low and market intensity is high, much of the variation in the marital time allocation will be reflected in the variation in the changes in specialization and market intensity, $\Delta S$ and $\Delta M$. Therefore, we can describe patterns of time use by estimating the extent to which $\Delta S$ and $\Delta M$ vary by cohort, human capital, and divorce risk. The methodology which we use to undertake this analysis is described in Section IV.

## IV.     Empirical Specification

We estimate the determinants of household specialization and market intensity in work hours with the reduced form labor supply equations:

$$S_{it} = H_{it}^h - H_{it}^w = \alpha_i^S + \beta^S AFTER_{it} + \theta^S X_{it} + u_{it}^S \qquad (1a)$$

$$M_{it} = H_{it}^h + H_{it}^w = \alpha_i^M + \beta^M AFTER_{it} + \theta^M X_{it} + u_{it}^M \qquad (1b)$$

where $\alpha_i^S$ and $\alpha_i^M$ are marriage-specific fixed effects, $H_{it}^j$ is annual hours of work for spouse $j$ in couple $i$ in year $t$, $AFTER_{it}$ is a dummy variable indicating that a first child was born to couple $i$ prior to year $t$, and $X$ is a set of control variables. The variables in $X$ include the age and education of both spouses, the year of the observation (all entered as dummy variables to capture non-linearities), and a dummy variable which equals one in the year in which the child was born.[19] $\beta^S$ is an estimate of the change in specialization—the divergence in husband's and wife's hours of work due to the birth of a child. $\beta^M$ measures the change in market intensity.

For comparison, we also estimate more standard models for husband's and wife's work hours of the form:

$$H_{it}^h = \alpha_i^h + \beta^h AFTER_{it} + \theta^h X_{it} + u_{it}^h \qquad (1c)$$

$$H_{it}^w = \alpha_i^w + \beta^w AFTER_{it} + \theta^w X_{it} + u_{it}^w \qquad (1d)$$

We report standard fixed effects estimates of (1a)-(1d). Fixed effects estimation controls for any heterogeneity/endogeneity based on individual specific unobservables. This eliminates various potential biases that arise in cross section estimates. For example, cross section estimates of the effect of motherhood on earnings would likely be biased downward because of the endogeneity of childbearing. Women who prefer home production to market work will be more likely to have children and also accumulate less human capital, and women with less-marketable skills will be more likely to have children. To the extent that the effects of preferences and ability are fixed over time, fixed effects will eliminate these biases.[20] Fixed effects estimates can also eliminate

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[19] The individual's wage rate is excluded because human capital accumulation and labor supply decisions are jointly determined.

[20] However, endogenous timing in fertility with respect to shocks to earnings may still generate negative biases. For example, if women tend to have their first child at a time in which they (correctly) expect to be underemployed, even the Fixed Effects coefficients will be biased downward.

biases due to assortative mating in estimating the effect of one spouse's characteristics on the outcomes or behavior of the other spouse. An additional endogeneity issue is selection into marriage and divorce since the sample consists only of married individuals. To the extent that this selection is based on characteristics that have a fixed effect on the outcome, this potential source of bias is eliminated as well.

We estimate an additional set of equations of the same form as (1a) - (1d), in which earnings are used to construct measures of $\Delta S$ and $\Delta M$, and also fixed-effect regressions for husband's and wife's hourly wage rate.

Estimates of the $\beta$'s from the wage equations indicate the impact of parenthood on the hourly wage rate. For women, we would expect this effect to be negative, as numerous studies have shown that motherhood is associated with a fall in hourly wages. This decline may be attributed to a reduction of effort expended for each hour of market work, a compensating variation due to a change in job characteristics in order to accommodate family responsibilities, a loss of specific human capital due to a work interruption, or foregone human capital accumulation associated with the drop in labor supply/participation.[21] Similarly, any changes in husbands' wages due to fatherhood reflect differences due to reallocation of effort, compensating variations due to a change in job characteristics, and the cumulative effect of changes in labor supply.[22] The effects of parenthood on annual earnings subsume the effects on labor supply/participation, as well as the effects on hourly earnings.

After estimating all variants of the base specification, we examine some sources of heterogeneity in post-child responses of couples by introducing variables which will be interacted with *AFTER* into each equation. To test whether the changes in

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[21] Unlike most of the literature on the family gap in women's wages, our earnings and wage equations do *not* include cumulative experience, which is an endogenous component of the response to parenthood. Our estimates of the impact of motherhood on hourly wages should be interpreted as being gross of the experience effects.

[22] And, in principle, penalties due to a career interruption.

specialization and market intensity associated with parenthood, in terms of hours worked, are different for two groups of couples, we estimate:

$$S_{it} = H_{it}^h - H_{it}^w = \alpha_i^S + \beta^S AFTER_{it} + \gamma^S AFTER_{it} V_{it} + \theta^S X_{it} + u_{it}^S \qquad (2a)$$

$$M_{it} = H_{it}^h + H_{it}^w = \alpha_i^M + \beta^M AFTER_{it} + \gamma^M AFTER_{it} V_{it} + \theta^M X_{it} + u_{it}^M \qquad (2b)$$

where $V = 1$ indicates that the couple belongs to some group and $V = 0$ denotes that the couple does not.[23] For example, $V = 1$ could indicate that the wife was born after 1950, or that the couple eventually divorced. Equations (2a) and (2b) constitute our interacted specification; in some specifications we also present three-way interactions between *AFTER*, birth cohort, and another *V*. For some variables, particularly whether the couple divorced during the sample period, there are endogeneity issues that interfere with our ability to interpret $\gamma$ as the effect of *V* on the change in market intensity or specialization, and in this case we treat our estimates as essential descriptive.

## V. Data

The data for this analysis come from the SRC sample of the Panel Study of Income Dynamics (PSID). The original 3,000 households, initially surveyed in 1968, constituted a national probability sample of U.S. households as of 1967. As children and other household members have left to form separate families, they have been added to the sample of households tracked by the PSID. We construct a panel data set for all married couples in the sample between 1968 and 1992, so that we observe marriages for a window of up to 25 years. Because we wish to focus on changing behavior across cohorts of married couples when their first child is born, we exclude all original sample members who were over 25 years of age at the beginning of the survey in 1968, except for those who were married to another sample member under 25 at the time, and all

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[23] There is an additional variable in "X" in these specifications: the interaction of the dummy variable representing the year in which the child is born with "V".

marriages in which the wife's first child was not born within the marriage.[24] Detailed retrospective information on demographic events has been collected by the PSID since 1985, and we have based our coding of the timing of marriage, divorce, and first births on the Childbirth and Adoption History File and the Marriage History File.[25] Marriages that contain individuals without valid demographic histories, for example those who left the sample before 1985, are also excluded from our analysis

The final data set consists of 19857 observations on 1627 couples, and the median number of years in the sample for a marriage is 9. The dependent variables in the base specifications are annual hours of work, the (log of the real) hourly wage rate, and (real) annual earnings. Specialization is defined as the husband's hours or earnings minus the wife's, and the level of market intensity is measured as the sum of husband's and wife's hours worked or earnings. The independent variables include a dummy variable which is equal to one in each year following the birth of the first child (*AFTER*), and dummy variables indicating the year of the observation, husband's and wife's age, husband's and wife's education[26], and whether the first child was born in that particular year.

The marital cohort is defined on the basis of the wife's birth date: marriages in which the wife was born after 1950 are included in the *LATE* cohort. This choice is somewhat arbitrary—exploratory analysis suggested that average changes in specialization and market intensity were more closely related to the wife's birth year than to the husband's, but that household behavior changed gradually for wife's birth years between 1940 and 1959. Other variables included in the interacted specifications are *DIVORCE* (whether the couple eventually divorced within the sample period), BOY (whether the first child was a boy), *COLH* (whether the husband had attended college), and *COLW* (whether the wife had attended college). We also included in some

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[24] A small number of annual observations in which the husband was over 60 years old, the wife was over 55, or either spouse was under 18 were also deleted.

[25] Therefore, our treatment of cohabitation and separation will depend upon how individuals report the beginning and ending of marriages in these retrospectives.

[26] This is measured as "years of school completed." Education levels increase during the panel for some individuals. However, we have eliminated obvious coding errors that take the form of transitory changes in educational attainment.

specifications dummy variables indicating whether the husband or wife lived with both parents when growing up.

The sample means are reported in the appendix table. Husbands work more than twice as many hours in the market than do wives, and their annual earnings are three times as high. One-fifth of the couples divorce during the sample period, and about 80% of all annual observations are after the birth of the couple's first child. To illustrate the variability over the sample in joint responses to childbearing, we calculate a single measure of the change in specialization and market intensity for each couple, using observations two years before and two years after the birth. The distribution of increases and decreases in these measures (with H denoting hours and Y earnings) is shown on Figure 2, with the 10-15% of the sample whose changes were less than 5% deleted.



$\Delta S=0$

H: 7%
Y: 9%

+

H: 10%          H: 14%
Y: 12%          Y: 37%

+

H: 55%
Y: 32%

$\Delta M=0$

Figure 2

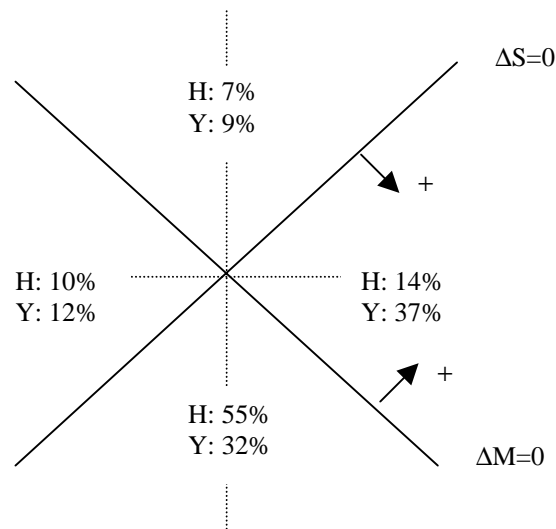Changes in hours are heavily concentrated in the quadrant representing positive changes in specialization and negative changes in market intensity, but changes in earnings are equally distributed between positive and negative changes in market intensity. Nearly twenty percent of households experience a decrease in specialization, as conventionally measured, following the birth of their first child.

## VI.  Results

In this section we first discuss the results of the estimation of the base specification for each of the eight outcomes (specialization, market intensity, and hours, earnings, and wage rates for husbands and wives).  We then discuss the interacted specifications.

## Table 1:  Base Specification

The results for the base specification are reported in Table 1.  The top panel reports the coefficients on *AFTER* for outcomes based on hours worked, the middle panel for earnings, and the bottom panel reports the *AFTER* effect on husband's and wife's wage rates.  The birth of a first child is associated with a substantial and significant increase in the degree of specialization in the household, and a net reduction in market intensity.  The hours worked by husbands and wives diverge by an average of 1112 hours per year, which is more than the average hours worked by wives in the sample (988).  Divergence in earnings increases by $11,956 per year, which is more than the average earnings of wives and nearly half the average earnings of husbands.  The market intensity of the household's time use falls, with total hours worked falling by about 28% after the birth.

From the fixed-effect equations for individual hours and earnings, we can see that more than 90% of the increased specialization in hours, and 60% of the increased specialization in earnings is caused by a reduction in the wife's hours and earnings, but that there is a significant change in husband's hours and earnings following the birth as well.  Men work, on average, an extra two hours per week after becoming fathers, and their earnings increase by 20% after the birth.[27]  In the bottom panel, we can see that changes in wage rates contribute to the child-induced increase in specialization:  the

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[27]  Recall that husband's age is included in the set of control variables, so this increase cannot be attributed to age effects.  However, the *AFTER* effect does include the effects of subsequent children.

wife's wage falls by 20% following the birth, while the husband's wage increases by more than 10%.

We note that our estimate of the effect of motherhood on earnings is larger than other estimates in the literature (see Waldfogel, 1998). In part, this is because our estimates are gross of the effects of human capital variables such as experience and tenure.[28]

In summary, we find strong evidence that specialization within the household, measured as the divergence in either hours or earnings of husband and wife, increases after the birth of a child. The total market intensity of the household's allocation of time and effort declines. These patterns result, not just from a withdrawal from market work by mothers, but also from substantial changes in the hours worked and wages of the fathers.

**Tables 2 through 5:  Interacted Specifications**

In Tables 2 through 5 we report the results for a series of interacted specifications in order to test for differences in specialization and market intensity between subgroups of the population. The format of these tables is similar to the format of Table 1. We report the coefficients and associated t-statistics for the variables *AFTER* and *V*AFTER* where *V* is a variable indicating presence in a particular subgroup, and in Tables 3 through 5 also report interactions between cohort and *V*AFTER*.

Table 2:  Wife's Birth Cohort

Because substantial changes in divorce laws and practice, and in female labor market behavior, occurred over our sample period, we would expect patterns of

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[28] Another reason our estimated wage penalty is somewhat larger than others in the literature is that we are only addressing the effect of the transition into parenthood. The coefficient on *AFTER* reflects effects of subsequent children along with the effect of the first child. We would expect the birth of the first child to be associated with a greater shift in household roles than births of subsequent children. To some extent, heterogeneity in responses may be due to heterogeneity in number of children born to parents. Of course, these conjectures are testable within our framework, and in future work we will enter variables reflecting the presence of subsequent children.

household specialization market intensity to have changed dramatically as well. In Table 2, we explicitly test for a significant difference in child-induced specialization and market intensity for couples by cohort by dividing the sample into two groups: those in which the wife was born after 1950 (*LATE* = 1), and couples in which she was born in 1950 or earlier (*LATE* = 0).

Couples in the younger cohort exhibit substantially smaller increases in specialization following the birth of their first child than do couples in the older cohort. Specialization in hours worked increases by only 1000 hours compared to 1300 for the older cohort, and earnings diverge by only $10,000 per year rather than $15,000. The cross-cohort reduction in specialization may be a response to increasing relative female wages, changing gender role norms, and/or increases in the perceived risk of divorce. The child-induced changes in market intensity for the two cohorts are not significantly different, however. The individual equations show why this is the case: in the younger cohort, husband's hours and earnings rose less after the birth of the child, while wife's hours and earnings fell less. These changes reinforce each other in reducing specialization, but have offsetting effects on the change in market intensity. This result emphasizes the importance of the husband's response in describing household adjustments to the birth. The late cohort does increase total market hours by significantly more than the early cohort, despite the younger wives' greater commitment to the labor force and lower fertility, because there is an offsetting change in the husband's hours.

Table 3:  Divorce Risk

In Table 3 we begin to examine the relationship between divorce and specialization by interacting the variable *DIVORCE*, which equals 1 if the couple divorced within the sample period, with *AFTER*. The fixed effects results indicate that couples whose marriages end in divorce experience a significantly smaller increase in specialization after childbearing. Differences in the change in household market intensity between the couples who divorce and those who do not are insignificant. The reduction in specialization is reflected in the responses of both husbands and wives:  men in

marriages which end in divorce increase their earnings by significantly less than men in marriages that don't end in divorce, and the women in these marriages reduce their work hours, earnings, and wages by significantly less than non-divorcing women after their first child is born.

When we include cohort in the model and interact the effect of divorce on the after-child responses with *LATE*, some interesting patterns emerge.  The reduced specialization of divorcing couples is now significant only for the younger cohort, and the positive post-child effect on husband's earnings disappears altogether for couples in the younger cohort whose marriages end in divorce.  This interaction of divorce and late cohort is strong enough to significantly reduce the market intensity of the household.  We speculate that divorces among the younger cohort may have come as less of a surprise, since a high proportion of the older cohort were married before the increase in divorce rates of the late 1960's.  The positive effect of future divorce on the wife's earnings and hours is still significant, but appears most strongly in hours for the older cohort and in earnings for the younger cohort.

While we can conclude that divorce is associated with less post-child specialization, we are unable to tell the direction of the causality underlying this relationship.  It could be that expectations of divorce generate less specialization. Because more specialization increases the cost of divorce,  couples who believe that it is likely that  a marriage will dissolve will limit the extent they will specialize. On the other hand, less specialization could make divorce more likely, since less specialization corresponds to a lower level of marital surplus.[29]

The problem of disentangling the causality in the relationship between divorce and specialization adds an additional dimension to the problem of determining the direction of the causality between divorce and female labor force participation - one of

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[29] Other endogeneity and heterogeneity issues are associated with the *DIVORCE* variable.  First, couples who married earlier are in the sample longer and are more likely to have experienced a divorce, all other things being equal.  Second, the components of ΔS may be correlated with unobservables which also affect *DIVORCE.*

the classic "chicken and egg" problems in labor economics.  We included, in other specifications, variables related to divorce risk that should present less of an endogeneity problem.[30]  Child gender is examined in the next section.  Because success of an individual's parents' marriage may be correlated with the expectation of success of his/her own marriage, we included dummy variables for whether the husband or wife lived with both parents when growing up. While these variables may reflect unobservable components of family background, they are exogenous in the sense that they are predetermined at the time of the marriage.  In results not reported in detail, we find that there is significantly more specialization, when measured in terms of annual earnings, in households in which the husband lived with both parents when growing up.  This arises primarily through wives' earnings.  However, there is no significant effect of the stability of  wives' parents' marriage on the amount of specialization.

Table 4:  Boy Interaction

Our motivation for interacting the variable *BOY*, indicating whether the first child is a boy, with *AFTER* is the finding first reported by Morgan, Lye and Condron that the presence of a boy in a marriage reduces the likelihood of divorce by 7 percent more than the presence of a girl.  The results in Table 4 indicate that the market intensity of a couple's time allocation, measured in both hours and earnings, is higher if their first child is a boy rather than a girl.  Earnings specialization is also significantly higher, though there is no significant difference in hours specialization. These differences arise from differences in husbands' earnings, which are substantially (over $3000) higher per year is a son is born rather than a daughter, due to increases in both wage rates and annual hours worked. Morgan et al speculate that the presence of a boy increases husbands'

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[30]  Gray and Vanderhart [1998] attempt to untangle the divorce risk-specialization relationship.  They estimate a simultaneous equations model of divorce probability and the male marriage wage premium, assuming that religion and marital tenure do not affect wages.  They also estimate the effect of state laws permitting unilateral divorce on the wage premium.

commitment to the marriage, we believe that a son also induces him to consume less leisure and work harder.[31, 32]

Specifications that include interactions between child gender and cohort show that the source of the husband's earnings increase has changed over time—there is a significant difference in earnings but not hours for the early cohort, and in hours but not earnings for the late cohort.[33] The gender of a couple's first child has no significant effect on the mother's wage rate, hours worked, or earnings.

Table 5:  Husband's Education and Wife's Education

In Table 5, we interact *AFTER* with dummy variables indicating whether the husband (*COLH*) or the wife (*COLW*) has attended college (i.e. years of education is greater than 12).  We expected to see that the wife's education level would reduce specialization, conditional on husband's education, while husband's education would increase it.  We also expected the education of both spouses to increase market intensity, since purchased child care would a relatively cheaper way of responding to the increased value of home time for highly-educated couples.  For the most part, our results are consistent with these expectations, though there are a few interesting exceptions.

Husband's college attendance is strongly associated with increased specialization and a smaller reduction in market intensity after the birth of the first child.  These patterns are apparent in both hours worked and earnings;  the post-child divergence

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[31] Our preliminary work on estimating the determinants of home production time indicate that men spend more hours in home production if they have a son relative to a daughter.  This implies that the increased commitment to market work due to the birth of a son is due to a drop in leisure rather than in home production time.

[32] These findings could in principle arise due to selection based on marital status.  For instance, the positive coefficient on *BOY\*AFTER* would arise if there is no difference in labor market behavior of fathers of sons vs. daughters, but men who have sons and divorce are a lower quality pool (in terms of unobservables in the earnings equations) than men who have daughters and divorce.  However, we ran wage and reduced form hours equations under fixed effects for *all* men (i.e., not selected on marital status) and found that fathering a boy relative to a girl leads to greater hours of work and hourly wages.

[33] We investigate in more detail the relationship between men's labor market outcomes, children, and child gender in Lundberg and Rose [1999].

between husband's and wife's work hours is 300 hours per year greater if the husband has attended college than if he has not, and the divergence in earnings is $8000 per year greater. Husband's college both increases the husband's hours and earnings and decreases his wife's, but the difference in the husband's outcomes is much greater than the difference in the wife's, so the level of market intensity increases. For husbands with no more than a high school education, the effects of the first child on both hours worked and earnings are significantly negative. In general, the relative effects of husband's education are smaller for the late cohort, though only the differences in hours effects are significant.[34]

Wife's college attendance has no significant effect on the household's response measured in hours of market work, but increases both specialization and market intensity in earnings. The wife's education has substantial positive effects on both her own earnings after childbirth and her husband's, and this effect comes through increases in the wage rates of both. Women with some college experience only half the post-child decline in wage rates of women with no college, and their husband's wages rise by an additional 5%. The own-wage effect is consistent with our earlier results showing that continuous participants experience no wage loss following childbirth, since continuous participants are more likely to be college-educated. The cross-effect of the wife's education on her husband's wage deserves further study.

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[34] Note that the late cohort decline in specialization is largely due to change in the behavior of the college-educated. No significant cohort effect in hours specialization remains for the less educated group.

**VII.  Conclusion and Extensions**

In this paper we have defined and estimated measures of the changes in specialization and market intensity within marriage that reflect joint changes in spouses' labor market hours, hourly wages, and earnings associated with parenthood. Not surprisingly, we find that specialization increases after a couple's first child is born, while market intensity declines. The results confirm our expectation that there has been a decline in specialization among more recent cohorts that might be attributed to a higher probability of divorce and other factors that have increased lifetime female labor force participation.  However, wife's education does not reduce the change in specialization, and one measure of the likelihood of divorce (actual divorce during the sample period) may be endogenous with respect to marital time allocation.  Though the results reveal some interesting patterns in marital time use, causal inferences based on these estimates cannot be made. Estimates of the effect of exogenous variables related to the likelihood of divorce (the sex of the first child and the stability of marriages in the preceding generation) on the changes in earnings due to parenthood are less problematic.

We would like to understand the causes of the decline in marital specialization over time, and plan to extend these results by analyzing the effects of two sets of exogenous variables on our measures of specialization and market intensity:  those that directly affect labor supply and human capital investment decisions, and those that affect the risk of divorce.  The labor market variables include local labor market conditions and family leave policy, and divorce-related variables includes extrahousehold environmental parameters, such as marriage market conditions, divorce laws and welfare laws that affect the relative well-being of the spouses in the event of divorce as well as variables which affect the risk of divorce but not the threat points.

Our results show that well-known patterns of decreased market work and wages for mothers are part of a joint household response to demands of childrearing that includes significant changes in the hours worked and wages of fathers, and that there is considerable heterogeneity across couples in this response. Our approach has been

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largely descriptive:  the analysis of family time allocation and children needs to be embedded in a more formal behavioral model in future work.  The results concerning divorce, divorce risk, and marital specialization suggest that the prospect of marital dissolution and expected well-being outside marriage need to be considered in modeling these household decisions.

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**Table 1**

**Effect of the Birth of the First Child on Marital Specialization and Market Intensity**[*]

| | | AFTER | N |
|---|---|---|---|
| **Hours Worked** | | | |
| | Specialization $(H_h - H_w)$ | **1112** (44.1) | 19857 |
| | Market Intensity $(H_h + H_w)$ | **-906** (-36.6) | 19857 |
| | Husband's Hours | **103** (6.2) | 19857 |
| | Wife's Hours | **-1009** (-54.0) | 19857 |
| **Earnings** | | | |
| | Specialization $(Y_h - Y_w)$ | **11956** (26.4) | 19857 |
| | Market Intensity $(Y_h + Y_w)$ | **-2145** (-4.9) | 19857 |
| | Husband's Earnings | **4906** (11.8) | 19857 |
| | Wife's Earnings | **-7050** (-44.3) | 19857 |
| **Wage Rates** | | | |
| | Husband's Wage | **0.11** (8.9) | 19617 |
| | Wife's Wage | **-0.19** (10.1) | 14410 |

[*] **AFTER**: After the birth of the first child. Wage: (log of the real) hourly wage rate. Hours: annual hours worked. Earnings: (real) annual earnings. Controls include: dummies for age and years of education for husband and wife, year of observation, and whether the first child was born during the year. T-statistics in parentheses.

## Table 2


### Cohort Interaction
### Difference in the Effect of the Birth of the First Child on Marital Specialization and Market Intensity
### Wife Born After 1950 (LATE = 1) vs. Not[*]

| | | AFTER | LATE*AFTER | N |
|---|---|---|---|---|
| **Hours Worked** | | | | |
| | Specialization $(H_h - H_w)$ | **1314** (33.5) | **-303** (-6.2) | 19857 |
| | Market Intensity $(H_h + H_w)$ | **-950** (-23.6) | **66** (1.4) | 19857 |
| | Husband's Hours | **182** (6.8) | **-119** (-3.7) | 19857 |
| | Wife's Hours | **-1132** (-43.0) | **184** (5.1) | 19857 |
| **Earnings** | | | | |
| | Specialization $(Y_h - Y_w)$ | **15259** (20.7) | **-4993** (-5.7) | 19857 |
| | Market Intensity $(Y_h + Y_w)$ | **-3065** (-4.3) | **1357** (1.6) | 19857 |
| | Husband's Earnings | **6097** (9.0) | **-1818** (-2.3) | 19857 |
| | Wife's Earnings | **-9162** (-35.5) | **3175** (10.3) | 19857 |
| **Wage Rates** | | | | |
| | Husband's Wage | **0.18** (8.4) | **-0.09** (-3.7) | 19617 |
| | Wife's Wage | **-0.25** (-8.1) | **0.09** (2.4) | 14410 |

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[*] **AFTER**: After the birth of the first child. Wage: (log of the real) hourly wage rate. Hours: annual hours worked. Earnings: (real) annual earnings. Controls include: dummies for age and years of education for husband and wife, year of observation, whether the first child was born during the year, and an interaction of **LATE** with whether the first child was born during the year. T-statistics in parentheses.

**Table 3**

**Divorce Interaction**
**Difference in the Effect of the Birth of the First Child on Marital Specialization and Market Intensity**
**Couples Who Divorced within the Period (DIVORCE = 1) vs. Not[*]**

| | | AFTER | LATE* AFTER | DIVORCE *AFTER | DIVORCE* LATE*AFTER | N |
|---|---|---|---|---|---|---|
| **Hours Worked** | | | | | | |
| | Specialization $(H_h - H_w)$ | **1132** (43.0) | | **-174** (-2.5) | | 19857 |
| | | **1335** (30.3) | **-297** (-5.7) | **-129** (-1.3) | **-180** (-1.3) | 19857 |
| | Market Intensity $(H_h + H_w)$ | **-910** (-35.2) | | **28** (0.4) | | 19857 |
| | | **-938** (-21.6) | **41** (0.8) | **-76** (-0.8) | **213** (1.6) | 19857 |
| | Husband's Hours | **111** (6.4) | | **-73** (1.6) | | 19857 |
| | | **198** (6.8) | **-128** (-3.7) | **-102** (-1.5) | **16.7** (0.2) | 19857 |
| | Wife's Hours | **-1021** (-52.4) | | **101** (2.0) | | 19857 |
| | | **-1136** (-34.7) | **169** (4.4) | **27** (0.4) | **198** (1.9) | 19857 |
| **Earnings** | | | | | | |
| | Specialization $(Y_h - Y_w)$ | **12337** (26.1) | | **-3402** (-2.7) | | 19857 |
| | | **15512** (19.6) | **-4711** (5.0) | **-1581** (-0.9) | **-4896** (-2.0) | 19857 |
| | Market Intensity $(Y_h + Y_w)$ | **-2076** (-4.5) | | **-738** (-0.6) | | 19857 |
| | | **-3366** (-4.4) | **1851** (2.0) | **1848** (1.0) | **-4383** (-1.8) | 19857 |
| | Husband's Earnings | **5131** (11.8) | | **-2070** (-1.8) | | 19857 |
| | | **6073** (8.3) | **-1430** (-1.7) | **134** (0.1) | **-4639** (-2.0) | 19857 |
| | Wife's Earnings | **-7206** (-43.4) | | **1332** (3.1) | | 19857 |
| | | **-9439** (-34.0) | **3281** (10.0) | **1715** (2.68) | **257** (0.3) | 19857 |
| **Wage Rates** | | | | | | |
| | Husband's Wage | **0.12** (8.7) | | **0.01** (0.4) | | 19617 |
| | Wife's Wage | **-0.20** (-10.5) | | **0.13** (2.4) | | 14410 |

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[*] See footnote for Table 2.

**Table 4**

**Child Gender Interaction**
**Difference in the Effect of the Birth of the First Child on Marital Specialization and**
**Market Intensity:  First Child is a Boy (BOY = 1) vs. Girl[*]**

|  |  | AFTER | LATE* AFTER | BOY*AFTER | BOY*LATE *AFTER | N |
|---|---|---|---|---|---|---|
| **Hours Worked** |  |  |  |  |  |  |
|  | Specialization $(H_h - H_w)$ | **1106** (33.4) |  | **12** (0.3) |  | 19852 |
|  |  | **1362** (23.5) | **-373** (-5.4) | **-87** (-1.2) | **130** (1.5) | 19852 |
|  | Market Intensity $(H_h + H_w)$ | -953 (-29.3) |  | **90** (2.2) |  | 19852 |
|  |  | **-938** (-16.5) | **-20** (-0.3) | **-20** (-0.3) | **164** (1.9) | 19852 |
|  | Husband's Hours | **76** (3.5) |  | **51** (1.9) |  | 19852 |
|  |  | **212** (5.6) | **-197** (-4.3) | **-53** (-1.1) | **147** (2.5) | 19852 |
|  | Wife's Hours | **-1030** (-42.0) |  | **39** (1.3) |  | 19852 |
|  |  | **-1150** (-26.7) | **177** (3.5) | **33** (0.6) | **17** (0.3) | 19852 |
| **Earnings** |  |  |  |  |  |  |
|  | Specialization $(Y_h - Y_w)$ | **10345** (17.4) |  | **3097** (4.2) |  | 19852 |
|  |  | **13456** (12.9) | **-4592** (-3.7) | **3269** (2.5) | **-486** (-0.3) | 19852 |
|  | Market Intensity $(Y_h + Y_w)$ | **-3823** (-6.6) |  | **3216** (4.5) |  | 19852 |
|  |  | **-4706** (-4.7) | **1281** (1.1) | **2983** (2.3) | **401** (0.3) | 19852 |
|  | Husband's Earnings | **3261** (6.0) |  | **3157** (4.6) |  | 19852 |
|  |  | **4375** (4.6) | **-1655** (-1.5) | **3126** (2.6) | **-43** (-0.1) | 19852 |
|  | Wife's Earnings | **-7084** (-33.9) |  | **59** (0.2) |  | 19852 |
|  |  | **-9081** (-24.9) | **2937** (6.8) | **-143** (-0.3) | **444** (0.8) | 19852 |
| **Wage Rates** |  |  |  |  |  |  |
|  | Husband's Wage | **0.09** (5.1) |  | **0.06** (2.7) |  | 19611 |
|  | Wife's Wage | **-0.21** (-8.5) |  | **0.03** (1.0) |  | 14409 |

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[*] See footnote for Table 2.

**Table 5**


**Husband's and Wife's Education Interaction**
**Difference in the Effect of the Birth of the First Child on Marital Specialization and Market Intensity**
**Husband has Some College (COLH=1), Wife has Some College (COLW=1)[*]**

| | | AFTER | LATE* AFTER | COLH* AFTER | COLW* AFTER | COLH*LATE *AFTER | COLW*LATE *AFTER | N |
|---|---|---|---|---|---|---|---|---|
| **Hours Worked** | | | | | | | | |
| | Specialization $(H_h - H_w)$ | **902** (22.0) | | **303** (6.0) | **21** (0.4) | | | 19857 |
| | | **980** (13.3) | **-103** (-1.3) | **398** (5.5) | **38** (0.6) | **-182** (-2.5) | **-28** (-0.4) | 19857 |
| | Market Intensity $(H_h + H_w)$ | **-1019** (-25.3) | | **105** (2.1) | **73** (1.5) | | | 19857 |
| | | **-1133** (-15.6) | **148** (1.9) | **145** (2.0) | **104** (1.6) | **-32** (-0.5) | **-46** (-0.7) | 19857 |
| | Husband's Hours | **-59** (-2.2) | | **204** (6.2) | **47** (1.4) | | | 19857 |
| | | **-76** (-1.6) | **23** (0.4) | **272** (5.7) | **71** (1.6) | **-107** (-2.2) | **-37** (-0.8) | 19857 |
| | Wife's Hours | **-961** (-31.6) | | **-99** (-2.7) | **26** (0.7) | | | 19857 |
| | | **-1056** (-19.3) | **126** (2.1) | **-127** (-2.4) | **33** (0.7) | **75** (1.4) | **-9** (-0.2) | 19857 |

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[*] See footnote for Table 2.

| | | AFTER | LATE*<br>AFTER | COLH*<br>AFTER | COLW*<br>AFTER | COLH*LATE<br>*AFTER | COLW*LATE<br>*AFTER | N |
|---|---|---|---|---|---|---|---|---|
| **Earnings** | | | | | | | | |
| | Specialization<br>$(Y_h - Y_w)$ | **4635**<br>(6.3) | | **8138**<br>(9.1) | **3300**<br>(3.7) | | | 19857 |
| | | **6918**<br>(5.2) | **-3027**<br>(-2.1) | **8800**<br>(6.7) | **2361**<br>(2.0) | **-1745**<br>(-1.3) | **1419**<br>(1.1) | 19857 |
| | Market Intensity<br>$(Y_h + Y_w)$ | **-8367**<br>(-11.8) | | **6644**<br>(7.6) | **3096**<br>(3.6) | | | 19857 |
| | | **-10086**<br>(-7.9) | **2180**<br>(1.6) | **7551**<br>(6.0) | **1819**<br>(1.6) | **-870**<br>(-0.7) | **2050**<br>(1.7) | 19857 |
| | Husband's<br>Earnings | **-1866**<br>(-2.8) | | **7391**<br>(9.0) | **3198**<br>(3.9) | | | 19857 |
| | | **-1584**<br>(-1.3) | **-423**<br>(-0.3) | **8175**<br>(6.8) | **2090**<br>(1.9) | **-1307**<br>(-1.1) | **1734**<br>(1.5) | 19857 |
| | Wife's Earnings | **-6501**<br>(-25.1) | | **-747**<br>(-2.4) | **-102**<br>(-0.3) | | | 19857 |
| | | **-8502**<br>(-18.3) | **2604**<br>(5.2) | **-624**<br>(-1.4) | **-271**<br>(-0.6) | **438**<br>(0.9) | **315**<br>(0.3) | 19857 |
| **Wage Rates** | | | | | | | | |
| | Husband's Wage | **-0.04**<br>(-1.9) | | **0.19**<br>(7.6) | **0.05**<br>(1.93) | | | 19617 |
| | Wife's Wage | **-0.30**<br>(-10.0) | | **0.04**<br>(1.0) | **0.14**<br>(4.0) | | | 14410 |

## Appendix Table 1
## Summary Statistics
## Mean (Standard Deviation)

|  | Husband | Wife |
|---|---|---|
| Annual Hours of Work | 2242 (703) | 988 (872) |
| Log of Real Hourly Wage (1983 dollars) | 2.29 (0.62) | 1.79 (0.73) |
| Real Annual Earnings (1983 dollars) | 25753 (21013) | 7395 (8790) |
| Years of Education | 13.5 (2.3) | 13.1 (2.1) |
| Age | 32.4 (6.8) | 30.3 (6.5) |

| | |
|---|---|
| After Child Born | .80 |
| Wife Born After 1950 | .71 |
| Couple Divorced within Sample Period | .20 |
| First Child is a Boy | .52 |
| Number of Couples | 1627 |
| Median Number of Years within Sample | 9 |