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The Impact of Future Divorce on Labor Supply and Work Hours of German Married Women*

By Barbara A. Butrica**

Summary

Using longitudinal data from the German Socio-Economic Panel, this paper considers the extent to which married women in Germany anticipate divorce and increase their labor supply in response. Previous research suggests that the probability of divorce had a significant and positive impact on labor supply decisions for United States married women in the 1970s. Butrica (1998) finds that this is no longer the case for United States married women in the 1980s. The results in this paper indicate that the probability of divorce positively and significantly influences labor force participation decisions for German married women in the 1980s; however, the results suggest that it does not influence hours decisions.

1. Introduction

This paper examines the impact that the probability of future divorce has on the labor supply decisions of German married women. A number of studies look at how divorce probabilities influence female labor supply decisions in the United States (Greene and Quester 1982; Johnson and Skinner 1986; Haurin 1989; Nakamura and Nakamura 1996).¹ Many of these studies use data from the 1970s or early 1980s and find a positive relationship between the probability of a future divorce and the increase in labor force participation and work hours of married women. Butrica (1998) uses data from the late 1980s and finds no significant relationship between the probability of divorce and married women's labor supply in the United States.

Johnson and Skinner (1986) first became interested in studying the relationship between married women's labor supply and marital separation because of the unexplained post-World War II increase in female labor supply that coincided with an increase in divorce rates in the United States. The authors were able to provide insight into how the anticipation of divorce influences married women's labor supply decisions. Recently Germany has experienced very large increases in divorce rates.² While labor force participation rates for women are not as high in Germany as they are in the United States, they too are increasing.³ In Germany during the 1980s we observe what the United States experienced in the 1970s: increasing divorce rates and labor force participation rates of women. We may be able to understand more about these trends in Germany by examining the relationship between married women's labor supply and the probability of a future divorce.

The framework for the analyses and estimations follows Johnson and Skinner (1986). The authors study how the probability of future divorce influences labor supply deci-

sions of married women in the United States in 1972. Like the authors, I estimate a simultaneous model of future divorce and current labor supply for the sample of married women. I use 1986 as the base year and follow women through 1992 to examine changes in their marital status. The results indicate that Germany in the 1980s looks very much like the United States in the 1970s. In Germany, the probability of divorce significantly influences labor force participation decisions of married women; however, the results suggest that it does not influence their work hours.⁴

2. Methodology

The estimation procedure follows Johnson and Skinner (1986) and involves estimating a simultaneous equation system for future divorce and current labor force participation. The first step is to estimate a reduced-form probit equation explaining future divorce where the dependent variable is a 1 if the woman divorces sometime between 1987 and 1992. A probit for labor force participation in 1986 is also estimated. The next step is to compute the predicted probability of divorce and the predicted labor force participation for each woman from the reduced-form equations. Finally, the predicted divorce probability is included as a regressor in the structural labor supply probit equation, and the predicted labor force participation is included as a regressor in the structural divorce probit equation.

After estimating equations that describe the probability of divorce and current labor force participation, I estimate both wage and hours equations. The problem of sample selection bias arises in estimating hours and wage equations because hours and wages are observed only for persons actually working. Heckman (1979) proposes a method

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¹ These studies are founded on the theory of marriage and divorce developed in Becker (1973, 1974), and Becker, Landes, and Michael (1977).

² Between 1970 and 1988, divorce rates in the United States were two to three times higher than those in Germany. However, during this same time period divorce rates in Germany grew by 76.5 percent while they grew by only 38.9 percent in the United States (U.S. Bureau of the Census 1994; Gustafsson and Bruyn-Hundt 1991).

³ The OECD reports that in 1970 female labor force participation rates in the two countries were nearly identical at more than 48 percent. By 1988 rates for women in the United States were more than 10 percentage points higher than in Germany. Between 1970 and 1988 labor force participation rates for women grew by 36.8 percent in the United States and 13.9 percent in Germany — a difference of nearly threefold (OECD 1991).

⁴ In a similar paper, Yang (1997) examines German married women's labor supply reactions to divorce and also finds that the probability of divorce has a positive and significant impact on labor force participation.

for correcting sample selection bias that allows the participation decision to be estimated separately from the hours decision. The estimation procedure he suggests involves two steps. The first step is to estimate a probit model of labor force participation. From this equation one can calculate the inverse Mills' ratio. The second step is to estimate hours worked for the sample of workers using OLS and including the inverse Mills' ratio as a regressor. My estimation procedure includes a third step in which I estimate a wage equation for the sample of workers including the inverse Mills' ratio as a regressor. I then use the estimated wage as a regressor in the hours equation.

I separate women into two groups: the divorced sample consists of those who are married in 1986 and who divorce between 1987 and 1992, and the married sample consists of those who remain married from 1986 through 1992. My definition of marriage and divorce is a functional one. I consider women married if they are living with a partner, either legally married or cohabiting for at least a year. Likewise, I consider women divorced if they are legally divorced, separated, or no longer living with a partner. I restrict the sample to women who are married and between the ages of 20 and 54 in 1986. The resulting sample size is 1,702 married women: 1,559 who remain married and 143 who divorce.

The labor force participation equation includes a number of variables regularly used in labor supply equations, such as age, education, family income excluding wife's earnings (nonlabor income), nationality, age of youngest child, local unemployment rate, and wife's work experience. To this standard list I add the predicted probability of divorce (constructed from the estimated divorce probit), as well as an interaction term that measures the differential impact of the

probability of future divorce on current labor supply for women with and without work experience. A number of these variables are expected to influence a woman's reservation wage. Age of wife, age of husband, income and children are expected to increase a woman's reservation wage and lower her probability of working. The probability of divorce is expected to lower a woman's reservation wage and increase her probability of working. Other variables in this equation, such as education, experience, and unemployment rate, are supposed to capture the market wage that a woman can expect to command in the labor force. The hours worked equation consists of variables typically found in the labor force participation equation, as well as log wage. Work hours describes annual hours worked for women participating in the labor force.⁵

Table 1 presents the mean values and standard deviations of variables in the married women's labor supply equations. I weight all statistics to account for unequal sampling probabilities and attrition. The average age of women in the sample is 38.8 years, while the average age of

⁵ I also estimate a structural divorce probit equation that includes a number of variables used in other studies to estimate the probability of divorce (Becker, Landes, and Michael 1977; Johnson and Skinner 1986). These variables include individual characteristics, such as age, education, nonlabor income, nationality, husband's health, age of youngest child, and number of years married. There are a number of environmental factors that may also affect the likelihood of divorce, such as whether the couple recently moved, whether the couple is cohabiting, whether the husband grew up in a nonurban environment, and whether other adults live with the couple. Finally, employment characteristics such as previous labor force experience and present labor force participation may also be important. For a more detailed discussion of the variables used in the divorce equation and the results of the estimation, please see Butrica (1998).

Table 1

Variable Definitions and Summary Statistics, 1986

Variable	Definition	Mean	Standard Deviation
Age (wife)	Age of wife	38.8	8.8
Age (husband)	Age of husband	41.8	9.1
Education (wife)	Education of wife	11.1	2.2
Education (husband)	Education of husband	12.2	2.8
Nonlabor Income	1985 income minus wife's 1985 earnings (0000's)	5.6	3.3
Nationality	Whether foreigner	6.8	25.1
Infant	Whether youngest child is under 3 years	11.6	32.1
Child	Whether youngest child is between 3 and 8 years	21.1	40.8
Unemployment Rate	Unemployment rate in 1986	9.1	2.6
Work 8485	Whether wife worked either 1984 or 1985	60.3	48.9
Current LFP	Whether wife worked in 1986	54.1	49.8
N of Cases			1,702

Source: Author's calculations using the GSOEP 1984-1996 and the PSID-GSOEP Equivalent File 1980-1996.

their husbands is 41.8 years. Foreigners make up 6.8 percent of the sample. The share of women whose youngest child is less than 3 years of age is 11.6 percent, while the share of women whose youngest child is between 3 and 8 years of age is 21.1 percent. Finally, 60.3 percent of women report working in at least one of two previous survey years, while 54.1 percent report working in the current period.

Table 2 compares a number of selected variables for married women who divorce between 1987 and 1992 and those who stay married during that time. Those who remain married are older than those who later divorce. Women who divorce have lower nonlabor income than those who remain married. Working women who divorce work 182 hours more on average than those who remain married (compare 1,729 hours to 1,547 hours). These results are statistically significant. Women who divorce have higher past and current labor force participation rates than those who remain married; however, these differences are not statistically significant.

3. Data and Summary Statistics

The analysis presented in this paper requires longitudinal data to track changes in the women's marital status. I use the German Socio-Economic Panel (GSOEP) and the PSID-GSOEP Equivalent File. The GSOEP is the only nationally representative panel study of households and individuals in Germany. Its purpose is to provide a dynamic record of the socio-economic characteristics of Germans. The GSOEP began in 1984 with a sample of 6,000 households in the Federal Republic of Germany, represen-

ting a disproportionate number of non-German guest-workers. The GSOEP data can be weighted to represent the total population of the western states of Germany. For more information about these data, see Wagner, Burkhauser, and Behringer (1993) and Haisken-DeNew and Frick (1996).

The PSID-GSOEP Equivalent File 1980-1994 contains equivalently defined variables for the PSID and the GSOEP. The Equivalent File includes a set of constructed variables (for example, annual hours and labor earnings) that are not directly available in the GSOEP, but that can be merged with the original survey. These data are discussed in more detail in Burkhauser, Butrica, and Daly (forthcoming).

4. Results

Table 3 describes the results of the structural labor force participation probit and OLS hours equations for married women. The explanatory power of each equation is high. The presence of infants and young children has a large negative and significant impact on labor force participation. If a woman's youngest child is less than three years of age, her probability of participating in the labor force declines by 43.0 percent. If a woman's youngest child is aged 3 to 8, her probability of working declines by 12.3 percent. Wife's education and years of work experience have a positive and significant impact on labor force participation. Finally, the probability of divorce is positively and significantly related to current labor force participation, suggesting that higher expectations of divorce lead to higher current labor force participation rates. The *WORK*DIVORCE* interaction

Table 2

Means and Standard Deviations of Selected Variables in 1986, by Subsequent Marital Status

Variable	Not Separated, 1987-1992		Separated, 1987-1992	
	Mean	Standard Deviation	Mean	Standard Deviation
Age (wife)	39.3	8.7	35.0	8.2
Age (husband)	42.3	9.0	37.1	8.2
Education (wife)	11.0	2.1	11.6	2.9
Education (husband)	12.2	2.8	12.1	3.0
Annual Hours (wife)	1,547	726	1,729	676
Annual Hours (husband)	2,183	760	2,109	728
Work8485	59.8	49.0	64.8	47.8
Current LFP	53.7	49.9	58.0	49.4
Nonlabor Income	5.6	2.9	5.1	5.3
Nationality	7.0	25.5	4.7	21.1
Infant	11.6	32.1	11.5	31.9
Child	20.9	40.6	22.9	42.0
N of Cases	1,559		143	

Source: Author's calculations using GSOEP, the GSOEP 1984-1996 and the PSID-GSOEP Equivalent File 1980-1996.

Table 3

Estimated Labor Supply Equations, 1986

	Probit for LFP			OLS for Work Hours	
	Coefficient	t-Statistic	Marginal Effect	Coefficient	t-Statistic
Age (wife)	-0.009	-0.790	-0.004	-8.16	-1.36
Age (husband)	-0.001	-0.071	0.000	-3.96	-0.68
Education (wife)	0.046	1.928	0.018	16.34	0.57
Education (husband)	-0.014	-0.745	-0.006	3.25	0.31
Nonlabor Income	-0.020	-1.321	-0.008	-17.19	-2.10
Nationality	0.148	1.325	0.058	392.03	4.31
Infant	-1.208	-8.171	-0.430	-784.74	-3.15
Child	-0.309	-2.637	-0.123	-361.85	-4.14
Unemployment Rate	-0.018	-1.070	-0.007	0.36	0.04
Work8485	2.885	19.128	0.844	1358.64	1.82
Probability of Divorce	5.978	3.533	2.370	950.72	0.84
Work x Divorce	-5.868	-3.535	-2.326	-945.47	-0.88
Predicted Log (Wage)	-	-	-	40.78	0.11
Inverse Mills' Ratio	-	-	-	421.24	0.97
Constant	-1.275	-2.506	-	454.84	0.51
Log Likelihood/R-Squared		-550.913		0.155	
N of Cases		1,702		934	

Source: Author's calculations using GSOEP, the GSOEP 1984-1996 and the PSID-GSOEP Equivalent File 1980-1996.

term is also negative and significant, indicating differences in the impact of the probability of divorce on married women with and without work experience.

The relationship between the *WORK*DIVORCE* interaction term and current labor force participation is better understood with the help of a simulation. Table 4 reports the labor force participation probabilities computed using the coefficients in Table 3. The probabilities reported in this table help to explain the differential impact that divorce has on the current labor force participation of a married woman with mean sample characteristics and recent work experience and a married woman with mean sample characteristics and no recent work experience. In the baseline scenario, the probability of working in the current period is 89.5 percent for married women with recent work experience and 10.7 percent for married women without recent work experience. When the probability of divorce increases by 10 percent (e.g., when the mean predicted probability of divorce is multiplied by 1.10), the probability of working in the current period is largely unaffected for married women with recent work experience.⁶ This change raises their probability of working in the current period by 1.1 percent from the baseline estimate. For married women without recent work experience, however, an increase of

10 percent in the mean predicted probability of divorce raises the participation probability by 9.9 percent. The calculations in this table suggest that the probability of divorce has a large and significant impact on current labor force participation only for married women without recent work experience.

The last step in this analysis is to estimate work hours for married women who work. I include the estimated wage, computed from the reduced-form wage equation, in the hours equation, as well as the predicted probability of divorce and the inverse Mills' ratio.⁷ Table 3 describes the results of the estimation. The coefficient on the inverse Mills' ratio is not significant. This implies that the probability of being selected into the sample of workers has no influence on desired hours. Income and the presence of infants and young children all have a negative and significant effect on the number of hours worked. Nationality (foreigner) and previous work experience have a positive

⁶ In the baseline scenario, the mean predicted probability of divorce is 9.3 percent for married women in Germany.

⁷ The results of the wage equation are described in Butrica (1998).

Table 4

Labor Force Participation Probabilities, 1986

	Work Experience	Percentage Change	No Work Experience	Percentage Change
<i>Baseline Scenario</i>	89.5		10.7	
<i>Probability of Divorce</i>				
Increase by 10 percent	90.5	1.1	11.8	9.9
Increase by 20 percent	91.4	2.1	12.9	20.5
Increase by 50 percent	93.7	4.7	16.8	56.4
Increase by 90 percent	96.0	7.3	23.0	113.9
Decrease by 10 percent	88.5	-1.2	9.8	-9.2
Decrease by 20 percent	87.3	-2.4	8.8	-17.9
Decrease by 50 percent	83.5	-6.7	6.4	-40.0
Decrease by 90 percent	77.4	-13.5	4.1	-62.0

Source: Author's calculations using the coefficients reported in the first column of Table 3 and the weighted means of the corresponding variables.

and statistically significant impact on the number of hours worked. The probability of divorce has no significant impact on the number of hours worked.⁸

5. Conclusions

The purpose of this study is to look more closely at the relationship between anticipated divorce and married women's labor supply decisions. Using data from 1986, Butrica (1998) finds that the probability of divorce has no significant impact on labor force participation and hours decisions of married women in the United States. This paper shows that in Germany, where both divorce rates and

women's labor force participation rates are much lower than in the United States, the probability of divorce significantly raises the probability of working, but not the hours of work for those married women who do work.

⁸ Because previous work experience, measured by whether women work in at least one of two previous years, may be driving some of the results described above, I estimate the same model using a variable that measures the percentage of her working life (over age 18) that a woman actually works. Using this measure of work experience, the results are the same with respect to the predicted probability of divorce and the WORK*DIVORCE interaction term.

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