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WHO WORKS WHEN? EVIDENCE FROM THE U.S. AND GERMANY

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ABSTRACT

This study uses data for the U.S. from the May 1991 CPS and for Germany from the 1990 wave of the Socioeconomic Panel (GSOEP) to analyze when people work during the day and week. The evidence shows: 1) Work in the evenings or at night is quite common in both countries, with around 7 percent of workers on the job even at 3AM; 2) Such work is performed mostly by people who are not shift workers; 3) Work at these times is inferior, in that it is performed disproportionately by people with little human capital; 4) Minority workers in the U.S. and the foreign-born in Germany are especially likely to work at these undesirable times; 5) Evening and night work is least likely in large metropolitan areas; 6) Spouses tend to work at the same time of the day; but 7) Young children break down the joint timing of spouses' work, with the burden of evening and night work falling disproportionately on working mothers. The findings demonstrate the gains to basing the analysis of work and leisure on data describing instantaneous time use.

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This study presents the analysis of instantaneous time use -- of what people are doing at particular points of the workday and workweek. This approach provides a novel view of the labor market, one that is not obtainable by looking at various integrations of time use, including the total amount of time worked per week or per year or the days-hours distinction of Hamermesh (1996, Chapter 2).

A number of issues can only be studied using information on instantaneous time use. For example, what is the nature of spouses' joint demand for leisure at different times of the day? This issue is especially important for analyzing the demand for child care and the role of subsidies to it. A huge literature has examined child care using integral time use data (e.g., Gustafsson and Stafford, 1992). Surely, however, much of the difficulty in obtaining child care and using it to ease market activities arises because it is unavailable or expensive at times when the consumer/worker's own value of time in the market is highest. The effect of child care on the timing of work can only be understood properly with instantaneous data. Family decision-making about work and leisure necessarily deals with questions about when, e.g., about who will work after 5PM, who will wake up to feed the baby at 3AM, etc. The general decision about how much to work may be integrative, but decisions about the specific issue of who will do what and when help to determine family well-being and are part of the bargaining that takes place within a marriage.

Popular demands for restructuring work clearly depend on how workers' marginal satisfactions in various activities differ at different points in time; and time use at each time of day or week depends on how workers' productivity differs at different moments. These are questions about instantaneous time use. Similarly, issues of retail opening hours are instantaneous: It matters greatly to workers whether stores are open the 40 hours per week 9AM to 5PM Monday through Friday, or the 40 hours that include noon to 6PM Monday through Saturday and 1PM to 5PM Sunday.

Instantaneous time use presents a wide variety of research topics (that, as I show below, have barely been touched by labor economists and others).[1] In this study I deal with the determinants of the timing of work of individuals in the United States in 1991 and Germany in 1990 and the role of timing of work within a marriage. Section 1 discusses the very meager previous research in this area, while Section 2 outlines the information available on this issue in the May 1991 Current Population Survey Supplement that provides the most recent information on this, and in the German Socioeconomic Panel (GSOEP) that has information for Germany.[2] Section 3 discusses patterns of timing using the individual worker as the basis of study, while Section 4 does the same thing using married couples as the central focus. Throughout Sections 2 through 4 I denote a table or figure by (U) if it describes the United States and by (G) if it is based on evidence for Germany.

1. What Do We Know About Instantaneous Time Use?

Several well-known issues in the analysis of labor markets might be viewed as related to studying instantaneous time use. Substantial information has been produced on labor-force participation, the zero-one question of whether a person is working or looking for work during a particular time interval (usually a week). This view could also be applied to analyzing whether or not the person works during a particular year on which one focuses. That example, however, would not be in the spirit of an approach to examining instantaneous time use, as work time clearly can take values other than zero or one over a basic interval that long. Indeed, even the standard focus of participation defined as occurring during a week necessarily masks a mix of leisure and work. Except for these somewhat inappropriate aspects, however, little theoretical or empirical research has been done on issues of instantaneous time use.

While there have been discussions of when people engage in different activities (for example, Melbin, 1987), only Winston (1982) presents a theoretical analysis of time use at a particular instant of time. He discusses this from a variety of viewpoints, including that of the price-taking worker-consumer. We can view the typical worker as maximizing the present value of a stream of utility:

$$(1) \qquad U^t = \sum_{t=1}^{\infty} U^t(C^t, L^t;\ w^t, I^t)[1+r]^{-t};$$

where $L^t = 0$ if the person is working during the short interval indexed by t and 1 if not. C is consumption during any interval, w is the price of the worker's time during interval t, and I is unearned income. The crucial novelty in (1) is that the intervals are defined to be short enough so that the only economic decision is whether to work or to enjoy leisure (and consume). Disaggregating activities within the intervals is assumed to be physically impossible. The utility-maximizing sequence of L^t is chosen based upon how w^t and the shape of U^t vary over time. Specifying decision-making this way becomes interesting to the extent that we can identify factors that affect w^t and U^t and use them to make predictions about interpersonal differences in the sequences L^t.

The approach implicit in (1) treats the sequence w^t as exogenous. No doubt the worker has little control over the wages he or she is offered; but in a market context the wage rate is jointly determined by workers' tastes and labor productivity during each basic time interval.[3] Barzel's (1973) profound analysis of the relationship between daily schedules and wages, which incorporated issues of fatigue and productivity, recognized this jointness. While I make some effort to account for the effects of employers' behavior and to draw inferences as if some of the results stem from workers' behavior only, the nature of the instantaneous use of time as the output of an implicit market provides a caution on the interpretation of empirical results. Anything we observe about patterns of instantaneous time surely results from behavior

by both workers and employers. Without a careful model estimated on matched establishment-household data, any findings are not solely expressions of workers' tastes for work at different times.

The sparseness of the theoretical development is matched by the near absence of empirical work on instantaneous time use. Some effort has been devoted to looking at shift work, including patterns in it (Hedges and Sekscenski, 1979, and Mellor, 1986), spouses' joint scheduling of shifts (Presser, 1987) and cyclical changes in employers' demand for shift work (Mayshar and Solon, 1993; Bresnahan and Ramey, 1994). While the analysis of shift work may be interesting, it has much less to do with the study of instantaneous time use than one might think, as the data in Table 1U should make clear. These data are based on the May 1991 Current Population Survey. The final column shows the percentage of all workers who are on a particular shift, while the first (second) column shows for each shift the percentage of all workers who are at work evenings (nights).

Table 1U classifes workers by shift according to the criteria of the U.S. Bureau of Labor Statistics (used by Mellor, 1986). The overwhelming majority of workers put in regular day shifts. While relatively few of these people work evenings or nights, they are so numerous that they represent the largest percentages of evening and night workers. Indeed, the 5.4 percent of workers on regular evening shifts who work between 7 and 10PM account for only one-third of those at work in the evening. Regular night-shift workers

Table 1U. Percent Distributions of Workers by Shift and Timing of Work, 1991 (N = 56,781)[a]

	Percent of Total Work Force:		
	At work 7PM-10PM	At work 10PM-6AM	TOTAL ON SHIFT
Shift:			
Regular Day	5.5	4.0	78.7
Regular Evening	5.4	3.6	5.9
Regular Night	1.3	3.0	3.1
Rotating	1.3	1.1	3.2
Split	.5	.2	1.0
Irregular	1.9	1.0	5.3
Other	1.1	.5	2.8
TOTAL	17.0	13.4	100.0

[a]Includes all workers who report four or more days of work in the survey week.

account for less than one-fourth of those at work between 10PM and 6AM. Shift work tells us relatively little about the timing of work.[4]

Other researchers, including Wilson (1988) and Kostiuk (1990), examine variations in w^t over the workday (actually, only comparing variations across starting times or shifts). The evidence for the U.S. is clear that the premium for evening or night work is not large. Multiple job-holding, which is partly an issue of instantaneous time use, has also been studied (most recently by Krishnan, 1990); and there has been some interest in how productivity varies over the work day (Hamermesh, 1990), an issue that goes back to the underpinnings of Taylorism (Florence, 1924). Pashigian and Bowen (1994) analyze how the rise in female labor-force participation will change shopping patterns, but they do not consider households' use of time.[5] Only Hill (1988) studies the timing of labor supply (in the context of asking how spouses' simultaneous consumption of leisure is related to their subsequent likelihood of divorcing). There has, however, been no empirical analysis of scheduling decisions based on standard models of utility maximization. Indeed, we do not even know anything about the demographic correlates of workers' schedules.

2. Measuring the Timing of Work

The 1990 wave of the GSOEP provides information on whether the person works "nights after 10PM," or "evenings between 7PM and 10PM," in the three categories: "Regularly," "occasionally," or "never." I assume,

though it is not explicit in the questionnaire, that responses about evening or night work refer to what the worker does on most of the days when market work takes place.[6] The survey also asks if the individual had any Saturday (or Sunday) with employed work: Every week; every 2 weeks; every 3-4 weeks; seldom; or never. The questions seem to refer to work on the main job, so that I assume here that information refers to the work schedule on that job.[7]

The May 1991 Current Population Survey provides information on whether the individual was working on the main job on each particular day of the week (and offers similar information for any second job) and also asks for the starting and ending times on the main job (and on any second job). The CPS codes these starting and ending times as integral hours.[8] I thus construct for each respondent an index of whether he or she is at work at a particular hour in the day. Ideally we would like to have data on workers' schedules for each day in the workweek. Unfortunately, the questionnaire only asks for one day's schedule and does not make clear about which workday the respondent should be thinking when giving starting and ending times. Presumably people respond with their most frequent daily schedule. It would be very interesting to construct a profile of who is at work during each hour of the week; but because of the way this question is asked in the CPS Supplement, a respondent's schedule of daily work times cannot be linked to the days he or she is at work.

In some of the descriptive work here I present substantial temporal detail on instantaneous labor supply from the CPS. In order to maintain even limited comparability with the German data, however, I restrict most of the analysis of the CPS data to whether people are working at some point in the evening (7PM to 10PM) or at night (10PM to 6AM). Because the distinction between main and all jobs is not so explicit in the GSOEP as it might be, many of the comparisons are made both to American data describing the main job, and the main job plus long (presumably at least several days per week) second jobs. The rarity of secondary jobs lasting 20 or more hours per week (less than 2 percent in the U.S., less than 1 percent in Germany) means that this distinction is unlikely to be important.

The analysis in Section 3 is carried out on files of data describing time use by individual civilians in the two sample. To analyze the timing of work by couples I combine data for spouses from the May 1991 CPS to form a file that contains each spouse's and the household's demographic characteristics as well as the pattern of time use over the day and week by each spouse. From the GSOEP I combine records for partners (married and unmarried) to create a similar file. These combinations generated the files of 30,936 married American couples and 2651 opposite-sex German couples that form the basis for the analysis in Section 4.[9]

Before turning to the comparative analyses, we can use the data that I have constructed to allow an hour-by-hour profile of labor-force activity in

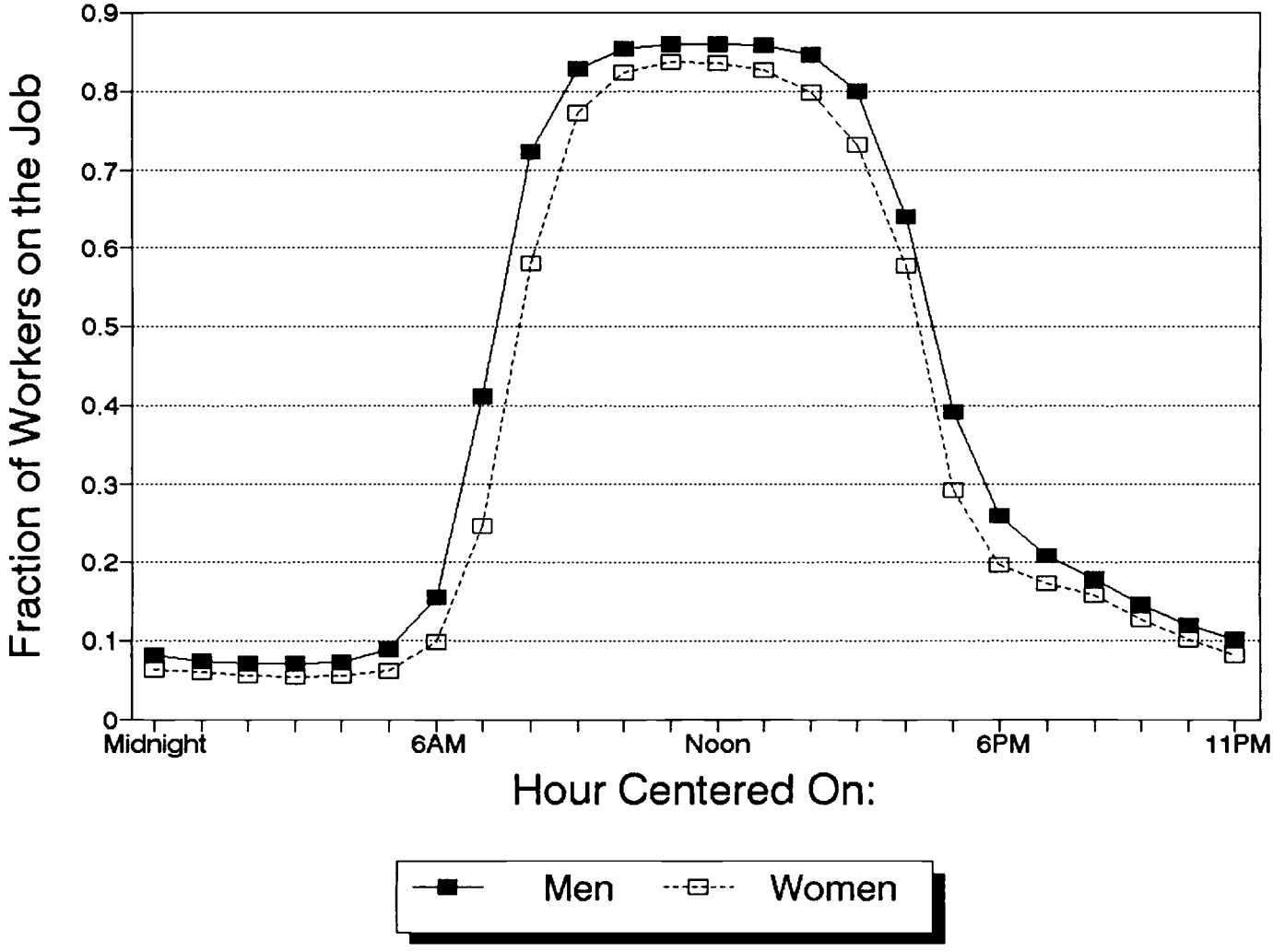
the United States. Given the framing of questions in the GSOEP on the timing of work no analogous data for Germany can be constructed. Figure 1U presents this information for men and women separately based on time at work on the main job or on a second job (of at least 20 hours per week, so that it probably describes behavior on at least two workdays per week). (The relatively few people who work on long second jobs means that the same figure for time at work on the main job looks only slightly different.) It is the first available figure that presents this kind of information (though Hedges and Sekscenski, 1979, did present distributions of starting and ending times separately).

Most of the patterns are what we would expect. 9AM through 4PM is the time when most workers are on the job (at least 80 percent of male workers); and at every single hour a greater fraction of male than of female workers are on the job, reflecting men's longer average daily hours. There is, however, no single hour when more than 87 percent of workers are at work. Obversely, even at the slackest time (3AM) at least 5 percent of male and female workers are engaged in market activity. In what follows I refer to work in the middle of the night as nonstandard or unusual, but it is not all that uncommon.

3. Patterns of Individuals' Work Time

In this Section I examine work on weekends, and in the evening or at night, by individuals in the two countries. The purposes are to establish

Figure 1U. Work Time by Time of Day



how important work at these unusual times is and to examine its correlates. As I noted in the previous Section, the differences between the nature of the information from Germany and the U.S. make international comparisons of the results somewhat difficult. Nonetheless, I do note the similarities and differences where they are interesting, especially where they serve to underscore the common determinants of labor-market behavior.

Tables 2 give an overview of the extent of effort at these times in the two countries.[10] The upper half of each table presents information by gender for employees, and for the self-employed, on work on the weekend. The data are not completely comparable across countries, since the CPS asks about usual work patterns, while the GSOEP gives information on the frequency of work at nonstandard times. In what follows I base the comparisons of the American data to weekend work in Germany that is performed each week or every other week, and to evening or night work in Germany that is performed regularly.

A surprisingly large fraction of employees works on Saturdays or Sundays in both countries. Nearly 20 percent of male American employees work on Saturdays, roughly equal to the percentage of Germans who work Saturdays at least every other week. Over 8 percent of male employees work on Sundays at least every other week in each country. While the patterns among male employees are very similar across countries, American women employees are much less likely to be working on Saturday than their German

Table 2U. Percent Distributions of Workers by Timing of Work, 1991

	Employees		Self-Employed
	Males	Females	
Saturday:			
Main job	19.9	13.9	42.9
Main job or second job	20.9	14.3	43.0
Sunday:			
Main job	8.2	6.5	17.5
Main job or second job	9.0	6.8	17.6
No weekend work:			
Main job	78.0	84.5	56.1
Main job or long second job[a]	77.1	84.1	55.9
Regularly work:			
Some work 7-10PM:			
Main job	19.0	16.6	24.4
Main job or long second job	22.0	19.2	25.5
Some work 10PM-6AM:			
Main job	16.4	12.2	9.9
Main job or long second job	17.5	13.0	10.7
10PM-Midnight:			
Main job	12.9	10.6	6.9
Main job or long second job	13.9	11.4	7.5
Midnight-3AM:			
Main job	8.4	6.3	4.2
Main job or long second job	8.9	6.6	4.4
3-6AM:			
Main job	9.3	6.5	6.5
Main job or long second job	9.7	6.7	6.8
Only between 6AM and 7PM:			
Main job	75.8	80.4	73.6
Main job or long second job	72.7	77.8	72.3
N =	28,951	26,614	5,099

[a]Second job at least 20 hours per week.

Table 2G. Percent Distributions of Workers by Timing of Work, 1990*

	Employees				Self-Employed	
	Males		Females			
Work on:	Sat.	Sun.	Sat.	Sun.	Sat.	Sun.
Each Week	10.3	3.1	13.1	2.4	62.7	32.8
Every Other Week	12.6	5.6	11.8	6.7	10.5	4.2
Every 3-4 Weeks	9.9	4.6	4.6	2.6	5.2	7.0
Seldom	11.0	6.2	4.4	2.6	4.9	11.5
Never	56.3	80.6	66.2	85.7	16.7	44.6
Infrequent or no weekend work	76.5		74.8		25.8	
N =	2903		1931		287	

Work:	7-10PM	After 10PM	7-10PM	After 10PM	7-10PM	After 10PM
Regularly	20.5	14.3	12.8	4.7	30.6	14.8
Occasionally	25.3	17.6	16.2	6.9	43.7	34.2
Never	54.2	68.1	70.9	88.5	25.7	51.1
No regular work between 6AM and 7PM	78.5		87.1		68.5	
N =	2879	2875	1917	1906	284	278

[a]May not add to 100 exactly due to rounding.

counterparts. Similarly, 9 percent of German women workers often work on Sundays, but fewer than 7 percent of American women do so.

Night work is also quite common in both countries, with one-fifth of male German employees regularly at work between 7PM and 10PM, and one-seventh regularly working between 10PM and 6AM. As with work on weekends, these figures are also remarkably close to those describing the incidence of evening and night work among American men. Among women the patterns do differ internationally, but in the opposite way from weekend work: German women are much less likely to work evenings or nights than their American counterparts. The difference in evening and night work may reflect the lesser participation rate and shorter hours of German female workers, as well as the formal opposition of German unions to women working at night. The more common weekend work by German women may result from married women's need to stay home during the week to care for children who are in school only half a day, a problem that does not exist on the weekend when in most German couples the husband is likely to be at home.

Self-employed workers, who presumably have greater freedom to choose the timing of their work, have strikingly different patterns of unusual work times from employees. The incidence of weekend work is greater in both countries than among employees, with self-employed workers being two to five times as likely to be working on Saturdays or Sundays. Among self-

employed workers Germans are substantially more likely to work on weekends than their American counterparts, despite the legal limits imposed on self-employed owners of small retail shops. This difference reflects the longer workhours of a population of self-employed workers in Germany that is about the same relative size as in the U.S.

Tables 2 demonstrate that between 7PM and 10PM the incidence of work is higher in both countries among the self-employed than among employees. The evidence in Tables 2 also makes it clear that, at least in the United States, the self-employed do not work more at night: In each time interval between 10PM and 6AM the incidence of work is the same or lower among the self-employed than among employees. On the other hand, despite laws governing work by self-employed shopkeepers, the average German self-employed worker is more likely than his or her American counterpart to work occasionally after 10PM, and slightly more likely to work nights regularly. The American data show that night work is not so likely to be chosen by workers who are less constrained in timing their work. This result suggests that (American) workers use part of their ability to obtain additional earnings to purchase more attractive work times, and thus that labor-force participants view working at night as inferior.

The determinants of nonstandard work times are examined in the regressions reported in Tables 3. In each pair the first table is for male workers and the second for females. In all four tables I present estimates with

and without separate constants for the industry in which the respondent works. For the United States this means that over 220 dummy variables, one for each three-digit Census industry, are included in the regressions that are reported. The German data provide enough information to allow the inclusion of separate constant terms for each of 35 industries.

The results for the United States are least-squares regressions on the zero-one variable, work in the evening (night) conditional on working at all.[11] To make the estimates for Germany comparable to those for the U.S. I define the zero-one variable, work regularly in the evening (night), in the German data and estimate least-squares regressions on this variable also. Since roughly the same percentage of Germans work regularly at these times as do Americans, this approach seemed to be the most useful way of combining the three responses in the GSOEP and making the results most comparable to those for the U.S.

The construction of most of the other variables included in the regressions is fairly straightforward. Education is years of schooling attained in the United States; in Germany education is computed using an algorithm that adds years of formal schooling and years of different types of training to generate a measure of total years of schooling.[12]

I also include in the equations for the U.S. a vector of variables indicating the size of the MSA where the worker lives along with a vector of variables for region of residence. Data on location are not available in the

public-use sample of the GSOEP, so that a comparison of these effects is not possible. The GSOEP does, however, contain information on the size of the firm where the worker is employed, and this is included in these equations.

We can view the results in the second and fourth columns of Tables 3 as abstracting in part from interindustry differences in technology. These differences are important, as the substantial increases in the fractions of variance accounted for by these variables indicate. Also, accounting for industry effects allows us to interpret the estimates in columns (2) and (4) as reflecting supply behavior more than the estimates in columns (1) and (3). Holding constant the measures of firm size in the German results strengthens the interpretation of the effects of the other variables on the timing of work as resulting from workers' choices. Nonetheless, both sets of estimates should be viewed as being at least partly contaminated by the determinants of employers' behavior in the matching process of workers' preferences and employers' offers of schedules and associated wage rates.

More educated workers in the U.S., and more educated men in Germany, are significantly less likely to be working evenings or at night. Better educated German women, however, are more likely to work at these unusual times, though the effects are significant only for work at night. Except for this group these results underscore a general finding throughout this and the next Section: Work at night is done disproportionately by workers with relatively little human capital. In the U.S. the government provides no

Table 3U1. OLS Estimates of Coefficients in the Determinants of the Probability of Working at Nonstandard Times, Main Job, 1991, Men, N=32,375[a]

	7PM-10PM		10PM-6AM	
Probability:	.198		.158	
Years of schooling	-.0043	-.0018	-.0120	-.0095
	(.0008)	(.0009)	(.0007)	(.0008)
Age	-.0107	-.0037	.0031	.0032
	(.0010)	(.0010)	(.0009)	(.0009)
$Age^2/100$	.0103	.0023	-.0054	-.0051
	(.0011)	(.0011)	(.0011)	(.0011)
Age Youngest Child:				
0-5	.0224	.0188	-.0013	.0027
	(.0068)	(.0066)	(.0063)	(.0060)
>5	.0265	.0174	-.0177	-.0203
	(.0058)	(.0056)	(.0053)	(.0051)
Married	-.0483	-.0252	-.0089	-.0033
	(.0060)	(.0058)	(.0055)	(.0053)
Black	.0335	.0213	.0564	.0297
	(.0091)	(.0088)	(.0083)	(.0081)
Hispanic	-.0073	-.0249	-.0035	-.0085
	(.0094)	(.0091)	(.0086)	(.0083)
Area unemployment rate	-.0026	-.0022	.0048	.0024
	(.0014)	(.0014)	(.0013)	(.0012)
MSA > 2.5 million	-.0276	-.0124	-.0243	-.0215
	(.0061)	(.0061)	(.0055)	(.0056)
MSA .5-2.5 million	-.0178	-.0059	.0021	-.0014
	(.0060)	(.0060)	(.0055)	(.0055)
MSA < .5 million	-.0118	.0001	.0095	.0077
	(.0070)	(.0068)	(.0064)	(.0062)
Industry effects	No	Yes	No	Yes
$\bar{R}^2$	.020	.101	.016	.102

[a]Also included here and in Table 3U2 are dummy variables for major region, and for Asian or other racial group.

Table 3U2. OLS Estimates of Coefficients in the Determinants of the Probability of Working at Nonstandard Times, Main Job, 1991, Women, N=28,289[a]

	7PM-10PM		10PM-6AM	
Probability:	.168		.120	
Years of schooling	-.0087	-.0016	-.0063	-.0019
	(.0009)	(.0010)	(.0008)	(.0009)
Age	-.0150	-.0096	.0027	.0026
	(.0010)	(.0010)	(.0009)	(.0009)
$Age^2/100$	.0147	.0092	-.0040	-.0034
	(.0012)	(.0012)	(.0011)	(.0011)
Age Youngest Child:				
0-5	.0293	.0184	.0183	.0075
	(.0068)	(.0065)	(.0060)	(.0058)
>5	.0040	-.0018	-.0129	-.0135
	(.0054)	(.0053)	(.0048)	(.0047)
Married	-.0601	-.0460	-.0339	-.0214
	(.0050)	(.0049)	(.0044)	(.0043)
Black	.0040	.0051	.0410	.0245
	(.0078)	(.0077)	(.0069)	(.0068)
Hispanic	-.0287	-.0228	-.0018	-.0001
	(.0098)	(.0095)	(.0086)	(.0084)
Area unemployment rate	.0008	.0001	.0015	.0007
	(.0014)	(.0014)	(.0012)	(.0012)
MSA > 2.5 million	-.0284	-.0137	-.0356	-.0235
	(.0061)	(.0060)	(.0054)	(.0053)
MSA .5-2.5 million	-.0107	-.0043	-.0189	-.0127
	(.0060)	(.0059)	(.0053)	(.0052)
MSA < .5 million	-.0118	-.0043	-.0134	-.0091
	(.0069)	(.0067)	(.0061)	(.0059)
Industry effects	No	Yes	No	Yes
$\bar{R}^2$	.035	.110	.009	.080

Table 3G1. OLS Estimates of Coefficients in the Determinants of the Probability of Working Regularly at Nonstandard Times, 1990, Men

	7PM-10PM		10PM-6AM	
Probability:	.215		.145	
Education	-.000015	-.000017	-.000015	-.000017
	(.000008)	(.000008)	(.000007)	(.000007)
Age	.0133	.0128	.0057	.0062
	(.0046)	(.0045)	(.0039)	(.0038)
$Age^2/100$	-.0180	-.0171	-.0082	-.0088
	(.0057)	(.0055)	(.0048)	(.0047)
Age Youngest Child:				
0-5	.0375	.0410	.0162	.0177
	(.0206)	(.0194)	(.0171)	(.0166)
>5	.0301	.0070	.0310	.0096
	(.0219)	(.0211)	(.0187)	(.0181)
Married	.0139	.0122	.0220	.0219
	(.0203)	(.0197)	(.0173)	(.0168)
Foreign-born	.0628	.0495	.0818	.0737
	(.0311)	(.0300)	(.0267)	(.0257)
Firm Size:				
>2000 Employees	.1080	.1273	.1134	.1210
	(.0199)	(.0232)	(.0170)	(.0199)
200-1999 Employees	.0719	.0836	.0551	.0658
	(.0209)	(.0229)	(.0179)	(.0197)
20-199 Employees	-.0234	-.0020	-.0206	-.0062
	(.0209)	(.0219)	(.0179)	(.0187)
Industry effects	No	Yes	No	Yes
$\bar{R}^2$	.026	.107	.030	.112
N =	3187		3180	

Table 3G2. OLS Estimates of Coefficients in the Determinants of the Probability of Working Regularly at Nonstandard Times, 1990, Women

	7PM-10PM		10PM-6AM	
Probability:	.135		.053	
Education	.000009	.000006	.000013	.000012
	(.000007)	(.000007)	(.000005)	(.000005)
Age	.0051	.0044	.0061	.0056
	(.0048)	(.0046)	(.0031)	(.0031)
$Age^2/100$	-.0070	-.0065	-.0078	-.0074
	(.0060)	(.0059)	(.0040)	(.0039)
Age Youngest Child:				
0-5	.0362	.0345	.0113	.0086
	(.0220)	(.0214)	(.0144)	(.0142)
>5	-.0029	-.0195	.0125	.0019
	(.0210)	(.0203)	(.0139)	(.0136)
Married	-.0148	-.0185	-.0046	-.0053
	(.0180)	(.0173)	(.0118)	(.0115)
Foreign-born	.0076	-.0013	.0082	.0054
	(.0312)	(.0301)	(.0206)	(.0200)
Firm Size:				
>2000 Employees	.0286	.0880	.0281	.0459
	(.0214)	(.0239)	(.0141)	(.0159)
200-1999 Employees	.0673	.0987	.0113	.0265
	(.0200)	(.0216)	(.0132)	(.0144)
20-199 Employees	.0022	.0277	-.0211	-.0100
	(.0192)	(.0201)	(.0126)	(.0134)
Industry effects	No	Yes	No	Yes
$\bar{R}^2$	.005	.093	.007	.075
N =	2155		2140	

special incentives that might lead employers to use low-skilled workers disproportionately on jobs that must be performed at night. In Germany this is less true, since wage premia for night work escape the very high payroll tax rates on employers, and the total earnings taxed have a monthly ceiling.[13] Taken together, these results and considerations suggest that, especially in the United States, we may be fairly sure that the lower incidence of evening and night work among more educated workers reflects people's general desires not to work at such times and educated workers' use of their earning power to purchase work schedules at more desirable times. This is additional, strong evidence that people view work at night as inferior.

The interesting international distinctions come in the relation between age and the probability of working evenings or at night. The probability of evening work falls for American men and women until roughly age fifty and rises thereafter. This is consistent with the effect of education on working at night, as workers whose investments in themselves are greater buy a more desirable work schedule. The probability of night work shows the opposite pattern, rising for both genders in the U.S., though only until workers reach their early thirties, and then falling. In Germany the patterns of both evening and night work are the same: They initially rise with age, reach peaks in workers' mid-thirties, then begin to drop. The results are roughly the same whether or not we hold constant for the worker's industry.[14]

The relationship of age to night work in the U.S. and to evening and night work in Germany is inconsistent with simple human-capital theory. These apparently contradictory results could arise if the pay premium for night work in the U.S. (for both evening and night work in Germany) were sufficiently high to offset people's unwillingness to be at work at the unusual times. Given the somewhat relevant evidence that shift differentials are relatively small in the U.S., probably 10 percent on average, and not more than 20 percent at the margin (Kostiuk, 1990; Shapiro, 1995), this explanation is not very satisfactory for the U.S. While no econometric studies have examined this issue for Germany, typical union contracts (which cover the much larger unionized sector in Germany and whose provisions are often extended to nonunion workers) suggest roughly similar premia.[15] Insofar as the probability even of night work is lower at age 50 in these groups than at age 25, however, the results can still be viewed as being consistent with life-cycle behavior, though not with the predicted U-shaped relationship to age.

The GSOEP allows us to explore an additional facet of the allocation of evening and night work, as it provides information on workers' tenure with their employer. A vector of variables indicating tenure was added to the equations, but none of the estimated coefficients in any of the four equations was significantly different from zero. Moreover, the inclusion of these vectors did not alter the pattern of coefficients on the age variables. This suggests that it is the life-cycle effects of preferences, not the interaction of seniority and

the concomitant firm-specific investment with those preferences, that determines who works at these times.

Hispanic workers do not differ greatly from non-Hispanic whites in their propensity to work at unusual times; but black workers of both genders are significantly more likely than non-Hispanic whites to be at work evenings or nights. Part of this difference disappears when the worker's detailed industry is held constant. Even accounting for this level of detail on industry, however, racial differences remain significant and fairly substantial. For example, among black women the probability of night work is 25 percent higher than among non-Hispanic whites within the same narrowly-defined industry. One might argue that this racial differential reflects lower-quality schooling (for a given number of years of education attained); but the relatively small impact of low schooling on the probability of evening and night work invalidates that argument. The race differential in evening and night work seems either to reflect a difference in tastes, which is hard to believe, or to be the outcome of labor-market discrimination.

The outcomes for foreign-born workers in Germany parallel the results for blacks in the United States. Foreign-born German men are significantly more likely to be working evenings or nights than are native German workers, while for women the effects are generally positive but never significant. In both countries the burden of working at nonstandard times is greater on minorities.

Interarea differences in unemployment are not strongly associated with differences in the probability of working evenings or nights. That is not true, however, for the vector of variables in Tables 3U indicating the size of the metropolitan area where the worker resides. In the equations that contain detailed industry effects this vector should be interpreted as reflecting the marginal impact of workers' disutility associated with being outside the house in areas of different size. The parameters on the variables for medium and smaller MSAs are generally negative, though not significantly so in the equations describing the probability of working evenings. In the equations for the probability of night work they are significantly negative for women.

The most interesting result is that residence in the largest MSAs significantly reduces the probability of evening work among both women and men; and for both genders the probability of night work is significantly lower there, with a slightly bigger effect among women. These differences exist even within detailed industries.[16] Thus unless intraindustry differences in the relative difficulty of producing in the evening or at night are associated with location, this pattern of results is consistent with workers' greater unwillingness to venture out to work in the dark where the perceived danger of being away from home is greater, with women apparently slightly more concerned about these dangers.

The data do not permit replication of this result for Germany. Tables 3G do, however, allow us to infer that evening and night work are more

prevalent in larger firms, especially for men. This is not just the result of differences in technology across industries: The effects are actually a bit larger when we hold constant for two-digit industry (in columns (2) and (4)). One might argue that larger firms are more capital-intensive and that workers must labor in the evening and at night to keep the valuable equipment occupied. If that were true, however, we would that find that the coefficients on firm size, particularly for very large firms, decline once the dummy variables for industry are added to the equations. That the coefficients remain essentially unchanged or even rise suggests that this effect is generated by workers' supply behavior. In a spirit similar to the explanation for the results on city size in the U.S., the positive correlation of firm size and evening and night work in Germany may reflect people's greater willingness to work where there is a greater likelihood that more coworkers will be present.

Married American men are significantly less likely to be working evenings than are single men, though only slightly and insignificantly less likely to be working nights. Among German men marital status is positively, though not significantly related to the probability of work at nonstandard times. In both Germany and the U.S. married women are less likely to be working evenings and nights, though only for American women are the effects significant (and both absolutely and proportionally larger than for American men). This might, of course, merely reflect married women's generally lower supply of hours in both countries.

What is surprising is that women with small children are more likely than those with no children to work evenings and nights, with the effects being significant in the U.S. This is not the result of differences in behavior between single and married mothers, since including interactions between marital status and children did not alter this inference. Since the best-documented fact about female labor supply is that the presence of small children reduces total hours of work, this finding implies that mothers of young children concentrate a disproportionate part of their market work outside what are considered standard working hours.[17] Moreover, this concentration is independent of any differences in child-care arrangements between the two countries.

4. Unusual Work Times in a Family Context

While the results for young mothers in Section 3 are intriguing, they are basically not satisfying. Without analyzing how couples use time jointly we cannot infer how alternative family situations affect the instantaneous probabilities of alternative uses of time. There is evidence that older couples treat aggregations of leisure time as complements (Hamermesh, 1980, Chapter 4); but the more general labor supply literature has difficulty finding effects in formal models of spouses' labor supply based on data on integral time use (Killingsworth and Heckman, 1986). By negative example these findings illustrate the importance of considering instantaneous time use: Given the relatively small fractions of the week that people typically work, we could

very easily find that husbands' longer weekly hours are associated with wives' longer weekly hours, holding their wage rates constant, even though each one is at home while the other works. The issue is not whether total work times of husband and wife are correlated when we integrate over a day, a week or a year. It is whether at each instant the probabilities that husband and wife are at work are independent.

Some inkling into the jointness of a couple's use of time at a point in time is obtained from simple contingency tables. Tables 4 include all married couples regardless of whether both spouses work or only one does. Each shows the percentage of couples choosing each of the four possible outcomes for work at the nonstandard times (7PM-10PM and 10PM-6AM), along with the probability of observing this pattern of outcomes (based on the appropriate χ^2 test). For both countries the first tableau in each Table makes it clear that among couples without children the instantaneous time use of husbands and wives is complementary: If one partner is working at a nonstandard time, the other is more likely to be at work.

As the second tableau for the U.S. shows, and as is true for night work in Germany, couples consume leisure jointly (work at the same time) when the youngest child in the house is of school age. When the youngest German child is a pre-schooler, however, husbands' and wives' leisure choices in the evening and at night are independent. With the much larger samples in the U.S. we still find some jointness in the consumption of leisure at night

Table 4U. Contingency Tables on Spouses' Work Time by Age of Youngest Child, 1991, Percent Distributions, All Married Couples

	7PM-10PM		10PM-6AM	
No kids	Woman Works: N	Y	N	Y
Man Works: N	85.94	4.18	89.36	3.08
Man Works: Y	7.92	1.96	6.27	1.29
	N = 16,659	p = .000	p = .000	

Youngest 6-17	Woman Works: N	Y	N	Y
Man Works: N	77.92	6.07	81.91	5.44
Man Works: Y	13.70	2.30	11.08	1.58
	N = 7,428	p = .000	p = .000	

Youngest 3-5	Woman Works: N	Y	N	Y
Man Works: N	73.32	7.50	78.95	6.00
Man Works: Y	16.29	2.89	13.58	1.46
	N = 2,732	p = .000	p = .058	

Youngest 0-2	Woman Works: N	Y	N	Y
Man Works: N	72.21	7.48	78.46	5.66
Man Works: Y	17.56	2.74	14.28	1.60
	N = 4,117	p = .000	p = .002	

Youngest 0-5	Woman Works: N	Y	N	Y
Man Works: N	72.65	7.49	78.65	5.80
Man Works: Y	17.05	2.80	14.00	1.55
	N = 6,849	p = .000	p = .000	

Table 4G. Contingency Tables on Couples' Work Time by Age of Youngest Child, 1990, Percent Distributions, All Opposite-Sex Couples[a]

Married Couples

No kids

		7PM-10PM: Woman Works: N	7PM-10PM: Woman Works: Y	After 10PM: Woman Works: N	After 10PM: Woman Works: Y
Man Works:	N	80.07	3.53	88.04	1.00
	Y	13.77	2.63	9.33	1.63
		N = 1104	p = .000		p = .000

Youngest 6-16

		7PM-10PM: Woman Works: N	7PM-10PM: Woman Works: Y	After 10PM: Woman Works: N	After 10PM: Woman Works: Y
Man Works:	N	72.14	5.98	81.71	2.39
	Y	5.98	2.56	14.70	1.20
		N = 585	p = .146		p = .026

Youngest 0-5

		7PM-10PM: Woman Works: N	7PM-10PM: Woman Works: Y	After 10PM: Woman Works: N	After 10PM: Woman Works: Y
Man Works:	N	72.05	3.84	83.29	1.78
	Y	22.33	1.78	14.52	.41
		N = 730	p = .242		p = .665

Unmarried Couples

		7PM-10PM: Woman Works: N	7PM-10PM: Woman Works: Y	After 10PM: Woman Works: N	After 10PM: Woman Works: Y
Man Works:	N	76.72	9.91	82.76	8.62
	Y	9.91	3.45	8.62	0
		N = 232	p = .029		p = .151

[a]Regular work during these times.

(when the young child is likely to be asleep); but for couples with young children the outcomes of choices about work and leisure in the (weekday) evening are somewhat less closely related. Together the evidence shows that the presence of young children loosens the nexus between the husband's and wife's joint consumption of leisure.[18]

The final tableau in Table 4G shows that unmarried opposite-sex German couples behave differently from married ones without children: Patterns of leisure are less mutually dependent among unmarried couples. This suggests that, as we would expect, each unmarried partner's choices are less based in maximizing utility jointly with the other partner than are the choices of spouses.

These tables suggest that partners wish to consume leisure jointly and that young children reduce this jointness; but to analyze the issue we need to abstract from factors that might affect the spouses' total demands for leisure and consumption over some integral of time. I thus hold constant each spouse's total work time and the couple's total consumption (actually, income), all of which are determined simultaneously by the interaction of the partners' wage rates and unearned income with the family utility function. This allows the analysis to focus on those factors that affect patterns of instantaneous work or leisure activity of the husband and wife after accounting for decisions about total work effort. As long as the premia for work at different times of the day are the same for all labor-force participants, any nonrandom patterns must

result from the couple's preferences or from differences in the value of each spouse's nonmarket time at different times of the day. This approach thus allows us to concentrate on the single issue of joint instantaneous time use and to avoid the usual (and increasing) econometric complexities involved in analyzing temporal aggregates of labor supply. This is possible if we restrict the analysis to couples with both partners working. Including a spouse whose labor supply is zero means we could not infer whether the spouses view their leisure as joint substitutes at a point in time, or merely whether there is some unobserved heterogeneity that generates a greater probability of one spouse working at a particular time that is related to the couple's choice that the other spouse not work at all.

Only married couples with both spouses reporting positive days and hours of work are therefore included in the analysis of the joint consumption of leisure. I divide the couples into the four categories implicit in the contingency tables in Tables 4 and estimate the effects of family structure using a multinomial logit procedure in which the excluded category is that neither spouse is at work during the particular time interval under study. Each spouse's days and hours per day of work are included in the logits, so that I am inquiring into how people shift the timing of their leisure within a fixed total amount of leisure consumed. Also included in the equations for the U.S., but not presented in Table 5U, are the vector of variables denoting the size of the worker's metropolitan area (as included in Tables 3U) and indicators of the

Table 5U. Determinants of the Timing of Joint Labor Supply, Married Couples with Both Spouses Working, 1991, All Jobs (Multinomial Logit Estimates)[a]

	Time at Work: 7PM-10PM			10PM-6AM		
	(2)	(3)	(4)	(6)	(7)	(8)
	Wife Only	Husband Only	Both	Wife Only	Husband Only	Both
Probability:	.097	.156	.049	.077	.125	.031
Youngest child:						
0-5	.550	.253	.052	.621	.259	-.129
	(.074)	(.063)	(.101)	(.084)	(.067)	(.127)
>5	.144	.006	-.433	.408	.065	-.317
	(.074)	(.060)	(.102)	(.082)	(.065)	(.122)
Annual income (000)	-.0076	-.0053	-.0104	-.0089	-.0093	-.0086
	(.0012)	(.0009)	(.0016)	(.0013)	(.0010)	(.0020)
Pseudo-R^2		.047			.037	
N =		13,266			13,266	
Tests of constraints: (p-values on χ^2-statistics)						
Kids matter:		.0000			.0000	
Kids (2) (or (6)) = Kids (3) (or (7)):		.0041			.0003	

[a]Neither spouse working at this time is the excluded category here and in Table 5G. Each spouse's hours and days worked are also included in the estimation in both tables. In this Table the household head's race and ethnicity (Hispanic or not) and the size of the metropolitan area where the couple resides are also held constant in both multinomial logits. In Table 5G foreign birth is held constant instead of these race and ethnicity measures, and no measures of the size of the area are included.

Table 5G. Determinants of the Timing of Joint Labor Supply, Married Couples with Both Spouses Working, 1990 (Multinomial Logit Estimates)

	Time at Work: 7PM-10PM			10PM-6AM		
	(2)	(3)	(4)	(6)	(7)	(8)
	Wife Only	Husband Only	Both	Wife Only	Husband Only	Both
Probability:	.104	.151	.051	.028	.118	.025
Youngest child:						
0-5	.994	.371	.501	.810	.238	-.082
	(.269)	(.228)	(.362)	(.523)	(.252)	(.527)
>5	.752	.380	.305	.791	.416	.024
	(.271)	(.218)	(.370)	(.524)	(.237)	(.481)
Monthly income (000)	.076	-.019	-.049	.016	-.118	-.082
	(.035)	(.052)	(.095)	(.060)	(.069)	(.126)
Pseudo-R^2		.061			.102	
N =		1050			1050	
Tests of constraints: (p-values on χ^2-statistics)						
Kids matter:		.004			.426	
Kids (2) (or (6)) = Kids (3) (or (7)):		.162			.593	

household head's race and ethnicity. In the estimates for Germany I include an indicator of whether the household head is foreign-born.

The purpose of this careful set of controls is to analyze how the four possible choices are affected by the presence of children and by a family's full income. The former are represented by variables measuring the age of the youngest child (less than 6 years, 6-17 (16 in Germany), or no child under 18 (17 in Germany) at home, the excluded category). The couple's family income is reported in the GSOEP as monthly income and in the CPS as annual income.[19] Including income in the logits is a pure test of income effects on couples' relative demand for jointly consuming leisure at various times of the day, since their days and hours of work are held constant. The sample is quite large for the U.S. (N = 13,266), but fairly small for Germany (N = 1050), which means that the number of German couples in some of the categories (e.g., children under 6 and only the wife working at night) is unfortunately very small.

Table 5G is based on time at work, possibly work on any job. To ensure that we have one set of outcomes that reflects all labor at these unusual times and to make the results more comparable across countries, Table 5U includes all time worked on the main job or on a major second job between 7PM and 10PM, or 10PM and 6AM. The results are affected only minutely if the sample underlying Table 5U is restricted to work on the main job at unusual times.

As implied by the contingency Tables 4, having children at home significantly affects the pattern of spouses' consumption of leisure at these unusual work times in the United States and has similar effects, though ones that are insignificant for night work, in Germany. Relative to the probability that neither spouse works at an unusual time, children increase the likelihood that only one spouse will be at work at such times conditional on the total days and hours supplied by each spouse. In the U.S. young children have insignificant effects on the relative probabilities that both spouses will be working in the evening or at night compared to the probability that neither works at this nonstandard time. Having older children at home, however, significantly reduces the chance that both partners will be at work evenings or nights. Whether this stems from a desire to consume leisure jointly with the older children or from concerns about what the children will do with their unsupervised leisure is unclear. In Germany having children at home does not significantly affect the relative probability that both partners work at night.

The data, especially the GSOEP, allow us to examine a number of interesting extensions of the basic model. One possibility is that the results are confounded by their ignoring the role that other household members might play in child care. Reestimating the multinomial logits for the United States with the inclusion of a variable indicating the presence of another adult in the household (present in 18 percent of the households underlying these estimates), we find no qualitative differences in the results shown in Table 5U. Similarly,

when the equations for Germany are reestimated to include an indicator of whether having an adult relative living with the couple affects the outcomes, none of the basic conclusions is changed.

Little more can be done on the American data; but the richer German data enable us to examine a number of other possibilities. One is to consider whether couples' beliefs about the role of the very stringent laws regulating retail hours in Germany are related to their choices of nonstandard work times. Despite the relatively short retail hours in Germany couples that respond in the questionnaire that lengthening retail hours would be important or very important do not exhibit significantly different patterns of nonstandard work times from other couples.

Among German couples that use formal child-care arrangements both spouses are slightly less likely to be working evenings or nights, with the only significant difference being that use of formal child-care is less common if both spouses are working at night. Given the relative rarity of formal child-care opportunities in the former West Germany, it is not surprising that these effects are small.[20] People who indicate that they would like to obtain alternative child-care arrangements, however, do behave significantly differently from others. The husband is less likely to be working at night while his wife is at home; and both spouses are less likely to be working in the evening. An interpretation of this result (and the standard problem with such subjective responses) is that those couples that view the issue as important are

those that are least satisfied with the current arrangement, and in this case implicitly are those that cannot choose work times as freely as do other couples with children.

An interesting question is whether the presence of young children, who we showed increase the probability that one partner works evenings or nights, is more likely to cause the husband or the wife to be working at these unusual times. The final p-values in the Tables are based on tests of the hypothesis that the effects of children (under 6, or 6 and over) are symmetric on which spouse is at work at an unusual time while the other is at home. In the U.S. they are not: It is the wife who shifts her workhours toward these nonstandard times while the husband stays home with the (sleeping?) child. For Germany the test statistics are not significantly nonzero, but the differences in the relative effects are in the same directions as in the U.S.[21]

One explanation for these results is that wives spend more time at home with the children during the day, so that their enjoyment from still more time with them is less than that of their husbands. Alternatively, though it seems farfetched, it is possible that the wage premia that wives receive for work at these unusual times compared to standard work times is greater than that of their husbands. In any case, it is clear that for workweeks of given lengths (same days and daily hours), the timing of mothers' work is more affected by the presence of children than is that of fathers.

In Germany higher income reduces the probability that both spouses or the husband alone work at nonstandard times, though none of the effects is significantly negative. In the U.S. there is, however, a significant negative income effect on all three alternatives to being at home together in the evening or at night. While the effects on the three combinations that involve evening work by one or both spouses are significantly different from each other in the U.S. (with the biggest negative effect on evening work by both spouses), higher income reduces night work in the U.S. by the same percentage for each category of outcome. The immense array of results from the labor supply literature has convinced us that the demand for leisure over an aggregate of time rises if people are given additional unearned income. Taken together the results here demonstrate that a married couple's demand for jointly consuming leisure at a point in time is affected similarly.

5. Conclusions and Implications

I have introduced the empirical analysis of instantaneous time use -- whether workers are in the labor market during particular narrow time intervals. This line of research should be distinguished from the analysis of integrative time use -- hours, days, weeks, etc. -- that is the focus of nearly all research on labor supply. The more important findings on instantaneous time use are:

> Work in the evening or at night is inferior. The self-employed, who presumably are more free to choose their own schedules, are less likely to be at work at night, even

though their total weekly hours exceed those of employees. Among married couples with identical days and hours of work, those with higher incomes are less likely to be in the labor market at these times. Blacks in the U.S. and foreign-born workers in Germany are more likely than otherwise identical workers to be in the labor market at these nonstandard work times independent of the industry where they work.

Husbands and wives without children at home consume leisure jointly (are in or out of the labor market at the same times of the day). The jointness is less among couples with school-age children, and it nearly disappears when very young children are present.

Even though women are much less likely than men to work nights and evenings, they bear a disproportionate share of the extra burden of such work when young children are present.

Evening and night work are least prevalent in our largest cities, an effect that is slightly more pronounced among women workers.

These findings suggest the importance of child-care facilities in determining working time, especially that of women workers. That having young children leads mothers to alter their work schedules is not a problem; but it induces a shift toward those unusual work times that women generally do not like and that workers' behavior suggests are inferior. Either couples do not have access to sufficiently low-priced child-care facilities that would enable them to avoid these work times, or regardless of price women particularly wish to be with their young children during daytime and must work at night if they are to work at all.

If the German data provided more detail on timing rather than merely on evening and night work, it would have been possible to compare the timing of work in the two countries more broadly. Had the U.S. survey asked for each person's usual schedule on each day we could have derived a complete picture of who is at work when. Despite the drawbacks of the data, however, the analyses summarized here have generated new results about labor-force behavior. This is not surprising, as it is easy to do so if new, albeit not totally satisfactory snapshots are taken of working time.

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FOOTNOTES

1. While there has been little analysis of these, Owen (1979) recognized their importance and discussed them at some length.

2. This set of data has already received substantial attention from both German and American researchers. (Gerlach and Hübler, 1992, and Hunt, 1995, are two of many examples.)

3. As Stafford (1980) points out, variations in labor productivity over the work schedule depend in part on the jointness of the schedules of capital and labor. This is especially important where the capital stock is lumpy and is specialized in a particular use.

4. While the table is restricted to those who work at least four days per week, the distributions look very similar if all workers are included.

5. Laband and Heinbuch (1987) discuss some of the issues involved in retail opening hours and how government regulations affect them.

6. I also assume, based on discussions with Professor Gert Wagner of the Deutsches Institut für Wirtschaftsforschung, who is responsible for the survey, that work at night after 10PM means work between 10PM and 6AM.

7. The instructions tell the respondent, "...beantworten Sie die folgenden Fragen bitte nur für Ihre derzeitige berufliche Haupttätigkeit." ("...please answer the following questions only for your current main paid activity.")

8. Clearly there is a problem in assigning starting and ending times to a particular single hour. In the CPS tapes the convention is to code any time between 30 minutes before the hour and 29 minutes after as being that hour only. Thus people who say their work starts at 7:45AM and ends at 6:23PM would be coded as starting at 8AM and finishing at 6PM.

9. Combining individuals is especially easy in the GSOEP, as each individual record lists the partner's unique identification number, so that every person who listed a partner could be

matched to that partner. In the CPS I merged records from files of adult men and women who were listed as residing in a household in which both spouses were present. This resulted in successful matches of 97.3 percent of married men and 95.7 percent of married women. The process of combining records in the GSOEP generated a small number of same-sex couples. Whether these really are homosexual couples or simply same-sex people domiciled together is unclear. Since in any case their behavior is likely to differ from that of the rest of the combined sample, I drop them from the analysis.

10. The numbers of observations for evening and night work differ slightly in the GSOEP because a few workers who responded to the question about Saturday work did not respond about their Sunday work, and vice-versa.

11. Clearly, probit analysis is the correct econometric procedure. A few were estimated, with coefficients that implied the same effects at the mean as the least-squares coefficients in Tables 3U and with almost identical t-statistics.

12. Ken Couch of Syracuse University provided this algorithm to me. It allows years of education to range between 0 and 19, very much like the 0 to 18 years available in the May 1991 CPS.

13. Einkommensteuergesetz 1990, Gruppe 1.

14. Without data on the health status of each worker in these samples we cannot be sure that the tapering off of work at night after the late forties is not based on declining health. Many other studies suggest, however, that differences in health status by age are very minor at least until the late fifties, so that health problems do not seem to be a good explanation for patterns of nonstandard work by age.

15. For example, the contract covering the chemical industry beginning in June 1992 specified a premium of 15 percent for regular night work and 20 percent if the night work is performed on an irregular basis. (Manteltarifvertrag für die chemische Industrie vom 24. Juni 1992)

16. None of the effects discussed here changes if we restrict the samples by excluding those few workers who are enrolled

in school.

17. This may also be the only commonly agreed upon fact generated by the immense econometric literature on female labor supply.

18. Excerpts from author's conversation with flight attendants on April 18, 1994, somewhere between Washington and Dallas:

> Lisa: My husband has an 8 to 5 job. I bid weekday trips so we can be together. We don't have any kids yet.
>
> Teri: I want to be with my babies, so I bid weekend trips.

19. The GSOEP gives monthly income in Deutschmarks, with a ceiling of 75,000DM per month (equivalent to an annual income of nearly $650,000 at the exchange rates of Summer 1995). I multiplied 75,000DM by 1.5 and assigned that value to the one couple that listed the top code. In the CPS the responses on income are categorical and describe annual income. Midpoints of the categories were assigned; and for those at the topcoded amount of $75,000 I again multiplied by 1.5 and assigned that number to the respondents. Clearly, topcoding is not a problem in the German data. In the U.S. data, however, 13.6 percent of the married couples with both spouses working that are used in the analysis in Tables 5U were topcoded.

20. Only 3 percent of children below the age of 3 have access to such facilities. 69 percent of 3-5 year-olds do, but only 5 percent of schoolchildren age 6-10 have the opportunity to obtain a place in a child-care facility (Schettkat and Fuchs, 1994).

21. In the U.S. even the absolute effects are greater, while in Germany they are about the same. The conclusions are not changed if we restrict the samples only to those couples where at least one spouse is working in the evening (or at night). Even among such couples, in both countries that partner will disproportionately be the wife.