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Evidence on Unemployment, Market Work and Household Production

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ABSTRACT

Time-diary data from four countries suggest that differences in market time between the unemployed and employed represent additional leisure and personal maintenance rather than increased household production. U.S. data for 2003-2006 show that almost none of the reduction in market work in areas of long-term high unemployment is offset by additional work at home. In contrast, in those areas where unemployment has risen cyclically, reduced market work is largely substituted by additional time in household production.

I. Introduction—the Problem

Over the past two decades research in macroeconomics has seldom ventured beyond the dichotomy between market work and all other time (usually called leisure). Two leading exceptions are Greenwood and Hercowitz (1991) and Greenwood *et al* (1995).[1] A central question, whether household production is readily substitutable for market production, remains largely unanswered. If it is, the welfare costs of cyclical reductions in the latter are likely to be small, regardless of the shape or functional form of the utility function.

Until recently, the theoretical literature had little information to guide its thinking on this issue.[2] Moreover, no study has examined how unemployment, both long-term differences and cyclical fluctuations, affects the split among market work, household production and other uses of time.[3] In what follows, we present US and international evidence on differences between unemployed and employed individuals in their allocation of time among market, household production and leisure/personal maintenance. These findings represent an important challenge to many conventional theories of labor supply in macroeconomics.

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[1]Baxter and Jermann (1999) linked this tradeoff to permanent-income explanations of cyclical fluctuations in consumption.

[2]Attempts to estimate substitution elasticities between market and household production have employed either the Panel Study of Income Dynamics (Benhabib *et al*, 1991) or time-diary surveys (Rupert *et al*, 2000).

[3]Even the simpler question regarding how the employed and unemployed differ in their use of time has received little attention. Ahn *et al* (2005) and Gronau (2006) have used time-diary data for Spain and recall data for Russia respectively to address this question.

II. New Facts on Time Use and Unemployment

A. The Data

We examine time-use surveys in which respondents keep a comprehensive diary of activities either begun at a specific time or occurring during a short time interval, which are then classified into a set of categories defined by the survey agency. For the US, we consider the 2003-2006 American Time Use Survey (ATUS), currently the only set of time diaries collected at regular frequencies (see Hamermesh *et al.*, 2005). The geographic information in this large data set allows us to examine differences in time use between employed and unemployed individuals as well as how these vary across local labor markets. We also study data from: Australia, 1992 (Australian Bureau of Statistics, 1993); Italy, 2002 (ISTAT, 2005); and Germany, 2001/02 (*Bundesministerium für Familie, Senioren, Frauen und Jugend*, 2005). The non-US studies obtained data from individuals on two or more days, so that potential problems induced by observing people on atypical days are reduced.

Following standard practice, we define market work as time spent for pay (or in unpaid household production for the market). We count as household production those unremunerated activities that satisfy the third-party rule (Reid, 1934) that substituting market goods and services for one's own time is possible. An Appendix available from the authors lists the categorization of activities in each data set.

B. Unemployment Status and the Mix of Work

We begin with the four national data sets. Table 1 presents means and standard errors of time spent on market work and household production for all respondents of age 15-59,

and separately for men and women.[4] For these samples pooled, an hour of market time not worked by an unemployed individual corresponds to only 16 (60 x 0.27) minutes of additional household production. Even the largest increment to household production observed among the unemployed, performed by German women, represents only 52 percent of the difference in time spent in market work between them and those German women who report themselves as employed.

The findings in Table 1 are robust to conditioning on other observables. For the same countries and gender groupings, Table 2 displays coefficients of unemployment status in regressions of time spent in market work and in household production which control for age, educational attainment and the numbers of children present, plus other variables as available in the individual data sets. The point estimate of the indicator for unemployment status in the equation for household production ranges from 12 to 51 percent of its size in the equation for market work. Even adjusting for observable personal characteristics, lower market work among the unemployed in the data sets that we use does not represent increased household production.

C. Local Unemployment and the Mix of Work

Cross-sectional differences between the unemployed and the employed reveal nothing about the impact of cyclical changes on an entire labor market. To study the role of cyclical unemployment on total work, one needs to examine how the degree of slack affects all individuals in that market—the unemployed, the employed and non-participants. The creation and continuation of the ATUS has made this possible.

[4]We restrict our samples by age to mitigate effects that may be induced by retirement incentives. In all tables presented in this section the data are weighted by the sampling weights provided in the data set.

To assess the impact of area unemployment on time use, we employ the Current Population Survey (CPS-MORG) for each year 2003-2006. The first column of Table 3 presents the unemployment rate in 2006 averaged across all ATUS respondents aged 15-59 and resident in the 107 metropolitan areas in which there were more than 500 respondents in the CPS-MORG. Column (2) presents unemployment rates in these same areas averaged over the current and the preceding five years as a measure of long-run unemployment across labor markets. Both long-run rates exhibit substantial geographic variation. The final column of the table presents the unemployment shock—the difference between the current year's unemployment rate and the unemployment rate averaged over the previous five years. We interpret this as the cyclical shock to the labor market in the area; here too we observe substantial geographic variation.

In Table 4 we examine how time use is related to unemployment in the labor market where the individual resides. As before, we divide total time into market work, household production, and the excluded category, all other uses of time, for all individuals ages 15-59 in the ATUS 2003-06. We linked the records of ATUS respondents to the long-term and current unemployment rates in the metropolitan areas in which they reside. Each regression also includes a wide variety of individual demographic controls. The upper panel of the table shows the results for the long-term (six-year) average unemployment rate. As expected, higher average unemployment in an area is associated with less market work: Each one percentage-point increase in unemployment is associated with the average person working 3.3 fewer minutes per day in the market. Full-time workers work about 300 minutes in the market on the average day, so that this decline is quite consistent with the expected difference that would occur mechanically where unemployment is higher.

As the results in the top panel of Table 4 show, there is almost no response of household production to higher long-term unemployment in a labor market. Indeed, the parameter estimate is unexpectedly negative, implying that where unemployment has been higher for a long time people engage in slightly less household production. Given the size of the effect and its statistical insignificance, the appropriate conclusion here is that the long-term differences in market work generated by long-term differences in unemployment are not accompanied by any offsetting differences in household production. These results are consistent with the results in Tables 1 and 2, which compared employed and unemployed individuals.

The middle panel presents estimates for the same regressions, which substitute the current for the long-term unemployment rate.[5] Here we see that, as with long-term unemployment, market-wide increases are associated with reductions in market time for the typical individual. The effect is virtually identical to that of differences in long-term unemployment across areas. For household production, however, a one-percentage-point "shock" to unemployment increases the average adult's household production by 2.5 minutes, an increase that is not significantly different from the negative of the effect on market work. The point estimates suggest that a one-hour decline in market-based production associated with cyclical increases in unemployment is matched by an increase in household production of 46 minutes; and we cannot reject the hypothesis that the offset is one-for-one.

In the bottom panel of the table we include both the lagged five-year average rate of unemployment in each area and its current value. Our estimates corroborate the

[5]We could just as easily have included the shock to unemployment, since it is calculated as the difference between current and long-term unemployment. The conclusions from equations using any two of the three measures would be the same as those based on the results in Table 4.

inferences drawn above: Higher local long-term unemployment is associated with *both* less market work and less household production. Areas of long-term high unemployment are those where the average individual has chosen to spend more time on personal activities and in leisure. When unemployment is temporarily higher, however, the resulting reduction in market work at the individual level is associated with increased household production, with no increase in personal activities or leisure. Evidently, permanent and temporary differences in local employment conditions evoke strikingly different responses in household behavior.

III. Interpretation

The lack of any effect of long-term differences in unemployment on time spent in household production is an important finding for macroeconomics and should inform its modeling of the labor market. Theories of labor supply based on non-separability of utility over leisure across time appear of little use in explaining the intertemporal behavior of leisure and household production at the individual level. One possibility is easy short-run substitution between market work and home production combined with external habits or social norms governing preferences over consumption and leisure (the time complement of the sum of market work and home production), which in turn differ geographically in ways which depend on the past history of unemployment.[6] In this setting, the welfare costs of short-term fluctuations are smaller, but long-run rises in unemployment may be costlier as household eventually adjust to and "keep up" with higher levels of leisure.

[6]Preferences governed by an external leisure habit (e.g. Uhlig 2007) have been used to study asset pricing. An alternative interpretation of our findings might be that households apply a signal-extraction rule to labor market shocks and respond to temporary labor market disturbances with continued "investment" in human capital via home production. However, in a companion paper, Burda and Hamermesh (2009) find no relation between individual unemployment duration and the allocation of nonmarket time in home production in US data.

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Table 1. Time Use by Employment Status and Gender, U.S., 2003-06, Italy 2002, Australia 1992, Germany, 2001.02, Ages 15-59*

	Market Work	Household Production	Market Work	Household Production
All		**U.S.**		**AUSTRALIA**
Employed	343.13	191.27	328.64	181.90
	(1.50)	(0.98)	(3.25)	(2.01)
Unemployed	35.58	249.82	37.6	230.3
	(2.08)	(4.44)	(3.53)	(5.82)
Male				
Employed	377.87	153.25	393.07	123.90
	(2.22)	(1.29)	(4.54)	(2.17)
Unemployed	44.40	202.79	52.15	182.1
	(3.50)	(5.08)	(5.42)	(5.43)
Female				
Employed	303.62	234.53	253.67	249.30
	(1.98)	(1.44)	(4.33)	(3.20)
Unemployed	26.31	299.30	20.12	288.10
	(2.35)	(6.06)	(4.10)	(9.04)
All		**ITALY**		**GERMANY**
Employed	370.17	156.02	268.85	214.66
	(1.87)	(1.19)	(1.91)	(1.27)
Unemployed	31.27	244.69	48.37	315.01
	(2.29)	(5.04)	(2.82)	(4.26)
Male				
Employed	413.95	87.05	323.90	158.52
	(2.46)	(1.06)	(2.85)	(1.61)
Unemployed	52.00	100.28	58.93	242.65
	(4.54)	(4.69)	(5.29)	(6.62)
Female				
Employed	305.98	257.12	212.86	271.75
	(2.71)	(2.02)	(2.42)	(1.80)
Unemployed	17.50	340.60	41.81	359.94
	(2.22)	(6.44)	(3.16)	(5.15)

*Standard errors of the means in parentheses. All observations are weighted to account for sampling distributions across days of the week here and in Tables 2-4.

Table. 2. Effect of Unemployment Status on Time Use, Average and by Gender, U.S. 2003-06, Italy 2002, Australia 1992, Germany, 2001.02, Ages 15-59*

	Market Work	Household Production	Market Work	Household Production
		U.S.		**AUSTRALIA**
All	-272.46	94.11	-293.54	84.51
	(9.69)	(6.49)	(9.36)	(5.06)
R^2	0.109	0.151	0.158	0.252
Male	-292.52	92.39	-336.29	82.93
	(14.92)	(9.13)	(13.31)	(12.38)
R^2	0.096	0.065	0.135	0.072
Female	-252.66	91.08	-234.38	78.61
	(12.64)	(9.17)	(12.75)	(8.63)
R^2	0.088	0.150	0.122	0.276
		ITALY		**GERMANY**
All	-321.42	90.52	-222.58	95.73
	(6.07)	(3.38)	(6.03)	(3.96)
R^2	0.169	0.385	0.115	0.166
Male	-356.88	41.26	-276.63	93.24
	(9.86)	(4.26)	(10.47)	(6.15)
R^2	0.113	0.072	0.080	0.033
Female	-296.02	124.7	-185.68	94.79
	(7.34)	(5.00)	(6.95)	(5.18)
R^2	0.172	0.334	0.083	0.124

*Standard errors in parentheses. Also included in the regressions are:
For the United States, vectors of indicators for educational attainment and the number and ages of resident children; indicators of gender and marital status, and their interaction; indicators of race, immigrant status; and age, here and in Table 4.
For Italy, all the same vectors and indicators are included, except immigrant status and race.
For Australia, all the same vectors are included, except only number of resident children is included, and race is not included.
For Germany, age, ages and number of children, and marital status are included.

Table 3. Metropolitan Area Unemployment Rates, 2003-2006, N = 107*

Year	Actual	Six-year Average	Shock
2003	5.94	4.69	1.49
	(1.41)	(0.97)	(1.02)
	[2.15, 10.97]	[2.66, 8.80]	[-1.27, 4.72]
2004	5.54	4.95	0.72
	(1.54)	(0.88)	(1.25)
	[1.93, 9.16]	[3.08, 6.86]	[2.26, 5.02]
2005	4.89	5.12	-0.27
	(1.15)	(1.03)	(1.07)
	[2.22, 9.08]	[2.65, 10.06]	[-2.66, 2.85]
2006	4.40	5.32	-1.10
	(1.09)	(0.97)	(1.15)
	[1.95, 8.89]	[3.03, 9.62]	[-4.78, 2.43]
2003-2006	5.29	4.98	0.00
	(1.44)	(0.99)	(1.43)
	[1.94, 10.97]	[2.65, 10.06]	[-4.78, 5.02]

*Standard deviations in parentheses, minima and maxima in brackets. Calculated from the CPS-MORG linked to ATUS respondents of all ages.

Table 4. Effects of a One-Percentage-Point Increase in the MSA Unemployment Rate on Time Use (in minutes/day), U.S. 2003-06, Ages 15-59, N = 21,867*

	Market Work	Household Production
Unemployment Rate:		
Average t-1…t-5		
	-3.32	-1.33
	(2.75)	(1.65)
R^2	0.102	0.201
Current		
	-3.26	2.50
	(1.71)	(1.10)
R^2	0.103	0.202
Average t-1…t-5	-2.02	-2.85
	(2.74)	(1.77)
Current	-2.75	3.22
	(1.70)	(1.18)
R^2	0.103	0.202

*Standard errors, robust to clustering on MSA, are in parentheses.

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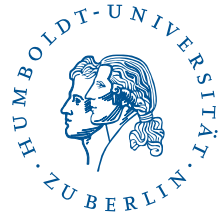

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