

The effect of macroeconomic conditions on parental time with children: evidence from the American time use survey

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Abstract This paper investigates the effect of changes in macroeconomic conditions on time allocation to children among mothers and fathers in the US. The study relies on 2003–2013 American Time Use Survey (ATUS) data. Accounting for a variety of personal demographic characteristics, as well as state and year fixed effects, we find that an increase in state-level unemployment rates is associated with an increase in enriching child–father time in families with small children (ages 0–4). However, there is heterogeneity in results by race, education and marital status, with results being statistically significant for white, married and college-educated fathers. Additionally, we find some evidence that an increase in unemployment rates is also associated with an increase in primary childcare for fathers in families with small children, as well as some declines in total time that fathers spend with older children. In contrast to this result, we find that mothers’ total time with children, as well as primary childcare time, is invariant to macroeconomic fluctuations in the labor market, however, as the unemployment rate goes up we do observe small declines in enriching time that white mothers in families with small children devote to enriching activities.

Keywords Time allocation · parental time-use · unemployment · childcare

JEL Classification J22 · D13 · J13

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1 Introduction

Social scientists have long been interested in the ramifications of macroeconomic fluctuations on various aspects of life such as health outcomes, health-promoting behaviors, divorce rates, infant birth weight, the emotional well-being of the unemployed, etc. (Krueger and Mueller 2012; Ruhm 1997; Dehejia and Lleras-Muney 2004; Hellerstein and Morrill 2013). Starting in December 2007, the United States experienced the so-called Great Recession, the deepest economic downturn since the Great Depression. The Great Recession, which corresponded with high levels of unemployment, has spurred researchers' interest in studying patterns of time allocation within households. While there is no doubt as to the deleterious effects of macroeconomic declines, the question of whether periods of "labor market slack" have any potential benefits deserves examination. In this study, we analyze the effects that macroeconomic fluctuations have upon the time that mothers and fathers devote to their children.

During periods of economic downturn, families may alter their allocation of time to different activities, as well as toward their children. Time that parents spend with their children is not only important for fostering child–parent relationships, but is also considered an important input toward the development of a child's cognitive and non-cognitive skills. The general consensus is that maternal time is paramount for many aspects of a child's development. Researchers note that a father's time is also extremely important in shaping children's social and emotional development (Casper and O'Connell 1998). The economics literature generally finds that the time parents spend with their children, especially in teaching-learning activities, is conducive to a reduction in behavioral problems and an improvement in children's math and verbal scores (Fiorini and Keane 2014; Sonchak 2014; Bernal et al. 2011; Milkie et al. 2015; Hsin and Felfe 2014; Parke 1990). Quite intuitively, any change in parental time allocation that is a result of changes in macroeconomic conditions may subsequently play a role in affecting children's behaviors, educational outcomes and overall interaction between parents and children. During periods of high unemployment, individuals may experience a time windfall, either as a result of changes in their employment status or by working fewer hours. An increase in unemployment rates during recessions may also induce some workers to exit the labor force, which would impact average time use (Edwards 2011). It is unclear a priori how unemployment may affect the allocation of time to children. As documented in the literature, extra time that is freed up due to a slack in the labor market is allocated to leisure and personal activities, rather than to household production (Burda and Hamermesh 2010). However, during periods of economic downturns, parents may decide to spend more time with children, as the opportunity cost of time decreases.

In this paper, using the 2003–2013 American Time Use (ATUS) data, we examine the impact of macroeconomic fluctuations on parental time allocation to children. The ATUS, which is administered by the Bureau of Labor Statistics (BLS), began in 2003, and has since accumulated information on the manner in which over 148,000 individuals choose to spend their time. To approximate for macroeconomic conditions, we rely on state-level unemployment rates. The time frame under consideration is particularly suitable, as it encompasses substantial fluctuations in macroeconomic conditions over the last decade. First, we observe a moderate economic expansion

from 2003 until the end of 2007, with unemployment bottoming out at 4.4%. Second, the ATUS timeframe encompasses the Great Recession, which culminated in the unemployment rate spiking to 10% in late 2009. Finally, our time frame concludes with the ongoing recovery from the Great Recession, where, unemployment had fallen to below 7% by the end of 2013. We build on the existing time-use literature and consider how overall changes in the economy impact time allocation of mothers and fathers to enriching activities, primary childcare and total time with children. We also explore the heterogeneity of the effects across different demographic groups of parents, as well as by the age of the youngest child.

Accounting for state and year fixed effects, as well as a variety of demographic characteristics, we find that increases in state-level unemployment rates are associated with an increase in time that fathers in families with small children (ages 0–4) spend in enriching activities. More specifically, a one percentage point increase in the unemployment rate increases time that fathers spend with children by 4.07% in the overall sample, with increases being larger among white, married and college-educated fathers. We also find that a higher unemployment rate is associated with an increase in primary childcare time among married fathers in families with small children. However, as unemployment rates increase, fathers decrease total time allocated to older children. More specifically, we find decreases in total time with children among non-college-educated fathers in families with children ages 5–9, and decreases in total time among college-educated fathers in families with children ages 10–17. In the subsample of mothers, we find that total time with children, and time in primary childcare, remains largely unresponsive to fluctuations in macroeconomic conditions, consistent with the fact that mothers typically try to protect their childcare time (Bianchi 2000). However, we do observe small declines in enriching time for mothers in families with small children. This decline, however, is countered by an increase in enriching time among fathers within the same demographic group, potentially suggesting that fathers are taking over some of the responsibilities that were performed by mothers.

2 Literature review

Before analyzing how changes in business cycles impact time allocation to children, it is instructive to examine the time allocation patterns induced by a decrease in market work, either due to individual unemployment status, or to broader macroeconomic fluctuations. While the literature has not systematically considered how the employed and unemployed differ in their time allocation, there is an emerging body of literature on time use, which has been motivated by the recent recession in the US.

Burda and Hamermesh (2010) is the first study that investigates how changes in unemployment, both long-term and cyclical, impact the allocation of time to household production, market work and other uses of time. Using the ATUS data for 2003–2006, they show that almost none of the lower amount of market work in the areas of long-term high unemployment is offset by additional household production. However, in the areas where unemployment has risen cyclically, reduced market work is compensated for almost entirely by the additional time spent in household production. Motivated by the Great Recession, Aguiar et al. (2013) use ATUS to

explore how forgone market work hours are allocated to other activities over the course of business cycles. They find that about 30% of forgone market time is allocated to home production, while leisure absorbs 50% of forgone market work, with sleeping and watching TV accounting for most of this increase.

Most recently, Morrill and Pabilonia (2015) examine how a family's time together responds to changes in macroeconomic conditions among married couples. Using 2003–2010 ATUS data, they find a significant U-shaped relationship between the amount of time that families spend together and the state-level unemployment rate, with the lowest amount of time spent together being when unemployment rates are around 9%. However, as unemployment rises above 9%, the amount of time that families spend together increases. Gimenez-Nadal and Molina (2014) utilize data from the Spanish Time Use Survey for 2002–2003 and 2009–2010 in order to examine how the magnitude of regional unemployment impacts the manner in which the unemployed allocate their time. Their results indicate that larger regional unemployment was correlated with men and women allocating more time to studies and household work respectively. In addition, higher regional unemployment did not affect the time allocated toward searching for employment, and both genders also allocated less time to personal care.

When it comes to parental time allocation with respect to childcare activities, it is well documented that mothers spend more time with their children compared to fathers (Guryan et al. 2008; Bianchi 2000). The literature, however, provides evidence of an increasing involvement of fathers in childcare activities, thus narrowing the gender roles gap. The trends of parents spending more time with children in the United States, as well as in European countries, have been increasing over recent decades. For example, the US data from 1965 to 1998 show that the time spent on childcare increased from 0.4 to 1 h per day for married fathers, and from 1.7 to 1.8 for married mothers (Bianchi 2000). Similar results are reported by Aguiar and Hurst (2007): The average time spent on childcare activities has increased by about 2.0 h per week from 1965 to 2003. The increase in parental employment over time suggests that fewer children are brought up in households with a non-working parent. The analysis of US time data indicates that unemployed mothers spend somewhat more time with their children in comparison to working mothers. However, the increase in market work of women over recent decades has been at the expense of a decrease in housework, and not childcare. Mothers seem to “protect” their childcare time by sacrificing sleep and leisure activities (Bianchi 2000; Fox et al. 2013).

Studies that focus on changes in patterns of parental time with children caused by declines in economic activities, especially in the context of the Great Recession, are scarce at present, but there is some evidence indicating a shift in “gender roles” during recessionary periods. Berik and Kongar (2013) document a decline in the childcare time gap between mothers and fathers, with fathers devoting more time to childcare activities. Similarly, in the context of the Great Recession, Gorsuch (2016) documents that a larger decline in employment for men relative to women was associated with the increase in childcare activities performed by men. Wulff Pabilonia (2015), examining time use among teenagers during the time period encompassing the Great Recession, finds that teenage boys spend significantly less time with their mothers as unemployment goes up, with no changes in time spent with fathers.

Because parental time with children is one of the parental “investments,” and is considered an important determinant of a child’s outcomes, it is necessary to understand how changes in macroeconomic conditions impact time allocation patterns. Using 2003–2013 ATUS data, and focusing on various demographic groups of fathers and mothers, we examine how the allocation of time in families with children of various ages responds to changes in macroeconomic fluctuations.

3 Data

In this study, we rely on 2003–2013 data from the American Time Use Survey (ATUS), a nationally representative survey administered by the BLS to report how, where and with whom Americans allocate their time, thus providing data on a wide variety of daily activities. The respondents of ATUS are sampled from the group of households in the outgoing rotation of the Current Population Survey (CPS). The initial data collection began in 2003, with a sample of nearly 20,720 people. However, in later years, the sample has been reduced to about 13,000 respondents per year. ATUS samples one respondent, aged 15 years or older per household. Each respondent reports detailed activities from the day prior to the day of the interview in time intervals based on a 24-hour diary (from 4 am to 4 am, ending on the interview day), which are then classified into ATUS-defined time use categories. For each activity, a respondent also indicates who was present with him/her during that specific activity, except for actions that are generally done alone, such as sleeping or grooming. In addition to individual level respondent time use and individual characteristics, ATUS also provides information on the household members of the respondent.

Since the ATUS data can be linked to its CPS component, and hence contains geographical identifiers, we are able to examine how parental time allocation to children is affected by differences in unemployment rates across states. We use the BLS monthly state unemployment rates data, and link them to the ATUS respondents based on survey timing and state of residence. The time period under investigation was marked by considerable variation in unemployment rates across the US. For example, the average unemployment rate for the timeframe of interest was approximately 6%, with a minimum of 2.5% in Hawaii in 2006 and maximum of 13.8% in Nevada in 2010.

We focus on ATUS adult respondents between the ages of 18 and 65 who resided in a household with at least one own child at the time of the interview. The pooled 2003–2013 data include 54,704 observations: 22,223 fathers and 32,481 mothers. The descriptive statistics for individual and household characteristics of the sample by gender are presented in Table 1. Women in the sample are, on average, 36.7 years old and slightly younger as compared to men, who average 39.6 years. Seventy-two percent of the women are married, as compared to 88% of the men. There is little discernible difference between the educational level of males and females in the sample.

In the context of time allocation, we first examine the total time that parents spend with their children, incorporating all activities for which a child was reported present. While certainly more time with children is better than less time, the total time

Table 1 Sample summary statistics (ATUS 2003–2013)

Variables	Fathers	Mothers
Age of parent	39.58 (8.66)	36.73 (8.52)
Parent White	0.84 (0.36)	0.80 (0.40)
Parent Black	0.09 (0.28)	0.13 (0.34)
Parent Hispanic	0.20 (0.40)	0.20 (0.40)
Race other	0.07 (0.25)	0.07 (0.25)
Education: <HS	0.13 (0.34)	0.12 (0.33)
Education: High school	0.30 (0.46)	0.28 (0.45)
Education: Some college	0.24 (0.42)	0.28 (0.45)
Education: College	0.33 (0.47)	0.32 (0.47)
Age of youngest child	6.75 (5.28)	6.68 (5.26)
Number of children	1.96 (0.99)	1.95 (1.02)
Parent married	0.88 (0.32)	0.72 (0.45)
Sample size	22,223	32,481

Notes: ATUS weights are used. Standard errors are in parenthesis

measure does not allow us to assess its quality. For instance, some activities contributing to the total time might be thought of as passive time together (e.g. a child is being present in a kitchen while the mother is cooking). To shed more light on the quality of time spent with children, we also focus on enriching activities where parents are actively engaging with children in various educational and leisure activities (such as visiting museums, attending sporting events, working on homework assignments, etc.). We follow Stewart (2010) to define enriching activities.¹ Finally, we are focusing on primary childcare time,² since it includes the most commonly examined set of activities in the time-use literature. Since allocation of

¹ See Stewart (2010) for more details on enriching activities.

² We utilize primary childcare activities as defined by ATUS (including activities related to the caring of and looking after children, activities related to children's education and activities related to children's health). Some of the activities included in enriching time are also categorized by ATUS as primary childcare, hence the enriching time and primary childcare time are not mutually exclusive.

time and type of activities depend on a child's age, we explore the heterogeneity in time with children by age of the youngest child: children ages 0–4, children ages 5–9 and children ages 10–17.

Table 2 presents the average minutes per day spent on different time categories for various demographic groups of mothers and fathers by age of the youngest child. There is a substantial disparity in time allocation patterns between spouses. For instance, mothers spend more total time, enriching time and time in primary childcare as compared to fathers, with gender gaps being the largest for primary childcare. As expected, as the children grow older both parents decrease the amount of time devoted to them. On average, black parents spend less time with children across all age groups and types of time in comparison to their white counterparts. Similarly, single mothers and fathers allocate less time to children compared to married parents. As corroborated by previous research, parents with a college education spend more time with children in primary childcare and enriching activities in comparison to parents with less education. However, if we look at the total time with children for parents with college and without college education, the average total time is very similar for some age groups of children, and in some instances parents with no college may be spending more total time with children. This may be due to the fact that non-college-educated parents are less likely to be working, hence they may be present around a child more often, however, these parents still spend fewer minutes in engaging activities in comparison to college-educated parents.

4 Estimation

Since the time that parents spend on certain activities with their children is recorded as zero for a substantial amount of the survey respondents, some researchers opt to model the time spent on each activity as a Tobit. A study by Stewart (2013) indicates that the reason for zeros in time diaries is “due to the mismatch between the length of the reference period and the time period over which the decisions are made.” Additionally, the study favors Ordinary Least Squares (OLS) over Tobit, given the robustness of OLS to alternative assumptions about the data generating process. Foster and Kalenkoski (2013), focusing on primary childcare time from ATUS, find that OLS and Tobit estimates are similar, with OLS estimates being less sensitive to the time diary survey window. Hence, to estimate the effect of unemployment rates on time allocation to children, we rely on OLS.³ The regression takes the following form:

$$Y_{ist} = \beta_1 X_{ist} + \beta_2 UR_{st} + S_s + T_t + D_t + M_t + \varepsilon_{ist} \quad (1)$$

where Y_{ist} is the amount of time with children for a parent i , in a state s , at time period t ; X_{ist} is a vector of personal family and individual parent characteristics, including a parent's educational attainment: those who do not have a high school diploma, high school graduates, those with some college and, finally, parents with a college degree and above; age, race, ethnicity, the number of children in the household, the age of the youngest child, and marriage status; UR_{st} is the average state-level unemployment rate calculated over the last 12 months, S_s are state fixed effects, T_t are year

³ In the paper's Appendix, we recalculate some of our results using Tobit, with results being very similar to OLS.

Table 2 Average time with children for fathers and mothers (in minutes per day)

Subsamples	Fathers			Mothers		
	Total time	Enriching time	Primary childcare	Total time	Enriching time	Primary childcare
All children						
All	261.35	54.07	53.81	378.58	69.84	101.64
White	263.90	55.44	54.54	386.25	73.25	104.69
Black	229.68	38.81	43.03	322.46	49.04	78.86
No college	261.00	51.09	48.46	379.37	66.25	93.56
College	262.05	59.98	64.43	376.87	77.52	118.93
Married	261.77	54.22	54.03	390.12	73.16	106.62
Single	258.22	52.93	52.19	348.63	61.23	88.70
Age 0–4						
All	312.58	71.28	80.83	481.50	94.72	155.02
White	314.63	73.57	82.30	488.98	99.56	159.50
Black	288.84	49.26	64.36	420.46	65.05	119.65
No college	314.67	66.85	72.97	485.42	89.23	142.13
College	308.49	79.95	96.20	473.14	106.44	182.51
Married	311.70	71.52	81.72	494.43	99.06	163.62
Single	318.67	69.63	74.61	448.78	83.75	133.25
Age 5–9						
All	261.75	52.21	49.80	362.70	64.19	87.11
White	266.28	53.46	50.22	374.65	67.51	90.61
Black	220.78	35.95	41.25	296.42	42.60	66.71
No college	257.56	49.83	45.78	363.24	62.10	82.42
College	270.24	57.04	57.93	361.55	68.60	97.03
Married	264.83	52.81	50.10	378.56	67.80	91.44
Single	237.04	47.41	47.35	321.46	54.78	75.87
Age 10–17						
All	185.85	31.20	20.50	250.44	40.31	40.24
White	188.52	31.70	20.65	255.97	42.11	41.52
Black	161.79	29.37	19.12	213.62	33.07	34.65
No college	191.77	30.97	17.73	248.02	38.31	36.40
College	192.09	34.95	26.03	255.70	44.67	48.61
Married	192.70	32.25	20.18	258.79	42.52	41.94
Single	185.62	32.63	22.97	228.05	34.38	35.70

Notes: Data come from ATUS 2003–2013. ATUS weights are used

fixed effects, D_t are day of the week fixed effects, M_t are month fixed effects, and ε_{ist} is an error term that is assumed to be normally distributed. State fixed effects capture the fixed differences in time use across the states, while day and month fixed effects control for the difference in time use across the days of the week and across months. Finally, year fixed effects are intended to capture long-run trends in time use. We estimate our regressions for the entire samples of mothers and fathers, and separately

by race, education (college and no college education), and marital status, by the age of the youngest child. In our alternative specifications (not included in the text), we focus on the time period prior to the Great Recession (2003–2007) to ensure that our results are not driven solely by large changes in unemployment during the recession. The results are qualitatively similar to the alternative time periods.

We focus on overall unemployment rates for several reasons. First, unemployment rates that are specific to each demographic group of parents may be subject to a large degree of measurement error. Second, similar to Wulff Pabilonia (2015), we are interested in how overall shocks to the economy effect time allocation, as opposed to changes in labor demand for a specific demographic group of parents. Unemployment rates are typically used as proxies for macroeconomic conditions. Though an imperfect measure of macroeconomic fluctuations, the use of unemployment rates allows one to examine how parents respond to macroeconomic declines. Finally, we do not focus on the impact of individual changes in parental employment status on time allocation for two reasons. First, as previously indicated, overall changes in the economy may impact time with children regardless of changes in the employment status of a parent. Second, employment status is not random, and work time and time with children may be simultaneously determined. Hence, individual employment status is endogenous (Morrill and Pabilonia 2015). Finally, as an alternative measure of macroeconomic conditions and as sensitivity check, we use state-level employment-to-population (EP) ratios, as some researchers believe that EP ratios may provide a more accurate measure of local labor conditions (Ruhm 1997; Lindo 2015). The monthly state-level data on EP ratios were obtained from BLS.

5 Results

Table 3 presents the results of the effect of the state-level unemployment rate on total and enriching time that fathers spend with children. To be brief, we only present coefficients on the unemployment rate by demographic groups of fathers and by the age of the youngest child (Panels A–D).⁴ In all of the regressions, we apply ATUS final weights, and cluster standard errors on the state level.

Focusing on the combined age groups first, our results in Table 3 indicate no statistically significant effect of the changes in the unemployment rate on the total time that fathers spend with their children. However, an increase in the unemployment rate positively impacts enriching time allocation. More specifically, a one percentage point increase in the unemployment rate translates into an additional 1.96 min per day with a child, or approximately 14 min per week. We observe substantial heterogeneity in fathers' time allocation patterns across demographic groups. For instance, changes in the unemployment rate do not affect time allocation of black males, but in a subsample of white males a one percentage point increase in the unemployment rate is associated with an increase in enriching time by 2.05 min. With regard to education, males with no college education are positively affected by an increase in the unemployment rate, but the point estimate for college-educated

⁴ Each cell represents a point estimate on the unemployment rate from our empirical specification for the dependent variables specified on the lefthand side of the table.

Table 3 Impact of the unemployment rate on the time allocation of fathers (in minutes per day)

Dependant var.	All	White	Black	No college	College	Married	Single
Panel A: All children							
Total time	1.119 (2.300)	1.977 (2.307)	-5.406 (8.220)	1.743 (3.220)	-0.498 (2.969)	1.825 (2.491)	-7.075 (5.628)
Enriching time	1.956*** (0.682)	2.049*** (0.676)	2.688 (2.929)	2.061** (0.990)	1.898 (1.244)	2.511*** (0.718)	-2.575 (2.639)
Panel B: Age 0-4							
Total time	4.449 (4.693)	6.176 (5.188)	-17.04 (13.26)	3.288 (6.571)	6.653* (3.965)	7.374 (4.612)	-14.25 (10.31)
Enriching time	2.897** (1.377)	3.344** (1.424)	1.381 (4.902)	2.874 (2.138)	3.917* (1.971)	4.321*** (1.123)	-7.404 (5.352)
Panel C: Age 5-9							
Total time	- 6.696* (3.471)	-5.786 (3.566)	-20.79 (14.11)	- 7.106* (4.013)	-6.171 (6.238)	-5.734 (3.602)	-17.84 (11.28)
Enriching care	1.295 (1.316)	1.456 (1.167)	5.040 (5.910)	0.734 (1.759)	2.562 (2.448)	1.832 (1.552)	-2.643 (3.850)
Panel D: Age 10-17							
Total time	1.718 (3.015)	0.788 (3.716)	14.61 (12.82)	6.461 (3.944)	- 8.714* (5.106)	0.0751 (3.398)	10.39 (9.704)
Enriching time	0.863 (1.029)	0.589 (1.126)	3.113 (2.297)	2.170 (1.363)	-1.958 (1.300)	0.525 (1.161)	2.259 (2.840)

Notes: Data come from ATUS 2003-2013. Each cell is a coefficient on the state unemployment rate from our empirical specification. All regressions include a respondent's age, race (black, white, race other), ethnicity, respondent's education (less than high school, high school education, some college and college), marriage status, number of children in the family, age of the youngest child, state, year, day and month fixed effects. Standard errors in parentheses are clustered by state. ATUS final weights are applied. Asterisks denote statistical significance at the 1% (***), 5% (**) and 10% (*) levels

fathers is not statistically significant. Additionally, a higher unemployment rate positively affects enriching time for married men: for a one percentage point increase in the unemployment rate, married fathers spend on average 2.51 min per day more in enriching activities. However, we do not find statistically significant effects among single men.

In Table 3, panels B–D, we further investigate the effect of unemployment rates on patterns of time allocation for fathers. For ATUS respondents with preschool children 0–4 years old, the results indicate no changes in total time with children as a result of a higher unemployment rate, except for fathers with college education, who increase total time by about 6.65 min per one percentage point increase in unemployment. However, when it comes to enriching time, we find that a one percentage point increase in the unemployment rate is associated with 2.90 more minutes per day spent in enriching activities for the overall sample of fathers, 3.34 min for white fathers, 3.92 min for college-educated fathers, and 4.32 min for married fathers. The point estimates within the subsamples of black fathers, those with no college education, and unmarried fathers are not statistically significant. Moving to Panel C (children ages 5–9), we find that an increase in the unemployment rate decreases the total time that fathers spend with children, however, this result appears to be primarily driven by fathers without a college education. None of the coefficients on enriching time are significant for this group of children. Finally, in families with older children (ages 10–17), in Panel D, we find that fathers with a college education spend 8.71 min less in total time with children per one percentage point increase in the unemployment rate. We do not observe any impact of unemployment rates on enriching time for older children.

When analyzing the effect of unemployment rates on time allocation for mothers, in the overall sample, in Table 4 (Panel A), we find that white mothers decrease enriching time with children as the unemployment rate increases. More specifically, for every percentage point increase in the unemployment rate, white mothers decrease the time that they allocate toward enriching activities with their children by almost 1.97 min among all children, 2.07 min for children ages 0–4, and 1.77 min for children 10–17 years of age. We also find a decrease in enriching time for less educated mothers (child's ages 5–9) and single mothers (child's ages 10–17). Interestingly, the decline in enriching time for white mothers in families with small children mirrors the increase in the enriching time for white fathers for the same age groups of children. This may possibly be attributable to the added-worker effect, as mothers are incentivized to seek employment so as to compensate for a loss in family income when the main bread winner loses his or her job. To add further credence to this hypothesis, we focus on the enriching time activities that fathers with small children (ages 0–4) spend without a mother being present in the subsample of married parents. Our results closely resemble the results in Table 3. We find that fathers spend more time alone with their children being involved in enriching activities. We find that married fathers spend 1.62 (se 0.792) minutes, married white fathers 2.00 (se 0.761) minutes, and married college fathers 2.29 (se 1.011) minutes more without a mother being present⁵ per one percentage point increase in the unemployment rate.

⁵ Full set of results is available from authors.

Table 4 Impact of the unemployment rate on the time allocation of mothers (in minutes per day)

Dependant var.	All	White	Black	No college	College	Married	Single
Panel A: All children							
Total time	-1.179 (2.063)	-1.957 (1.932)	-3.729 (5.925)	-1.759 (2.363)	-0.121 (2.539)	-0.882 (2.218)	-1.409 (2.775)
Enriching time	-0.768 (0.735)	-1.967** (0.840)	1.058 (1.670)	-1.222 (0.979)	0.507 (1.074)	-1.085 (0.984)	0.0758 (1.249)
Panel B: Age 0–4							
Total time	-0.646 (4.059)	-1.483 (3.064)	4.887 (9.736)	-2.404 (6.099)	4.134 (3.880)	-3.181 (3.652)	6.177 (5.927)
Enriching time	-0.245 (1.168)	-2.074** (1.027)	4.958 (3.162)	-0.459 (1.710)	0.766 (1.819)	-1.833 (1.226)	3.241 (2.147)
Panel C: Age 5–9							
Total time	-0.635 (2.234)	-1.010 (2.922)	-9.429 (11.45)	-1.241 (3.203)	-0.615 (3.823)	2.780 (3.890)	-8.860 (7.771)
Enriching care	-1.118 (1.312)	-1.999 (2.007)	-1.608 (2.443)	-2.629* (1.526)	1.244 (1.807)	-0.176 (1.891)	-3.154 (1.914)
Panel D: Age 10–17							
Total time	-2.194 (2.114)	-2.312 (2.814)	-9.418 (7.243)	-0.210 (3.000)	-6.000 (5.057)	-1.018 (2.894)	-4.851 (4.174)
Enriching time	-1.439 (0.919)	-1.768* (1.026)	-1.867 (1.933)	-1.576 (1.055)	-0.648 (1.769)	-1.225 (1.181)	-2.154* (1.159)

Notes: Data come from ATUS 2003–2013. Each cell is a coefficient on the state unemployment rate from our empirical specification. All regressions include a respondent's age, race (black, white, race other), ethnicity, respondent's education (less than high school, high school education, some college and college), marriage status, number of children in the family, age of the youngest child, state, year, day and month fixed effects. Standard errors in parentheses are clustered by state. ATUS final weights are applied. Asterisks denote statistical significance at the 5% (***) and 10% (*) levels

Table 5 provides the results of the effect of unemployment rates on primary childcare for fathers and mothers. The results indicate that in the overall sample, fathers increase the time allocated to childcare by 1.77 min per day as the unemployment rate increases by one percentage point. When we examine the results by demographic groups, the only statistically significant point estimate is for married fathers (2.02 min per one percentage point increase in unemployment). When we look at the results by age of the youngest child, we find that the increase of 3.95 min in childcare time for fathers is only present in the subsample of married fathers in families with small children. We do not find any changes in primary childcare time for mothers.

Finally, we examine whether our main conclusions hold when we use an alternative measure of macroeconomic conditions: EP ratios. Estimates in Table 6 indicate the effect of EP ratios, averaged over the last 12 months, on total and enriching time for fathers. The results corroborate our previous findings, as our point estimates closely resemble our results obtained using the unemployment rates reported in Table 3. More specifically, an increase in EP ratio reduces the amount of enriching time for fathers in families with small children. However, unlike with the unemployment rates, none of the results were statistically significant for mothers.⁶

6 Discussion and conclusions

In this paper, we estimate the effects of macroeconomic fluctuations, as approximated by state-level unemployment rates on the amount of time that parents spend with children, using data from 2003–2013 ATUS. We find that an increase in the unemployment rate increases the time that fathers spend in enriching activities with their children. However, this result only holds for fathers in families with small children, ages 0–4. More specifically, a one percentage point increase in the unemployment rate increases time allocation to enriching activities by 2.90 min in the overall sample, 3.34 min among white fathers, 3.92 min for college-educated fathers, and 4.32 min among married fathers (which is equivalent to 4.07, 4.54, 4.90 and 6.04% increase for the respective subsamples of fathers when evaluated at the mean) per one percentage point increase in the unemployment rate. To put this result into the context of the most recent recession in the US, our calculations suggest an average increase in father–child time in enriching activities of approximately 101.50 min per week for fathers in families with small children, given that over the recent recessionary period national unemployment rates have increased by approximately 5% points. This increase is even larger in the subsamples of white and married fathers. We also observe some declines in total time with children among fathers with older children. While this may lead to less parental supervision, total time encompasses passive and active engagement, and we do not find the declines in activities that comprise direct engagement with a child. Wulff Pabilonia (2015), however, finds declines in time that teen boys spend with their mothers, while Morrill and Pabilonia (2015) point out that in their sensitivity checks, they do not find changes in parental time with an increase in unemployment. Hence, the results may differ depending on a

⁶ We do not include these results, however, we can provide them upon request.

Table 5 Impact of the unemployment rate on primary childcare time (in minutes per day)

Dependant var.	All	White	Black	No college	College	Married	Single
Fathers							
Childcare (All ages)	1.773* (1.062)	1.308 (0.925)	1.588 (3.369)	1.718 (1.426)	2.063 (1.308)	2.020* (1.159)	-0.592 (2.521)
Childcare (Age 0–4)	3.117 (1.999)	2.633 (1.915)	1.983 (7.584)	3.339 (2.514)	4.214 (2.563)	3.947* (2.045)	-3.356 (5.202)
Childcare (Age 5–9)	0.215 (1.652)	-0.0624 (1.758)	0.761 (3.732)	0.0869 (2.437)	0.302 (2.165)	0.270 (1.904)	0.648 (3.130)
Childcare (Age 10–17)	0.465 (0.868)	0.0385 (0.887)	4.852 (3.668)	0.679 (1.046)	-0.596 (1.495)	0.0615 (0.915)	2.298 (3.262)
Mothers							
Childcare (All ages)	0.628 (0.901)	0.662 (0.700)	2.429 (2.055)	0.622 (0.995)	0.579 (1.169)	0.226 (0.918)	1.632 (2.073)
Childcare (Age 0–4)	1.025 (1.652)	1.417 (1.165)	2.641 (5.352)	1.058 (2.260)	1.615 (2.343)	-0.715 (1.732)	5.689 (4.943)
Childcare (Age 5–9)	0.481 (1.221)	0.690 (1.691)	-2.547 (3.775)	0.721 (1.414)	0.339 (2.352)	1.445 (1.772)	-1.665 (1.488)
Childcare (Age 10–17)	-0.396 (0.954)	-0.853 (1.062)	3.822 (2.836)	-0.575 (0.888)	0.271 (2.162)	-0.297 (1.053)	-1.275 (1.576)

Notes: Data come from ATUS 2003–2013. Each cell is a coefficient on the state unemployment rate from our empirical specification. All regressions include a respondent's age, race (black, white, race other), ethnicity, respondent's education (less than high school, high school education, some college and college), marriage status, number of children in the family, age of the youngest child, state, year, day and month fixed effects. Standard errors in parentheses are clustered by state. ATUS final weights are applied. Asterisk denotes statistical significance at the 10% (*) level

child's gender and age group. Finally, we find that fathers in families with small children (and more specifically married fathers) allocate more time to primary childcare activities as the unemployment rate increases, which is consistent with other studies that focus on primary childcare allocation before and after the Great Recession (Berik and Kongar 2013; Gorsuch 2016).

Time allocation of mothers, and more specifically time in primary childcare, as well as total time, are invariant to changes in the unemployment rate. This finding may foster additional credence in Bianchi's (2000) aforementioned notion that women take necessary measures to "protect" their time with children, thereby inhibiting substantial changes in the time that mothers allocate toward primary childcare. We do find, however, that white mothers in families with small children spend on average 2.07 min less (2.8% when evaluated at the mean) in enriching activities. This decline, however, is coupled with an increase in enriching time for fathers in the same demographic group, which may point to an added-worker effect, with fathers filling in while mothers choose to work. We further find that married fathers, including white and college-educated fathers in this subsample, spend more enriching time with children when the mother is not present. This is consistent with Starr (2014), who finds evidence of the added-worker effect for women with children during the Great Recession.

Table 6 Impact of the EP ratios on the time allocation of fathers (in minutes per day)

Dependant Var.	All	White	Black	No college	College	Married	Single
Panel A: All children							
Total time	-0.279 (1.942)	0.238 (2.025)	-3.172 (6.001)	0.121 (2.504)	-0.822 (2.375)	-0.767 (2.058)	6.085 (5.792)
Enriching time	-1.540** (0.589)	-1.827*** (0.576)	-2.148 (2.256)	-1.542* (0.801)	-1.548 (1.061)	-2.059*** (0.714)	2.959 (2.369)
Panel B: Age 0-4							
Total time	-2.986 (3.426)	-2.092 (3.961)	-6.354 (8.397)	-1.748 (4.864)	-5.245 (3.380)	-4.716 (3.225)	12.74 (11.37)
Enriching time	-2.641** (1.026)	-3.216*** (1.156)	-4.259 (3.901)	-2.745 (1.707)	-3.175* (1.785)	-3.746*** (0.927)	5.050 (4.975)
Panel C: Age 5-9							
Total time	5.773 (3.653)	7.024** (3.370)	2.548 (12.43)	5.168 (4.260)	7.561 (4.815)	5.525 (3.933)	13.87 (9.598)
Enriching care	0.945 (1.368)	1.207 (1.144)	-1.114 (4.318)	0.462 (1.613)	2.375 (2.394)	0.456 (1.476)	6.509 (4.039)
Panel D: Age 10-17							
Total time	-0.518 (2.386)	-0.859 (2.557)	5.402 (11.28)	-1.057 (2.797)	0.115 (4.910)	-0.0180 (2.472)	0.966 (10.02)
Enriching time	-1.579 (0.946)	-1.904* (0.981)	1.694 (3.195)	-1.782 (1.292)	-1.407 (1.478)	-1.538 (1.029)	0.884 (2.489)

Notes: Data come from ATUS 2003-2013. Each cell is a coefficient on employment-to-population ratio instead of the unemployment rate from our empirical specification. All regressions include a respondent's age, race (black, white, race other), ethnicity, respondent's education (less than high school, high school education, some college and college), marriage status, number of children in the family, age of the youngest child, state, year, day and month fixed effects. Standard errors in parentheses are clustered by state. ATUS final weights are applied. Asterisks denote statistical significance at the 1% (***) 5% (**) and 10% (*) levels

Macroeconomic declines generally have negative effects on parents and their children, disproportionately impacting the least advantaged demographic groups. For instance, a systematic literature review by Rajmil et al. (2014) indicates that the 2008 economic crisis has harmed children's health. However, we find that fathers in families with small children spend more time in enriching activities with children, and this additional time may mitigate some of the negative effects of economic downturns. As noted by Parke (1990), fathers interact differently with children in comparison to mothers, and this unique type of interaction plays an important role in shaping children's emotional development. While we observe a decline in enriching activities with children among white mothers, this decline is more than compensated by the increase in enriching time with fathers. Reallocation of time during macroeconomic declines also suggests a shift in gender roles, where fathers appear to take over functions that have been commonly performed by mothers. Unfortunately, it is difficult to assess the potential benefit of the increase of enriching father-child time due to the absence of measurable child outcomes data in the ATUS. However, given the importance of parental time investment, and especially direct engagement including learning and teaching routines, it is very likely that these time increases can be conducive to fostering better relationships between children and their parents.

Conflict of interest The authors declare that they have no conflict of interests.

7 Appendix

Table 7 Sample sizes (ATUS 2003–2013)

Subsamples	Obs. for fathers	Obs. for mothers
All children		
All	22,223	32,481
White	19,256	26,626
Black	1466	3730
No college	13,363	20,775
College	8860	11,706
Married	19,465	22,383
Single	2758	10,098
Age 0–4		
All	9348	13,327
White	8081	10,841
Black	549	1511
No college	5454	8327
College	3894	5000
Married	8383	9683
Single	965	3644
Age 5–9		
All	6058	9166
White	5240	7560
Black	432	1057
No college	3669	5880
College	2389	3286
Married	5290	6147
Single	768	3019
Age 10–17		
All	6817	9988
White	5935	8225
Black	485	1162
No college	4240	6568
College	2577	3420
Married	5792	6553
Single	1025	3435

Notes: Data come from ATUS 2003–2013

Table 8 Impact of the unemployment rate on time allocation of fathers (Tobit, minutes per day)

Dependant var.	All	White	Black	No college	College	Married	Single
Panel A: All children							
Total time	0.962 (2.356)	1.512 (2.404)	-0.744 (7.982)	1.426 (3.243)	-0.246 (2.933)	1.455 (2.590)	-4.809 (5.542)
Enriching time	1.796*** (0.525)	1.700*** (0.589)	3.339 (2.635)	1.756** (0.798)	1.991* (1.150)	2.313*** (0.607)	-1.730 (2.284)
Panel B: Age 0-4							
Total time	3.707 (4.631)	5.534 (5.076)	-16.867 (12.721)	2.293 (6.360)	6.599* (3.919)	6.456 (4.562)	-12.604 (10.023)
Enriching time	2.122* (1.214)	2.508* (1.226)	2.333 (4.100)	2.169 (1.774)	3.104* (1.692)	3.508*** (1.050)	-5.916 (4.542)
Panel C: Age 5-9							
Total time	- 6.034* (3.426)	-5.410 (3.550)	-17.342 (11.486)	- 6.327* (3.798)	-5.538 (6.116)	-5.205 (3.594)	-14.902 (10.033)
Enriching care	1.856* (1.084)	1.569 (1.110)	3.598 (3.480)	1.244 (1.620)	3.424* (1.938)	2.216* (1.195)	-1.002 (3.019)
Panel D: Age 10-17							
Total time	2.028 (2.797)	0.357 (3.360)	22.182* (12.077)	6.651* (3.900)	-7.303 (4.588)	0.238 (3.239)	12.375 (8.455)
Enriching time	1.105 (0.738)	0.853 (0.885)	3.959* (2.288)	1.935* (1.138)	-0.711 (1.298)	0.853 (0.885)	0.889 (1.872)

Notes: Data come from ATUS 2003-2013. Marginal effects from Tobit are calculated as unconditional marginal effects on the expected value of the dependent variable. All regressions include a respondent's age, race (black, white, race other), ethnicity, respondent's education (less than high school, high school education, some college and college), marriage status, number of children in the family, age of the youngest child, state, year, day and month fixed effects. Standard errors in parentheses are clustered by state. ATUS final weights are applied. Asterisks denote statistical significance at the 1% (***) and 5% (**) and 10% (*) levels

References

- Aguiar, M., & Hurst, E. (2007). Measuring trends in leisure: The allocation of time over five decades. *Quarterly Journal of Economics*, *122*(3), 969–1006.
- Aguiar, M., Hurst, E., & Karabarbounis, L. (2013). Time use during the great recession. *American Economic Review*, *103*(5), 1664–1696.
- Berik, G., & Kongar, E. (2013). Time allocation of married mothers and father in hard times. *Feminist Economics*, *19*(3), 208–237.
- Bernal, R., Pena, X., Fernandez, C. (2011). *The differential effects of quantity versus the quality of maternal time investments on child development*. Manuscript, Universidad de los Andes.
- Bianchi, S. (2000). Maternal employment and time with children: Dramatic change or surprising continuity? *Demography*, *37*(4), 401–414.
- Burda, M., & Hamermesh, D. (2010). Unemployment, market work and household production. *Economics Letters*, *107*(2), 131–133.
- Casper, L., & O'Connell, M. (1998). Work, income, the economy, and married fathers as child-care providers. *Demography*, *35*(2), 243–250.
- Dehejia, R., & Lleras-Muney, A. (2004). Booms, busts and babies' health. *The Quarterly Journal of Economics*, *119*(3), 1091–1130.
- Edwards, R. (2011). *American time use over the business cycle. Working paper prepared for the session 114, of the annual meeting of the Population Association of America*. April 1, Washington D.C.
- Fiorini, M., & Keane, M. (2014). How the allocation of children's time affects cognitive and non-cognitive development. *Journal of Labor Economics*, *32*(4), 787–836.
- Foster, G., & Kalenkoski, C. (2013). Tobit or OLS. An empirical evaluation under different diary window lengths. *Applied Economics*, *45*(20), 2994–3010.
- Fox, L., et al. (2013). Time for children: Trends in the employment patterns of parents, 1967–2009. *Demography*, *50*(1), 25–49.
- Gimenez-Nadal, J. I., & Molina, J. A. (2014). Regional unemployment, gender, and time allocation of the unemployed. *Review of Economics of the Household*, *12*(1), 105–127.
- Gorsuch, M. (2016). Decomposing the increase in men's time on childcare during the Great Recession. *Review of Economics of the Household*, *14*(1), 53–82.
- Guryan, J., Hurst, E., & Kearney, M. (2008). Parental education and parental time with children. *Journal of Economic Perspectives*, *22*(3), 23–46.
- Hellerstein, J., & Morrill, M. (2013). Booms, busts and divorce. *The B.E. Journal of Economics Analysis*, *11*(1). doi:10.2202/1935-1682.2914
- Hsin, A., & Felfe, C. (2014). When does time matter? Maternal employment, children's time with parents and child development. *Demography*, *51*(5), 1867–1894.
- Krueger, A. B., & Mueller, A. (2012). The lot of the unemployed: A time use perspective. *Journal of the European Economic Association*, *10*(4), 765–794.
- Lindo, J. (2015). Aggregation and the estimated effects of economic conditions on health. *Journal of Health Economics*, *40*, 83–96.
- Milkie, M., et al. (2015). Does the amount of time mothers spend with children or adolescents matter? *Journal of Marriage & Family*, *77*(2), 355–372.
- Morrill, M., & Pablonia, S. (2015). What effects do macroeconomic conditions have on families' time together? *Review of Economics of the Household*, *13*(4), 791–814.
- Parke, R. D. (1990). In search of fathers: A narrative of an empirical journey. In I. Sigel, G. Brody. Hillsdale (Ed.), *Methods of family research* 1, (153–188). NJ: Erlbaum.
- Rajmil, L., et al. (2014). Impact of the 2008 economic and financial crisis on child health: A systematic review. *International Journal of Environmental Research and Public Health*, *11*(6), 6528–6546.
- Ruhm, C. (1997). Are recessions good for your health? *The Quarterly Journal of Economics*, *115*(2), 617–650.
- Sonchak, L. (2014). Essays on the effects of early investments on children's outcomes. All Dissertations. 1384. http://tigerprints.clemson.edu/all_dissertations/1384.
- Starr, M. (2014). Gender, added-worker effects, and the 2007–2009 recession: Looking within the household. *Review of Economics of the Household*, *12*(2), 209–235.
- Stewart, J. (2010). The timing of maternal work and time with children. *Industrial and Labor Relations Review*, *64*(1), 181–200.

-
- Stewart, J. (2013). Tobit or not tobit? *Journal of Economics and Social Measurement*, 38(3), 263–290.
- Wulff Pabilonia, S. (2015). Teenagers' risky health behaviors and time use during The Great Recession. *Review of Economics of the Household*, doi:[10.1007/s11150-015-9297-6](https://doi.org/10.1007/s11150-015-9297-6).