

**A cross-country analysis of childcare time for married  
and single parents, 2000-2017**

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A senior project  
presented for the degree of  
Bachelor of Arts

Department of Economics  
Pomona College  
May 2019

## Abstract

This paper compares the time use of single and married parents in the United States and the United Kingdom. It uses a Juhn-Murphy-Pierce (1993) decomposition to explore the differences in childcare time between single, primary-earning, and secondary-earning parents across countries. The paper uses data from the American Time Use Survey, 2003-2017, and from the United Kingdom Time Use Survey, 2000-2001 and 2014-2015. Differences in childcare time between groups are found to be greater in the US than in the UK. Single mothers provide more childcare time than do primary-earning mothers but less than do secondary-earning mothers in both countries. Single fathers in the US provide more childcare time than do primary-earning fathers but less than do secondary-earning fathers, while single fathers in the UK provide less childcare time than either primary- or secondary-earning fathers. In most groups, parents provide more childcare time in later years than in earlier years. The quantity and price effects of the prediction of childcare time often work in opposite directions, and the magnitude of effects changes over time, suggesting changing constraints, abilities, and/or preferences of parents over the sample years in the provision of childcare.

## 1 Introduction & Literature Review

Single-parent households make up a large and growing number of families in the United States. In 2018, there were over 10.5 million single-parent households in the country, compared to just over 6 million in 1980. Up to 25% of children in the United States live with a single parent (Census Bureau 2019), and in the United Kingdom approximately 22% of households with children are single-parent households (Office for National Statistics). Most single parents are mothers. In the United States almost a quarter of single-parent households are headed by men (Census Bureau 2019), while in the United Kingdom approximately 7% of single parents are single fathers. Economists know too little about the ways in which single parents spend their time. This paper uses time diary data of over 50,000 parents to examine their childcare time.

Life in general is a product of some combination of intention and chance, and family structure is no exception. Some individuals in single-parent households chose deliberately to adopt or give birth to children without being in a partnered relationship, while others find themselves raising children alone. The reasons are myriad: divorce, bereavement, and incarceration are a few. No person lives a “typical life”; nonetheless, economic researchers can do more to understand American single parents and how they live their lives. Children represent large investments of time and energy, and understanding how American families are structured, and how individuals operate within those structures, will help us to better understand American life.

The seminal economic model of time use comes from Gary Becker’s *A Treatise on the Family* (1998). Becker’s model suggests that people derive utility from both goods and leisure. They must do some amount of household production, both to maintain an acceptable living environment and to produce utility from purchased goods (e.g. turning groceries into a home-cooked meal). People in single-adult households find the appropriate balance of market work, non-market work (home production), and leisure in their own lives. People in multiple-adult households, however, have the option of “trading” market and non-market work

(Becker 1998). Thus, even in a world without gender and gender roles, households benefit from having one partner specialize in market work, and another partner specialize in non-market work and childcare; doing so expands the household's production possibilities frontier. In the particular case of two-parent households, the presence of the other parent also changes a person's opportunity cost for time in the market, since he or she may be able to offset childcare onto the other partner rather than onto paid care laborers such as daycare workers. For a more in-depth review of the Beckerian time-use theory underlying this paper, see Appendix B.

Issues of family structure are entwined with issues of race and gender. Single mothers outnumber single fathers in both the US and the UK, a disparity reflected in popular culture by the stereotypical "lone mother" and by the specific benefits programs targeted at women (such as Special Supplemental Nutrition Program for Women, Infants, and Children in the United States, more commonly known as WIC). The disparity between the numbers of single mothers and single fathers is even greater in the UK than in the US.

Issues of economic inequality are also implicated. Douthitt (2000) comments on the rising income and wealth inequality in the US (a trend that has continued since his paper's publication) and recalculates poverty rates while incorporating time as a resource. He argues that people need time to maintain an adequate standard of living. Two families, each with a household income of \$60,000 but one with one part-time worker and the other with two full-time workers, have substantially different levels of experienced wealth. Douthitt argues that "time poverty" is likely particularly prevalent among single parents, who have difficulty specializing in household production or taking shift work; he argues that poverty rates incorporating time poverty leave employed mothers approximately five times as likely to be impoverished (Douthitt 2000). Han et al. (2018) provide a different look at time use across the income distribution; the authors remark that leisure time has increased more rapidly at the bottom of the income distribution than at the top, and argue that leisure inequality may slightly lessen the impact of overall inequality in the US.

Even when time use research focuses on a person's personal life, it must grapple with time spent at work. Single parents are less likely than married parents to be employed, and more likely to be either unemployed or not in the labor force (author's calculations). Some countries, such as the United States, use welfare programs to encourage parents to work in the market, while others, such as the United Kingdom, focus on allowing single parents to raise their children without undue financial strain (Kalenkoski et al. 2007). Avram et al. (2018) argue that benefit programs that tie benefits to job search efforts have mixed results, increasing the flow of single parents into employment but also pushing others into non-claimant unemployment, or unemployment without claiming the benefits of the program. Felfe and Zierow (2018) study the effects of extending half-day childcare to full-day childcare, and find negative effects on children's socio-emotional development. The effect is stronger among children with disadvantaged backgrounds, and

the authors suggest it may be partially because daycare staff are less successful than parents at supporting the development of a child’s emotional skills (Felfe and Zierow 2018). Parenthood and employment are two important decisions in a person’s life, both because of their large investments of time and because of their salience for many people’s identities. Researchers and policymakers should thus be careful in their pronouncements and suggestions for whether and what behavior to encourage in the population, and in how to do so.

The literature on single parents and their time use lacks recent analysis. In this paper I explore the differences between single and married parents in time use, dividing married parents into primary and secondary earners. I use the American Time Use Survey (ATUS) and the United Kingdom Time Use Survey (UKTUS). ATUS has data for the years 2003-2017, and UKTUS has data for 2000 and 2001 (the “2000 survey”) and for 2014 and 2015 (the “2014” survey). I compare the summary statistics of time use of these groups over the years in the samples, then use Tobit regressions on one group to predict the time use of the others. The aim of this project is to explore whether observable variables can explain the differences in time use between single parents, and primary-earning and secondary-earning married parents. I also seek to explore whether single parents behave on average in a manner more similar to primary or secondary earners under different policy regimes.

I predict that American single parents will behave more closely to primary earners, while UK single parents will behave more like secondary earners. My hypothesis is based on the idea that the US and UK have different welfare systems, with American welfare benefits encouraging market work and UK welfare benefits encouraging time spent at home. I also explore variation over time for how well the behavior of primary- and secondary-earning parents can predict the behavior of single parents. I predict that parents will spend more time on childcare in later than earlier years, and that disparities between parental groups will grow over the years of the sample. Section II describes in detail the data and summary statistics for this analysis. Section III outlines the econometric methods used. Section IV presents results. Section V concludes.

## 2 Data

This analysis uses the American Time Use Survey (ATUS) and United Kingdom Time Use Survey (UKTUS) to explore time use of parents. ATUS has data for the years 2003-2017. It is administered yearly by the US Bureau of Labor Statistics to a nationally representative subsample of the Current Population Survey. Thus, observations in ATUS are linked to their CPS entries, which provides a rich dataset not only on time use but also on other individual and household characteristics. The UKTUS has data for 2000 and

2001 and for 2014 and 2015, administered in two different surveys with slightly different methodologies. I refer to these as the “2000 survey” and the “2014 survey.”

My analysis is based on parents who are either unmarried and not living with a significant other; or married and living with a spouse. I exclude parents who are divorced and not remarried; who are unmarried but cohabiting with a significant other; or who are married but whose spouse is absent. I do this to focus on the Beckerian aspect of time use in market and non-market labor. A married person with a household child but not cohabiting with a spouse cannot access the spouse’s time for childcare, and a single person cohabiting with a significant other may have different expectations about the riskiness of becoming (or having the unmarried partner become) a stay-at-home partner. The clearest study of differences between single and married parents, therefore, focuses on married parents who have 48 collective hours a day to allocate, and single parents who have 24. I will hereafter refer to parents who are married and living with their spouses simply as “married parents,” and parents who are unmarried and not living with a partner as “single parents.”

Within the group of married parents, I define married individuals in the sample as either primary or secondary earners. In the United States, the definition is based on the individual’s labor force status and his or her partner’s labor force status. There are four cases. If the individual in the sample is employed and his or her partner is not, then the individual is the primary earner. If the individual is not employed and his or her partner is, then the individual is the secondary earner. If neither partner is employed, the individual is a secondary earner. If both partners are employed, then the individual is a primary earner if and only if the individual’s own weekly earnings are greater than the partner’s weekly earnings. In the United Kingdom, the survey data mark the highest income-earner in the sample, and I use these indicators to identify primary earners among married parents.

The proportion of primary and secondary earners in the sample of married mothers and married fathers changes over time. Table 2 shows the proportion of American married mothers and fathers in each year who are primary earners. Because the UK sample does not cover the years between the 2000 survey and the 2014 survey, I do not provide a similar table for the UK, but I do discuss the proportions of primary earners below. In the U.S., the proportion of women who are primary earners has modestly increased from 19.5% in 2003 to 22.2% in 2017, reaching a peak in the years following the Great Recession. The proportion of men who are primary earners has fallen more substantially, from a high of 79.4% in 2003 to a low of 70.9% in 2017. The shift is more dramatic in the United Kingdom. In the 2000 survey, 16% of married mothers were primary earners, compared with 93% of married fathers. By 2014, the proportions were 41% and 42%, respectively. Thus, one task of this paper is to examine how married mothers and fathers may have changed their behavior as the proportion of male-breadwinner families decreased.

Single fathers appear approximately to resemble primary-earning fathers in their time use, while single mothers do not display a clear pattern toward either the time use of primary-earning mothers or secondary-earning mothers. In this analysis I take up the question of whether single parents behave in a manner more similar to primary-earning or secondary-earning parents.

Figure 1 shows the mean minutes spent on childcare by different groups in the United States over the years of the sample, 2003 to 2017. Because of the gap between UK sample years, I do not provide an analogous graph for the United Kingdom. However, Figures 3 and 4 in the appendix show the distribution of childcare time for groups in both countries. In the United States, primary-earning fathers spent more time on childcare as the sample years progressed, as did secondary-earning fathers. Single fathers did not display a clear pattern, and their data were much noisier as the number of single fathers in each year was relatively small. Primary-earning mothers had somewhat noisy data with no clear pattern, while secondary-earning mothers tended to increase childcare time over the sample years. Single mothers also did not display a clear pattern.

Across years and in both the US and UK samples, women provide more childcare than do men. Table 1 provides general summary statistics of the samples. Single parents in both countries are on average younger than married parents. Married mothers are slightly younger than married fathers in both countries, and single mothers are younger than single fathers in the US but not in the UK. Single-parent households in both countries have fewer children on average than married-parent households. Households in the US have more children on average than households in the UK. There are both numerically more single mothers than single fathers in both countries (a ratio of between 3:1 and 4:1) and single mothers tend to have more children than single fathers in both countries. In both countries women are less likely to be employed in the market, and conditional on their employment have lower wages and lower usual number of hours worked in a week.<sup>1</sup> Single parents tend to earn substantially less than married parents. In the US single and married fathers tend to work the same number of hours in the market, while single mothers work slightly fewer hours than married mothers. Children in single-parent families are on average younger than children in married-parent families. Single-parent families tend to be less wealthy than married-parent families. The full distribution of annual household incomes for all household types can be found in Table 8 in the appendix.

The distribution of education levels can be found for United States parents in Table 3 and for United Kingdom parents in Table 4. In the US, women are on average more educated than men and single parents are on average less educated than married parents (though, because degree qualifications are generally absorptive states, this phenomenon may be partially because of their lower average age). In the United Kingdom, single

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<sup>1</sup>Note that the earnings measures for the UK data differ between groups of workers in the labor force and between types of earnings. I report here the take-home pay of employees (as opposed to, for example, self-employed people), which has very low sample size for single fathers, so I omit their earnings for this table.

parents are less educated on average. Single mothers are more educated than single fathers (notably, no single father in the sample has higher education qualifications) but married mothers are less educated than married fathers.

I make an important caveat about cross-country analysis and the data that I use between the United States and the United Kingdom. I restrict my analysis to within-country comparisons in this paper because of the substantial methodological differences between the surveys. In particular, measurements of time use are not always directly comparable across countries. For this reason any comparisons across countries should be viewed cautiously.

Table 1: Summary statistics by country, gender, and marital status

Variable		Single mothers			Married mothers			Single fathers			Married fathers		
		n	Median	Mean	n	Median	Mean	n	Median	Mean	n	Median	Mean
Age		5997	28	30.14	27503	38	38.04	1474	30	31.52	24444	40	40.39
Minutes of childcare per day		5997	70	106.17	27503	68	107.76	1474	15	64.12	24444	10	54.44
Number of own children in household		5997	1	1.67	27503	2	1.93	1474	1	1.57	24444	2	1.94
% employed		5997		62	27503		66	1474		82	24444		92
Earnings per week (only employed)		3844	400	494.79	16557	615.38	777.39	1096	522.8	655.997	19635	1167.47	962
Spouse's earnings per week					27503	738.46	884.45				24444	290	460.83
Usual hours worked per week		5997	27	22.18	26673	30	23.45	1474	40	33.96	23490	40	42.01
% with child 1-2 in house		5997		28	27503		21	1474		32	24444		20
% with child 3-5 in house		5997		33	27503		29	1474		32	24444		29
% with child 6-12 in house		5997		43	27503		53	1474		39	24444		54
% with child 13-17 in house		5997		21	27503		39	1474		15	24444		40
<b>Panel B. United Kingdom</b>													
Variable		Single mothers			Married mothers			Single fathers			Married fathers		
		n	Median	Mean	n	Median	Mean	n	Median	Mean	n	Median	Mean
Age		578	25	26.69	2965	38	38.43	187	23	25.17	1511	39	39.21
Minutes of primary childcare per day		578	30	64.14	2965	20	58.38	187	0	30.66	1511	20	61.9
Number of own children in household		612	1	1.65	3151	2	1.88	187	1	1.23	1595	2	1.87
% employed		612		46	3151		82	187		52	1595		80
Take home pay per week (employees only)		48	193	426.24	1315	800	1220.15				566	900	1664.36
Usual hours worked per week		612	0	9.44	3151	31	28.13	187	3	14.77	1595	37	30.65
% with child under 5 in house		612		42	3151		44	187		24	1595		43
% with child 6-12 in house		612		62	3151		60	187		29	1595		62
% with child 13-17 in house		612		46	3151		37	187		47	1595		38



Table 2: Percent of married mothers and fathers who are primary earners over time, 2003-2017

Year	% of women	Obs	% of men	Obs
2003	19.5	2615	79.4	2290
2004	19	1669	76.1	1519
2005	17.9	1710	78.1	1500
2006	18.3	1816	76	1531
2007	18.1	1600	77.3	1436
2008	22.7	1612	77.5	1466
2009	24	1636	75	1466
2010	23.1	1655	71.8	1436
2011	22.7	1429	73.1	1295
2012	23.1	1406	74.8	1300
2013	23.5	1266	74.7	1154
2014	25.1	1335	74.9	1167
2015	23.4	1223	73.2	1069
2016	22	1085	75.9	1086
2017	22.2	1118	70.9	1027

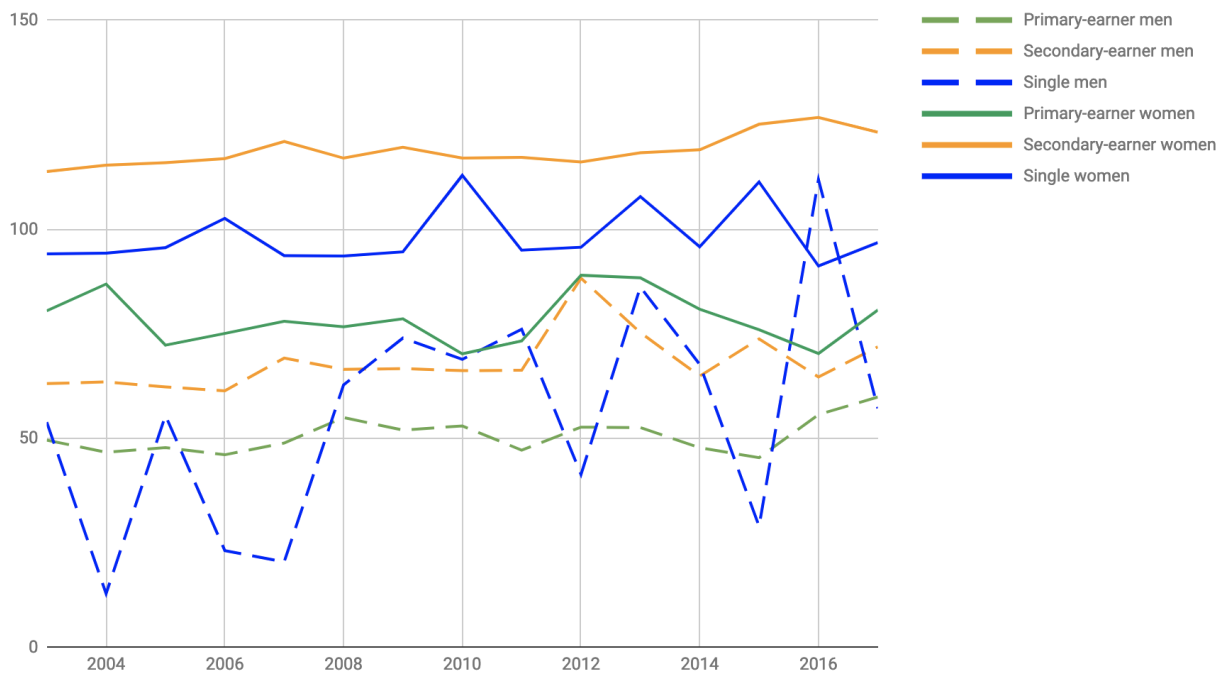


Figure 1: Mean minutes spent on childcare per day over time, 2003-2017 in the US

Table 3: Distribution of education levels in the United States by gender and marital status

Education level	Single mothers		Married mothers		Single fathers		Married fathers	
	%	Cum.	%	Cum.	%	Cum.	%	Cum.
Less than high school	21.61	21.61	9.82	9.82	25.92	25.92	11.52	11.52
High school	38	59.6	23.54	33.37	43.12	69.04	27.27	38.79
Some college	22.3	81.91	14.51	47.88	17.04	86.08	14.35	53.13
College graduate or higher	18.09	100	52.12	100	13.92	100	46.87	100

Table 4: Distribution of education levels in the United Kingdom by gender and marital status

Education level	Single mothers		Married mothers		Single fathers		Married fathers	
	%	Cum.	%	Cum.	%	Cum.	%	Cum.
Secondary	78.88	78.88	58.77	58.77	80.65	80.65	56.37	56.37
A level or equivalent	9.75	88.63	12.94	71.71	19.35	100	11.74	68.11
Higher education	7.21	95.85	12.98	84.69	0	100	11.84	79.95
Degree or higher	4.15	100	15.31	100	0	100	20.05	100

### 3 Methods

This appendix explains the theoretical underpinnings of Beckerian time use models, which form the basis of this analysis. I herein summarize the writings of Blau, Ferber, and Winkler (2014). Neoclassical models of household economics and time use assume that a household is made up of some number of adults and some number of children. Members of the household want to maximize utility, which requires allocating time into market and nonmarket activities. Nonmarket activities include home production, such as housework and childcare, as well as leisure time. Market and nonmarket time are intertwined. A household needs some kind of earnings to acquire the goods and services that provide utility, and market goods require some kind of input of time and/or labor in the home to access their utility.<sup>2</sup> Adults may form multiple-adult households for a variety of reasons (other than the obvious utility of cohabiting with a loved one). Two-adult households can have one adult specialize in home production and the other in market production. Comparative advantage suggests that households with two trading adults will be able to have more home goods and market goods (per person) than either person would be able to have living alone.<sup>3</sup>

The notion of comparative advantage and trade meshes with this analysis in two ways. First, time is a limited resource at all income levels and in all family types. Assuming some minimum threshold of time required for basic personal care and sleep, a person has a fixed amount of time in the rest of the day to allocate between the market and the non-market. In the graphical analysis below persons are assumed to

<sup>2</sup>People who use their energy to cook homemade food from their groceries are putting in nonmarket time and labor to convert a market good (groceries) into a utility-bringing item (dinner). This kind of labor could be outsourced to the market, for example by placing an order with a food delivery service. Other kinds of utility-bringing activities require nonmarket time and cannot be outsourced. For example, a person who wishes to watch television using a streaming service must use not only money to pay for the service but also *time* to actually watch the television.

<sup>3</sup>There are other economic benefits to household/family formation, including economies of scale for expenditures and household production, consumption externalities, income risk pooling, and marriage-specific investments. See Blau, Ferber, and Winkler (2014) for a detailed discussion.

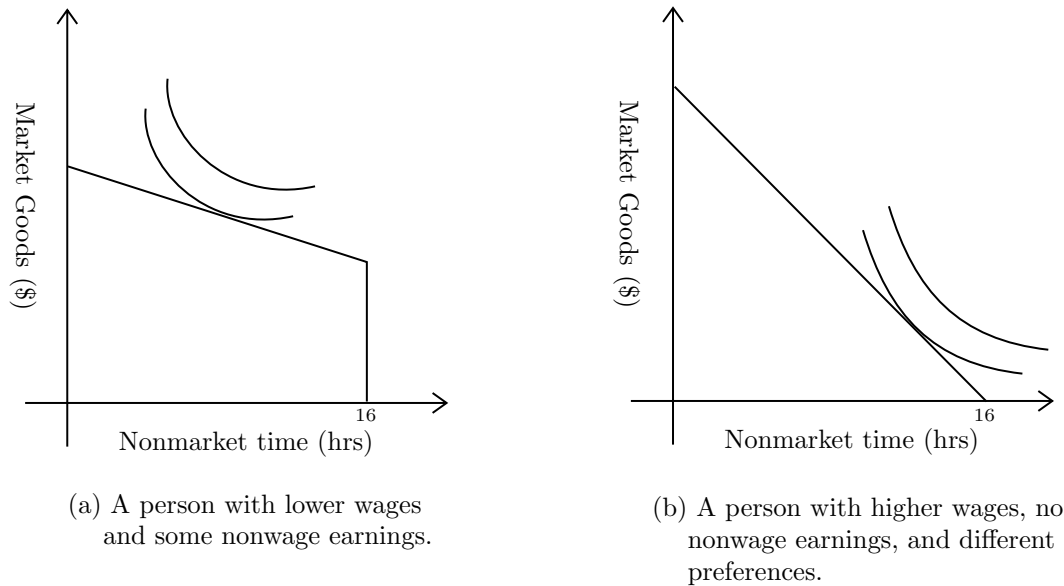


Figure 2: Diagram of labor supply decisions for two persons.

need 8 hours for basic care, leaving 16 hours a day to allocate. Corner allocations of 0 or 16 hours a day in the market are often not feasible for single-adult households in the long term.<sup>4</sup> A two-adult household, however, has 32 hours per day to allocate between adults, and thus has a larger number of possible bundles. Childcare is one kind of home production. A single-parent family thus has fewer possible bundles of time allocation for childcare time than a two-parent family. Moreover, a two-parent family could more easily spend more time on active childcare than a single-parent family.

A person's labor supply decision depends on his or her time use preferences as well as his or her relative marginal utility for goods versus leisure time. The indifference curves that result from these preferences interact with the budget constraint to determine whether a person enters the labor market. Labor supply decisions are thus the product of both a person's preferences as well as a person's potential wage and nonlabor income. Welfare programs, by increasing a person's nonlabor income or by increasing a person's effective wage in the market, change the budget line and thus may induce a person to enter or to leave the market, or to increase or decrease his or her hours in the market.

The body of my analysis involves using the decomposition method first outlined by Juhn, Murphy, and Pierce (1993), hereafter JMP. I use this method to compare single parents to primary-earning and secondary-earning parents. I compare US mothers with US mothers, UK fathers with UK fathers, and so on. Because measurement of many variables does not always align between the ATUS and the UKTUS, I choose not to decompose differences between, for example, single US fathers and single UK fathers.

<sup>4</sup>Welfare payments, pensions, and other forms of non-wage income alter this individual calculus. See Figure 2.

The JMP decomposition is based on the observation that a regression can be divided into four basic pieces: the dependent variable, the independent variables, the coefficients, and the residuals.

$$Y_{ij} = \mathbf{X}_{ij}\beta_{ij} + u_{ij} \quad (1)$$

In Equation 1,  $Y$  represents the dependent variable, here minutes spent on childcare on the diary day.  $X$  is a vector of observable characteristics about the individual in the data, such as age, education level, and weekly earnings. The residuals are captured by  $u$ . Variables are indexed by individual  $i \in \{1 \dots n_j\}$  in group  $j \in \{1, 2\}$ . In the between-group decompositions,  $j$  represents group membership, for example  $j = 1$  for single mothers and  $j = 2$  for secondary-earning mothers. In the within-group decompositions,  $j$  represents membership in a year of the data, for example  $j = 1$  for observations in 2003 and  $j = 2$  for observations in 2017.

The JMP distribution assigns meaning to the residuals in the form of some unobservable characteristic that affects an individual's outcome (as well as some amount of noise). Define:

$$u_{ij} = F_j^{-1}(\theta | \mathbf{X}_{ij}) \quad (2)$$

where  $F_t^{-1}(\cdot | \mathbf{X}_{ij})$  is the inverse cumulative distribution of residuals and  $\theta_{ij}$  is an individual's percentile in the residual distribution. Within this framework, the regression equation can be decomposed, where  $\bar{\beta}$  is the average of the coefficients across groups and  $\bar{F}(\cdot | X_{ij})$  is the average of the cumulative distribution:

$$Y_{ij} = \mathbf{X}_{ij}\bar{\beta} + \mathbf{X}_{ij}(\beta_t - \bar{\beta}) + \bar{F}^{-1}(\theta_{ij} | \mathbf{X}_{ij}) + \left( F_j^{-1}(\theta_{ij} | \mathbf{X}_{ij}) - \bar{F}^{-1}(\theta_{ij} | \mathbf{X}_{ij}) \right) \quad (3)$$

In this scheme, any difference in outcomes between the  $j$  groups is explainable by variation in three factors: the observable quantities, the "prices" for those quantities, and the unobservable prices/quantities. In the wage equation scheme originally proposed by JMP, differences in observables reflected differences in education level, work experience, and so on between groups. Differences in coefficients (prices) referred to the different returns that, for example, an extra year of schooling would provide to an individual from a particular group. Differences in unobservables were attributed to differences in "skill" of individuals in the sample. In my scheme, the unobservable prices and quantities could refer to a wide variety of tastes and preferences that differ between individuals, such as enjoyment of primary childcare, utility derived from other activities, "efficiency" of childcare, and so on.

The first term in Equation 3 captures the effect of changing observable quantities while holding fixed their prices. The second term captures the effect of changing the prices with fixed observables. The third

term captures the effect of changing the unobservable prices and quantities. The decomposition is achieved through three equations:

$$Y_{ij}^1 = \mathbf{X}_{ij}\bar{\boldsymbol{\beta}} + \bar{F}^{-1}(\theta_{ij}|\mathbf{X}_{ij}) \quad (4)$$

$$Y_{ij}^2 = \mathbf{X}_{ij}\boldsymbol{\beta} + \bar{F}^{-1}(\theta_{ij}|\mathbf{X}_{ij}) \quad (5)$$

$$Y_{ij}^3 = \mathbf{X}_{ij}\boldsymbol{\beta} + F^{-1}(\theta_{ij}|\mathbf{X}_{ij}) = Y_{ij}^2 = \mathbf{X}_{ij}\boldsymbol{\beta} + u_{ij} = Y_{ij} \quad (6)$$

$Y^1$  only allows observable quantities to change, while holding fixed observable prices and unobservables.  $Y^2$  also allows observable prices to change, so any additional explanatory power of  $Y^2$  over  $Y^1$  comes from the varying prices.  $Y^3$  allows all three components to change, so any additional power comes from the residuals. Note that  $Y^3 = Y$  so that all variation is accounted for in this framework (though the explanatory power of the residuals may be quite noisy).

In this analysis I perform regressions of the form in Equation 1, with observations weighted to reflect the national population of the sample (US or UK). The observable characteristics in the regressions include: age, age squared, age cubed, weekly hours worked in the market<sup>5</sup>, usual weekly wages/earnings, and number of children in the household. I also include indicator variables for the diary day being a weekend; for the presence of children in the household between the ages of 0-5, 6-12, and 13-17; for household income bins; and for education bins. The US sample also has spouse's weekly wages, which the UK sample does not explicitly give. In the US sample single parents are given a spouse's earnings of 0.

## 4 Results

The JMP decomposition that I outlined in Section III substantial variation in the time that parents of various groups spend on childcare, and on the predictors that are most powerful for explaining that childcare time. On the whole, women spend more time on childcare than men. Single parents tend to spend less time on childcare than secondary-earning parents, but more than primary-earning parents. On the whole, variation is less in the UK than in the US, though this may be because of methodological differences in the surveys. However, this top-line finding obscures substantial variation, which I explain in the sections below.

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<sup>5</sup>The UK samples provide actual hours worked in the past week in the market, while the US data provide only usual hours worked. I thus use actual hours where available and usual hours otherwise, since a person's actual time in the market in a given week is more likely to affect how they spend their non-market time during that week.

## 4.1 Mothers

Table 5 and Table 6 show the results of decomposing differences between single and married mothers in the US and UK across all years. In the United States, single mothers tend to spend more time on childcare than do primary-earning women, but less time than do secondary-earning women. This is to be expected if one of the benefits of partnership in parenting is the ability to specialize into market and non-market activities. This broad finding, however, obscures substantial variation across the distribution of childcare time and across years in the sample. At the bottom of the distribution, single mothers have time use more similar to that of secondary-earning mothers, while at the top of the distribution their time use is more like that of primary-earning mothers. In 2003, the differences in childcare time are larger at the top of the distribution, both between single and primary-earning mothers and between single and secondary-earning mothers, but the magnitude of differences is similar between the groups, so that single mothers are approximately in the middle of primary- and secondary-earning mothers throughout the distribution. In 2017, differences with secondary-earning women are smaller at the 90th percentile of the distribution than differences with primary-earning women, but there is little pattern across the distribution.

In the United Kingdom, shown in Table 6, the differences in time use between single mothers and primary- or secondary-earning mothers are of approximately the same magnitude, suggesting that for the sample including all years, single mothers are approximately in the middle of these two groups. This remains true in the 2000 sample alone, but in the 2014 single mothers behave more like primary-earning mothers at the top of the distribution.

Differences in time use between groups are overall more modest in the UK than in the US, such that the different groups of mothers are more similar in their childcare time across the distributions. The exception to this observation is the comparison of single women with secondary-earning women in the UK in the 2014 sample, which shows much greater variation in time use between the groups. Figures 3 and 4 in the appendix show the distributions of childcare time for the populations under consideration in this analysis.

The JMP decomposition breaks down differences in the dependent variable (here, minutes spent on childcare) into differences in the observable quantities of independent variables, differences in the coefficients associated with those quantities, and differences in unobservable prices and quantities (the residuals). See Section 3 for a more detailed explanation of this method. Among differences between groups of mothers in the United States, quantity effects and price effects usually have the same sign. This will not be the case in Panels C and D of fathers in the US (see below). In Panel A, comparing single mothers with primary-earning mothers, the magnitudes of the price effects tended to be larger in 2003 than the quantity effects. This observation inverts in the interjacent years, such that magnitude of quantity effects are larger in 2017.

The magnitude of the unobservables decreases between 2003 and 2017, suggesting that the explanatory power of the observable quantities and prices for Panel A in the U.S. grows over the years of the sample. In the US panel B, the 2003 sample shows that quantity effects are larger than price effects, and the small unobservables effect means that the quantity effect largely dominates. There is little clear pattern in 2017, though the magnitude of the unobservables grows between the sample years.

Panel A describes the decomposition results for single mothers in the US as compared with primary-earning women, while Panel B reports the comparison with secondary-earning women. Panel A shows that in 2003, positive and negative signs on the quantity, price, and unobservable segments of the composition are varied throughout the time distribution, leaving little clear pattern. In 2017, however, the observable quantities of the independent variable by single mothers predict that single mothers would spend much more time on childcare than primary-earning women. At the bottom of the time distribution, the prices and unobservables cancel out this effect to leave very small differences. The magnitude of the price and quantity effects decreases up the distribution, leaving single mothers spending more time on childcare than primary-earning women at the top of the distribution.

Table 6 displays information on decompositions for the UK. In the United Kingdom, single mothers across all years of the sample are approximately in the middle of primary- and secondary-earning mothers in terms of childcare time. However, this obscures changes over time. In the 2000 survey, single mothers spend more time on childcare than either group of married mothers, while in the 2014 study they perform less childcare than either group of married mothers. The differences between groups are relatively smaller in the UK than they are in the US. As Table 7 shows, this difference is largely because single mothers in the UK spend more time on childcare in the 2014 survey than in the 2000 survey, while the opposite is true for primary- and secondary-earning mothers.

Table 7 gives within-group comparisons over time. For American mothers, there is broadly more childcare time in 2017. Among single women, the difference is largely coming from changes in observable quantities, though at the 90th percentile of time use the price effect dominates. Quantities also dominate among primary-earning women. In both of these groups, price and quantity effects have opposite signs. Among secondary-earning women, price and quantity effects have the same sign. The net effect of change in childcare time across years is relatively small in magnitude, although the price and quantity effects are individually quite large. In the United Kingdom, mothers have almost exclusively positive quantity effects for childcare time and negative price effects for the across-year comparison. This suggests that changes and prices must dominate to account for the decrease in childcare time among primary- and secondary-earning mothers, while quantity effects dominate for single mothers. For all groups of mothers in both countries the effects of unobservables are relatively small. Future research could explore the implications of these changing effects.

These initial results suggest that the observable characteristics of single mothers changed in such a way as to increase their childcare time in the UK, while other constraints on time changed for married mothers.

## 4.2 Fathers

Table 5 shows the results of decomposition for fathers in the US, and Table 6 provides the same information for the UK. In the United States, single men at the bottom of the distribution have no difference in childcare time from primary- or secondary-earning men. In the top half of the distribution, however, single fathers broadly spend less time on childcare than either primary- or secondary-earning men. The difference becomes more pronounced over time. Single fathers behave more like primary-earning men than secondary-earning men. In both 2003 and 2017 and between both single and primary-earning men and between single and secondary-earning men, the price and quantity effects of the decomposition have opposite signs. The signs of both prices and quantities tend to flip at approximately the median of the distribution. At the bottom of the distribution in both years and both comparisons, quantities have a positive predictive effect and prices have a negative effect, suggesting that if single men had the same observable characteristics as married men they would perform more childcare. At the top of the distribution, the quantity effect is negative, suggesting the opposite. The price effects for US men are almost universally the opposite sign from the quantity effect, making the differences between groups relatively much smaller.

Table 7 decomposes within-group comparisons of childcare time among parents in the US and the UK. In the United States, single fathers tend to spend less time on childcare in 2017 than in 2003, while married fathers tend to spend more. As in Table 5 and in Table 6, many of the price and quantity effects move in different directions. The pattern is the same in the United Kingdom, where single fathers spend less time on childcare in the later sample years and married fathers spend more. Because single fathers in the UK already spent less time on childcare than married fathers in the 2000 survey, this difference becomes greater in the 2014 survey. For single fathers in the UK and for primary-earning fathers in the UK, quantity effects for the comparison over time are positive and price effects are negative. The opposite is true for secondary-earning fathers in the UK, suggesting that these groups may have had opposite changes in their observables and other time constraints in the intervening years between the surveys.



Table 5: Juhn-Murphy-Pierce decomposition results for parents in the US, by year

<b>Panel A. Single Women Compared With Primary-Earning Women</b>																	
<b>Percentile</b>																	
All years						2003						2017					
	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	
<b>10</b>	0	19.5	-5.06	-14.44	0	20.6	-0.3	-20.3	0	31.1	-18.5	-12.5	0	31.1	-18.5	-12.5	
<b>25</b>	10	3.83	9.49	-3.32	5	-0.2	7.8	-2.6	0	-1	2.6	-1.7	0	-1	2.6	-1.7	
<b>50</b>	19	13.85	11.34	-6.19	4	-3.6	16.1	-8.5	8	6.5	5.7	-4.2	8	6.5	5.7	-4.2	
<b>75</b>	24	11.03	6.05	6.91	25	4.9	9.4	10.7	30	21.2	11.9	-3.1	30	21.2	11.9	-3.1	
<b>90</b>	35	15.96	1.57	17.47	45	2.2	14.8	28	71	82.1	-22.3	11.2	71	82.1	-22.3	11.2	
<b>Panel B. Single Women Compared With Secondary-Earning Women</b>																	
<b>Percentile</b>																	
All years						2003						2017					
	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	
<b>10</b>	0	-14.4	13.9	0.5	0	-7.3	7.5	-0.2	0	-4	-0.9	4.8	0	-4	-0.9	4.8	
<b>25</b>	-5	-23	14.5	6.5	-5	-28.2	19.2	4	-8	-37.6	14.8	14.8	-8	-37.6	14.8	14.8	
<b>50</b>	-16	-15.8	-3.6	3.4	21	-33.9	9	3.9	-21	-24.5	-7	10.5	-21	-24.5	-7	10.5	
<b>75</b>	-44	-27.1	-8.7	-8.3	-25	-24.2	-2.3	1.5	-40	-16.6	-17.6	-5.9	-40	-16.6	-17.6	-5.9	
<b>90</b>	-60	-33.3	-15.1	-11.7	-35	-31.7	-0.5	-2.8	-24	20.8	-25.1	-19.7	-24	20.8	-25.1	-19.7	
<b>Panel C. Single Men Compared With Primary-Earning Men</b>																	
<b>Percentile</b>																	
All years						2003						2017					
	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	
<b>10</b>	0	32.9	-24.8	-8.1	0	-1.6	-3.1	4.7	0	286.2	-274.9	-11.3	0	286.2	-274.9	-11.3	
<b>25</b>	0	6	-2.9	-3.2	0	-47.5	32.3	15.2	0	175.7	-177.6	1.9	0	175.7	-177.6	1.9	
<b>50</b>	-10	-27.3	22.3	-5	12	-93	84.1	20.9	-30	36.7	-63.5	-3.2	-30	36.7	-63.5	-3.2	
<b>75</b>	-10	-15.5	5.4	0.1	-4	-131.8	118.3	9.5	-59	-53.1	-15.2	9.3	-59	-53.1	-15.2	9.3	
<b>90</b>	5	-3.2	0.9	7.2	-30	-164.6	144.3	-9.7	-60	96.7	25.2	11.5	-60	96.7	25.2	11.5	
<b>Panel D. Single Men Compared With Secondary-Earning Men</b>																	
<b>Percentile</b>																	
All years						2003						2017					
	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	
<b>10</b>	0	25.5	-27.2	1.6	0	13.2	-7	-6.2	0	274.7	-275.8	1	0	274.7	-275.8	1	
<b>25</b>	0	-5	1.3	3.7	0	-41.2	25.9	15.3	0	97.7	-107.7	10	0	97.7	-107.7	10	
<b>50</b>	-20	-43.2	15.5	7.5	5	-82.4	63.1	24.3	-25	-31.7	2.9	3.8	-25	-31.7	2.9	3.8	
<b>75</b>	-40	-32.4	-6.2	-1.5	-29	-133	107.4	-3.4	-70	-159.8	74	15.7	-70	-159.8	74	15.7	
<b>90</b>	-44	-20.2	-7	-16.8	-60	-180.1	133.2	-13	-90	-260.4	170.8	-0.4	-90	-260.4	170.8	-0.4	

Table 6: Juhn-Murphy-Pierce decomposition results for parents in the UK, by year

<b>Panel A. Single Women Compared With Primary-Earning Women</b>																	
All years						2000						2014					
Percentile	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	
10	0	13	-11.8	-1.2	0	17.5	-16.4	-1.2	0	34.4	-40.3	5.9	0	34.4	-40.3	5.9	
25	0	-15.3	12.3	3	0	-14.7	9.7	5	0	-25.6	6.8	18.8	0	-25.6	6.8	18.8	
50	20	-22.8	26.2	16.6	20	-12.9	19.9	12.9	-40	-96.8	45.1	11.7	-40	-96.8	45.1	11.7	
75	20	-15.4	33.4	2	20	4.6	14.8	0.6	-50	-86.5	34.4	2.1	-50	-86.5	34.4	2.1	
90	0	-81.3	92.6	-11.3	0	15.9	-5	-10.9	-10	-3	13.8	-20.8	-10	-3	13.8	-20.8	

<b>Panel B. Single Women Compared With Secondary-Earning Women</b>																	
All years						2000						2014					
Percentile	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	
10	0	17.6	-19.8	2.2	0	24.7	-27.3	2.6	0	-6.9	-8.2	15.1	0	-6.9	-8.2	15.1	
25	0	-11.6	7.5	4.1	0	-3.2	-0.7	3.9	-40	-43.3	-11.7	15	-40	-43.3	-11.7	15	
50	10	-16.2	24.2	2	10	-4	12.4	1.6	-90	-95.9	-10.4	16.3	-90	-95.9	-10.4	16.3	
75	20	-22.1	41.6	0.5	20	9	10.6	0.4	-120	-91.3	-12.6	-16.1	-120	-91.3	-12.6	-16.1	
90	30	-148.9	183.3	-4.4	30	25	10.3	-5.3	-130	-27.8	-57.1	-45.1	-130	-27.8	-57.1	-45.1	

<b>Panel C. Single Men Compared With Primary-Earning Men</b>																	
All years						2000						2014					
Percentile	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	
10	0	548	-553.7	5.7	0	4541.8	-4553	11.2	0	346.9	-343.6	-3.2	0	346.9	-343.6	-3.2	
25	0	244.1	-261.2	17.1	0	882.6	-901.6	19	0	214.9	-237	22.1	0	214.9	-237	22.1	
50	0	1.1	-18.5	17.5	0	-231.3	217.4	13.9	-40	95.5	-164.4	28.9	-40	95.5	-164.4	28.9	
75	-20	-197.5	177.8	-0.3	-20	-4240.7	4219.1	1.6	-120	9.2	-130.8	1.6	-120	9.2	-130.8	1.6	
90	10	-422.2	461.8	-29.7	10	-9516.4	9556	-29.7	-190	10.2	-141.4	-58.7	-190	10.2	-141.4	-58.7	

<b>Panel D. Single Men Compared With Secondary-Earning Men</b>																	
All years						2000						2014					
Percentile	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables	
10	0	737.4	-725	-12.4	0	3487.5	-3482.5	-5	0	277.3	-305.2	27.9	0	277.3	-305.2	27.9	
25	0	384	-382.8	-1.2	0	1541.9	-1544	2.2	-40	170.5	-251	40.5	-40	170.5	-251	40.5	
50	20	110.9	-101.9	11	20	-166.5	180.8	5.7	-100	75.8	-207.4	31.7	-100	75.8	-207.4	31.7	
75	-20	-192.4	175.8	-3.4	-20	-4917.3	4905.9	-8.5	-200	1.3	-193.9	-7.4	-200	1.3	-193.9	-7.4	
90	50	-265.9	325.4	-9.5	50	-8629	8667.5	11.5	-250	12.8	-200	-62.3	-250	12.8	-200	-62.3	

## 5 Conclusion

The top-line findings of this analysis are unsurprising: parenting is complicated and not well-predicted by observable economic or demographic factors; and single parents perform childcare differently from either primary- or secondary-earning parents. In both the US and the UK, single mothers performed more childcare time than primary-earning mothers but less than secondary-earning mothers, a finding that matches the predictions of time-budgeting models. The same is true for single fathers in the US, but not for single fathers in the UK. Single fathers in the UK spend less time on childcare than either primary- or secondary-earning fathers. This may be because single fathers in the UK have different constraints on their time or different preferences for time use, or it may be because of the small sample size of single fathers in the UK. Future research could explore the ways that single fathers in the UK spend their time, and on their particular experiences. I thus find that, in contrast with my initial prediction in Section I, most single parents in both countries are approximately in the middle of primary- and secondary-earning married parents.

I use a decomposition pioneered by Juhn, Murphy, and Pierce (1993) to explore differences in time use between single, primary-earning, and secondary-earning parents in the US and the UK. I find that most groups of parents spend more time on childcare in later years than earlier years of the sample (2003-2017 for the US, and 2000-2001 and 2014-2015 for the UK). This is in accordance with my initial prediction. The effects of observable quantities and the coefficients on those quantities frequently work in opposite directions, so that the relationships between observable characteristics and time use for different groups is complicated and varies across time. Future research ought to explore the ways that children's outcomes are affected by increased childcare time in the context of different family structures.

Table 7: Decomposition results for parents in the US, 2003 and 2017 and in the UK, 2000 and 2014

Single mothers								
Percentile	US				UK			
	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables
10	0	19.1	-12.1	-7	0	894.7	-889.8	-4.9
25	3	-14	13.6	3.4	0	137.2	-134.8	-2.3
50	-6	-15.6	13.6	-4	40	116.4	-86.4	9.9
75	0	-24.2	9.8	14.5	40	89.5	-54.9	5.4
90	-36	-10	-30.2	4.2	0	52.5	-62.2	9.7
Primary-earning mothers								
Percentile	US				UK			
	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables
10	0	6.4	-7	0.6	0	2346.3	-2348.6	2.3
25	-2	-19	11	5.9	0	1628.9	-1639.2	10.3
50	-2	-18.6	16.7	-0.1	-20	967.7	-991.4	3.7
75	5	-10.9	11.2	4.7	-30	91.7	-126.7	5.1
90	-10	-14.3	-7	11.3	-10	61.4	-64.4	-7
Secondary-earning mothers								
Percentile	US				UK			
	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables
10	0	1.8	-4.6	2.7	0	4212.6	-4225.7	13.1
25	0	-7.2	3.9	3.2	-40	2699.5	-2752.5	13
50	-6	-5.5	-2.7	2.2	-60	1137.6	-1209.6	12.1
75	-15	-8.9	-4.9	-1.2	-100	-15.7	-72.9	-11.4
90	-25	-18.4	-4.1	-2.5	-160	11.4	-140.2	-31.2
Single fathers								
Percentile	US				UK			
	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables
10	0	46.8	-28.8	-18	0	5620.6	-5601.3	-19.2
25	0	20.2	-18.4	-1.73	0	4848.9	-4845.4	-3.4
50	15	-4	3.1	16	30	3530.9	-3506.6	5.7
75	31	-8.6	88.6	23.9	70	868.4	-822.2	23.9
90	0	-64.2	-36.8	101	130	220.6	-102.8	12.3
Primary-earning fathers								
Percentile	US				UK			
	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables
10	0	15.6	-12.7	-2.9	0	7318	-7313.4	-4.7
25	0	-2	-0.7	2.7	0	4716.8	-4725.5	8.7
50	-27	-17.1	-9.7	-0.3	-10	2556.5	-2569.2	2.6
75	-24	-3.4	-12.3	-8.4	-30	431	-457.5	-3.5
90	-30	-2.9	-16.2	-10.8	-70	100.7	-157.5	-13.3
Secondary-earning fathers								
Percentile	US				UK			
	Total	Quantities	Prices	Unobservables	Total	Quantities	Prices	Unobservables
10	0	36.8	-41.1	4.3	0	41	-70	29.1
25	0	2.5	-11.1	8.7	-40	-299.5	234.1	25.4
50	-15	-42.8	23.8	4	-90	-2411.6	2302.5	19.1
75	-10	-18.5	0.6	7.9	-110	-3387.7	3291.1	-13.3
90	-30	3.2	-1.7	-31.6	-170	-4910.7	4780.4	-39.7

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## 7 Appendix: Additional Tables and Figures



Figure 3: Distributions of childcare time for US parents by gender and marital/earner status

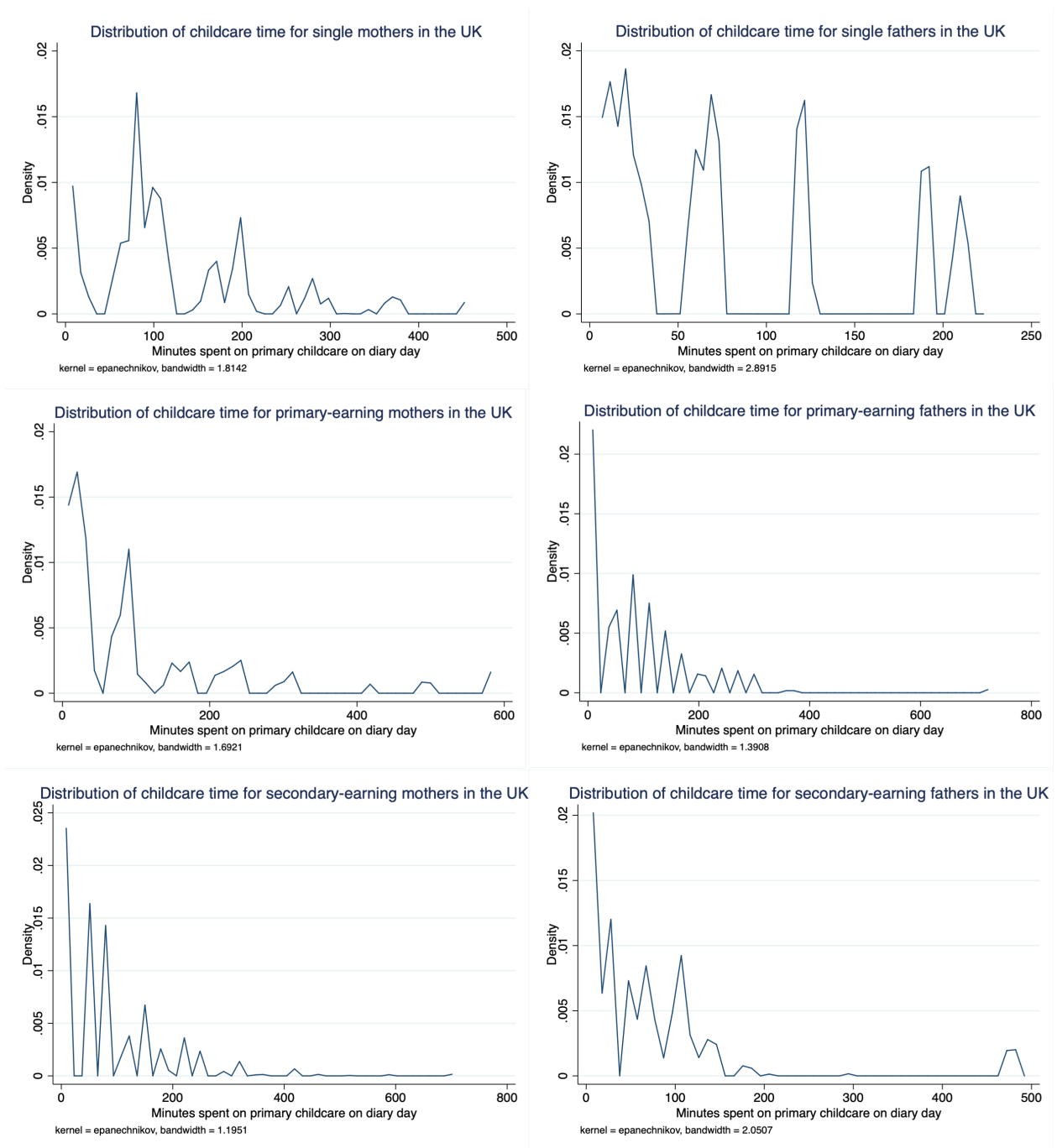


Figure 4: Distributions of childcare time for UK parents by gender and marital/earner status

Table 8: Distribution of income by country, gender, and marital status

<b>Panel A. United States</b>											
	Single mothers		Married mothers		Single fathers		Married fathers				
	Percent	Cumulative	Percent	Cumulative	Percent	Cumulative	Percent	Cumulative			
<b>Family income</b>											
Less than \$5,000	9.39	9.39	0.86	0.86	4.17	4.17	0.82	0.82			
\$5,000 to \$7,499	5.23	14.62	0.7	1.56	2.72	6.89	0.69	1.5			
\$7,500 to \$9,999	5.43	20.05	0.67	2.22	3.58	10.47	0.53	2.04			
\$10,000 to \$12,499	6.09	26.13	1.23	3.45	3.77	14.24	1.28	3.31			
\$12,500 to \$14,999	5.03	31.16	1.33	4.79	4.05	18.29	1.35	4.66			
\$15,000 to \$19,999	7.86	39.02	2.64	7.42	8.19	26.48	2.49	7.15			
\$20,000 to \$24,999	7.9	46.93	3.47	10.9	8.35	34.83	3.37	10.52			
\$25,000 to \$29,999	7.26	54.18	4.04	14.93	8.95	43.78	3.99	14.51			
\$30,000 to \$34,999	7.01	61.19	4.62	19.56	6.95	50.73	4.6	19.12			
\$35,000 to \$39,999	5.01	66.2	4.48	24.03	6.78	57.51	4.64	23.76			
\$40,000 to \$49,999	7.57	73.77	7.76	31.79	9.87	67.38	7.59	31.35			
\$50,000 to \$59,999	7.46	79.23	8.17	39.97	6.18	73.56	8.53	39.87			
\$60,000 to \$74,999	5.53	84.76	11.86	51.83	8.2	81.76	11.99	51.86			
\$75,000 to \$99,999	4.83	89.59	16.99	68.82	7.06	88.82	16.93	68.79			
\$100,000 to \$149,999	3.06	92.65	14.51	94.51	3.74	92.56	14.58	83.38			
\$150,000 and over	1.55	94.2	11.19	99.61	2.7	95.27	11.22	94.59			
<b>Panel B. United Kingdom</b>											
	Single mothers		Married mothers		Single fathers		Married fathers				
	Percent	Cumulative	Percent	Cumulative	Percent	Cumulative	Percent	Cumulative			
<b>Gross household income per year</b>											
Less than £2,610	8.36	8.36	0.73	0.73	0	0	0	0			
£2,610 - £5,210	33.26	41.62	3.72	4.45	40.46	40.46	3.56	3.56			
£5,210 - £10,430	34.05	75.66	5.86	10.31	14.9	55.36	8.11	11.67			
£10,430 - £15,640	11.74	87.4	11.48	21.79	0	55.36	12.6	24.27			
£15,640 - £20,860	7.64	95.04	17.07	38.87	22.45	77.8	15.75	40.01			
£20,860 - £33,800	2.79	97.84	32.71	71.58	0	77.8	28.68	68.7			
£33,800 - £41,000	0	97.84	8.98	80.56	22.2	100	13.19	81.89			
£41,000 - £46,000	0	97.84	5.9	86.46	0	100	3.77	85.66			
£46,000 - £55,000	0	97.84	3.12	89.58	0	100	4.59	90.25			
£55,000 - £80,000	2.16	100	6.39	95.97	0	100	3.91	94.17			
£80,000 or more	0	100	4.03	100	0	100	5.83	100			