

Child Care Choices, Family Income and Mother's Employment: What can we learn from the 2004 SIPP panel?

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Introduction

- Today, a majority of parents with children under 5 depend on substitute care givers. The increased need for non-parental care reflects the increase in maternal employment over the last 30 years and the desire for educational opportunities for young children.
- The task of selecting a child care arrangement often involves a number of factors such as employment demands, family changes, and the well being of the child in need of care.
- Using the Survey of Income and Program Participation (SIPP), this study will add to and expand on past research by examining both the individual and joint impact of mother's labor force participation and family income on child care choice.

Mother's Labor Supply and Family Childcare Choice: An Economic Perspective

- Traditional models of labor supply focus on the adjustments of hours spent working relative to hours spent on non-work activities, such as household production and leisure
- Market work for parents of preschoolers, and in particular mothers, implies a demand for non-parental childcare, which entails costs as well as influencing the wellbeing of the child
- An adjustment to the conventional approach suggests that the mother's labor force participation decision and her hours worked if she does participate influence the family's childcare choice

- The family's utility maximization, in turn, is contingent upon the choice of childcare arrangement

Data

- The Survey of Income and Program Participation (SIPP) provides detailed, national level data on social and economic characteristics as well as detailed information on child care arrangements
- The data in this poster were collected from February through May 2005 in the 4th Wave of the 2004 SIPP Panel. The questions ask about a typical week in the previous month
- Our study is limited to women, aged 19-44, with at least one child under 4 years old
- Our sample had 1,270 women

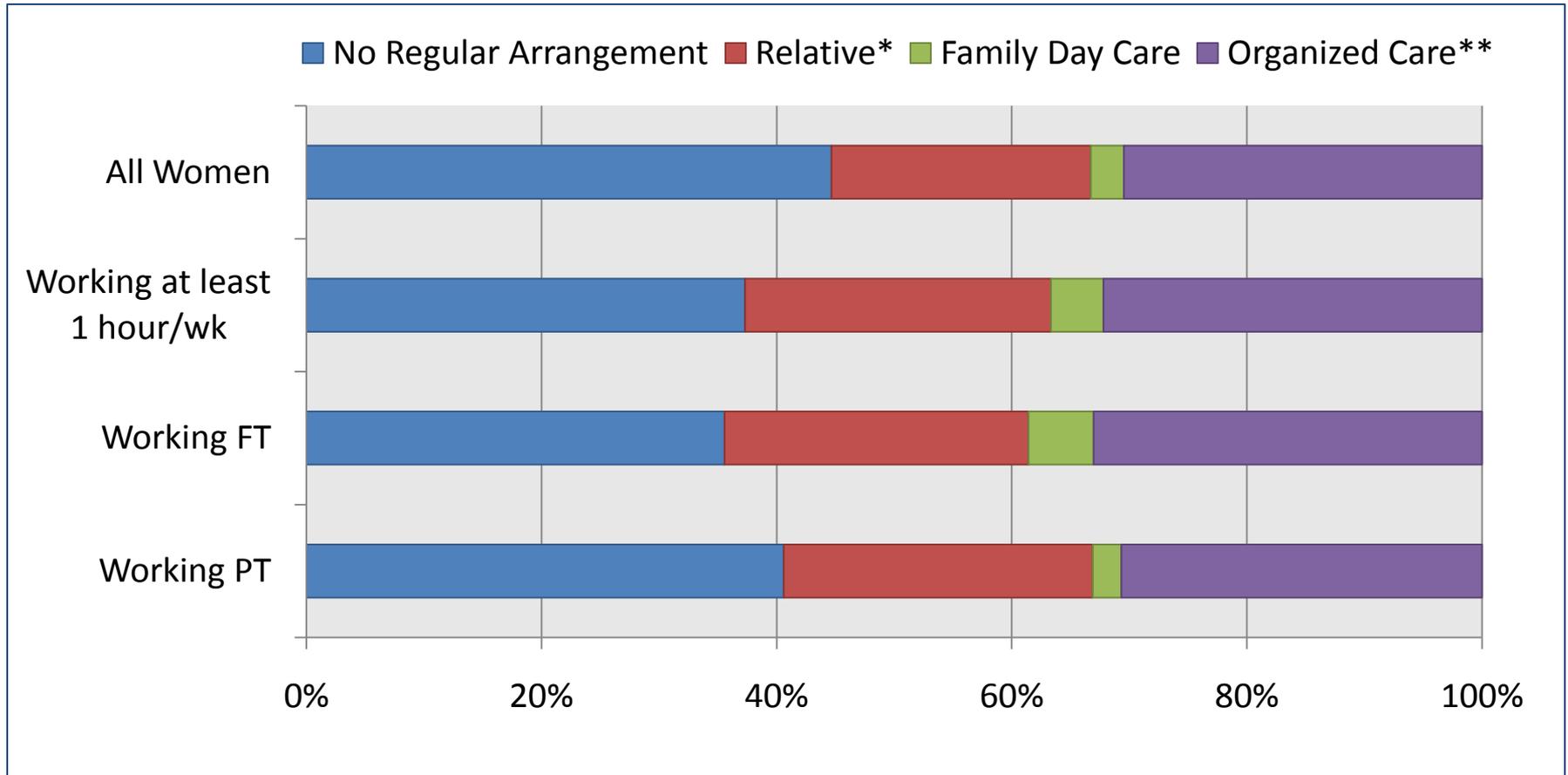
Measures

Child Care Arrangements Defined

- The primary child care arrangement is the arrangement used most hours during the week.
- Based on SIPP definitions and the literature, we've broadly classified child care arrangements into the following categories:
 - Relative care (mothers, fathers, grandparents, siblings, or some other relatives)
 - Organized care (day care or child care centers, nursery school, preschools, and Head Start)
 - Family day care (other non-relative provider in child's home, day care in provider's home, babysitter, etc.)
 - No regular arrangement (not in a child care arrangement on a regular basis)

- Employment status is broadly classified into the following categories:
 - Working(working at least 1 hour per week)
 - Working Full-time (working 35 hours or more a week)
 - Working Part-time (working more than 1 hour a week, but less than 34 hours a week)

Primary Child Care Arrangement by Mother's Hours Worked

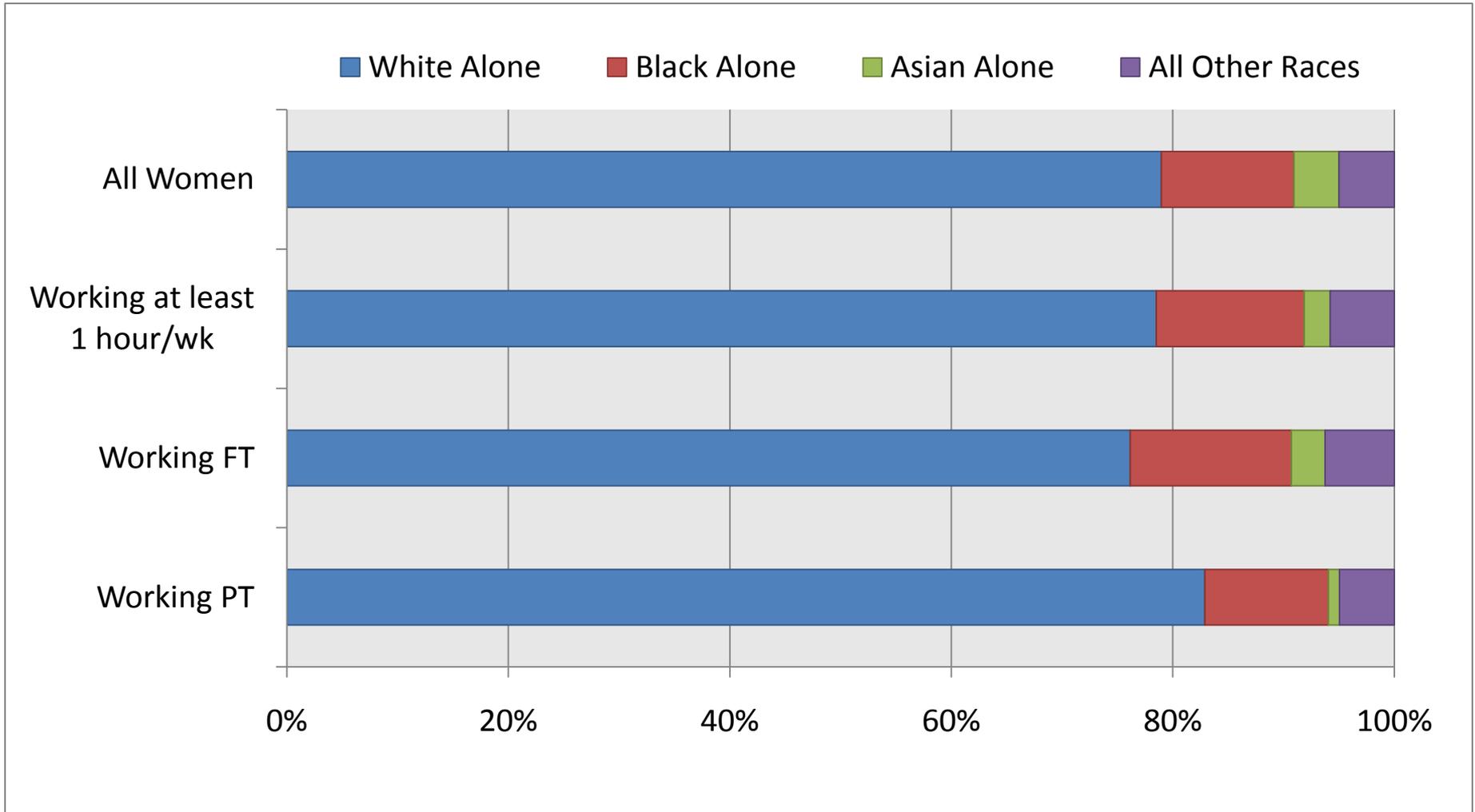


*Includes care by Father

**Includes School and Pre-School.

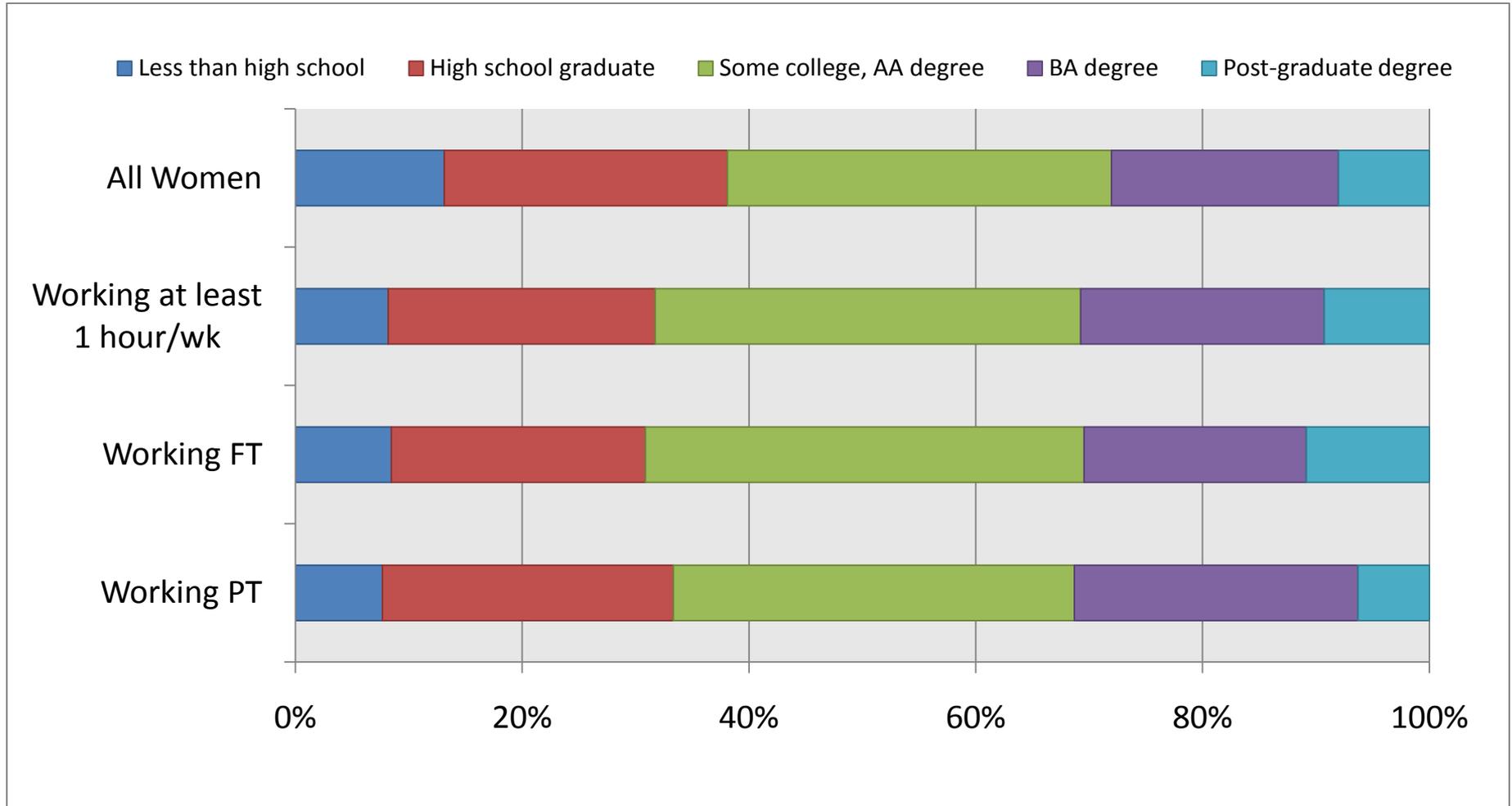
Source: U.S. Census Bureau, Survey of Income and Program Participation, 2004 Panel, Wave 4. For information on sampling and nonsampling error, see <[www.census.gov/SIPP/sourceac/S&A04_W1toW12\(S&A-9\)\[1\].pdf](http://www.census.gov/SIPP/sourceac/S&A04_W1toW12(S&A-9)[1].pdf)>

Mother's Race by Hours Worked



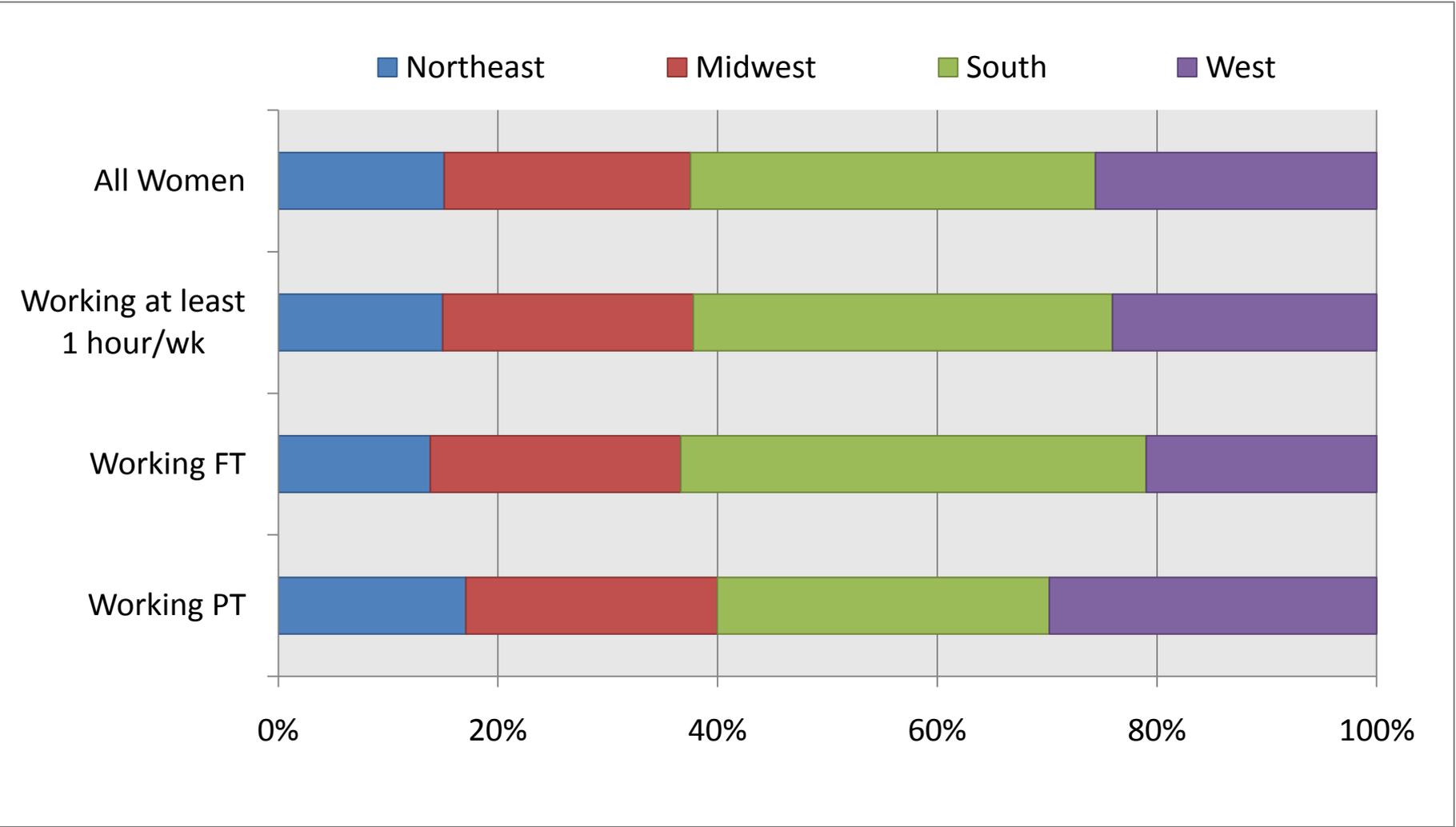
Source: U.S. Census Bureau, Survey of Income and Program Participation, 2004 Panel, Wave 4. For information on sampling and nonsampling error, see <[www.census.gov/SIPP/sourceac/S&A04_W1toW12\(S&A-9\)\[1\].pdf](http://www.census.gov/SIPP/sourceac/S&A04_W1toW12(S&A-9)[1].pdf)>

Mother's Educational Attainment by Hours Worked



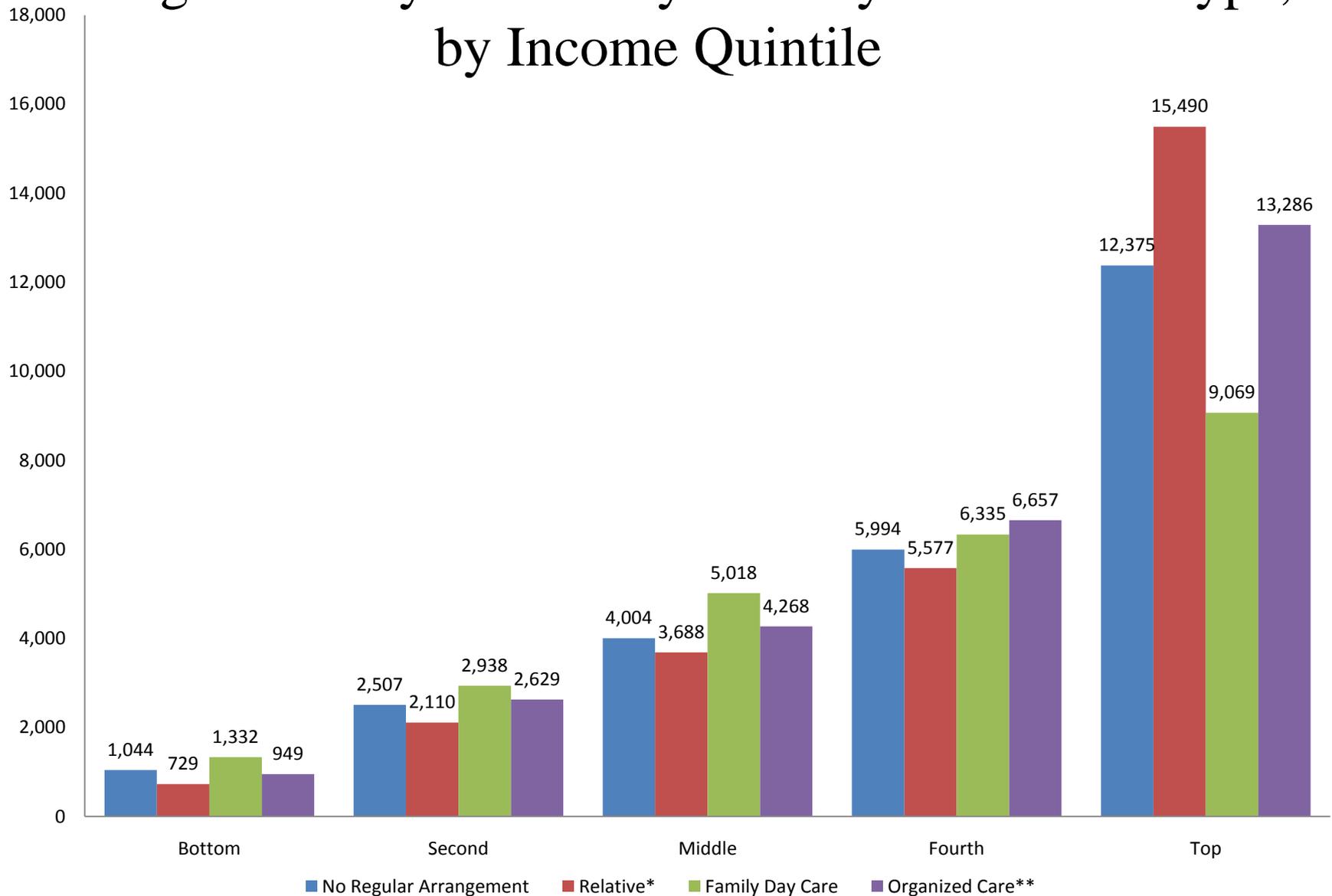
Source: U.S. Census Bureau, Survey of Income and Program Participation, 2004 Panel, Wave 4. For information on sampling and nonsampling error, see <[www.census.gov/SIPP/sourceac/S&A04_W1toW12\(S&A-9\)\[1\].pdf](http://www.census.gov/SIPP/sourceac/S&A04_W1toW12(S&A-9)[1].pdf)>

Mother's Region by Hours Worked



Source: U.S. Census Bureau, Survey of Income and Program Participation, 2004 Panel, Wave 4. For information on sampling and nonsampling error, see <[www.census.gov/SIPP/sourceac/S&A04_W1toW12\(S&A-9\)\[1\].pdf](http://www.census.gov/SIPP/sourceac/S&A04_W1toW12(S&A-9)[1].pdf)>

Average Monthly Income by Primary Child Care Type, by Income Quintile



*Includes care by Father

**Includes School and Pre-School.

Source: U.S. Census Bureau, Survey of Income and Program Participation, 2004 Panel, Wave 4. For information on sampling and nonsampling error, see <[www.census.gov/SIPP/sourceac/S&A04_W1toW12\(S&A-9\)\[1\].pdf](http://www.census.gov/SIPP/sourceac/S&A04_W1toW12(S&A-9)[1].pdf)>

A Model of Mother's Labor Supply and the Family's Childcare Choice

- We assume a mother's labor supply behavior influences her family's choice of child care for their preschool age child
- Prior research argues that labor supply effort needs to be account for the mother's decision to participate in the labor market
- We propose a specification that treats the mother's labor supply effort as endogenous in the family's choice of child care
- This assumption requires us to estimate her labor supply effort accounting for her decision to participate in the labor market

- The model developed is a hybrid of the two-stage least squares model
- The first stage looks at the mother's labor supply behavior accounting for selectivity
- The second stage estimates a multinomial choice model given the first stage estimates regarding the mother's labor supply behavior

Mother's Labor Supply and Family Childcare Choice: An Economic Perspective

- Assume a two-parent family with a preschool age child
- The family's utility function can be defined as: $U=U(X, C, H_o)$
- With utility increasing in X , C , and H_o and the labor force participation of the father is exogenous
- The mother's time constraint can be defined as:

$$\tilde{H} = H_w + H_o = H_w + (H_{cc} + H_{hp} + l)$$

- H_w – time working in the labor market
- H_o – non-work hours
- H_{cc} – time spent in child care
- H_{hp} – time spent in home production activities, other than child care.
- l – time spent on leisure

- Total hours of child care used by the family is finite and can be expressed as:

$$C = C_f + C_i = (C_c + C_{fd}) + C_i$$

- C_f – formal child care
- C_i – informal child care and care received at home by one or both parents, or by other family members
- C_c – center-based care
- C_{fd} – in-home care by an unrelated person, such as a nanny and family day care arrangements

Mother's Labor Supply and Family Childcare Choice: An Economic Perspective

- The family's budget constraint can be expressed as:

$$B = wH_w + V - (p_f C_f + p_i C_i)$$

- V – value of family income from sources other than the mother's employment
- W – the mother's hourly wage
- H_w – mother's time working in the labor market
- p_f – price of formal child care
- p_i – price of informal child care
- C_f and C_i – time child spend in formal and informal care

The family chooses that combination of X , H_w , C_h , C_f , and C_i that maximizes the utility subject to the time and budget constraints.

$$\mathbf{Max} \quad U[X, H_w, (C_h, C_f, C_i)]$$

$$\mathbf{Subject\ to:} \quad B = wH_w + V - (p_f C_f + p_i C_i)$$

$$\tilde{H} = H_w + H_o = H_w + (H_{cc} + H_{hp} + l)$$

$$C = C_h + C_f + C_i = C_h + (C_c + C_{fd}) + C_i$$

The model for estimation

A mother will be employed ($P_i = 1$) when P_i^* is positive; she will not be employed otherwise, ($P_i = 0$)

$$(P_i^* = Q_i \Theta + \varepsilon_i)$$

The mother's labor supply effort will be observed for those individuals where $P_i^* > 0$, so that the expected labor supply effort can be written as

$$W_i | P_i^* > 0 = Z_i \gamma + \Theta \lambda_i + \varepsilon_i$$

W_i^* estimated for each mother of a preschool age children from the model of labor supply behavior controlling for selectivity. These are used to model family child care choice

$$C_{ik} = X_i \beta + w_i^* \tau + u_i$$

C_{ik} -- the k^{th} child care choice selected by the i^{th} family for their preschool age child

X_i -- a set of exogenous variables associated with the i^{th} family

W_i^* -- the estimated labor supply effort of the mother of the i^{th} family, controlling for selectivity

β and τ -- the parameter vectors

u_i -- error term

Table 1: Regression results for the mothers of a pre-school age child, Wave 4, 2004 SIPP panel						
(Work effort equation for mothers, dependent variable is: the average hours worked in a week during wave 4)						
(Probit selection equation for mothers, dependent variable: 1 -- was employed, 0 -- otherwise)						
Variable	Work effort model			Probit selection model		
	Est. Coeff.	Std. Err.	Significance-level	Est. Coeff.	Std. Err.	Significance-level
Intercept	-10.81	5.977	**	-2.60	0.370	***
Rho-value	0.69	0.160	***			
Mother's characteristics						
Mother's age	0.53	0.094	***	0.00	0.007	
Mother's race						
<i>White</i>	1.64	2.192		-0.19	0.143	
<i>Black</i>	2.74	2.184		-0.40	0.190	**
Mother's Hispanic ethnicity	2.90	1.748	*	0.21	0.113	*
Mother's marital status						
<i>Widowed/divorced/separated</i>	3.45	2.014	*	0.02	0.155	
<i>Never married</i>	6.20	1.682	***	0.05	0.127	
Mother's educational attainment						
<i>High school</i>	8.65	2.170	***	-0.01	0.142	
<i>Some college, no degree</i>	10.26	2.265	***	-0.03	0.151	
<i>Associates' degree or professional certificate</i>	7.76	2.319	***	-0.10	0.157	
<i>College</i>	9.22	2.329	***	0.05	0.154	
<i>Post-graduate degree</i>	14.44	2.837	***	0.64	0.208	**
Mother's employer						
<i>Private sector</i>	7.68	2.809	***			
<i>State or local government</i>	6.57	3.333	**			
<i>Federal government</i>	5.69	4.261				

Mother's industry of occupation							
<i>Agriculture & Mining</i>	18.47	5.448	***				
<i>Manufacturing</i>	3.27	3.326					
<i>Wholesale or retail trade</i>	6.70	3.322	**				
<i>Transportation or utilities</i>	7.75	3.890	**				
<i>Information</i>	9.19	4.827	**				
<i>Financial</i>	7.53	3.418	**				
<i>Professional services</i>	6.79	3.492	**				
<i>Education or health services</i>	5.90	3.138	*				
<i>Leisure or hospitality</i>	3.61	3.328					
<i>Other service related occupations</i>	7.48	3.802	**				
<i>Public administration</i>	7.05	3.960	*				
	Family's characteristics						
Natural logarithm of family income less mother's earnings contribution	0.76	0.394	**		0.28	0.030	***
Family income below the poverty threshold	9.55	3.590	***		1.80	0.150	***
Family lives in a metropolitan area	-0.04	1.506			0.03	0.102	
Family's region of residence							
<i>Northeast</i>	-5.90	1.914	**		-0.05	0.135	
<i>South</i>	-0.63	1.611			0.08	0.108	
<i>West</i>	-1.66	1.524			-0.20	0.106	**
Number of own children less than 18 years old in family	-1.11	0.478	**		-0.08	0.029	***
Notes:							
Total number of (unweighted) observations: 871							
Censored observations: 871							
Uncensored observations: 1270							
*** -- significance-level, 0.01;		** -- significance-level, 0.05;		* -- significance-level, 0.10			
Source: U.S. Census Bureau, Census Survey of Income and Program Participation, 2004 panel, wave 4.							
Note: Reference Levels for categorical variables in employment selectivity and work effort models are as follows:							
Mother's race: all other races, (Asian, American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander); Hispanic Ethnicity: not Hispanic; Marital Status: married; Educational Attainment: less than high school;							
Employer: self-employed, Industry: construction; Family income below poverty threshold: Family income equal to or above poverty;							
Family lives in metropolitan area: non-metropolitan; Family region of residence: Midwest.							

Mother's Employment Selectivity

- Our probit model for employment selectivity (choosing to work or not) was significant

Mother's Work Effort

(controlling for employment selectivity)

- Hispanic ethnicity: (+)
 - On average, Hispanic mothers worked 2.9 hours more per week than non-Hispanic mothers
- Marital status: (+)
 - On average, widowed/divorced/separated mothers worked 3.5 hours more per week than the married group
 - On average, never married mothers worked 6.2 hours more per week than the married group
- Level of educational attainment: (+)
 - On average, mothers worked 8 – 14 hours per week more than the group with less than high school education.

- Employer Type: (+)
 - On average, mothers employed in the private sector and in state or local government worked 7-8 hours more per week than self-employed mothers
- Industry of Occupation: (+)
 - On average, mothers in all industries except manufacturing and leisure or hospitality worked between 3 – 18 hours per week more than mothers in construction
- Family income below the poverty threshold: (+)
 - On average, mothers in families with incomes below the poverty threshold worked 9.6 hours per week more than the mothers not in poverty.
- Family's region of residence: (-)
 - On average, mothers who lived in the northeast worked 5.9 fewer hours than those living in the Midwest

Variable	Child Care Choice					
	<i>Relative care vs. No regular care</i>		<i>Family day care vs. No regular care</i>		<i>Organized care vs. No regular care</i>	
	Est. Coeff..	Signif. level	Est. Coeff..	Signif. level	Est. Coeff..	Signif. level
Intercept	2.30	*	2.01		-1.20	
Mother's age	-0.07	***	-0.11	***	-0.03	**
Mother's average monthly earnings	0.00		0.00		0.00	
Log average monthly total family income	0.02		-0.13		0.08	
Monthly family income below the poverty threshold	0.08		-1.41		0.40	
<i>Estimated average hours worked per week by the mother</i>	-0.01		0.05		0.02	
Mother's race						
<i>White</i>	0.61	*	0.74		0.02	
<i>Black</i>	0.24		0.93		-0.06	
Mother's Hispanic ethnicity	-0.16		-0.32		0.06	
Mother's educational attainment						
<i>High school graduate</i>	-0.60	*	-1.42	**	0.03	
<i>Some college</i>	-0.82	**	-2.52	***	0.07	
<i>AA degree, professional certificate</i>	-0.33		-0.69		0.09	
<i>College graduate</i>	-0.50		-1.36	*	0.37	
<i>Post-graduate degree</i>	-0.39		-0.48		0.48	
Residence in a Metro Area	0.05		0.24		0.12	
<i>Region of residence</i>						
<i>Northeast</i>	0.10		1.40	**	-0.16	
<i>South</i>	0.17		0.82	*	-0.16	
<i>West</i>	0.16		0.29		0.12	

	Est. Coeff..	Signif. level	Est. Coeff..	Signif. level	Est. Coeff..	Signif. level
Variable						
Intercept	2.30	*	2.01		-1.20	
Mother's age	-0.07	***	-0.11	***	-0.03	**
Mother's average monthly earnings	0.00		0.00		0.00	
Log average monthly total family income	0.02		-0.13		0.08	
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<i>College graduate</i>	-0.50		-1.36	*	0.37	
<i>Post-graduate degree</i>	-0.39		-0.48		0.48	
Residence in a Metro Area	0.05		0.24		0.12	
<i>Region of residence</i>						
<i>Northeast</i>	0.10		1.40	**	-0.16	
<i>South</i>	0.17		0.82	*	-0.16	
<i>West</i>	0.16		0.29		0.12	
<i>Family type</i>						
<i>Married couple family</i>	-1.25	**	-1.67	*	-0.15	
<i>Female headed family</i>	-0.74		-2.59	**	0.08	
<i>Housing tenure</i>						
<i>Own</i>	0.08		0.07		-0.12	
<i>Number of children in household under 18</i>	0.11	*	-0.11		0.00	
Total number of (unweighted) observations: 895						
Likelihood ratio: 113.192 *** (model goodness of fit measure)						
*** -- significance-level, 0.01; ** -- significance-level, 0.05; * -- significance-level, 0.10						
Source: U.S. Census Bureau, Survey of Income and Program Participation, 2004, wave 4.						
Note: Reference Levels for categorical variables in model are as follows:						
Mother's race: all other races, (Asian, American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander);						
Hispanic Ethnicity: not Hispanic; Marital Status: married; Educational Attainment: less than high school;						
Family lives in metropolitan area:non-metropolitan; Family region of residence: Midwest; Family owns home: family rents home.						
Family income below poverty threshold: Family income equal to or above poverty; Family type: Unmarried couple family						

Family Choice of Child Care Given Mother's Work Effort

- Model compares Parent or other relative care, Family day care, and Organized center-based to no regular care arrangement
- Mother's age: (-)
 - On average, older mothers were more likely to primarily use no regular arrangement as compared to the other three arrangements
- Mother's race: (+)
 - On average, white mothers were more likely to use relative care than no regular arrangement compared to Asian, American Indian or Alaska native, native Hawaiian or other Pacific Islander mothers.

Family Choice of Child Care Given Mother's Work Effort

- Mother's educational attainment: (-)
 - On average, mothers with an educational attainment of high school or some college no-degree were less likely to use relative care than no regular arrangement as their primary arrangement.
 - On average, mothers with an educational attainment of high school, some college no-degree, and college graduate were less likely to use family day care than no regular arrangement as their primary arrangement.

- Mother's region of residence: (+)
 - On average, mothers residing in the northeast and the south were more likely to use family day care than those in the midwest.
- Family type: (-)
 - On average, mothers in married couple families were less likely to use relative care as their primary arrangement, compared to mothers in non-married couple families.
 - On average, mothers in married couple families and female headed families were less likely to use family day care as their primary arrangement, compared to mothers in non-married couple families.
- Number of children in household under 18: (+)
 - On average, the more children under 18 that resided in the household, the more likely mothers were to choose relative care as their primary arrangement.

Future Research

- Expand the research to include additional data from wave 8 of the 2004 panel and wave 5 of the 2008 panel.
- Investigate families' choice of child care over time and assess how changes in social and economic characteristics of families affect child care choice.
- Further investigate “non-intuitive” results to determine the lack of explanatory power and the sign of educational attainment on child care choice.