CALCULATING A PRICE INDEX FOR FAMILIES WITH CHILDREN: IMPLICATIONS FOR MEASURING TRENDS IN CHILD POVERTY RATES

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This paper investigates the effects of varying consumption patterns for families with and without children on measured trends in child poverty. We first use data from consumer expenditure surveys to calculate price indices by family type. We next examine the effect of using these group-specific price indices on measured trends in child poverty. Although we find that, all else equal, children increase the cost of living, our calculations indicate that on average families with children experienced relatively lower inflation rates than families without children during the 1968 to 1987 period. While this result suggests that estimates of child poverty rates calculated using an average price index may have overstated secular increases in child poverty, we find that child poverty rates calculated using a price index specific to families with children are not substantively different from those calculated using an average index for all families.

I. INTRODUCTION

According to official estimates, the economic status of children in the United States has deteriorated over the past two decades. In 1994, 21 percent of all children lived in families whose income fell below the poverty line, compared with 14.2 percent in 1973 (*Statistical Abstract*, 1994). Additionally, poor children have become poorer; the percentage of poor children below 50 percent of the poverty line has increased over the same time period. These trends have generated a great deal of public concern for, and research on, the causes and consequences of child poverty. For example, the increase in the percentage of children in female-headed families can account for much of the increase in child poverty rates before 1980, while during the 1980s, decreases in the real income of all family types played a more important role (Fuchs, 1986; Bane and Ellwood, 1989). The consequences of poverty on children's emotional and cognitive development have been well-established (see Huston, 1991 for a review).

At the same time, however, recent research has questioned the ability of commonly used measures to accurately capture well-being. First, one line of research focuses on the measurement of poverty itself and questions whether the official poverty rate can be considered a valid social indicator (see, for example,

Watts, 1968; Danziger, *et al.*, 1986). Criticisms of the poverty rate are based on a range of factors, from the under-reporting of income in census surveys, to the proposition that consumption is superior to income as an indicator of well-being, to the short-term nature of the poverty rate. One of the more serious limitations of the poverty rate, for example, is that it is calculated using only cash income. The dramatic rise in spending for in-kind benefits would suggest that published estimates overstate poverty. In fact, a recent Census study finds that adding the market value of in-kind benefits to family income in 1990 reduced the child poverty rate from 20 percent to 15 percent (Census, 1992). More recently, Slesnick (1993) argues that poverty rates are overstated because the equivalence scales implicit in the calculation of poverty thresholds are incorrect.

Finally, in 1995 a panel assembled by the National Research Council issued a series of recommendations for a new approach to measuring poverty (Citro and Michael, 1995). One issue the panel addressed is the current method used to update the thresholds for inflation. Thus the accurate measurement of the cost of living is important to the accurate measurement of poverty.

In fact, the Consumer Price Index (CPI) is an extremely important and widely-used social indicator, measuring such factors as trends in real incomes and the growth rate of GDP. As with the official poverty rate, however, the CPI is not without critics. For example, the CPI, as a Laspeyres index, has always been thought to suffer from some bias due to its inability to capture substitution effects (see Moulton, 1996 for a review). This criticism gained the national spotlight in recent years, with remarks by Federal Reserve chairman Alan Greenspan that the CPI has overstated inflation, and with the recent report issued by the Boskin Commission concluding that for the past two decades the CPI has overstated changes in the cost of living by 1.1 percent per year (Senate Finance Committee, 1996; Boskin, *et al.*, 1998). These conclusions have dramatic implications for federal entitlement expenditures and the overall economy and, as such, have been the subjects of a fair amount of controversy.[1]

This paper examines the implications of the method used to calculate the CPI for measuring trends in child well-being. The research on the CPI suggests that it overstates changes in the cost of living. We first ask whether the CPI, as currently calculated, over- or understates changes in the cost of living for certain demographic groups, in particular, families with children. While there are no obvious priors on the direction of the bias, one can imagine that families with children consume markedly different consumption bundles than families without children, implying that these families may also experience different rates of change in the cost of living. We use data from Consumer Expenditure Surveys to construct separate price indices for families with children and for families without children.

We then examine whether these results have any implications for the measurement of trends in child poverty. Since the price index is used to update poverty thresholds, an accurate measure of price changes for families with children is important to determining trends in child well-being. We use these indices

[1]A recent issue of Challenge (Vol. 40, No. 2, March/April 1997) includes several articles discussing the Commission's findings.

to assess whether the use of an economy-wide, rather than a group-specific price index, to deflate family income leads to an under- or overestimate of the rate of child poverty.

II. THE EFFECT OF FAMILY CHARACTERISTICS ON INFLATION RATES

It has been well established that demographic factors exert an influence on consumption patterns net of price and income effects (Barten, 1964). The number and age composition of children in the household, for example, have consistently been found to influence patterns of household demand (as has the age, race, and education of the household head), even when analyzing the consumption of fairly aggregate commodity groupings. More recently, researchers have incorporated household composition into demand analyses as a means to estimate the cost of children and the allocation of household income between children and adults (Espenshade, 1984; Lazear and Michael, 1988; Deaton, et al., 1989).

More recent research has examined inflation rates for different demographic groups. Michael (1979) constructed household-specific price indices from expenditure data and found that the rate of inflation does vary, although not consistently over time, with several household characteristics. More recently, researchers have examined the consumption patterns of the elderly and found that this group faces higher rates of inflation than the average household (Bridges and Packard, 1981; Amble and Stewart, 1994). This result appears to be driven by the fact that the elderly spend a relatively high percentage of their budgets on medical care.

In the same vein, we might expect the presence of children to alter a family's consumption patterns, and thus the rate of price changes it faces. Whether this effect yields significantly different inflation rates, which in turn, yield different estimates of child poverty, is the question we address below.[2]

III. DATA AND METHODS

The Consumer Price Index (CPI) is constructed on the basis of the consumption patterns of the *typical* urban household, i.e. the average market basket. It is used in a wide variety of applications as a measure of changes in the cost of living and affects millions of individuals, e.g. workers whose wages are tied to the CPI, Social Security beneficiaries, and food stamp recipients. Specifically, the CPI is a Laspeyres index, where the index in period t is measured as the ratio of the cost of purchasing a fixed bundle of goods ($i = 1, \ldots, I$), measured in base period r, (Q_{ir}) at prices in period t (P_{it}) to the cost of purchasing that same bundle at prices in period 0 (P_{i0}). Thus, the CPI is called a "fixed quantity" index because the quantity weights remain constant. If we define an expenditure weight for item I

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[2]Families with children may also experience differential inflation rates if the presence of children is correlated with other factors that influence prices or consumption bundles. As discussed later, for example, low-income families have been found to face higher inflation rates. Thus, if families with children are over-represented among the poor, they also will face higher inflation rates. In Section IV, we examine whether the effect of children on the price index is due to its correlation with other family characteristics.

219

using base period prices as

$$w_{i,0} = \frac{P_{i0}Q_{ir}}{\sum_i P_{i0}Q_{ir}},$$

then an index of price change from the base period to period t can be calculated as

$$I_{t,0} = \sum_i w_{i0}\left(\frac{P_{it}}{P_{i0}}\right) \times 100,$$

where the weights in the base period are normalized to sum to 1. In order to obtain a set of weights, w_i, the Bureau of Labor Statistics calculates consumption patterns from the most recent Consumer Expenditure Survey, and they remain fixed until new weights from a more recent expenditure survey become available.

The problem with use of an overall index is that since prices of goods generally change at different rates, households with consumption patterns different from the average are unlikely to experience the rate of inflation indicated by the CPI. Thus, in order to construct a price index that correctly captures inflation rates experienced by households with children, it is necessary to derive a set of average expenditure weights for such households and to apply these weights to a vector of prices.[3] We do this by first obtaining expenditure weights from the 1960–61 Consumer Expenditure Survey and the 1972–73 Survey of Consumer Expenditures (CES). We use data from both surveys in an attempt to follow the method used by the BLS to construct the CPI: the official CPI from 1964 to 1977 is calculated using weights from the 1960–61 survey, and the CPI from 1978 to 1987 is calculated using weights from the 1972–73 CES.

The 1960–61 CES obtained interviews with 13,728 families regarding spending for detailed consumption items.[4] We use data from the public use tape to allocate total expenditures for each family into 52 items, covering 95 percent of total expenditures, using Michael's (1979) categorizations as a guide. From the 1972–73 survey, containing data for over 19,000 families, we use information for the 9,869 consumer units interviewed in 1972. We assign expenditures on approximately 1,600 items to the 52 categories used in the earlier survey, plus two additional items. These 54 items account for 93 percent of total expenditures (see Appendix 1 for a complete list of the expenditure items used).[5]

[3]Differential inflation rates for families with and without children might also occur if these families faced systematically different prices for similar goods and services, due, for example, to differences in residential location. While this is a potentially interesting question to investigate there is little *a priori* reason to expect such systematic price differences, and as such we focus on the effect of differing expenditure patterns across household based on the presence or absence of children (in addition to the age distribution of the children).

[4]The BLS uses an urban subset of the 1960–61 CES to construct the weights for the CPI. As it is not possible to exactly identify this urban subsample, we use information from the entire sample for our analysis.

[5]Items not counted in our definition of total expenditure include goods such as property insurance, taxes and improvement work on other properties, expenditures on business trips, funeral expenses, legal fees, and accounting fees. We also do not include gifts and contributions to persons outside the household or outlays for retirement plans.

Expenditures for housing are measured as rent for renters and rental equivalences for homeowners. However, an estimate of rental equivalence is only available on the 1972 survey. To obtain a similar estimate for families in the 1960 survey, we follow the methodology used by Slesnick (1993). Using the 1972 survey, we regress the rental equivalence for homeowners on the market value of the home, region, urban, and other demographic variables. We then use these coefficients, coupled with the characteristics of the homeowners in the 1960 survey, to estimate rental equivalences for homeowners in the 1960 survey.[6]

We then calculate expenditure weights for each of the 50 plus items for each sample family. After constructing these weights, we calculate a price index for each family by applying price data for each item, obtained from published BLS documents, to each expenditure weight (see authors' working paper, 1994, for price items used). We use weights from the 1960–61 CES to calculate price indices for 1968–77, and weights from the 1972–73 CES to calculate price indices for 1978–87.[7] While the CPI is relative to the base year 1967 (i.e. 1967 = 100), we created our index relative to 1968, given the limited availability of detailed price data before 1968.

IV. CHILDREN AND HOUSEHOLD INFLATION RATES

Selected expenditure weights for families with and without children are reported in Table 1.[8] Families with children spend a somewhat higher share of their budgets on food, clothing, and transportation, and a somewhat lower share of their budgets on medical care and housing. Most of these differences are statistically significant, and they are consistent with other research using CES data (Lazear and Michael, 1988). The results in Table 1 illustrate that families with children spend differently from families without children, which in turn suggests that they may face different rates of inflation.

Table 2 presents our calculated price index from 1969 to 1987 for different family types. The price index for families with children remains consistently lower than the indices for all families and for families without children.[9] We also find that during the 1970s the price index increased somewhat less rapidly for black families with children than for non-black families with children. By the late 1980s, however, the price index is higher for black families.

The last row of Table 2 presents calculations designed to illustrate the importance of these index differences in dollar terms. We deflate mean family

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[6]The equation used to predict rental equivalence for homeowners in the 1960 CES is: *Monthly Rent* = 46.9 + 0.0028 (*Market value of own home*) −2.9 (*North East*) −16.6 (*North Central*) −23.3 (*South*) + 30.6 (*Urban*) + 19.2 (*Education of family head* > = *college*) + 3.1 (*# Children*) + 0.00158 (*Income*) −0.00000000016 (*income squared*). The dependent variable, *Monthly Rent*, was estimated using the 1972 CES sample of homeowners. (The sample size is 5,344; all dollar values are in 1961 dollars.)

[7]Annual average price indexes from the Monthly Labor Review were used for the years 1968–75. Given that no annual averages were published beyond 1977, we used an average of June and October prices for "All Urban Consumers" for the years 1977–87.

[8]Families with children are defined as families with children under age 18 in the household.

[9]Note that the value of the index measures price changes since 1968 and not price changes from one year to the next.

221

TABLE 1

SELECTED FAMILY EXPENDITURE WEIGHTS

	With Children		Without Children	
	1961	1972	1961	1972
Food at home	0.218	0.184	0.189	0.166
	(0.085)	(0.104)	(0.100)	(0.109)
Food away from home	0.042	0.042	0.053	0.042
	(0.039)	(0.037)	(0.082)	(0.053)
Rent	0.059	0.075	0.086	0.113
	(0.086)	(0.133)	(0.128)	(0.165)
Housing costs	0.133	0.140	0.167	0.154
	(0.117)	(0.121)	(0.164)	(0.160)
Clothing	0.090	0.071	0.061	0.049
	(0.048)	(0.040)	(0.049)	(0.043)
Medical care	0.061	0.053	0.073	0.066
	(0.044)	(0.047)	(0.071)	(0.065)
Private transportation	0.123	0.171	0.101	0.152
	(0.109)	(0.127)	(0.120)	(0.147)
Entertainment	0.035	0.035	0.027	0.026
	(0.025)	(0.043)	(0.029)	(0.041)

Source: Consumer Expenditure Surveys: 1960–61 and 1972–73.

Notes: (1) Mean expenditure shares are reported with standard deviations in parentheses. (2) All differences between families with children and families without children for the same year are significant at the 5 percent level, except for "Food away from home" in 1972. (3) Entertainment = spectator admissions, participants sports, clubs dues, reading, hobbies, and music. (4) Private transportation = car purchase, gasoline, tires and tubes, repairs and parts, auto insurance, auto registration. (5) Housing costs = estimated rental equivalence (calculated only for home owners). (6) Rent = calculated only for renters. (7) Medical costs = insurance premiums, hospitalized illness, physicians services, dental services, eye care, drugs and medicines, medical appliances and supplies.

income in 1987 (approximately $30,853) to 1968 dollars, using each index. Deflating income with the index for families with children yields a real income of $10,672, while deflating with the index for families without children yields a real income of $10,414. The result is a $258 difference in purchasing power, or approximately a 2.5 percent difference.[10]

In order to determine what expenditure patterns are driving the difference in the price index, Table 3 analyzes the contribution of select commodity groups to the difference in the 1987 price index for families with and without children. Expenditure weights (columns 2 and 3) and relative price changes (column 4) are reported separately for families with and without children. In addition, commodities are classified into two groups: (1) families without children spent a *higher* proportion of their budget on these goods than did families with children and the prices of these goods increased *faster* than average (panel a), and (2) families without children spent a *lower* proportion of their budget on these goods than did families with children and the prices of these goods increased *slower* than

[10]Recall that the BLS uses a select urban subsample of the CES to calculate the CPI. As a rough test of whether our results are sensitive to the use of the entire CES sample, we calculated index differences for urban residents. The index differences between families with and without children were similar to those for the full sample, although slightly smaller.

TABLE 2

PRICE INDICES FOR DEMOGRAPHIC FAMILY GROUPS

Year	All	With Children	No Children	Black, With Children	Non-Black, With Children
1969	105.44	105.33	105.55	105.07	105.36
1970	110.51	110.32	110.71	110.22	110.34
1971	114.88	114.58	115.20	114.28	114.61
1972	118.64	118.26	119.05	118.01	118.29
1973	126.22	125.96	126.51	126.21	125.93
1974	140.63	140.49	140.79	140.38	140.50
1975	153.35	153.08	153.64	152.42	153.15
1976	162.24	161.71	162.81	160.67	161.82
1977	172.30	171.63	173.01	170.29	171.77
1978	177.83	177.46	178.13	178.98	177.29
1979	197.53	197.11	197.86	196.95	197.12
1980	222.22	221.46	222.83	219.64	221.67
1981	239.93	238.67	240.94	237.57	238.80
1982	252.62	250.69	254.16	250.35	250.72
1983	260.78	258.43	262.66	258.57	258.42
1984	270.59	267.65	272.94	268.30	267.58
1985	280.12	276.76	282.80	277.35	276.69
1986	285.20	281.33	288.29	282.83	281.15
1987	293.09	289.11	296.27	290.32	288.97
$30,853	$10,527	$10,672	$10,414	$10,627	$10,677

Notes: (1) Calculations are based on expenditure weights for consumer units from the CES (CES 1960–61 for the years 1968–77 and CES 1972–72 for the years 1978–87). Price data for 1969–87 were obtained from the Monthly Labor Review. See Section II for a description of the methodology. (2) All inflation rates are relative to the base year 1968. (3) The last row converts median family income of $30,853 in 1987 dollars to real 1968 dollars using each corresponding index (a value of $10,527 is obtained using the overall index).

average (panel b). Both of these types of goods would account for the higher price index for families without children relative to those with children.

Column 5 reports the contribution to differences in the price index of the variation in spending patterns on each commodity group. This estimate was obtained by calculating what the price index would have been for families without children, on average, if they spent the same fraction of their budgets on this commodity group as did families with children. For example, if families with children spend 5 percent of their budgets on good X, and families without children spend 3 percent of their budgets on good X, we set good X's budget share for families with children to 3 percent and assume the remaining 2 percent is spent on a good whose relative price remained constant over the period.[11] Note that because of this assumption, the explained variation in column 5 sums to more than 100 percent.

Panel (a) indicates that higher expenditures on fuel oil, gas and electricity by families without children, coupled with the relative price increases for these goods, accounts for 16.4 percent of the index difference between families with and without children. In general, the goods listed in panel (b) exerted a stronger influence

[11]If families with children spend less on the good, instead of more, then the budget share for families without children is adjusted downward and the remaining budget share is assumed to be spent on a good whose relative price was constant.

223

TABLE 3

THE INFLUENCE OF SPECIFIC COMMODITY GROUPS ON DIFFERENCES IN PRICE INDICES FOR
FAMILIES WITH AND WITHOUT CHILDREN

Commodity Group	Budget Share		Relative Price Change (1968–87)	% of Index Differences Explained
	No Children	Children		
(a) Commodities for which the budget share for families without children is greater than for families with children, and that experienced a relative price increase.				
Housing costs	0.155	0.141	1.29	6.2
Fuel oils, gas and electricity	0.052	0.046	1.58	16.4
Auto insurance and public transportation	0.036	0.029	1.39	15.3
Eye care and medical appliances and supplies	0.005	0.004	1.31	1.3
Other: reading, insurance, clothing upkeep	0.046	0.033	1.19	9.9
(b) Commodities for which the budget share for families without children is less than for families with children, and which experienced a relative price decrease.				
Household furnishings	0.032	0.042	0.78	14.8
Adult male and kids clothing	0.020	0.045	0.71	41.4
Auto costs	0.074	0.089	0.72	19.2
Dental costs	0.006	0.008	0.86	2.8
Other: school books, personal care supplies, entertainment	0.035	0.049	0.67	23.2

Notes: Columns (2) and (3) show budget shares for select commodity groups for families without children and families with children, respectively. Column (4) reports the change in the price of each commodity group relative to the overall CPI. Column (5) reports the contribution of each commodity group to explaining the differences in the price indices for families with and without children. Entertainment includes TV, radio, spectator and participation.

on the index. Families with children spent a higher fraction of their budgets on adult male and children's clothing. Coupled with the relative price decline of this commodity group, this difference accounts for 41 percent of the index difference between families with and without children.

The difference between the price index for families with children and families without children shown in Table 2 represents the "gross" effect of children on the price index, i.e. it reflects both the direct effect of the presence of children on consumption patterns and the effect of other family characteristics that may be associated with the presence of children. While this is the difference we use to determine the effect of using group-specific price indices to calculate trends in child poverty, it may also be informative to examine how the index varies with other household characteristics. By using a multivariate framework we can determine the effect on the index of children "net" of other factors and assess whether the effect of children on the price index derives from its correlation with other family characteristics.

Tables 4.1 and 4.2 report regression estimates of the relationship between the price index and select family characteristics.[12] The dependent variable is the

[12]The full results for the regressions in Tables 4.1 and 4.2 are available on request.

TABLE 4.1
Regression Estimates of The Effect of Children on the CPI

Panel (A)

	1969	1970	1971	1972	1973	1974	1975
Kid	-0.22^a	-0.37^a	-0.60^a	-0.77^a	-0.54^a	-0.32^a	-0.59^a
	(0.02)	(0.02)	(0.03)	(0.04)	(0.05)	(0.08)	(0.10)
Adj. R^2	0.0118	0.0198	0.0273	0.0279	0.0085	0.0011	0.0025

	1976	1977	1978	1979	1980	1981	1982
Kid	-1.12^a	-1.41^a	-0.76^a	-0.88^a	-1.56^a	-2.49^a	-3.71^a
	(0.11)	(0.13)	(0.18)	(0.24)	(0.32)	(0.37)	(0.39)
Adj. R^2	0.0077	0.0084	0.0018	0.0014	0.0025	0.0048	0.0097

	1983	1984	1985	1986	1987
Kid	-4.49^a	-5.56^a	-6.33^a	-7.24^a	-7.45^a
	(0.39)	(0.41)	(0.42)	(0.41)	(0.42)
Adj. R^2	0.0141	0.0196	0.0242	0.0330	0.0332

Panel (B)

	1969	1970	1971	1972	1973	1974	1975
Kid	0.05^b	-0.12^a	-0.14^a	-0.04	0.23^a	0.71^a	1.01^a
	(0.03)	(0.04)	(0.05)	(0.06)	(0.08)	(0.12)	(0.15)
Age $\times$ 100	3.79^a	3.07^a	1.16^c	1.59^c	2.51^a	6.61^a	7.28^a
	(0.33)	(0.45)	(0.62)	(0.78)	(0.97)	(1.48)	(1.88)
Age$^3 \times$ 1000	-0.18^a	-0.15^a	0.01	0.19^a	0.32^a	0.28^b	0.61^a
	(0.03)	(0.04)	(0.01)	(0.08)	(0.10)	(0.15)	(0.19)
$F_{inc} \times$ 10	0.05^a	0.08^a	0.03	-0.19^a	-0.82^a	-1.44^a	-1.17^a
	(0.02)	(0.03)	(0.03)	(0.04)	(0.05)	(0.08)	(0.11)
$F_{size} \times$ 10	0.22^a	0.08	-0.35^a	-0.13	1.89^a	3.51^a	3.94^a
	(0.07)	(0.09)	(0.12)	(0.15)	(0.19)	(0.29)	(0.37)
Adj. R^2	0.0939	0.0524	0.0576	0.0759	0.1129	0.1479	0.1584

	1976	1977	1978	1979	1980	1981	1982
Kid	0.79^a	1.14^a	1.42^a	1.07^a	0.97^b	0.83	1.44^a
	(0.17)	(0.20)	(0.27)	(0.35)	(0.47)	(0.54)	(0.57)
Age $\times$ 100	5.74^a	4.52^c	6.73^b	19.43^a	30.08^a	24.80^a	19.37^a
	(2.09)	(2.48)	(3.06)	(3.98)	(5.36)	(6.23)	(7.71)
Age$^2 \times$ 1000	0.78^a	1.30^a	0.83^a	-0.15	-0.68	0.10	1.24^c
	(0.21)	(0.24)	(0.31)	(0.40)	(0.54)	(0.62)	(0.65)
$F_{inc} \times$ 10	-1.58^a	-2.03^a	-0.45^a	-0.55^a	-0.61^a	-0.85^a	-0.95^a
	(0.12)	(0.14)	(0.06)	(0.08)	(0.11)	(0.13)	(0.14)
$F_{size} \times$ 10	2.70^a	3.31^a	3.48^a	4.92^a	4.86^a	4.34^b	2.62^c
	(0.41)	(0.49)	(0.72)	(0.94)	(1.27)	(1.47)	(1.53)
Adj. R^2	0.1332	0.1548	0.1529	0.1516	0.1463	0.1436	0.1573

	1983	1984	1985	1986	1987
Kid	1.44^a	1.57^a	1.45^b	2.18^a	2.05^a
	(0.57)	(0.60)	(0.62)	(0.60)	(0.62)
Age $\times$ 100	15.07^b	12.94^c	8.00	2.43	3.60
	(0.65)	(6.85)	(7.07)	(6.84)	(7.06)
Age$^2 \times$ 1000	1.65^a	0.23^a	2.75^a	3.81^a	3.64^a
	(0.65)	(0.07)	(0.71)	(0.68)	(0.71)
$F_{inc} \times$ 10	-1.00^a	-1.07^a	-0.81^a	-0.99^a	-1.05^a
	(0.14)	(0.14)	(0.16)	(0.14)	(0.15)
$F_{size} \times$ 10	-0.10^b	-0.92	-5.40^a	-4.94^a	-5.73^a
	(1.54)	(1.61)	(1.91)	(1.61)	(1.67)
Adj. R^2	0.1527	0.1613	0.1489	0.1687	0.1620

Note: Panel (A) reports simple regressions which additionally include a constant—parameter estimates are listed with standard errors in parentheses. Superscripts a, b, c denote significance levels of 1%, 5%, and 10% respectively. Panel (B) reports select estimates—all years additionally include a constant, three region dummies, an urban dummy, a dummy for black, three educational attainment dummies, and a dummy for female-headed households. Variables are defined as: Kid = 1 if there are kids in the household, age = age of household head, F_{inc} = family income and F_{size} = family size.

225

TABLE 4.2

REGRESSION ESTIMATES OF THE EFFECT OF CHILDREN ON THE CPI

Panel (A)						
	1969	*1970*	*1971*	*1972*	*1973*	*1974*	*1975*
AU6	-0.49^a	-0.59^a	-0.67^a	-0.94^a	-1.07^a	-1.29^a	-1.64^a
	(0.03)	(0.04)	(0.05)	(0.06)	(0.08)	(0.13)	(0.16)
SU6	0.20^a	-0.42^a	-0.68^a	-0.75^a	-0.17^a	-0.39	-0.28^c
	(0.02)	(0.03)	(0.05)	(0.06)	(0.07)	(0.12)	(0.15)
NU6	0.09^a	-0.24^c	-0.53^a	-0.71^a	-0.52^a	-0.28^a	-0.62^a
	(0.02)	(0.03)	(0.04)	(0.05)	(0.06)	(0.10)	(0.12)

	1976	*1977*	*1978*	*1979*	*1980*	*1981*	*1982*
AU6	-1.96^a	-2.22^a	-1.98^a	-2.90^a	-3.76^a	-4.33^a	-5.14^a
	(0.18)	(0.21)	(0.31)	(0.40)	(0.54)	(0.62)	(0.65)
SU6	-0.42^a	-0.58^a	-0.17	-0.08	-0.48	-1.51^a	-2.87^a
	(0.16)	(0.19)	(0.27)	(0.35)	(0.47)	(0.55)	(0.57)
NU6	-1.15^a	-1.53^a	-0.55^b	-0.52^c	-1.19^a	-2.24^a	-3.56^a
	(0.13)	(0.16)	(0.24)	(0.31)	(0.42)	(0.48)	(0.50)

	1983	*1984*	*1985*	*1986*	*1987*		
AU6	-5.13^a	-6.05^a	-6.01^a	-6.73^a	-6.83^a		
	(0.66)	(0.69)	(0.70)	(0.69)	(0.71)		
SU6	-3.92^a	-5.13^a	-6.17^a	-7.27^a	-7.57^a		
	(0.57)	(0.60)	(0.62)	(0.60)	(0.62)		
NU6	-4.56^a	-5.61^a	-6.62^a	-7.47^a	-7.69^a		
	(0.55)	(0.53)	(0.54)	(0.53)	(0.54)		

Panel (B)						
	1969	*1970*	*1971*	*1972*	*1973*	*1974*	*1975*
AU6	*0.06*	-0.15^a	*-0.02*	0.19^b	0.62^a	1.44^a	2.33^a
	(0.04)	*(0.05)*	*(0.07)*	*(0.09)*	*(0.11)*	*(0.17)*	*(0.21)*
SU6	0.13^a	-0.13^a	*-0.08*	0.25^a	0.81^a	1.64^a	2.37^a
	(0.04)	*(0.06)*	*(0.08)*	*(0.09)*	*(0.12)*	*(0.18)*	*(0.23)*
NU6	0.06^b	-0.12^a	-0.19^a	-0.11^c	0.14^c	0.54^a	0.68^a
	(0.03)	*(0.04)*	*(0.05)*	*(0.07)*	*(0.08)*	*(0.12)*	*(0.16)*
$Age \times 100$	3.87^a	2.90^a	2.02^a	3.33^a	5.37^a	11.91^a	16.70^a
	(0.38)	*(0.51)*	*(0.71)*	*(0.89)*	*(1.10)*	*(1.67)*	*(2.13)*
$Age^2 \times 1000$	-0.18^a	-0.13^a	*0.02*	*0.05*	*0.08*	*0.16*	*0.17*
	(0.04)	*(0.05)*	*(0.07)*	*(0.08)*	*(0.11)*	*(0.16)*	*(0.20)*
$F_{inc} \times 10$	0.05^a	0.08^a	0.03	-0.17^a	-0.77^a	-1.37^a	-1.60^a
	(0.02)	(0.03)	(0.03)	(0.04)	(0.05)	(0.08)	(0.11)
$F_{size} \times 10$	0.13^c	-0.09	-0.39^a	-0.39^b	1.35^a	2.66^a	2.78^a
	(0.07)	(0.10)	(0.14)	(0.18)	(0.22)	(0.33)	(0.42)

	1976	*1977*	*1978*	*1979*	*1980*	*1981*	*1982*
AU6	2.20^a	3.22^a	2.27^a	1.95^a	2.51^a	2.81^a	3.97^a
	(0.23)	(0.28)	(0.35)	(0.45)	(0.61)	(0.71)	(0.74)
SU6	2.15^a	2.84^a	1.86^a	1.74^a	1.58^a	1.32^c	1.94^a
	(0.25)	(0.30)	(0.36)	(0.47)	(0.63)	(0.73)	(0.76)
NU6	0.43^a	0.59^a	0.71^b	0.28	-0.27	-0.67	-0.44
	(0.17)	(0.21)	(0.30)	(0.40)	(0.53)	(0.62)	(0.64)
$Age \times 100$	15.73^a	19.15^a	11.45^a	24.56^a	38.44^a	35.19^a	32.50^a
	(2.36)	(2.79)	(3.23)	(4.20)	(5.67)	(6.59)	(6.84)
$Age^2 \times 1000$	0.05	0.08	0.42	-0.60	-1.41^a	-0.81	0.09
	(0.23)	(0.27)	(0.32)	(0.42)	(0.56)	(0.65)	(0.68)
$F_{inc} \times 10$	-1.46^a	-1.87^a	-0.45^a	-0.55^a	-0.61^a	-0.85^a	-0.95^a
	(0.12)	(0.14)	(0.06)	(0.08)	(0.11)	(0.13)	(0.14)
$F_{size} \times 10$	1.57^a	2.01^a	3.65^a	4.96^a	5.29^a	5.10^a	3.68
	(0.47)	(0.56)	(0.76)	(0.99)	(1.33)	(1.54)	(1.60)

TABLE 4.2—continued

	1983	1984	Panel (B)—continued 1985	1986	1987
AU6	4.34[a]	4.75[a]	4.99[a]	5.80[a]	5.69[a]
	(0.74)	(0.78)	(0.80)	(0.78)	(0.80)
SU6	1.79[b]	1.89[b]	1.63[b]	2.42[a]	2.23[a]
	(0.77)	(0.80)	(0.83)	(0.80)	(0.83)
NU6	−0.66	−0.70	−1.02	−0.38	−0.50
	(0.65)	(0.68)	(0.70)	(0.68)	(0.70)
Age × 100	29.89[a]	29.07[a]	25.76[a]	20.68[a]	21.88[a]
	(6.90)	(7.22)	(7.46)	(7.21)	(7.45)
$\text{Age}^2 \times 1000$	0.35	0.86	1.19[c]	2.21[a]	2.04[a]
	(0.68)	(0.71)	(0.74)	(0.71)	(0.74)
$F_{\text{inc}} \times 10$	−1.00[a]	−1.07[a]	−1.08[a]	−0.99[a]	−1.05[a]
	(0.14)	(0.14)	(0.15)	(0.14)	(0.15)
$F_{\text{size}} \times 10$	−1.46	−0.60	−1.56	−3.12[c]	−3.85[b]
	(1.62)	(1.69)	(1.75)	(1.69)	(1.74)

Note: Panel (A) reports simple regressions which additionally include a constant—parameter estimates are listed with standard errors in parentheses. Superscripts *a*, *b*, *c* denote significance levels of 1%, 5%, and 10% respectively. Panel (B) reports select parameters estimates—all years additionally include a constant, three region dummies, an urban dummy, a dummy for black, three educational attainment dummies, and a dummy for female-headed households. Children variables are AU6 = 1 if all children are less than 6 years old, SU6 = 1 if some children are less than 6, and NU6 = 1 if none under six (reference group is no children).

calculated price index for each individual household. Thus each regression examines the effect of covariates on the cumulative price change since 1968. The analysis is performed for each year from 1969 to 1977 using the 1961–62 CES sample, and from 1978–87 using the 1972 CES sample. Observations with missing information were deleted from the samples. We use two different specifications to account for the presence of children: (1) a dummy variable for whether the family has any children, as shown in Table 4.1, and (2) three dummy variables capturing the age distribution of the children (the omitted category is no children), as shown in Table 4.2.

Panels (A) of Tables 4.1 and 4.2 present univariate results that correspond to the patterns found in Table 2, i.e. the price index is consistently lower for families with children than for families without children. Additionally, the index is relatively lower over most of the period for families with young children. Panels (B) of each table control for a number of additional family characteristics (see Appendix 2 for variable means). We now find that in most cases the effect of children on the price index reverses sign from negative to positive, indicating that, controlling for other family characteristics that may be associated with the presence of children, children increase the price index. Further analyses revealed that the negative univariate effect of children on the price index derives almost entirely from the fact that families with children are on average younger than other families. As the regression coefficients on the quadratic in age indicate, the price index for younger families is lower than that for older families, a finding that is consistent with the results of Bridges and Packard (1981).

When we characterize the presence of children by their ages, (Table 4.2) the results indicate that the positive effect of children on the price index derives primarily from the effect of younger children, with the youngest children having the

greatest impact. This result is consistent with the idea that younger children alter the family consumption bundle more dramatically than do older children.

Several of the other variables are also significant. The price index is higher for lower income families, a result that is consistent with earlier findings (Muellbauer, 1974; Williamson, 1977). Although income appears to play an important role in determining the price index, its inclusion did not alter the coefficients for the presence of children. Thus, the effect of children on the price index does not derive from its correlation with family income. Urban families (not reported) faced higher price indices through the early 1970s, but lower price indices from 1973 onward. These results for the early 1970s are similar to the effect of urbanicity found in Michael (1979). Finally, black families (not reported) face lower price indices than non-black families during the 1970s. Michael also finds that non-black families experienced higher price changes over the 1967–72 period.

We conclude from the above results that during the 1968–87 period, prices increased less rapidly for families with children than for those without children, even though the presence of children *per se* is associated with higher family inflation rates. Thus if we calculate "real" income using the group-specific price indices shown in Table 2, we would expect that poverty rates for children would be *lower* than when using an average index. We address this issue in the following section.

V. CHILD POVERTY RATES

The estimation of poverty rates depends in an important way on the Consumer Price Index. A family is defined to be in poverty in a given year if family income is below the official poverty threshold. This threshold was created in the mid-1960s and is updated for inflation each year using the CPI. While we focus here on the effect of the price index on poverty rates, it should also be noted that the price index affects the updating of other transfers that benefit children and the measurement of real income by which many families qualify for means-tested benefits.

In order to compare the effect of using the overall index vs. an index specific to families with children, Table 5.1 reports child poverty rates for several years as calculated from the March Current Population Surveys using the price index for families with children and the average price index for all families. The indices were used to update the relevant poverty threshold for each family from its value in 1968.[13] The estimates in the first row for each year are calculated using the average price index for all families as obtained from the CES (Table 2, column 2), and the estimates in the second row are based on the average price index for CES families with children (Table 2, column 3).[14]

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[13]We deflated each poverty threshold back to its 1968 value by using the ratio of the current year CPI to the CPI in 1968.

[14]We also calculated poverty rates for black and non-black children using the average price index for black and non-black families with children, respectively. The results were very similar to the results presented here using the average price index for all families with children.

TABLE 5.1

POVERTY RATES FOR CHILDREN BY SELECT FAMILY CHARACTERISTICS CONSUMER
EXPENDITURE SURVEY BASED PRICE INDICES

	All	Black	Non-Black	Female-Headed	Children < 6
Price index used:					
1976					
All	0.164	0.418	0.120	0.533	0.192
With children	0.162	0.415	0.119	0.531	0.190
1979					
All	0.159	0.396	0.117	0.481	0.185
With children	0.156	0.389	0.115	0.476	0.182
1981					
All	0.190	0.445	0.145	0.529	0.226
With children	0.188	0.441	0.144	0.527	0.224
1984					
All	0.201	0.467	0.154	0.542	0.236
With children	0.199	0.462	0.153	0.538	0.234
1985					
All	0.195	0.437	0.154	0.545	0.231
With children	0.193	0.431	0.152	0.539	0.228

Notes: Calculations based on the CPS—1977, 1980, 1982, 1985 and 1986. Poverty thresholds for each family from the CPS were updated using each index above. Family income was then compared with each of these thresholds, giving two estimates of child poverty. "All" refers to the average index over all CES families. "With children" is an average index for all CES families with children.

As expected, we see that poverty rates for children calculated using the price index for CES families with children (row 2) are lower in all years than the rates calculated using the overall price index (row 1). The differences, however, are never more than one-tenth of a percentage point. Thus, although price increases experienced by families with and without children are significantly different statistically, the magnitude of this difference seems to be too small to affect the measurement of child poverty in a way that is significant from a policy point of view.

Another aggregate poverty measure is the average poverty gap, or the average difference between the poverty line and family income for those below poverty. Using the average price index for all families, we estimate an average poverty gap in 1985 for children in poverty of $4,829, while using the price index for families with children yields an estimate of $4,749. The $80 difference between the two estimates is not substantively large.

Although we have calculated poverty rates using the average price index for families with children, this index was calculated using samples of families from 1960 and 1972. The characteristics of families with children may have changed significantly between 1972 and 1985, suggesting that the CES index may not be appropriate for families with children in 1985. An obvious example is that the percentage of families with children that are female-headed has increased significantly since 1972. We might expect female-headed families to experience relatively different rates of inflation than two-parent families, given their different living situations without concomitant differences in housing and child care costs. In this

229

TABLE 5.2

POVERTY RATES FOR CHILDREN BY SELECT FAMILY CHARACTERISTICS CURRENT
POPULATION SURVEY BASED PRICE INDICES

	All	Black	Non-Black	Female-Headed	Children < 6
Price index used:					
1976					
All	0.167	0.424	0.123	0.542	0.194
With children	0.165	0.419	0.121	0.536	0.193
1979					
All	0.157	0.393	0.116	0.478	0.184
With children	0.157	0.391	0.116	0.477	0.183
1981					
All	0.190	0.446	0.145	0.530	0.227
With children	0.189	0.443	0.144	0.528	0.226
1984					
All	0.205	0.473	0.158	0.548	0.240
With children	0.203	0.470	0.156	0.545	0.238
1985					
All	0.199	0.442	0.157	0.552	0.235
With children	0.198	0.440	0.155	0.549	0.233

Notes: Calculations based on the CPS—1977, 1980, 1982, 1985 and 1986. Poverty thresholds for each family from the CPS were updated using each index above. Family income was then compared with each of these thresholds, giving two estimates of child poverty. "All" refers to the average index over all CPS families. "With children" is an average index for all CPS families with children.

case, the average price index for families with children, calculated over a sample in 1972 that consisted of relatively few female-headed families, will be an inaccurate measure for families with children in 1985.[15]

In order to examine this issue, Table 5.2 evaluates whether accounting for the changing characteristics of families with children affects the price index and the calculation of child poverty by using the regression coefficients reported in Table 4.1 to predict an index for each family in the CPS. Recall from this table, for example, that larger families generally experienced higher rates of inflation than smaller families, as indicated by the coefficient on family size. As a comparison between using an average vs. family-specific index, we also present poverty rates calculated using an average of the predicted indices for all families in the CPS. As the numbers in Table 5.2 indicate, (1) the difference between using an individual vs. an average predicted index are minimal, and (2) accounting for the changing characteristics of the population (Table 5.1 vs. 5.2) has a slightly bigger, although still small, effect on the price index and estimates of child poverty. While predicting an index for individual families is not a realistic policy recommendation, the estimates indicate that accounting for the changing characteristics of the population may have a small impact on the price index.

[15]Of course, a similar issue arises for all consumers when using the index calculated based on expenditure patterns for CES consumers in 1972. For example, the average consumer was more educated in 1985 than in 1972. This fact, coupled with the regression estimates indicating that more educated families face lower rates of inflation (see the full results from Tables 4.1 and 4.2—available on request), suggests that the average index may be similarly inappropriate.

We next examine the effect of using the predicted indices on another measure of child welfare—the distribution of children (according to their family's income) who fall below the poverty line. Deflating income by an average index for families with children will have no effect on estimates of the distribution of income because each family's income is multiplied by the same factor. The use of family-specific indices, on the other hand, may have an effect on the distribution of income, given that a family's characteristics and, thus consumption patterns, tend to be correlated with its position in the income distribution. Table 6 reports alternative estimates of the distribution of children below the poverty line in 1976,

TABLE 6

THE DISTRIBUTION OF CHILDREN BELOW POVERTY

Percent of Poor Children with Family Income:	< 50% of Poverty Line	50–75% of Poverty Line	75–100% of Poverty Line
1976			
CPS, all	0.308	0.308	0.384
CPS, individual	0.309	0.315	0.377
1981			
CPS, all	0.413	0.294	0.293
CPS, individual	0.412	0.292	0.284
1984			
CPS, all	0.436	0.303	0.261
CPS, individual	0.438	0.302	0.256

Notes: Calculations based on the CPS—1977, 1982 and 1985. Poverty thresholds for each family from the CPS were updated using each index above. Family income was then compared with these thresholds, giving the ratio of the family's income to the poverty level. "CPS, all" is an average of a predicted price index for each CPS family, while "CPS, individual" is a predicted, family-specific index.

1981, and 1985, using the average predicted index vs. a family-specific index. The results indicate that using an average price index as opposed to a family-specific index has essentially no effect on the measurement of the percentage of children in poverty who live below 50 percent of the poverty line and those who live in families with income 50 to 75 percent of the poverty line. We see that in all three years, however, use of the average index overstates the percentage of children living in families with income within 25 percent of the poverty line. Nevertheless, as with the results in Tables 5.1 and 5.2, we see that using the different indices has only a modest effect on this measure of children's economic status.

Thus, although we document differences in the price index between families with children and families without children, the magnitude of these differences suggests that the effect of using an average vs. a group-specific price index to calculate real income would be minimal. Also, we find only small differences in estimates of child poverty using the two indices.

VI. CONCLUSIONS

We find that families with children experienced lower inflation rates than families without children over the period 1968–87. Results from a multivariate

231

analysis suggest, however, that children *per se* do not skew consumption patterns in the direction of commodity groups that have experienced less rapid price increases. Rather, this result follows from the fact that families with children tend to be younger on average than other families, coupled with the fact that younger families experience lower inflation rates. In fact, holding the age of the family head constant, children appear to alter family consumption patterns in a way that produces relatively higher family rates of inflation.

Nevertheless, when we use group-specific price indices to calculate trends in real income we find that the resulting estimates of child poverty are not substantively different from estimates obtained using an overall price index. While past research suggests that calculating group-specific price indices might be more appropriate for populations, such as the elderly, the evidence at this point, for the 1970s and 1980s, does not suggest that a separate index is warranted for families with children.

APPENDIX 1

EXPENDITURE ITEMS (CONSUMER EXPENDITURE SURVEYS)

Food at home; Food away from home; Alcohol; Tobacco; Rent; Interest on mortgages; Property taxes; Property insurance and other; Repairs and replacements; Owned vacation home; Solid and petroleum fuels; Gas and electricity; Water and sewerage; Telephone and telegraph; Other household services; Household supplies; Household textiles; Furniture; Floor coverings; Appliances; Housewares; Insurance on furnishings; Other home furnishings; Clothing, men; Clothing, boys; Clothing, women; Clothing, girls; Footwear, men; Footwear, women; Footwear, children; Clothing, children under 2; Clothing materials; Clothing upkeep; Automobile purchase; Gasoline, motor oil, *etc.*; tires and tubes; repairs and parts; auto insurance; auto registration and other; public transportation; hospitalized illness; physicians services; dental services; eye care; drugs and medicines; medical appliances, supplies; personal care services; personal care supplies; television; radio, phonograph; spectator admissions; participant sports; club dues, hobbies; reading; music*; tuition+; school books+

Notes: * Obtained for 1960 weights, but not for 1972, + obtained for 1972 weights, but not for 1960.

APPENDIX 2

VARIABLE MEANS—CES SAMPLES

	1960–61	1972–73
Families with children	0.52	0.44
Black	0.09	0.10
Age of head	47.5	47.6
Education of head < H.S.	0.53	0.41
Education of head = H.S.	0.26	0.31
Education of head > H.S.	0.21	0.28
Female-headed family	0.17	0.20
Family size	3.2	2.9
Family income	6,328	1,1150
Urban	0.64	0.62
N	13,380	9,243

Source: CES– 1960–61 and 1972–73. Sample weights were used.

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233