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ABSTRACT

In the study of the determination of family size it is natural to focus on variables that describe the position of parents at the time of family formation. In fact, however, we do not have perfect measures of all that is relevant at this time; and for some of the "true" variables that matter, better proxies may be found in variables that describe the families from which the husband and wife came. This study explores the relationship between the number of children that couples have and some variables describing the background of the husband. When a man had an affluent or educated father and came from a small family or from a non-farm background, he and his wife tend to have fewer children than other couples. This is not just because these couples were themselves more affluent or educated; even when the "current" variables are introduced into the analysis, a statistically significant effect of the background variables persists. The effect of the background variables may be due to taste differences or to differences in prices and opportunities not adequately measured by the "current" variables. Professor Easterlin hypothesized that those who grew up in affluent parental homes would tend to have fewer children than others because of the tastes for a high standard of living acquired there. (Author/JM)

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PREPARED FOR THE NATIONAL INSTITUTES OF HEALTH

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25th Year

Rand

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PREFACE

In this report evidence is presented concerning the relation between the characteristics of one generation and the number of children born to the next generation. This aspect of the family formation process has obvious implications for the study of trends in fertility and the associated distributional aspects of differential fertility, but it has not been very well researched.

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Yoram Ben-Porath of the Hebrew University in Jerusalem is a consultant to The Rand Corporation.

SUMMARY

In the study of the determination of family size it is natural to focus on variables that describe the position of the parents at the time of family formation. In fact, however, we do not have perfect measures of all that is relevant at this time; and for some of the "true" variables that matter, better proxies may be found in variables that describe the families from which the husband and wife came.

This study explores the relationship between the number of children that couples have and some variables describing the background of the husband (the data used do not describe the background of the wife). When a man had an affluent or educated father and came from a small family or from a non-farm background, he and his wife tend to have fewer children than other couples. This is not just because these couples were themselves more affluent or educated; even when the "current" variables are introduced into the analysis, a statistically significant effect of the background variables persists.

The effect of the background variables may be due to taste differences or to differences in prices and opportunities not adequately measured by the "current" variables. Professor Richard Easterlin of the University of Pennsylvania, trying to bridge the treatment of fertility in sociology and in economics, offered the hypothesis that those who grew up in affluent parental homes would tend to have fewer children than others because of the tastes for a high standard of living acquired there. The findings here are consistent with this "Easterlin Effect," but one cannot exactly distinguish from the data between this and alternative mechanisms of intergenerational influences.

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CONTENTS

I. INTRODUCTION

The effects of economic characteristics of parents on the status and behavior of their children have recently attracted the interest of economists (Bowles, 1972; Griliches and Mason, 1972). Sociologists have been more interested in these questions and have covered a broad range of topics. The recent contribution of Blau and Duncan (1970) is well known among economists, but it would be impossible to cite all the other relevant contributions.

Parents affect the economic opportunities of their offspring by transferring material wealth to them; by transmitting hereditary characteristics; by investing resources in their nutrition, health, and education (investment in human capital); and by their own economic and social position. Not only do some parents give their children better opportunities than others, but the rates of return in alternative pursuits may be differentially affected, setting in motion different life cycle patterns of educational and occupational choices. In addition parents may affect the tastes of their offspring by generating positive or negative "demonstration effects," or by deliberate attempts to manipulate their children's aspirations. Many of the skills that determine opportunities are unobservable, and there is often no way of distinguishing between them and "tastes."

The importance of getting some notion about the magnitudes and mechanisms of the intergenerational effect is obvious. Given the negative association between family size and economic position and given what we know about number of children and the quantity and quality of their education, it is clear that these intergenerational links are an element in the widening of income inequality from generation to generation (see Kuznets, 1972).

II. FERTILITY: AN EASTERLIN EFFECT

The parental effects that concern me here are the effects of the characteristics of the first generation on the size of the third generation. A specific hypothesis concerning parental effects on fertility has been offered by Richard A. Easterlin: People who are exposed to a high standard of living in their adolescence develop expectations and tastes with respect to consumption that tend to depress fertility, other things equal (Easterlin, 1968, 1970). The relationship that Easterlin expects to find and pursues in several time series studies is that first generation income will be inversely related to the size of the third generation (Easterlin, 1968).

Another obvious intergenerational link is the number of children of the first generation, or the numbers of siblings of the second generation. The number of siblings may have had some effect on the standard of living that the members of the second generation experienced at their parents' homes. (The parents may have decided jointly on the number of children and the standard of living, but it is in any case their <u>ex post</u> level that matters here.) There is no reason to restrict simple taste effects to consumption. The number of children living in the first generation household may have directly affected the taste for children of the second generation. Although the effect of the standard of living on fertility is inverse, it is impossible to predict the sign of the direct taste effect.

If s_i is standard of living aspired to by generation i, y_i its full income, n_i the number of children of generation i, and x_i a vector of other variables affecting n_i, the argument is

(1) $s_i = s(y_{i-1}, n_{i-1})$,

(2) $n_i = n[s(y_{i-1}, n_{i-1}), n_{i-1}, x_i, y_i]$.

The three working hypotheses are as follows:

(3) $s_1 = \frac{\partial s_i}{\partial y_{i-1}}$ 0; $s_2 = \frac{\partial s_i}{\partial n_{i-1}}$ 0; $n_{i1} = \frac{\partial n_i}{\partial s_i}$ 0;

so that the relationship between the number of children n_i and first generation income (y_{i-1}) is

$$(4)\quad \left.\frac{\partial n_i}{\partial y_{i-1}}\right|_{x_i, y_i, n_{i-1}} = n_{i1}s_1 > 0.$$

The relationship between the number of children of the second and first generations is

$$(5)\quad \left.\frac{\partial n_i}{\partial n_{i-1}}\right|_{x_i, y_i, y_{i-1}} = n_{i1}s_2 + n_{i2}.$$

If the partial taste effect of the number of children of the first generation (n_{i2}) is non-negative,[1] then the total effect is positive and one expects people who come from large families to have more children than others.

The other variables in equation (2), the income and other characteristics of the second generation, are also not independent of first generation characteristics. If x is, for example, the schooling of the second generation, certainly it is a function of the first generation's income and the number of siblings. Thus, there is a full range from "gross" to "net" first generation effects on fertility, depending on the degree to which one holds constant variables describing the second generation husband and wife, variables that depend in turn on their parents' characteristics. Cruder relations are:

$$(6)\quad \left.\frac{\partial n_i}{\partial y_{i-1}}\right|_{n_{i-1}} = \left.\frac{\partial n_i}{\partial y_{i-1}}\right|_{y_i, x_i} + n_{i3}\left.\frac{\partial x_i}{\partial y_{i-1}}\right|_{n_{i-1}} + n_{i4}\left.\frac{\partial y_i}{\partial y_{i-1}}\right|_{n_{i-1}},$$

$$(7)\quad \left.\frac{dn_i}{dn_{i-1}}\right|_{y_{i-1}} = \left.\frac{\partial n_i}{\partial n_{i-1}}\right|_{y_i, x_i} + n_{i3}\left.\frac{\partial x_i}{\partial n_{i-1}}\right|_{y_{i-1}} + n_{i4}\left.\frac{\partial y_i}{\partial n_{i-1}}\right|_{y_{i-1}}.$$

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[1] $n_{i2} = \left.\frac{\partial n_i}{\partial n_{i-1}}\right|_{s_i, x_i, y_i}$

The total relation will be similar except that both will be affected by the relation between n_{i-1} and y_{i-1}.

In principle one could use cross section data to support or reject the Easterlin hypothesis. In view of the relatively unfamiliar nature of the problem and the potentialities for many other hypotheses, this study will be just an excursion through some data, mining for various first generation effects on fertility. These "effects" include characteristics of the household where the second generation grew up, which requires reexamination of the effects on fertility of the characteristics of the second generation husband and wife. I shall later raise some questions about the interpretation of the findings.

III. SOME PRELIMINARIES

It seems reasonable for many questions to try to distinguish between the background effects of religion or ethni[illegible] and those of first generation income or schooling. The rati[illegible] presumably is that when the characteristics of parents and children are perfectly, or almost perfectly, correlated then it is impossible and hardly interesting to distinguish between first and second generation effects. The characteristics of the first generation that are more interesting are those that change or could change between generations. Given that such mutable characteristics as income or education are often correlated in the cross section with such ascriptive and nearly immutable traits as religion and ethnic affiliation, it is important to control for the latter. (Of course the mutable characteristics may be so highly correlated across generations that a credible distinction between the first and second generation effects may be impossible.) A conservative view of intergenerational effects is obtained by examining the data within ethnic and religious groups. I shall often restrict myself to whites, non-Catholics (WNC) and shall have much less to say about the smaller groups of blacks and Catholics.

The data used in this report are from the Panel Study of Income Dynamics produced for the Office of Economic Opportunity by James Morgan and his associates in the Survey Research Center of the University of Michigan. The sample included about 4,900 families, and blacks were overrepresented. The first wave was taken in 1968. The data used here are from 1968, 1969, and 1970, but I do not use the longitudinal aspect of the study. Most of the information in the questionnaire pertains to the head of the family. To avoid some of the ambiguities that come from premature death or from divorce, I concentrate on couples where both husband and wife are present; the information on "head" is on the husband. There is some information about the household where the husband grew up, mostly about his own father. This includes the father's schooling, major occupation, region and type of community, and an evaluation by the respondent whether his father was poor or rich. Number of siblings, schooling of oldest brother or sister, and evaluation of their economic position are given. There is no information on the mother of the husband and on the parents of his wife. There is no direct question on income of parents. The procedure adopted here was to estimate the earnings of the husband's father (the first generation) by running a regression of the natural logarithm of earnings on years of schooling, and dummy variables for urban/rural, south/non-south residence, major occupation, and age and age squared. This is a crude estimate of the first generation's careers extending over several decades in terms of constant 1966 prices. The approach has obvious but unavoidable limitations.

The questionnaire tried to isolate completed families by asking whether the couple intended to have more children. One can have some legitimate doubts about the firmness of such "commitments," but this can be useful information. I performed some of the analysis on white, non-Catholic "complete" families (WNCC), excluding from the sample those who indicated that they wanted more children. WNCC also excluded those who indicated that they could not have more children even if they wanted them, people whose actual number of children may be lower than the desired number. (I do not try to exclude families with "excess" children.) Most of the results presented here pertain to the population of married couples, husband and wife present, where the wife is 35 years old or older. As the purpose of the Michigan survey was not specifically demographic, the information on number of children is not a demographer's dream. The question pertains to the number of children the husband had, and there is no way of knowing whether this includes children who died or whether they were all born to the current wife. Another imperfect surrogate for the desired completed family size is the ideal number of children.[1]

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[1]The observations in the sample of the second generation have weights designed to extrapolate estimates for the second generation population of households. If one wants to talk about the population of the first generation, obviously many are "overrepresented" in the second generation. In tables where second generation characteristics are presented as dependent on first generation income or schooling, the weights of observations for the second generation were divided by the number of siblings plus one. (The correct divider would have been the number of *surviving* second generation plus one.)

IV. EVIDENCE

THE CRUDE RELATIONSHIPS BETWEEN FERTILITY AND PARENTAL VARIABLES

The first generational effects that I consider are partial and refer only to the husband's side, and even here I do not know anything about the husband's mother. I shall use "first generation" variables to refer to the characteristics of the husband's father, the number of siblings of the husband, the region where he grew up, and whether he comes from a farm background. When I use "second generation" it is always the current husband.

In Table 1, part a, the average number of children of the second generation couple. n_i, is related to the predicted annual earnings of the first generation father. An inverse relation is observed among whites, non-Catholics, and Catholics. The relation tends to be more pronounced in the relatively lower levels of first generation income (below $4000). Among blacks, more than half of the first generation fathers are concentrated in the lowest income group, and their children have on the average one fewer child than the sons of those with predicted earnings of $3,000 or more. The variation within this higher category is erratic.

When the "ideal" rather than actual number of children is considered (Table 1, part b) one observes a slightly narrower range of variation and a somewhat flatter curve in the case of white non-Catholics. The relationships among Catholics and blacks are erratic.

The differences between the two groups of white non-Catholics are not large. The "completed" group shows a somewhat narrower range of variation, which results from respondents' tendency to conform to standards and suppress their individual "deviations." In the following tables it will suffice to consider couples where the wife is 35 years old or more. Age may be a better criterion here than intentions.

The association between the number of children in the third generation and the number of siblings of the second generation husband, (dn_i/dn_{i-1}), is direct (see Table 2; also Duncan et al., 1965). It is clear among white Catholics and non-Catholics and is less clear among

Table 1

NUMBER OF CHILDREN IN THE THIRD GENERATION BY PREDICTED EARNINGS OF FIRST GENERATION[a]

First Generation Predicted Annual Earnings ($)	White Non-Catholics, Wife 35+	White Non-Catholics "Completed"[b]	White Catholics, Wife 35+	Blacks, Wife 35+
a. Actual number of children				
Total	2.66 (931)	2.42 (1131)	3.43 (266)	3.90 (341)
to 2,999	3.51 (203)	3.29 (226)	4.17 (14)	4.43 (212)
3,000-3,499	2.97 (184)	2.74 (213)	3.77 (42)	3.16 (42)
3,500-3,999	2.47 (86)	2.37 (112)	4.40 (23)	3.85 (20)
4,000-4,999	2.46 (222)	2.36 (262)	3.62 (81)	2.68 (35)
5,000-5,999	2.44 (141)	2.41 (166)	3.17 (73)	5.04 (11)
6,000+	2.30 (95)	2.21 (152)	2.66 (33)	3.33 (21)
b. Ideal number of children				
Total	3.06	2.90	3.58	3.88
to 2,999	3.59	3.45	3.74	4.39
3,000-3,499	3.24	3.02	4.03	3.53
3,500-3,999	3.05	2.82	3.97	3.42
4,000-4,999	3.11	3.01	3.54	2.98
5,000-5,999	2.88	2.78	3.39	3.76
6,000+	2.59	2.51	3.39	3.45

[a]Number in parentheses indicates the number of observations in the sample upon which the mean is based.

[b]"Completed" shows couples that indicated no intention of having more children. Excluded are couples who indicated that for some reason they cannot have more children.

blacks. The ideal rather than the actual number is less strongly related to the number of siblings.

The schooling of the first generation, one of the components used to "predict" earnings, is inversely related to fertility among white non-Catholic couples (Table 3). This inverse relation is marked in the lower levels of schooling (up to 12 years) and stops there. Among Catholics an inverted U shape is observed with peak fertility at 9-11 years of school; this U shape is replicated when the dependent variable is the ideal number of children. Black fathers are concentrated in the two lowest schooling categories and there the relation holds.

By first generation occupation, the highest number of children in the third generation is among the sons of laborers (4), farmers (3), and operatives (2.7), the lowest is among self-employed businessmen (2.2). The means for the other major occupations do not differ by more than 0.1 (Table 4).

Farm background is associated with approximately 0.7 more children among whites and blacks. A smaller (crude) differential is associated with having grown up in the south (Table 5).

Table 6 presents some regression results where the actual number of children in the third generation is regressed on several first generation variables. The regressions are used as a descriptive device. They refer to white non-Catholics, wife age 35+. First generation variables account for close to ten percent of the variance in the number of third generation children. The magnitudes of regression coefficients and elasticities are subject to fluctuations depending on the particular combination of variables considered; and given the agnostic approach adopted here, I have no particular preference for any formulation. The regression coefficients and elasticities should be interpreted in terms of equations (6) and (7). The age of the second generation head of family and his wife represent not only life cycle effects but also historical differences between cohorts. Thus, the combined "time" effect is not (necessarily) monotonic; predicted earnings, number of siblings, and farm background have coefficients significantly different from zero. On the average, an additional sibling is associated with .11

Table 2

NUMBER OF CHILDREN IN THIRD GENERATION BY NUMBER OF SIBLINGS IN SECOND GENERATION[a]

Number of Siblings	White Non-Catholics, Wife 35 +	White Catholics, Wife 35 +	Blacks, Wife 35+
a. Actual number of children			
Total	2.67 (973)	3.38 (281)	4.11 (379)
0	2.39 (59)	2.93 (18)	6.76 (20)
1	2.53 (132)	3.30 (37)	3.83 (31)
2	2.60 (121)	3.65 (40)	2.36 (26)
3	2.75 (144)	3.12 (48)	3.04 (35)
4	2.89 (129)	3.76 (30)	3.32 (53)
5	2.67 (85)	3.59 (35)	6.03 (34)
6	3.16 (82)	3.77 (28)	4.41 (33)
7	2.90 (65)	4.41 (13)	4.06 (31)
8+	3.52 (156)	4.11 (32)	4.77 (116)
b. Ideal number of children			
Total	3.08	3.59	3.80
0	2.72	3.28	3.60
1	3.06	3.27	3.14
2	3.24	3.82	4.27
3	3.10	3.68	3.87
4	3.06	4.34	3.71
5	3.10	3.64	4.43
6	3.26	3.77	4.32
7	3.83	3.77	4.13
8+	3.65	4.09	3.98

[a]See notes to Table 1.

Table 3

NUMBER OF CHILDREN IN THIRD GENERATION BY THE EDUCATION OF THE FIRST GENERATION[a]

Education of First Generation	White Non-Catholics, Wife 35 +	White Catholics, Wife 35 +	Blacks, Wife 35 +
a. Actual number of children			
Total	2.65 (945)	3.42 (269)	3.90 (341)
0 - 5	3.00 (105)	3.09 (35)	4.35 (106)
6 - 8	2.71 (638)	3.71 (181)	3.24 (202)
9 - 11	2.93 (48)	4.31 (13)	4.09 (18)
12	2.30 (71)	2.96 (26)	3.49 (8)
12 plus non-academic training	1.97 (8)	3.00 (2)	n.a.
College but no degree	2.45 (26)	2.07 (7)	n.a.
B.A.	2.26 (33)	1.72 (4)	2.47 (6)
College plus advanced degree	2.38 (16)	n.a.	n.a.
b. Ideal number of children			
Total	3.07	3.59	3.88
0 - 5	3.47	3.08	4.15
6 - 8	3.10	3.63	3.77
9 - 11	3.56	3.93	4.73
12	2.71	3.03	5.04
12 plus non-academic training	2.70	3.00	n.a.
College but no degree	3.01	5.55	n.a.
B.A.	2.63	2.87	2.49
College plus advanced degree	2.59	n.a.	n.a.

[a]This is the education of the husband's father, or the children's grandfather.

Table 4

NUMBER OF CHILDREN IN THE THIRD GENERATION BY THE OCCUPATION OF THE FIRST GENERATION

	White Non-Catholics, Wife 35+	White Catholics, Wife 35+	Blacks, Wife 35+
Total[a]	2.65 (945)	3.42 (269)	3.90 (341)
Professional, technical and kindred workers	2.42 (50)	4.56 (5)	.84 (8)
Managers, officials, and proprietors	2.33 (36)	2.68 (16)	n.a.
Self-employed businessmen	2.22 (73)	3.33 (21)	1.40 (4)
Clerical and sales workers	2.40 (23)	4.50 (16)	2.99 (4)
Craftsmen and foremen	2.32 (166)	3.42 (74)	4.58 (28)
Operatives and kindred workers	2.73 (111)	3.01 (49)	3.22 (21)
Laborers, service workers, and farm workers	3.98 (60)	3.63 (32)	3.76 (68)
Farmers and farm managers	3.02 (395)	4.38 (43)	5.01 (206)

[a]Including cases where father's occupation is unknown or is coded as "miscellaneous."

Table 5

NUMBER OF CHILDREN IN THE THIRD GENERATION BY FARM BACKGROUND AND BY REGION OF ORIGIN OF THE SECOND GENERATION[a]

	White Non-Catholics, Wife 35+	White Catholics, Wife 35 +	Blacks, Wife 35+
a. Actual number of children			
Total	2.67 (973)	3.38 (281	4.12 (379)
Farm background	3.12 (445)	4.01 (44)	4.59 (203)
Non-farm background	2.43 (528)	3.30 (237)	3.80 (176)
b. Ideal number of children			
Total	3.08	3.59	3.80
Farm background	3.50	3.98	4.50
Non-farm background	2.88	3.54	3.43
a. Actual number of children			
Total	2.67 (973)	3.38 (281)	4.12 (379)
South	3.05 (370)	4.00 (27)	4.11 (350)
Non-south	2.67 (603)	3.34 (254)	4.17 (29)
b. Ideal number of children			
Total	3.08	3.59	3.80
South	3.39	3.37	3.93
Non-south	2.96	3.61	2.98

[a]Numbers in parentheses indicate the number of observations on which the means are based.

Table 6

REGRESSIONS OF THE ACTUAL NUMBER OF CHILDREN IN THE THIRD GENERATION ON VARIOUS FIRST GENERATION VARIABLES

Regression Intake[a]		Constant Term	Predicted Earnings of First Generation (thousand dollars)	Siblings	Farm Background	Education of First Generation	Age of Second Generation Husband	Age of Second Generation Wife	R^2
(1)	b	4.63	-.13	.12	.44		.04	-.08	.095
	t		(2.24)	(3.35)	(2.49)		(2.21)	(4.34)	
	η		-.18	.16	.07				
(2)	b	4.97	-.20	.12			.04	-.08	.088
	t		(3.81)	(3.59)			(2.39)	(4.38)	
	η		-.28	.17					
(3)	b	4.32		.12	.60	-.04	.04	-.08	.093
	t			(3.67)	(3.80)	(1.75)	(2.13)	(4.27)	
	η			.17	.09	-.11			
(4)	b	4.37		.15		-.05			.075
	t			(4.60)		(2.07)			
	η			.22		0.13			

[a] b is the regression coefficient.

t is the absolute value of the ratio of the coefficient to its standard error.

η is the partial elasticity at the means.

child, meaning an elasticity of .16 at the means. Duncan et al. (1965) reported a regression coefficient of .101 of live births on second generation number of siblings for women aged 47-61.[1]

The elasticity with respect to first generation predicted earnings is close to -0.2. Given the low average earnings of farmers and farm workers on one hand, and their higher fertility on the other, when farm background is omitted the elasticity of family size with respect to first generation predicted earnings approaches -0.3.

THE RELATION BETWEEN FERTILITY AND "CURRENT" VARIABLES

Some of the current variables are correlated with the first generation variables, so one cannot deal only with the latter. Some recent studies have examined the relationships among fertility, education, and other variables and interpreted them within the framework of the household production model.[2] The general idea behind these studies is that there might be some positive effect of income on the desired number of children, but there is reason to believe that the value of the wife's time generates a substitution effect away from children, for it may be assumed that the mother's time is an important determinant of the cost of children relative to other goods. If education is related to the price of time, there is reason to expect a stronger inverse relation between fertility and the wife's schooling than between fertility and the husband's schooling.[3]

The crude relationship between the schooling of and the number of children born to the second generation is presented in Table 7. An inverse relation is clearly discerned with the education of either

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[1]After Duncan controlled for farm background, duration of marriage, and wife's education, the coefficient declined to .053.

[2]Some of this work is contained in the supplement to the March/April 1972 issue of *The Journal of Political Economy.*

[3]A simple model expressing this idea is presented in Ben-Porath, 1973. A more general theoretical treatment is contained in Willis, 1973 and in Becker and Lewis, 1973.

spouse, except that women classified as illiterate have relatively few children.[1] The crude relation is somewhat steeper when wife's rather than husband's schooling is the independent variable. Among Catholics there is almost no relationship with husband's schooling. When I classify by the education of both spouses (Table 8), the partial inverse association survives with regard to the schooling of both spouses.

Table 9 presents some regression equations similar to those reported in other studies. What emerges from Table 9 is the following:

(1) The few second generation variables used account for something above one-tenth of the variance in the number of children.

(2) Schooling is associated in a non-linear way with the number of children. This can be captured either by a quadratic term for wife's schooling or by a model that allows for an interaction between the education of the husband and that of the wife.[2]

(3) The difference in derivatives of the number of children with respect to schooling of the husband and wife and the difference in the corresponding elasticities are very small. This casts some doubts on some past interpretations of this relationship (see Ben-Porath, 1973).

(4) Income in several shapes and forms fails to be positively and significantly related to family size.

- When second generation predicted earnings based on the same earning equation used for first generation predicted earnings are introduced (and second generation education is excluded) a significant negative coefficient emerges, which could have been expected in view of the role schooling plays in the earning equation (regression 3).
- When the family wage and non-labor income are both included together with schooling (regression 4) the coefficients are correspondingly negative and positive but not statistically significant.

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[1]This may reflect either the behavior of a severely adversely selected group or a more pedestrian reason; coding error in which women with unknown schooling are included in this group.

[2]The "interaction model" has been offered by Willis, 1973 and discussed by Ben-Porath, 1973.

Table 7

NUMBER OF CHILDREN IN THIRD GENERATION BY SECOND GENERATION YEARS OF SCHOOLING

Years of Schooling	By Husband's Years of Schooling: White Non-Catholics 35+	By Husband's Years of Schooling: Catholics	By Husband's Years of Schooling: Blacks	By Wife's Years of Schooling: White Non-Catholics, 35+	By Wife's Years of Schooling: Catholics	By Wife's Years of Schooling: Blacks
a. Actual number of children						
Total	2.66 (962)	3.39 (280)	4.10 (371)	2.67 (964)	3.39 (278)	4.11 (370)
Illiterate	4.11 (34)	n.a.	4.66 (47)	2.90 (31)	1.92 (6)	5.93 (22)
0-5	4.10 (40)	3.36 (9)	4.99 (79)	4.87 (44)	5.14 (13)	4.40 (40)
6-8	3.01 (236)	3.41 (53)	3.51 (108)	2.50 (177)	3.63 (31)	5.21 (127)
9-11	2.87 (163)	3.32 (45)	4.45 (75)	2.69 (155)	3.51 (50)	4.38 (86)
12	2.58 (150)	3.28 (52)	3.95 (29)	2.65 (270)	3.41 (106)	3.19 (47)
12+ non-academic training	2.60 (91)	3.30 (43)	3.64 (9)	2.43 (110)	3.48 (39)	3.00 (30)
College with ne degree	2.13 (113)	3.26 (44)	2.48 (14)	2.28 (104)	3.44 (15)	3.29 (9)
B.A.	2.53 (79)	3.73 (25)	2.05 (10)	2.46 (55)	2.66 (8)	2.53 (9)
College plus advanced degree	2.13 (56)	2.23 (8)		2.10 (18		
b. Ideal number of children						
Total	3.09	3.59	3.79	3.08	3.60	3.84
Illiterate	4.99	4.66	4.30	3.62	3.34	5.02
0-5	4.11	3.56	3.67	4.40	4.65	4.54
6-8	3.44	3.44	4.26	3.27	3.37	3.98
9-11	2.84	3.44	3.56	3.00	3.31	4.28
12	2.92	3.35	4.14	3.13	3.70	2.91
12+ non-academic training	3.33	3.36	3.02	3.04	3.64	3.67
College with no degree	2.89	3.72	3.08	2.83	4.03	2.89
B.A.	3.05	3.63	2.82	2.73	3.83	3.31
College plus advanced degree	2.63	3.30	2.70	2.38	3.00	

Table 8

ACTUAL NUMBER OF CHILDREN IN THIRD GENERATION BY SECOND GENERATION'S YEARS OF SCHOOLING, CROSS CLASSIFIED: WHITE NON-CATHOLICS, WIFE 35+

Wife's Schooling	Husband's Schooling				
	Illiterate	0-8	9-12	13+	All
Illiterate	n.a.	5.15 (7)	2.03 (11)	2.42 (10)	2.90 (31)
0 - 8	4.73 (25)	3.40 (131)	3.19 (52)	2.05 (11)	3.38 (221)
9 - 12	2.91 (7)	3.01 (110)	2.72 (180)	2.45 (127)	2.67 (425)
13	n.a.	1.83 (24)	2.58 (67)	2.34 (190)	2.36 (287)
All	4.11 (39)	3.16 (276)	2.71 (313)	2.37 (339)	2.66 (962)

Table 9

REGRESSIONS OF NUMBER OF CHILDREN ON SECOND GENERATION VARIABLES, WHITE NON-CATHOLIC WOMEN, AGE 35+[a]

	Constant	Husband's Education (HED)	Wife's Education (WED)	Wife Illiterate	WED x HED	WED^2	Husband's Predicted Earnings (in thousand $)	Family's Non-labor Income	Husband's Hourly Earnings	Husband's Labor Income	R^2
b	8.59	-0.92	-.368	-1.936		.013					.110
t		(3.63)	(3.10)	3.45		(2.31)					
	8.46	- .216	-.224	1.258	.0117						.108
		(3.23)	(3.46)	(2.46)	(2.13)						
	9.27		-.270	1.267	.0		-.452				.100
			(4.14)	(2.49)	(2.70)		(3.63)				
	8.74	-.084	-.373	-1.909		.014		.020	-.055		.114
		(3.19)	(3.19)	(3.41)		(2.43)		(.82)	(1.70)		
	8.17		-.375	-2.263		.011		.015		-.028	.098
			(3.13)	(4.08)		(1.93)		(.60)		(1.81)	

[a]All the regressions also included the age of the husband and wife.

b is the regression coefficient.

t is the absolute value of the ratio of the coefficient to its standard error.

o When second generation labor income and family's non-labor income are included and second generation schooling excluded, the coefficients are correspondingly negative and positive, but again they are not significant.

Although detailed interpretation is beyond the scope of this study, these findings may indicate that the value of time also operates in the case of the (second generation) husband's time, diluting the income effects that are in any case measured with large error. The difference between husband and wife may have been overly emphasized.

COMBINING CURRENT AND BACKGROUND VARIABLES

Does one set of factors operate solely through the other? Does the relation between first generation's income and the number of children born to the second generation reflect just the fact that the son of the rich tend to get more education and marry more educated women? It would help to examine the correlation matrix in Table 10, which indicates fairly high correlations among the elements in the two sets of independent variables. Classifying the average number of children in the third generation by second generation education, by (separately) first generation predicted earnings and education, and by the number of second generation siblings, Table 11 indicates that the same kinds of associations observed separately persist in the cross classifications. When the two types of variables are placed together in regressions, the results are as shown in Table 12.

(1) When the two sets of variables are combined, R^2 is .12 to .13, not much higher than what was observed when each of the sets was considered separately (9.0 to .11). Th's of course reflects that there is relatively high correlation between first and second generation variables. Still, there is a statistically significant increase in the "unexplained" variation when first generation variables are excluded. The F statistic for omitting the set of first generation .ables is 5.1, with 3 and 736 degrees of freedom, and is significant at .005.

Table 10

CORRELATION MATRIX FOR WHITE NON-CATHOLIC WOMEN, AGE 35+

	1	2	3	4	5	6	7	8
1. Number of children	1.000	.264	-.186	.177	.168	-.194	-.159	-.118
2. Ideal number of children		1.000	-.158	.138	.136	-.232	-.183	-.012
3. Predicted earnings of first generation			1.000	-.344	-.507	.427	.317	0.700
4. Siblings				1.000	.264	-.386	-.307	-.213
5. Farm background					1.000	-.326	-.197	-.137
6. Second generation husband's education						1.000	.557	.363
7. Second generation wife's education							.1000	.287
8. First generation education								1.000

Table 11

NUMBER OF CHILDREN BY PAIRS OF FIRST AND SECOND GENERATION VARIABLES, WHITE NON-CATHOLICS, WIFE 35+

a. Number of children by second generation years of schooling and first generation predicted earnings

Husband's Schooling	Predicted Earnings of First Generation		
	to 2,999	3,000-4,999	4,500+
Illiterate	4.21 (21)	4.27 (9)	
0 - 8	3.84 (98)	3.02 (12[illegible])	2.15 (44)
9 - 12	3.04 (55)	2.71 (130)	2.67 (121)
13+	2.90 (27)	2.32 (103)	2.35 (194)

b. Number of children in third generation by number of siblings in second generation and second generation years of schooling

Siblings	Second Generation Schooling			
	Illiterate	0 - 8	9 - 12	13+
0 - 1	3.02 (2)	3.05 (22)	2.49 (55)	2.30 (109)
2 - 4	5.69 (7)	2.91 (150)	2.82 (147)	2.45 (147)
5+	3.41 (25)	3.47 (169)	3.00 (108)	2.59 (83)

c. Number of children by first and second generation years of schooling

Education of First Generation	Second Generation Schooling			
	Illiterate	0 - 8	9 - 12	13+
Illiterate	n.a.	n.a.	n.a.	n.a.
0 - 8	4.32 (28)	3.21 (245)	2.82 (253)	2.29 (211)
9 - 12	n.a.	2.36 (13)	2.47 (38)	2.57 (64)
13+	n.a.	0.56 (6)	2.23 (19)	2.40 (57)

Table 12

REGRESSIONS OF NUMBER OF CHILDREN IN THIRD GENERATION ON FIRST AND SECOND GENERATION VARIABLES, WHITE NON-CATHOLICS, WIFE 35+

	Constant	Second Generation Education (HED)	Wife's Education (WED)	Wife's Illiteracy	WED^2	HED x WED	Predicted Earnings of First Generation (thousand $)	Siblings of Second Generation	Farm Background	Education of First Generation	R^2
b	8.20	-.064	-.344	-1.754	.013		-.113	.072			.122
t		(2.39)	(2.89)	(3.13)	(2.26)		(2.04)	(2.03)			
b	8.14	-.193	-.210	-1.08		.012	-.110	.076			.122
t		(2.91)	(3.26)	(2.10)		(2.25)	(2.07)	(2.15)			
b	7.89	-.059	-.352	1.71	.013		-.058	.078	.382		.128
t		(2.20)	(2.97)	(3.06)	(2.33)		(.96)	(1.89)	(2.18)		
b	7.72	-.062	-.352	1.72	.013			.072	.452	-.062	.127
t		(2.31)	(2.97)	(3.08)	(2.32)			(2.04)	(2.82)	(.23)	

b is the regression coefficient

t is the absolute value of the ratio of the coefficient to its standard error.

(2) When siblings and predicted earnings of first generation are the only independent variables, both are important (regression 1), but farm background takes away from first generation predicted earnings (regression 3).

(3) When "effects" are compared in terms of partial derivatives and elasticities at the means (Table 13), the first generation effects in terms of predicted earnings and siblings are reduced from "gross" elasticities of -.28 and .17 to "net" elasticities after controlling for current variables of -.16 and .09. That is, more than half the first generation effect survives the introduction of second generation variables. There is a direct relation beyond the indirect effect that operates through the schooling of the second generation husband and wife.

(4) The introduction of the first generation variables reduces by less than a third the elasticities of the number of children with respect to second generation husband's and wife's education.

Table 13

DERIVATIVES AND ELASTICITIES OF NUMBER OF CHILDREN IN THE THIRD GENERATION IN VARIOUS REGRESSIONS

Variable	Source Table	Reg.	Type of Regression[a]	Regression Coefficient		Derivative	Elasticity
Second generation wife's education	9	1	Second var. quadratic	-.368	.013	-.087	-.31
Second generation husband's education	9	1	"	-.092		-.092	-.32
Second generation wife's education	9	2	Second interaction	-.224	.012	-.097	-.35
Second generation husband's education	9	2	"	-.216	.012	.089	-.32
Second generation wife's education	12	1	Mixed quadratic	-.344	.013	-.063	-.23
Second generation husband's education	12	1	"	-.064		-.064	-.23
Predicted earnings of first generation	6	1	First	-.13		-.130	-.18
Predicted earnings of first generation	6	2	"	-.20		-.20	-.28
Predicted earnings of first generation	12	1	Mixed	-.11		-.11	-.16
Siblings, second generation	6	1	First	.11		.11	.16
Siblings, second generation	12	1	Mixed	.067		.067	.09
Education of first generation	6	3	First	-.043		-.043	-.11
Farm background	6	1	First	.44		.44	.07
Farm background	1	3	Mixed	.38		.38	.06

[a]The terms are first, second, and mixed, referring to the sets of explanatory variables. Quadratic and interaction are the two functional forms used with respect to second generation variables.

V. CONCLUSION

The preceding evidence shows that even when one accounts for schooling of second generation husband and wife, variables that have to do with the household where the husband grew up have "net" association with the number of children in the third generation. In describing the evidence, I distinguish between "direct" and "indirect" first generation effects. In act there are no direct effects; all traits of the first generation operate through tastes, prices, or resources of the second generation in determining the size of the third generation. In introducing this study I suggested that one could emphasize effects either through tastes in the manner suggested by Easterlin (1968) or through resources and prices in a manner that would build on the approach of the household production model of Becker (1965). At the present level of analysis I cannot distinguish between these competing hypotheses.

Appendix A

DEMONSTRATING AMBIGUITIES: A MODEL OF LEFTOUT VARIABLES

To demonstrate some of the ambiguities of interpretation that attach to my empirical results, consider the following simple model:

(8) $$n_i = \alpha x^*_i + \beta s_i + \varepsilon ,$$

(9) $$x^*_i = \gamma y_{i-1} + x_i ,$$

(10) $$s_i = \delta y_{i-1} + v ,$$

where $\alpha < 0$, $\beta < 0$, $\gamma > 0$, $\delta > 0$, $\sigma(\varepsilon, x^*_i) = \sigma(\varepsilon, y_{i-1}) = 0$. The number of children of the second generation, n_i, is postulated to depend on x^*_i, a "true" economic variable--for example, a quality-corrected measure of the value of time (in this case α is likely to be negative)--and "tastes," s. The true economic variable has a component that depends on a first generation variable, y_{i-1}--for example, the income of the first generation--an autonomous element, x_i, which I assume is measurable, like years of schooling. Tastes, s, are also partly dependent on y_{i-1} and partly autonomous (v), ε is a random component in the determinations of n_i.

If we run a regression of n_i on the two measured variables, x_i and y_{i-1}

(11) $$n_i = \hat{a}_1 x_i + \hat{a}_2 y_{i-1} ,$$

we can ask how the estimated coefficients are related to the true coefficients of the structure (8) - (10).

Using the left-out variables approach (Griliches and Mason, 1972) one can see the following:

(12) $$\text{Plim } a_1 = \alpha + \beta\psi_{vx.y_{i-1}}$$

(13) $$\text{Plim } a_2 = \alpha\gamma + \beta\delta + \beta\psi_{vy_{i-1}.x_i}$$

$\psi_{vx.y_{i-1}}$ and $\psi_{vy_{i-1}.x_i}$ are the partial regression coefficients of v, the autonomous part in tastes on the two observed variables, x and y. Equation (12) shows that a_1 is not a consistent estimate of α, the true effect of x* (Eq. (8)), because it is "contaminated" by the effect of taste (β), and the association between the autonomous element in tastes and x. For a similar reason, a_2 is not a consistent estimate of the effect of y_{i-1} (consistency implies that as we took larger and larger samples, the estimated coefficient would converge to the true coefficient). The best one could hope for is to have these two coefficients equal to zero--that is, complete independence between the autonomous elements in the three equations. In that case the coefficient of x_i, a_1 (for example, years of schooling) indeed measures the effect of the economic variable. The coefficient of y_{i-1} is then a consistent estimate of $\alpha\gamma + \beta\delta$, the sum of influences through the economic variable and tastes.

Assume that in fact there are no taste effects (β=0). Then, if x* were measured correctly there would be no need to introduce y_{i-1} into the regression. If x* is not measured correctly and there is a quality element that depends on y_{i-1}, one needs to include y_{i-1} in the regression; and its negative coefficient is just a reflection of the unobserved component of x_i^*. In that case Plim $a_2 = \alpha\gamma$, and Plim $a_1 = \alpha$. It may be argued that the true α is zero and that Plim $a_2 = \beta\delta$. This is when $\psi_{vx.y_{i-1}} = \psi_{vy.x_{i-1}} = 0$. But $\psi_{vx.y_{i-1}}$ may well be positive. The autonomous element in tastes may be empirically related to years of school, for example. People with a taste for a high standard of living and few children may simultaneously choose to stay longer in school. With β, the taste effect, negative, $\beta\psi_{vx.y_{i-1}}$ imparts a downward bias to the coefficient of education. One "pure" sociologist's hypothesis may be that α is indeed zero and that a negative a_1 is just a result of the fact that small families and a high level of education are jointly determined by certain taste factors.

How is a_2 affected by the positive correlation between v and x? By hypothesis, v and y_{i-1} are unrelated, but with v and x correlated this is not true of the *partial* coefficient of v on y_{i-1}, holding x_i constant. It is easy to see that

$$\text{(14)} \qquad \text{Plim } \psi_{vy_{i-1}\cdot x} = \frac{-\gamma}{1-r_{xy}^2} b_{vx}$$

where b_{vx} is the regression coefficient of the random taste variable on education, r_{xy} is the correlation between x and y; Plim $\psi_{vy_{i-1}\cdot x}$ is negative and γ and b_{vx} are assumed to be positive. If $\beta < 0$ a positive element is added to an otherwise negative expression.

This analysis applies the usual left-out variables model in the manner used by Griliches and Mason (1972). These are not the only sources of difficulty: One could speak about errors of measurement in both y_{i-1} and x or of the partition of effects between various current and parental variables, but this should suffice to indicate the difficulties in linking the empirical findings to one specific channel of influences.

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