ASSET ACCUMULATION AND FAMILY SIZE

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Abstract—Utilizing panel data on families, estimates are made of the effects of
   children on asset accumulation, asset composition, consumption, and family
   income. Young children are found to depress savings for young families but
   to increase savings for marriages of duration greater than five years. The
   principal channel through which children act to reduce savings is the decline
   in female earnings associated with the child-induced withdrawal of wives
   from the labor force. Family consumption actually decreases with the birth
   of a child, but this reduction is insufficient, for young families, to offset the
   fall in income. For families in which the wife does not work the estimates
   suggest that savings may actually increase with children.

INTRODUCTION

In this paper, we examine the influence of children on a family's ability to accumulate assets. The number of children a couple has, the average spacing between siblings and the timing of births within a marriage have all been alleged to have important impacts on family savings. This relationship between family size and household savings has long been a popular theme in the demographic and development literature, and the postulated negative correlation between them is thought to be a contributing factor in limiting capital formation and economic growth. More recent investigations of American data have indicated that rapid childbearing early in marriage inhibits asset growth and that these effects persist over a couple's lifetime (Freedman and Coombs, 1966; Coombs and Freedman, 1970). Others have argued that family size per se is not the relevant constraint and that any savings effects are related primarily to the age of children (Espenshade, 1975). In a complementary literature, researchers have attempted to measure the direct costs of children in terms of the additional consumption expenditures induced by the presence of a child (Espenshade, 1973). In this study, we test a number of these hypotheses using a 3-year micro-longitudinal data file for the period 1967–1970—a data set unique in the breadth and quality of its information on the components of a family's assets and liabilities.

In addition to measuring the gross effect of children on asset accumulation, we also explore the principal channels through which this impact occurs: changes in both husbands' and wives' hours of work affecting income, and changes in household consumption. This gross effect is decomposed in another dimension by inspecting changes in asset composition. Because total assets can be separated into financial and durable goods components, we are able to isolate those aspects of family composition that result primarily in a reshuffling of the asset portfolio. In the first section of this paper, we outline an empirical model of asset accumulation and present an overview of the data. The second section summarizes our major empirical findings.

FRAMEWORK FOR ANALYSIS

Determinants of Family Savings

Our approach is based on the life-cycle model of asset accumulation. When viewed in this perspective, savings and asset accumulation depend entirely on the lifetime profiles of consumption and income.[1] By altering the life-cycle patterns of consumption, income and time allocation of spouses, a given sequence of childbearing may impinge on these decisions and hence alter a family's desired asset accumulation. Since a formal development of the life-cycle theory is beyond the scope of this paper, we provide instead a brief descriptive summary of the major effects which we have sought to measure in our empirical work.[2]

The principal economic variables used to explain savings are family income and its rate of growth. If access to capital markets is perfect and there is no uncertainty, the fundamental economic theorem derived from the life-cycle approach is that lifetime wealth (or permanent income), rather than current income, is the determinant of family consumption. Thus, current income levels which exceed permanent income will be saved while those which fall short will lead to dissaving. This rigid division between the influence of permanent and current income is weakened somewhat if we relax the two caveats above on capital markets and uncertainty. Imperfect capital markets and incomplete foresight would both assign to current income an independent role in determining current consumption, a role that will likely depend on the life-cycle stage. If families are not completely free to borrow and lend at constant market interest rates, it follows that if current income falls, the family is more likely to be pressed against credit constraints and to be forced to reduce its current consumption. Consumption should move more closely with current income in such a world, when compared to a situation in which perfect capital markets prevail. It seems reasonable that younger families who have not yet acquired much collateral or assets would more likely absorb a current income decline by partly reducing this consumption.

Similarly, in the perfect certainty case, there would be no surprises, so that fluctuations in income would not force families to revise either their expectations of lifetime wealth or future plans. If future income is uncertain, however, year-to-year changes are not completely innocuous from a lifetime perspective, for they provide signals about more distant income prospects and hence influence perceptions of lifetime wealth (and therefore consumption). This observation is more critical for young families, for it is at this early stage of the life-cycle that earnings' growth, rather than the level of earnings, becomes an independent proxy for ultimate lifetime wealth.

In this life-cycle framework, the effect of childbearing on family savings flows through several channels. In addition to their own consumption requirements, children alter the time allocation of their parents, directly affecting both the income and consumption decisions of all family members. In order to understand the anatomy of savings' behavior and to check on the congruity of our results with other studies, we have analyzed savings, consumption, and income separately.

On the consumption side, children have two effects. Obviously, the needs of the children must be met and the demand for commodities complementary with children will also increase. In addition, parents' consumption may change as the allocation of their time between the market and the home is altered. Since children will typically raise the value of their mother's time in the household more than that of their father, the most direct influence of children is the reduction in market work by mothers. This increase in non-market time by women will typically lead to a substitution of husbands' time toward the marketplace. Whether the family as a whole will consume more or less depends, however, on whether mar-

ket-purchased goods are, on net, substitutes for or complements with children and household time.

To give just two examples, living space and household durable goods are probably complementary with household time and children, while restaurant meals, vacations, and other forms of market entertainment are probably substitutes. While we are not prepared to argue these divisions with any conviction, the critical point is that there is no presumption from the theory that the presence of a child and the consequent increase in the value of a wife's time will lead to an increase in the consumption level of the household. If items in the total consumption bundle are dominated by substitutes for children and household time, then total family consumption may fall when children are present.

Whether family consumption, including that of children, rises or falls will also depend on the current composition of the family's consumption bundle. For example, if the family already owns a house and other goods which are complementary with children, then the birth of a child would affect total consumption mainly through its impact on goods which are substitutes, raising the likelihood that total consumption would fall. Conversely, new families who have not yet purchased these child-complementary goods will be induced to do so when their children are first born. In this case, the net effect of a child on total consumption would depend on whether complementary goods rise more than substitute goods fall. In either case, though, we would expect that the effect of children on total consumption would itself be a function of the age and previous consumption history of the family, and the age of a child.

In order to examine these issues we have, in our empirical work, divided family net worth into durable goods and financial assets and have estimated, separately, the influence of childbearing patterns on each. In addition we have allowed children to affect savings differ-

ently depending on their age, duration of the marriage, and on the number of siblings.

Given the impact of children on total family consumption, their effect on savings and asset accumulation will depend on whether the reallocation of household members' time lowers family income more than family consumption. The dominant linkage on the income side is the reduction in family income that results from the well-established lower work effort of women induced by the presence of a child. Research on female labor supply has demonstrated that the impact of a child on female work depends critically on the ages of children as well as their number.

Empirical Specification

Our research is based on the Panel Study of Consumer Durables and Installment Debt collected by the Survey Research Center of the University of Michigan. This data set is a three-year panel survey for the years 1968 through 1970.[3] In each year, individuals were questioned about their previous year's income, by source, their labor force status, family size and composition, and detailed components of the current value of their assets and liabilities. Because the primary purpose of this panel study was to examine financial adjustments of individuals over time, more attention and quality control was directed at the asset and debt variables.

Since we are attempting to trace the effect of family composition on asset growth for intact families, we confined our analysis to couples who were married-spouse-present for the complete duration of the panel. In addition, the Michigan survey questioned families only on the age and number of their children who are less than 18 years old. For families in later stages of the life-cycle when adult children are common, the measures of family size and child spacing available in this data are clearly inadequate. We, therefore, restricted our regressions to those families who were married less than

19 years in 1970, for whom we are reasonably certain that their history of childbearing is complete. Confining the analysis to this restricted sample does raise the potential of sample selection bias, an issue we address in the empirical section. Fortunately, this exclusion does not appear to affect our results.

Family net worth is derived from five categories: (1) net equity in the home;[4] (2) net equity in cars;[5] (3) total installment and noninstallment debts;[6] (4) the value of consumer durables;[7] (5) the value of financial assets held in checking, savings and certificates of deposit, stocks and bonds minus the amount owed on stocks. Total net worth is defined as the sum of categories 1, 2, 4, and 5 minus category 3. Net worth in the form of durable assets is the sum of 1, 2 and 4 minus 3; and financial net worth is category 5. Finally, annual savings is defined as the change in net worth from one year to the next.

The linear regression model used to explain movements in savings takes the form[8]

$$A_t = \alpha_0 + \alpha_1 A_{t-1} + \sum_{i=1}^{N} \beta_i X_{it} \qquad t = \begin{cases} 1970 \\ 1969 \end{cases}.$$

The values of the X_{it} refer to the year during which asset accumulation took place. To illustrate, for $A_{(t=1970)}$, family size is updated for births occurring after 1969 asset levels were reached and the ages of children are their 1970 ages. Since our data measure assets for 494 families in three successive years, we observe the process of asset accumulation twice (between 1969 and 1970 and from 1968 to 1969); the data are pooled across these two periods allowing for a shift in the function for the 1969–1970 period.[9]

The economic variables in these regressions are (1) previous year's net worth; (2) a four-year average of husband's income; (3) the change in husband's income between year t and $t - 1$, entered directly and interacted with marriage duration; (4) a dummy variable indicating that family income is unstable from month to month;

and (5) wife's education as a proxy for her contribution to permanent income. Modern economic theories of consumption suggest two distinct income concepts relevant for savings behavior—permanent or lifetime income of households and transitory deviations of current income from its permanent level.[10] To approximate this distinction, we opted for simplicity and used a four-year average of husband's income to measure the long-run income concept and yearly changes in husband's income to index more transitory variation.[11] These distinctions are not exact and we discuss their interpretation below in the context of the regression results.[12]

Families were also asked if their income varied a great deal from month to month. In a world of imperfect capital markets, monthly income instability could induce an insurance motive for savings. While the response to this question is qualitative, it does capture income movements which could be hidden in annual data.

The demographic variables include race (1 if white), husband's age, and a linearly splined duration of marriage variable with different slopes depending on whether the marriage duration was less or more than 9 years. Our data give only duration of the current marriage, with no information available on whether this is the first marriage. As a partial control for previous marriages with children, we entered a variable (Divorce Proxy) which assumes the value one if the age of oldest child is greater than current marriage duration plus two years. Because trade unions provide their members with many mechanisms for savings (e.g., pension plans) about which there is no information in our data, a dummy variable for union membership (for males) was included. Finally, a small fraction of the families owned businesses but the Michigan survey did not question families about the value of such assets. As a control for business-related assets, we have included a dummy variable indicating business ownership.

There are five variables measuring family composition. To allow younger and older children to have differential impacts, the number of children more than four years old and less than five were entered separately.[13] We also allowed the effect of young children to vary with the duration of marriage. In their study, Freedman and Coombs (1966) found strong evidence that childbearing early in marriage was particularly detrimental to asset accumulation. To test this hypothesis, we included, in addition to the number of young children, a variable interacting the number of children under five with a weight (D_i) constructed from the duration of marriage. This weight D_i is defined as

$$D_i =$$

$$\text{Max} \left\{ 0, 1 - \frac{\text{Marriage Duration} - 1}{8} \right\}.$$

With this formulation, the change in asset accumulation induced by a young child is

$$b_0 + b_1 D_i$$

where b_0 is the coefficient on number of young children and b_1 the coefficient on the interacted variable. Thus, the initial effect of a birth in the first year of marriage is $b_0 + b_1$. This effect of a birth decays linearly (at a rate $b_1/8$) until the ninth year of marriage to a permanent level b_0.[14] This formulation is useful because it permits the estimation with linear regression of what is essentially a nonlinear effect. The final two children variables, which represent our measure of child spacing, are the average number of years between births for two-child families and families with three or more children.

The same set of explanatory variables is used to divide the change in assets into its constituent components: family income, husbands' and wives' labor supply,[15] and family consumption.[16] These later regressions should not be thought of as the most appropriate isolated specification for each but rather represent our attempt to decompose, in an accounting sense, the net effect of these variables on saving.[17]

Finally, in our statistical treatment of the effect of children we are implicitly maintaining that the number and age distribution of children are exogeneous with respect to family savings and consumption. But the observed partial correlation of children with consumption (and hence savings) may be due to causation running in both directions or, more likely, their joint determination by some third, and unmeasured, variable. If so, then the estimated "effect" of children on asset growth and consumption would be a biased hybrid of several linkages. A full development of this issue would require the specification of a model explaining jointly the fertility decisions of the family, including the timing and spacing of the births, along with its consumption and savings rates. A clear resolution of the endogeneity issue is clearly beyond the scope of this paper and our results, therefore, should be interpreted with this caveat in mind.[18]

EMPIRICAL ANALYSIS

The discussion of our empirical estimates is organized into three subsections representing the major categories of variables considered in this analysis: the economic, demographic, and children variables. Table 1 presents the net worth and components of net worth regressions and Table 2 lists similar regressions obtained for female hours, female income, and family consumption.

Economic Variables

The economic variables provide a useful gauge on the soundness of our approach and also suggest some intriguing adjustments in a family's consumption, savings, and labor supply decisions to new economic circumstances, especially at different stages in the life cycle. Maintaining our interpretation of average male income as a surrogate for permanent income, our estimates of the marginal pro-

Table 1.—Regression Estimates of Determinants of Net Worth and Asset Composition
("t") statistics in parentheses below coefficients)

Variable	Total Net Worth Coefficient	Total Financial Assets Coefficient	Total Durable Assets Coefficient
Net Worth Previous Year	1.0600 (90.08)	.3323 (27.57)	.7277 (48.28)
Average Male Income	.1160 (3.98)	.0722 (2.23)	.0437 (1.17)
Change in Male Income	-.0749 (-.58)	-.0197 (-.14)	-.0551 (-.33)
Change in Male Income * Marriage Duration	.0210 (1.99)	.0025 (.21)	.0185 (1.37)
Monthly Income Instability	1156 (2.98)	62.1 (.14)	1093.5 (2.20)
Wife's Education	95.6 (1.80)	197.1 (3.36)	-101.5 (-1.49)
Marriage Duration 1-9 Years	-121.5 (-1.38)	-330.1 (-3.41)	208.5 (1.86)
Marriage Duration 10-18 Years	47.12 (.80)	-89.08 (-1.37)	136.2 (1.81)
Husband's Age	-25.84 (-.76)	22.45 (.60)	-48.3 (-1.12)
Race	75.03 (.19)	-557.0 (-1.33)	652.0 (1.29)
Husband in Union	-663.7 (-2.57)	54.83 (.19)	-718.5 (-2.18)
Family Owned Business	-2262 (-2.48)	3675 (3.66)	-5937.9 (-5.09)
Number of Children Over 4 Years Old	-20.5 (-.19)	-285.8 (-2.46)	265.3 (1.96)
Number of Children Under 5 Years Old	325.0 (1.38)	675.8 (2.61)	-350.8 (-1.18)
Number of Children Under 5 * Marriage Duration	-1505.6 (-2.74)	-1930.7 (-3.19)	425.1 (.60)
λ	193.8 (.40)	704.9 (1.33)	-511.1 (-.35)
Divorce Proxy	-462.2 (-1.01)	-838.9 (-1.67)	376.7 (.64)
Year	251.5 (1.07)	146.4 (.56)	105.1 (.34)
Intercept	598.2 (.45)	-738.0 (-.50)	1336.2 (.79)
R^2	.927	.536	.782

Table 2.—Regression Estimates of Determinants of Wife's Annual Hours of Work and Income, and Family Consumption ("t" statistics in parentheses below coefficients)

Variable	Wife's Annual Hours	Wife's Income	Family Consumption
Net Worth Previous Year	-.0019 (.80)	.0101 (1.56)	.0103 (.78)
Average Male Income	-.0340 (-5.91)	-.0759 (-4.74)	.8900 (27.3)
Change in Male Income	-.0532 (-2.10)	-.1615 (-2.29)	.5079 (3.53)
Change in Male Income * Marriage Duration	.0038 (1.82)	.0128 (2.21)	-.0161 (1.37)
Monthly Income Instability	-97.6 (1.27)	-245.9 (1.15)	-15.10 (3.48)
Wife's Education	47.26 (4.51)	256.8 (8.81)	131.1 (2.21)
Marriage Duration 1-9 Years	-44.1 (2.56)	-175.6 (3.66)	-81.5 (.83)
Marriage Duration 10-18 Years	10.8 (.93)	-12.7 (.39)	-72.3 (1.10)
Husband's Age	10.17 (1.53)	23.96 (1.30)	49.4 (1.31)
Race	-141.6 (1.82)	-254.9 (1.16)	-350.3 (.80)
Husband in Union	-27.6 (.54)	-30.9 (.21)	499.2 (1.74)
Family Owned Business	-189.5 (1.06)	-640.0 (1.28)	1268 (1.25)
Number of Children Over 4 Years Old	-96.9 (4.66)	-163.4 (2.82)	-106.1 (.90)
Number of Children Under 5 Years Old	-355.4 (7.27)	-815.4 (6.35)	-1137.8 (4.36)
Number of Children Under 5 * Marriage Duration	-198.4 (1.83)	-781.3 (2.60)	723.9 (1.18)
λ	216.9 (2.28)	-279.3 (1.06)	-471.8 (.88)
Divorce Proxy	337.8 (3.75)	1026.1 (4.10)	1316.3 (2.58)
Year	8.44 (.18)	159.3 (1.23)	668.7 (2.55)
Intercept	898.7 (3.45)	596.0 (.82)	24.8 (.02)
R^2	.184	.208	.533

pensity to save and consume from permanent income are .116 and .890, respectively. These estimates are well within the range of those reported by Mayer (1972) in his extensive survey of the consumption function literature. Wife's education, our proxy for her contribution to permanent income, also has a significant positive impact on both family savings and consumption. The dummy variable for family monthly income instability was included to capture a possible precautionary motive for savings. Families with unstable monthly incomes appear to insure against this risk by accumulating a larger stock of assets.[19]

In all regressions, the response to changes in male income depends strongly upon marriage duration. In the early years of marriage, an increase in husband's income across years produces a large positive increase in consumption, has negligible effects on savings, and induces a significant and partly compensatory decrease in his wife's work effort and her income. However, among couples who have been married longer, a similar rise in male income produces a smaller increment in family consumption and a significant positive increase in savings. Moreover, wives in older marriages react less to their husbands' income change both in their annual working hours and income. Almost all economic theories of consumption argue that propensities to consume (save) should be lower (higher) from transitory income than from permanent income. Since we estimate smaller marginal propensities to consume and higher propensities to save out of transitory income for the average family, our evidence lends support to these theories.

Our more unconventional finding involves the dependence of this effect on marriage duration. There are two factors related to length of marriage that may supply a rationale for this interaction. First, if future income is uncertain, year-to-year changes provide signals about future career wage trajectories and hence influence perceptions of lifetime wealth.[20] Income experiences early in the life-cycle may weigh heavily in forming future projections. A young person, the beneficiary of a particularly large increase in his income, will revise upwards previous calculations of expected lifetime wealth raising his desired permanent consumption stream and lowering savings. At later stages of the life-cycle when career positions have congealed, yearly income changes should have less effect on consumption since more information will have accrued about a family's long-run wealth. Thus, income changes among more mature workers are likely to correspond more to simple interyear transitory variation, and induce larger savings responses.

A second factor involves imperfections in capital markets. If families are themselves unsure of their lifetime incomes, then attempts on their part to borrow against their future stream carries with it the potential for default. Access to formal financial markets is limited at best for young couples who have not yet acquired sufficient assets to satisfy collateral, down payment and other contractual requirements designed to secure repayment. In contrast to older families who can adjust to temporary departures from normal economic circumstances through savings or dissavings, younger families, pressed against credit constraints, may be forced to absorb more of their short-term income declines in terms of current consumption. Increased availability and reliance on capital markets as marriage duration increases is consistent with our estimates of rising propensities to save (and decreasing propensities to consume) from changes in husband's income.

Capital market imperfections may also explain our estimated female labor supply and income reactions to changes in husband's income. Jacob Mincer (1962) has argued that young wives will respond to transitory income changes of their husbands with compensating variation in their labor supply and income in order to

maintain family income. The necessity for a woman to increase her work effort in response to an income loss of her husband depends on the ability of the family to smooth income fluctuations by savings behavior. With limited access to capital markets, our evidence suggests that young families do adjust more to transitory declines in income not only by decreasing current consumption but also by increasing the extent of labor market and income producing activities of the wife.[21] In effect, the market labor supply of wives serves the function of a lending institution, smoothing movements in her spouse's income. As the family ages and accumulates its own savings reserve, credit constraints are less binding since couples can implicitly borrow from themselves. Hence, changes in current income should affect current consumption and spouse's labor supply less as the family ages.

Demographic Variables

If interest rates exceed rates of time preference[22] consumption should increase with age and savings decrease. High interest rates make future consumption less expensive and tilt life-cycle consumption profiles in favor of future consumption with the implication that savings is more likely early in life. While we obtain a positive sign for age in our consumption equation and a negative coefficient on savings, the statistical significance is weak.[23] More intriguing are the results for marriage duration. We find negligible effects of duration on aggregate net worth accumulation, but length of marriage does affect the composition of the asset portfolio especially during the early years of marriage.[24] The longer couples are married, the more their assets are transferred from financial and liquid forms into the durables components. This coincides with popular notions that young couples initially acquire financial assets in order to purchase consumer durables such as a home—a pattern that will be impor-

tant in our interpretation of the effect of children.

Conditional on previous net worth, race has little impact on savings. Two variables (union, and business-owned assets) were included in the net worth regressions mainly to control for omitted categories of assets. The significant and large negative coefficients on both variables indicate that these individuals do substitute out of our measured assets into these unobserved components. Our proxy for divorce has a small negative effect on asset growth, but is associated with an increase in wife's hours and income and family consumption. This was expected since earlier research has established that a history of divorce increases female labor supply.

The variable "λ" was added to these regressions to control for the sample censoring introduced by restricting the sample to families married less than 19 years.[25] In view of its insignificant coefficient, sample censoring does not appear to be a serious problem in the net worth regression.[26]

Children Variables

Table 3 summarizes our regression estimates for the effect of numbers of children under five and over four on family savings, consumption, wife's hours and income. For children under five, these are presented for young children present in the first year of marriage, "the young marriage effect," and the impact of young children in the household after eight years of marriage, "the mature marriage effect." The last column in Table 3 gives the implied change in savings calculated from the wife's income and family consumption regressions. Note that this indirect estimate is quite close to that estimated directly in the Net Worth regression.

The set of children variables are significant in all regressions,[27] except for durables, but their importance depends critically on the age of a child and his location in marriage duration. The number of children over four years old has a negligible

Table 3.—Estimated Effect of Children on Family
Assets, Income and Consumption

Number of Young Children	Net Worth	Finan- cial Assets	Dur- ables	Con- sumption	Wife's Hours	Wife's Income	Wife's Income Minus Con- sumption
a) First year of marriage	-1181	-1255	74	-414	-534	-1597	-1183
b) After nine years of Marriage	325	676	-351	-1138	-335	-815	323
Number of Children Age 5 or Older	-21	-286	265	-106	-97	-163	-57

effect on total family savings.[28] Using our hours, income, and consumption equations, we can trace this minor net impact to the following factors. First, the reduction in wives' working hours is one-fifth as large as that due to pre-school children. This smaller hours decline translates into a considerably smaller reduction in female earnings—a drop of $163 compared to $815 for young children. Finally, even this effect on savings is partly offset by a $106 reduction in family consumption.

That children do not increase family consumption may seem puzzling. Since children eat and consume, it is traditionally assumed that they must of necessity cause the household to consume more. But this would follow only if the reallocation of husbands' and wives' time fails to reduce their own consumption. If items in the household consumption bundle are dominated by substitutes for household time, then total family consumption may fall when children are present.

Yet, in spite of the theoretical ambiguity, it remains true that some previous studies (see especially Espenshade, 1973) have reported positive effects of children on consumption. But these studies typically control for *current* family income

rather than the long-run permanent income of the family, as measured by the husband's income and the education of the wife. The effect of this is to over-control for the mechanisms whereby families adjust to the birth of a child. Our results suggest that one of the principal mechanisms is to reduce both the hours worked by wives *and* the consumption of the family. The net effect of these is to reduce savings, at least when the child is born early in the marriage, since the reduction in wives' income is greater than the reduction in consumption.

In order to reconcile our results with these earlier studies of effect of children on family consumption, we re-estimated the model using, instead of a four-year average of male income and the change in the male income variables, an exactly analogous set which substitutes averages and changes in family income. In these regressions, children indeed have a significant positive effect on consumption. However, the interpretation of this positive effect must be made with some care. Since children reduce the hours worked and income of wives, a regression in which family income is controlled estimates two logically distinct effects for children. First, there is the direct negative

effect on family consumption measured in our regression which does not control for changes in the income of wives. Second, since wives' income falls with children, in order for family income to remain constant, male income must rise to exactly offset this decline. Hence, when viewing families with children, we are implicitly viewing those with higher levels of male income. It is not surprising that families in which the husband has a higher wage rate consume more.

Although the number of older children has a minor influence on total savings, they do alter the composition of savings. Older children significantly increase durable assets and reduce assets in financial form. This recomposition is not surprising if children increase the demand for housing and other durable goods. Since children do alter the composition of assets, comparisons across studies measuring the effect of children on savings rates must be made with great care. The estimated effects are likely to be quite sensitive to how comprehensive the asset or savings definitions are.

Young children (present early in marriage) have a much more pronounced effect on family savings.[29] For example, we find a child in the first year of marriage reduces savings by $1,181. This lower savings is reflected entirely in a decline in financial assets. Since we suspect that children are complementary with durable goods, young families are forced to run down their liquid assets and increase borrowings. However, this straightforward effect belies an entire set of independent effects which can be traced through the income and consumption equations. On the income side, it is well established that young children are a strong deterrent to market work of women. We duplicate that result here, but find as well that this reduction in working hours is significantly larger earlier in marriage. It is at this point in the life cycle that female hours of work are large partly to compensate for low levels of husband's income.[30] This larger hours reduction due to

the presence of a child results in a larger decline in female earnings among young married couples. As a partial offset to lower female earnings, family consumption declines by $414. Family consumption declines because the increased female home time is substituted for some goods normally purchased in the market. In addition, any money costs of work associated with the wife working are also saved.

These large effects of young children decay with marriage duration until, by the ninth year of marriage, young children actually have a slight positive effect on savings. This reversal in the effect of young children is caused by a smaller decline in female earnings and working hours due to the presence of young children, and a larger reduction in total family consumption. What accounts for the differential impact on family consumption as a function of marriage? As we have argued earlier, the net effect of children on consumption depends on whether the reduction in substitutes offsets the increase in compliments. Whether family consumption rises or falls will depend on the current composition of the family's consumption bundle. For example, if the family already owns a house and other goods which are complementary with household time and children then the birth of a child would affect total consumption mainly through its impact on goods which are substitutes for household time and children, hence, raising the likelihood that total consumption would fall. As mentioned above, marriage duration itself is associated with a movement of assets from financial forms to durable goods. As a marriage proceeds, families will have acquired a large stock of consumer durables, some of which were purchased in anticipation of the arrival of children. When young children do arrive, these families are not required to increase their stock of these durable goods, while they do reduce those goods which are substitutes for children and wives' time. In contrast, younger families have not yet acquired those consumer durables.

Hence, they must increase the purchase of these goods which partly offsets the reduction in consumption of other goods which are substitutes for children.

To this point, we have explored the effects of children on savings conditional on husband's income allowing the principal mechanisms for savings adjustments to flow through consumption and female hours. Our presumption has been that variation in husband's earnings are determined primarily by factors other than family size. While we believe that this assumption is by and large correct, we recognize that husbands also may react in their investment and labor supply decisions to the presence and characteristics of children. In Table 4 we report regressions of husbands' labor supply—their annual hours—as a function of the identical children variables included in the other regressions. Family size results in an increase in husbands' work effort but the increase in hours is larger in response to young children than older children.[31] These positive hours responses of the husband suggest that families respond to children not only by reducing wives' work,

Table 4.—Regression Estimates of Determinants of
Husband's Annual Hours of Work
("t" statistics in parentheses below coefficients)

Variable	Hours
Husband's Education	5.67 (.62)
Wife's Education	-11.0 (.98)
Husband's Age	3.92 (.66)
Number of Children Over Four	33.5 (2.09)
Number of Children Under Five	97.8 (2.09)
Number of Children Under Five *Marriage Duration	-131.7 (1.40)
Year	1.14 (.02)
λ	-156.5 (1.78)
Intercept	212.9 (9.46)

but by increasing that of husbands'. Thus our earlier regressions probably overstate the negative effect of children on savings because they control for husbands' earnings.[32]

Child Spacing. We re-estimated our empirical model including an expanded set of children variables. The two additional variables were our measures of child spacing—the average interval in years between births for two-child families and for families with three or more children.[33] The new coefficients for our economic and demographic variables were essentially identical to those obtained in the earlier specification. Therefore we report in Table 5 only our estimates for the children variables[34] in a form comparable to Table 3.

Turning to our spacing variables, we estimate that longer birth intervals increase family savings. This net positive impact on savings is a consequence of a larger reduction among long-spacers in

family consumption than in female earnings. The lower female earnings results from a larger reduction in female labor supply among families who space their children further apart. One often-mentioned motivation for concentrated child bearing is to minimize the total amount of market work lost because of children. By concentrating her births in a relatively short span of her life cycle, a woman is able to hasten her return to the work force.[35] In support of this hypothesis, we estimate that increasing the interval between births by one year reduces female labor supply by 35–40 hours per year.[36]

The increase in savings for long-spacers results primarily from the reduction in family consumption among these types of families. As the effects of consumption on savings depends largely on the "smoothness" of consumption across the life-cycle, factors that operate to concentrate consumption in relatively short time spans will have a depressing impact on savings.

Table 5.—Estimated Effect of Children and Child
Spacing on Family Assets, Income and
Consumption

Number of Young Children	Net Worth	Finan-cial Assets	Dur-ables	Con-sumption	Wife's Hours	Wife's Income	Wife's Income Minus Con-sumption
a) First year of marriage	-1122	-1238	96	-504	-538	-1613	-1110
b) After nine years of marriage	14	551	-538	-687	-296	-716	-29
Number of Children Age 5 or Older	-102	-353	251	26	-96	-144	-170
Spacing - 2-child families	127	-16	144	-157	-35	-54	103
Spacing - 3 or more children in family	309	122	187	-447	-40	-99	348

Concentrated child bearing is analogous to bunching the influence of children in a short period and may produce a bunching of consumption as well. In contrast, long-spacers have "smoothed" the effects of children over the life-cycle inducing a smoothing of consumption.[37]

CONCLUSIONS

In this paper, we provide estimates of the effects of children on asset accumulation, asset composition, consumption, and family income. We estimate that the net effect of young children is to depress savings for young families but to increase savings for marriages of duration greater than five years. We find that conventional wisdom, which associates large family size with higher consumption levels, is incorrect. The principal channel through which children act to reduce savings is the decline in female earnings associated with the child-induced withdrawal of wives from the labor market. Family consumption actually decreases with the birth of a child but this reduction is insufficient to offset the fall in family income.

We also find that the impact of children on the family's financial position is critically dependent on the duration of marriage. Children born early in a marriage reduce assets by approximately 12 percent while those born after nine years of marriage increase assets by 2 percent. This difference is due to two effects: early child bearing has a somewhat smaller negative effect on consumption and also induces a larger negative effect on female earnings. Our results on asset composition indicate that early births are associated with a switch from financial to durable goods assets, while for the latter births this effect is greatly reduced. Families who have children early in marriage hasten this recomposition, while for delayed births the shift has already occurred. As the child ages and enters school, wives with school-age children have $163 lower earnings but their families consume $106 less. The net effect on savings is insignificant.

These results contrast sharply with ear-lier research which has found significant positive effects of children on family consumption. We duplicate these results and show that they are due to a misspecification of the family income constraint in which current family income rather than the permanent level is held constant. By allowing in our specification for families to freely allocate their time between the market and home, we have found that children induce a substitution toward "leisure" and away from market goods. For families in which the wife is not working, our consumption effect suggests that, on net, savings may actually increase with children.

NOTES

[1] Savings is defined in the conventional manner as the difference between current income and current consumption while assets at any age are accumulated savings.

[2] For a formal treatment of this model, see Smith (1980a).

[3] The survey followed families for four years—1967–1970. We did not use the initial year (1967) because the data on financial assets were coded in very large intervals in that year. Starting in 1968, dollar values for financial assets were given. However, the 1967 data were employed to construct certain variables used in the empirical work.

[4] Individuals were asked in each year the current market value of their home and the amount of first and second mortgages on their home. Net equity is equal to current market value minus all outstanding debts on home.

[5] Net equity on cars was derived as follows. For each car, interviewees were asked the make, year and body style of all cars owned. Based on these characteristics, the National Automobile Dealers Association (NADA) book value was used to impute a value to the car. From the total value of all cars, we subtracted total installment and noninstallment debts on cars.

[6] Installment and noninstallment debt for the following categories were included: additions and repairs, medical and dental, debts on durable good purchases and "other" installment and noninstallment debts. The other category included other consumer installment debts (i.e., dishwasher, hi-fi, radio, furniture, lawnmowers, sporting goods, and consolidation loans).

[7] Six types of durable goods were included—black and white television, color television, refrigerator, washing machine, stove and air conditioner. In the initial survey year, in each category, ownership and age of each durable was recorded. The average retail

values of these six appliances were gathered from various editions of *Merchandising Week*, 1967–1979. The average retail values used were: black and white TV—$200; air conditioner—$200. Eight-year useful lives were used for TVs and air conditioners; seven-year life for washing machines; twelve-year life for refrigerators; and twenty-year life for a stove. At the end of the useful life, scrap values were $25 black and white TV, $100 color TV, $40 air conditioner, and $50 for the others. Straight line depreciation was used between purchase value and scrap value. These assumptions generated initial dollar values for the stock of these durables in 1966. In each year, the costs of new durable purchases were added to 90 percent of the value of the previous year's stock.

[8] Lagged assets appears on the right-hand side of this model because savings $(A_t - A_{t-1})$ will in general be a function of nonwage income in addition to labor income. Since nonwage income is just a flow of earnings from the stock of initial assets (δA_{t-1}) a rearrangement of the definition of savings will yield the above equation with $\delta_1 = 1 + \delta$. The coefficients, β_i measuring the impact of the variables X_{it} on A_t have the identical interpretation as if savings were used as the dependent variable.

[9] This is formally correct only if "unmeasured" variables, common to a particular family, are uncorrelated over time. If life-cycle plans are revisable, then there is no *theoretical* reason for believing that successive observations on the same family are, in some sense, measuring the same thing. There remains, of course, the *statistical* argument that unmeasured variables, tastes, etc., are common to all periods of observation on a single family and that, as a consequence, intrafamily observations are not independent. We address this issue below.

[10] For two famous economic studies that rely heavily on this distinction between permanent and transitory income, see Friedman (1957) and Brumberg and Modigliani (1962).

[11] As we discuss below, yearly changes in husband's income also capture in part future career wage growth projections.

[12] The contribution of wives' permanent income to family permanent income is even more difficult to measure, especially because changes in the wife's labor supply and earnings are large during childbearing years. Ideally we would want a measure of the wife's wage rate and the growth in that wage over time but data limitations prevent this. As a proxy, the education of the wife is used to capture these components.

[13] Alternative specifications that separated the number of children at ages other than five were tried. The specification we used in the analysis was preferred by the data. In addition, it most closely approximates the critical pre-school, in-school distinction.

[14] We experimented with a number of alternative specifications of this variable. We allowed the effect to decay to different marriage durations, to vary with the age of a child from 1 to 4 years old, and to decay at different rates during the first four years of marriage and durations of 5 to 9 years. While not reported here, these experiments indicated that children 1 to 4 years old had the same effect on asset accumulation. The specification we adopted was the best in the sense that it minimized the sum of squared residuals. For the original application of this specification in a different context, see Welch (1979).

[15] For comparability with the other equations, the wives' annual hours and income equations were estimated using OLS over the full sample of women including those with zero income and hours. Although Tobit estimations are more appropriate given the zero truncation, it has been shown that OLS closely approximates the Tobit expected value locus in empirical research. See Smith (1980b). The labor supply definition used in annual hours of work—the product of weeks worked and usual weekly hours. For husbands, annual hours includes hours worked on the second job.

[16] Because of the identity relating current income, savings, and consumption, we are able to indirectly derive the total yearly flow of consumption services for a family. The service flow of consumption in any year (C_t^f) is defined as

$$C_t^f = C_t^n + (r + \delta).5(d_{t-1} + d_t)$$

where C_t^n represents nondurable consumption, d the stock of consumer durables at the end of period t, δ the depreciation rate of that stock, and r converts the durable stock into a yearly consumption flow. This formulation assumes that new durables are purchased uniformly during the year so that on average a family receives consumption benefits from half of newly purchased durables (i.e., $.5(d_{t-1} + d_t) = (d_{t-1} + .5\Delta d_t)$. Similarly, yearly consumption *expenditures* (C_t^x) are

$$C_t^x = C_t^n + \Delta d_t + .5\delta(d_{t-1} + d_t) .$$

After some algebraic manipulation, we have

$$C_t^f = C_t^x - (1 - .5r)\Delta d_t + rd_{t-1} .$$

Total family income (Y) is

$$Y = Y_L + .5r(F_t + F_{t-1})$$

where Y_L is family labor income and F_t are financial assets. Since $C_t^x = Y - \Delta F_t$, we can write

$$C_t^f = Y_L + .5r(F_t + F_{t-1}) - \Delta F_t - (1 - .5r)\Delta d_t + rd_{t-1} .$$

Since our data provide information on all the terms on the R.H.S. of this equation, we can solve for the implied yearly flow of consumption services (C_t^f). As an estimate of r, we used the coefficient on lagged net worth in the Total Net Worth regression. See Darby (1977) for a derivation.

[17] For example, wives' labor supply depends less on the number of children less than five years of age than it does on whether there is such a child, regard-

less of how many. This type of specification was tested in the net asset equation and was not superior to the one we present. This does not mean that alternative specifications could not be found to improve *individual* regressions for different dependent variables.

[18] In lieu of this we have resorted to a less formal test to determine if the endogeneity of children is somehow driving our results. If unmeasured "tastes" for children are important for the saving and consumption decisions and if these tastes are common to a family from year to year, then errors in our consumption and asset equation in one year, for one family, ought to be correlated with the errors for the same family in subsequent years. We have computed the "within" error correlation for both asset and consumption equations. Those for the asset equations (.03) are all insignificantly different from zero. The correlations for the consumption equations are .19 (significantly different from zero) for the specification reported in Table 2 and .02 for the model with the child spacing variables included. The absence of any strong "fixed effect," as measured by these correlations, is supportive of the presumed exogeneity of children for assets' growth and consumption, but there is another possibility. Changes in assets or consumption on a year-to-year basis, i.e., transitory uncorrelated movements, may affect the birth decision of families and so contribute to a spurious correlation between family size and our dependent variables. Unfortunately, this argument is virtually impossible to refute given the data at our disposal. However, it seems to us difficult to argue that these transitory movements could be responsible for the measured effects of all of our variables measuring the size and age distribution of children since most of these are predetermined, i.e., are fixed before the time that our observation on period consumption and asset change are measured. For a treatment of the endogeneity question, see Waite and Stolzenberg (1976).

[19] However, it is somewhat surprising to note that the bulk of this accumulation of assets takes the form of durable goods. This may cast some doubt on our interpretation of this as induced by a precautionary motive.

[20] In the perfect certainty case there are no sur-

prises so that fluctuations in income do not cause families to revise either their expectations or future plans. Because of this, lifetime wealth will not be influenced by short-run events when perfect certainty prevails.

[21] In a related study, Smith (1979) provides evidence that among young white couples, incomes of husbands and wives were strongly negatively correlated. This correlation in spouses' earnings decreased with age.

[22] Time preference is defined as an individual's subjective value of a unit of present consumption in terms of future consumption evaluated at equal levels of present and future consumption.

[23] On the suspicion that the direct age effects were confounded by our control for marriage duration, we reestimated our equations dropping the marriage durations variables. Our new estimates were essentially identical to those reported here not only for age but also for the other variables.

[24] We are using only the linear (noninteracted) duration terms to interpret this effect. The effects of changes in marital duration thus refer to couples with no children under five and no changes in husband's income.

[25] λ is estimated from an *auxillary* probit function on the probability of sample inclusion (i.e., married less than 19 years). In addition to its obvious dependence on age, this probability depends on family characteristics related to age at marriage and the possibility of previous marriages. Our regressors included a splined husband's age variable, race, husband's education, the number of young and older children in the family, the age of the oldest child, and the difference in spouses' ages and education. Given the probit estimates, λ is calculated as the inverse of Mill's ratio—the ratio of an ordinate of a standard normal to its right tail area. To correct for sampling censoring, we included the estimated value of λ for each family in the regressions reported in the text. For the original derivation of this statistical procedure in a different context, see Heckman (1980).

[26] The only equations in which sample censoring appears to be important are the wife's annual hours and income regressions. Presumably, unobservable factors correlated with short marriage durations are correlated with low hours and income of the wife.

[27] The following table presents F values and the associated significance level for (a) the joint significance of the three children variables, (b) the hypothesis that the "initial effect of a child in the first year of marriage is zero":

Hypo-thesis	Net Worth	Financial Assets	Durable Assets	Female Income	Female Hours	Consumption
			Equation			
a	2.54 (.0541)	5.33 (.0013)	1.78 (.1482)	34.53 (.0001)	40.84 (.0001)	7.40 (.0001)
b	6.76 (.0095)	6.26 (.0125)	.0163 (.8984)	41.11 (.0001)	35.52 (.0001)	.66 (.4146)

[28] Espenshade (1975) also reports that family size did not affect savings. He also finds, with a very different specification, that young children reduce savings.

[29] Freedman and Coombs also report that child bearing early in marriage also has a large negative impact on savings.

[30] Note that the effect of duration of marriage is significantly negative in the equation for wives' annual hours.

[31] Surprisingly, we find no increase in husbands' hours in "the young marriage effect." Thus, the negative savings response to young children early in marriage are not altered by consideration of husband's hours responses.

[32] Ideally, we would want measures of both husband's and wife's wage rates, so that all hours adjustment, due to children, would be freely variable. Our data, unfortunately, does not permit us this experiment.

[33] We offer a separate set of estimates with these spacing variables included because our primary concern was to measure the effects on savings of family size per se, differentiated primarily by the age of children. We did not want the effects of these family size variables to be camouflaged by spacing considerations. Our original specification of number of young and older children implicitly implies a crude measure of spacing. But even for families with two children—a child less than five and older than four—large differences can exist among families in the number of years between these two births. It is these differences which we are attempting to capture with our spacing variables. Fortunately, the inclusion of these spacing variables did not alter the basic results obtained for the three children variables discussed earlier, with one exception. In this more comprehensive model, we estimate a somewhat smaller positive effect on savings for young children born late in marriage. This result flows almost exclusively from a lower estimate of the decline in family consumption induced by a young child.

with three children, an increase in average birth intervals from 2 to 4 years reduces market work by one year.

[36] This lower female earnings among long-spacers would normally imply lower savings among these females from the income component of savings. But although shorter birth intervals minimize the total lifetime labor market withdrawal, it may concentrate that reduction in a shorter period of the life-cycle. In the period in which a short-spacer has young children, her reduction in labor supply and earnings per period may be larger than that of a long-spacer. The larger total lifetime withdrawal of long spacers then flows from the greater number of periods with young child present which offsets the smaller more uniform reduction per period.

[37] In addition, children spaced further apart may permit a family to take advantage of more economies of scale in consumption through the "hand me down" effect.

ACKNOWLEDGMENTS

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[34] The following table presents F values and the associated significance level for (a) the joint significance of our five children variables, (b) the hypothesis that the "initial effect of a child in the first year of marriage is zero," and (c) the joint significance of the two spacing variables.

Hypo-thesis	Equation					
	Net Worth	Financial Assets	Durable Assets	Female Income	Female Hours	Consumption
a	3.14 (.0082)	3.51 (.0039)	1.64 (.1456)	21.37 (.0001)	25.94 (.0001)	7.13 (.0001)
b	6.12 (.0135)	5.88 (.0155)	.0270 (.8694)	41.85 (.0001)	36.06 (.0001)	.99 (.3194)
c	4.02 (.0018)	.79 (.4560)	1.43 (.2393)	1.55 (.2129)	3.31 (.0370)	6.60 (.0014)

[35] Empirical support for this view is found in Cogan and Berger (1978) who report that longer birth intervals are associated with large reductions in lifetime work effort. They estimate that for a woman

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