Determinants of parental investment in children's human capital formation via higher education

by

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THE PROBLEM AND THE MODEL

By investing in one's own human capital formation, that is, in a person's own productivity, one can presumably reap financial returns in the form of increased earnings later in life. As one can increase physical productivity by investing in physical capital, so can one increase human productivity by investing in human resources. A relatively recent body of research on human capital deals with this concept of education as an investment good. This human capital investment can take the form of general education (including college) or specific job training. The most common form of investment, at least for young high school graduates, is college education.

For young persons investing in college educations, the most usual method is via parents. This especially holds true since college has come to replace high school as the mark of an "educated" person and as the prerequisite for a higher-status, well-paying job. Taubman and Wales (22) found the latter consideration to indeed hold; that education serves as a screening device to bar the less educated (lacking these "credentials") from the higher paying professions. Even without statistical methods of analysis, parents have observed this phenomenon and have come to regard their children's college education as a major item in the family budget along with food, clothing, housing, automobiles, and insurance.

The first question that arises is why should someone invest in someone else's education or human capital formation? In this case the

investor does not personally realize the benefits from his/her investment, so strictly speaking he/she has no apparent incentive to make the investment. The second question: given that this investment by an outside party occurs, what factors could influence it and in what way?

Most analyses of individual decision making assume the individual will seek to maximize his/her own benefits (in whatever form), whether in the present or over time. This assumption is not inconsistent with the parent's investing in a child's education or otherwise providing for his/her "significant others." One needs only to broaden the definition of the unit whose welfare is to be maximized.

It is not unrealistic to assume that a member of a family will identify his/her well-being with the family's and therefore seek to maximize the well-being of the family over time. This especially applies in the case of parents providing for children. A parent may view a child as an extension of his/herself into the future; parents commonly have certain expectations for their children or perhaps try to shape the child into something the parent could have been. Providing the child with "all the advantages I never had" occurs very frequently. Parents also often value family heritage and may view a child as a continuation of this.

With this kind of perception of the family, it then becomes rational for parents to invest in children's human capital formation. It also makes sense to put limited family resources where these would be most productive. The earlier in life a person makes an investment, the more years the person can realize the benefits from it. If the present value of a person's lifetime net earnings stream is

$$PV = \sum_{j=0}^{n} \frac{Y_j}{(1+i)^{j+1}},$$

the higher n (number of years of returns) the higher the PV. This draws directly on Becker's work (2).

Children generally have more productive years ahead of them than do their parents. Therefore, if the goal is to maximize the well-being of the family over time, resources would be most profitably invested in the child instead of the parent. Since the child has a much longer productive life ahead over which to realize the gains (and as such realizes greater total benefit than would the parent, assuming them to be of equal ability), the investment in the child results in greater total benefit for the family as a whole.

This does involve certain assumptions about other factors. For example, if the parent might realize great benefits from extra education, while the child for his/her interest and/or ability already has the education necessary, the above assumption could be reversed. In this case a conflict might arise between the partent's and the child's education. The previous analysis tends to assume that the benefits arising from continuing education for the parent are small compared to the benefits arising from initial education for the child. The greater opportunity-cost sacrifice generally involved in a parent's education than in a child's (at least for full time educational effort that will be competitive with continued employment) may reduce the net benefits which would accrue from the parent's education and thus also encourage the shift of resources to the child.

Other relevant points include the probability that the child will need the parents' assistance due to less financial independence and less access to capital markets than have older people (2). The parents will also be more likely to have already developed a lifestyle and accumulated a substantial reserve for their own needs (including retirement), so they may not feel as great a need for investment in their own earning power as they would for the child. (Education is here assumed to be an investment good rather than a consumption good, although the latter also exists.)

Given, however, that parents will choose to invest in the child's education rather than their own, the quantity of this investment may still vary widely. A greater monetary expenditure is assumed to represent a greater investment in education - presumably, in order for a greater investment to take place, the investor feels he/she will receive greater benefits.

The investor has a wide range of choices: for example, college vs. post-high-school vocational training; a state-supported university vs. a private school; an in-state vs. out-of-state university; a junior college vs. a university; dormitory residence vs. off-campus or commuter status. One can reasonably assume that parents would not pay the higher cost of a set of alternatives if they did not feel there was some educational benefit (however defined) to the child by doing so; therefore, the financial cost of the child's education (assumed paid by parent as discussed in the next chapter) reflects the investment made by the parent in the child's human capital formation.

The positive correlation between costs and resulting benefits is supported to some extent by Weisbrod and Karpoff (25). They analyzed benefits from education independently of non-schooling variables (such as ability) and quality of the school, and found that the quality of the school attended affects earnings. With ability held constant, the graduate of a below-average school tends to earn 10% less than the graduate of one of the "best" schools. Since the "best" schools also tend to charge higher rates, this establishes some grounds for associating educational spending with quality.

A more direct support of the assumption comes from Wachtel (24), who found that the variance in investment cost among colleges is an important determinant of earnings. If colleges operated efficiently (along their production possibility frontiers), the cost differences would reflect quality differences. While this situation probably does not exist precisely, if costs significantly affect earnings this demonstrates at least the importance of quality in determining earnings. Considering returns to both social and private investment, Wachtel also found as a consequence that estimated rates of return to schooling are lower with all costs considered than when years of schooling serve as a proxy for all these costs. Wachtel's results also support the hypothesis that students with higher earnings potential (probably from higher ability) will invest more per year of schooling.

Many factors could influence how much a parent (representing the family) may pay for his/her child's education. The most obvious factor is financial ability to pay for it. Components of this include

partents' and student's earned income, wealth, and transfer payments, and also any funds the student might receive for educational purposes (such as veterans' and social security benefits). An indifference curve diagram best illustrates the effects of financial ability (Figure 1).

Assume there exist two alternatives: expenditure on human capital formation and expenditure on other goods. Utility (however defined) arises from both. The indifference curves U_0 and U_1 reflect the different combinations of the two alternative goods which will yield equal satisfaction. The convexity to the origin of U_0 and U_1 indicates that as a person has more of one good already, he/she would offer more of that good in exchange for a given extra amount of the other good. The capital formation aspect of the human capital good which will eventually shift the budget constraint outward will be ignored for the present. The budget constraint is defined as Total Family Income = Earned (adjusted gross) Income of Parent + Earned Income of Student + Other (nontaxable, transfer payments, etc.) Income of Parent + Other Income of Student + Services Derived from Net Wealth (home, financial investments) of Parent + Services Derived from Net Wealth of Student + Educational Benefits (veterans', social security) received by student.

Assume point A represents the family's original position. Other things equal, an increase in Total Family Income from an increase in any of its components except Educational Benefits will result (point B) in an increase in human capital formation (for the child, following the reasoning presented previously). This assumes that human capital

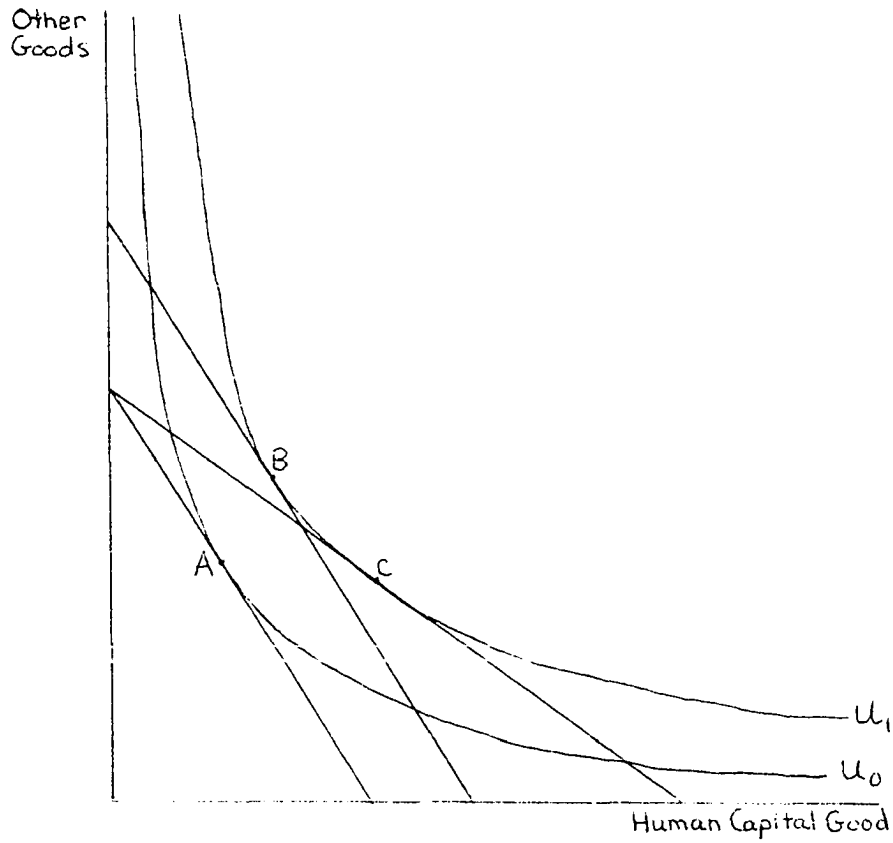

Fig. 1. Indifference curve diagram showing a change from original position A due to an increase in income (point B) or an increase in educational benefits (point C).

formation is not an inferior good (a reasonable assumption, supported by Campbell and Siegel's (6) reported income elasticity of +1.20). The government ties educational benefits to expenditure on education, if not directly then through foregone opportunities; therefore, an increase in Total Family Income from a given increase in these benefits results in an even greater increase in spending on human capital formation (point C) than would the same increase in real income from other sources. In short, an increase in Total Family Income from any source will tend to increase spending on the child's education.

At least two studies confirm this expected relation. Galper and Dunn (9) found a significant relationship between enrollments and real family income; also significant in explaining enrollments were the change in size of the armed forces (due to the draft) and discharges thereof, all adjusted for the size of the high school graduating class. Campbell and Siegel (6) dealt with income and direct cost (tuition); they found that undergraduate enrollment was positively related to income (elasticity = +1.20) and negatively related to tuition (elasticity = -.44). Higher education therefore becomes income elastic and price inelastic. The price inelasticity supports the assumption made (and discussed in the next chapter) that once the family makes the decision to send the child to a certain college, they will send the child there regardless of whether he/she receives financial aid; if enrollment varies but little as tuition itself changes, it should not vary much as the amount parents pay of a given tuition changes.

The above diagram also reflects the importance of the relative opportunity-cost price of education to other goods. If the individual did not go to school, he or she could work and be able to obtain (in the present) more Other Goods. While the student's actual foregone earnings are unknown, the unemployment rate in his/her area could be relevant; as unemployment rates rise, unemployed workers frequently go back to school and/or current students will remain in school until conditions improve. Therefore, the unemployment rate, by lowering the expected opportunity cost of going to school, may positively affect spending on education if not countered by the negative effect of a decrease in income of the unemployed.

One study (Crean, 8) has dealt explicitly with this. The number of students of a given age between 14 and 19 who were enrolled in secondary school in Canada was given as a function of expected lifetime financial returns, expected financial cost of education, nonfinancial costs and benefits, and the permanent income of the families of the students. Crean hypothesized that only financial cost of education should affect retention rates in the short run. As Canada has free tuition, only foregone earnings mattered in measuring cost; since wages are sticky in the short run, time series unemployment rates served as a proxy for short run fluctuations in cost. Crean found a significant positive relationship between unemployment rates and students in school, confirming the above hypothesis.

Also, the relative opportunity cost of education as an investment good would be affected by the expected returns to the educational

investment, such as by how much future earnings would increase as a result of the schooling. Where much could be gained, one would expect greater investment. From an examination of the data on rates of return, only the first year and the final year of a higher educational program appear to affect the rate of return. The educational level of the student might exert some independent influence; a person soon to graduate might make more of a financial sacrifice to finish his/her curriculum than a person still years away from the degree.

Returns to education most probably vary somewhat with occupation. For example, returns would be higher in professional occupations than for factory workers. Parents would likely have a tendency to view returns to education as they in their line of work have experienced. Children also tend to choose or at least judge returns by the same type of occupation (i.e. professional, laborer, etc.) as their parents because parents have served as their role models for so long (3, 26). Therefore, the type of occupation of parents might affect family perception of returns to education as well as the income available for investment. One might expect higher educational spending from professional parents than from parents in other occupations.

It has also been shown by Swift and Weisbrod (21) that the higher the education of the parents, the more their children will invest in education; therefore, "education transmits its energizing effects from generation to generation," and educated parents contribute to future social well-being by influencing their children.

The set of data available did not include the educational level of the parent. Therefore, one can only use occupation and to some degree parental income as proxies, since especially professional and technical occupations require higher education than others. However, this is rather inadequate since according to Mayhew (15) occupational choice accounts for less than half of the extra earnings associated with increased education; the remainder arises from the benefits of increased education within one's original occupation (which one would have chosen regardless of schooling). However, Taubman and Wales in their previously mentioned study (22) did find evidence of an occupational screening effect of education. Available data on returns to education are not broken down by occupation in addition to the breakdowns by race, sex, region, and educational levels, so inclusion of occupational types as dummy variables might aid in explanation.

Rates of return may also vary across regions, although computed rates only exist for South vs. non-South. Lassiter (13) found income and education significantly related to each other, though not highly so, in breakdowns by race and region. Most differences in the income-education association between racial and regional groupings were also significant. In the South, the amount of variation in income explained by education exceeded that in the North. Therefore, geographic region may have a contributing explanatory effect.

Despite Affirmative Action, sex still affects earnings and employment in favor of males. While Malkiel and Malkiel (14) found that most

discrimination was based on job assignments rather than overt salary discrimination, the overall pattern of females receiving less money than similarly qualified males still holds. Families guided by utility maximization would therefore probably prefer to invest more in the education of a son than in that of a daughter. Although this pattern may be changing with the age of women's liberation, traditional values still permeate society.

Whether or not both parents work may also be relevant. This should primarily affect Total Family Income, although with no necessary correlation since lower income families may be more likely than higher income families to have both parents working, out of sheer necessity. With the second (usually female) parent's income, the family can afford more educational spending (although the reverse causation may also prevail - the second parent works to finance a predetermined expenditure). For female students, a working mother may also serve as a role model and therefore encourage female educational investment.

Finally, the more cohesive the family unit, the greater the likelihood that parents will identify the child's welfare with their own. Any method of measuring family cohesion, at least with the type of data available, will no doubt invite objections. However, families where parents are married or widowed are probably in general more cohesive than families where the parents are separated or divorced, on the grounds that the marital status could serve as a symptom of family closeness.

This association has received some support in the psychological literature. Robertson (18) cites many studies associating marital status with incidence of mental illness. For both sexes, divorced people have the highest incidence of mental illness; next, the widowed; and lowest, married people. Mental illness quite conceivably could affect family cohesion, or vice versa. More directly, a study by Smith et al. (20) considered marital status along with other factors as indicators of family cohesion when analyzing the battered baby syndrome. This shows a direct relationship between the socio-psychological conditions of the parent and the affection for and treatment of a child (although the type of effect considered in the present study obviously differs).

Several hypotheses, then, were examined. First, all types of income (parent and student, taxable and nontaxable, and matching educational grants) were expected to positively affect spending on the student's education. Net wealth of both parent and student, as further indication of financial resources, were also hypothesized to be positively significant with respect to education spending.

The effect of parental occupation was also explored. Professional parents especially were expected to spend greater amounts on their children's educations. Although occupation could serve as a measure of permanent income and therefore supplement the effects observed due to gross income, it more likely indicates (as discussed later) some values inherent in families of a particular occupational type. For example, since professional parents have more education themselves and their

occupations often depend on their education, they might put greater weight on educational achievement than would other families. Although the mother's occupation was not given in the available data, the presence of a working mother was expected to correlate with the female sex of the student, encouraging female higher education (as discussed later).

Similarly, effects due to the region in which the family lives were also tested. The South in particular was expected to have a lower expenditure on education, as will also be discussed later.

Returns to education were hypothesized to have a positive effect on spending, as were the related variables of the educational level of the student and the male sex of the student. Parents were expected to spend more where more was expected to be gained.

The unemployment rate of the population of the state of residence could plausibly go in either direction, either a positive effect through lowering opportunity cost or a negative effect through increased uncertainty concerning the family income. There was no a priori prediction as to which effect would be stronger.

Finally, several variables which could affect the parents' tendency to spend on the child rather than themselves were proposed. The ages of both parent and student were considered; the tendency should be stronger with older parents and younger students to invest in the student. Marital status served as an indication of family cohesion; married and widowed parents were expected to spend more on their children and divorced and separated parents were expected to spend less.

DATA AND PROCEDURES

Data Base

The data used in this study came from the American College Testing Program's (ACT) Family Financial Statements. ACT (a nonprofit corporation) offers a student financial need analysis service to colleges, universities, and other post-high-school educational institutions to help them screen applicants who need financial aid.

All applicants for financial aid must fill out a Family Financial Statement. Where the student is self-supporting, only data on the student are included; where the Internal Revenue Service counts a student as dependent, ACT requires parents' financial information in addition. On the basis of this data, and from figures on estimated tuition and living expenses supplied by the student's first-choice institution, ACT arrives at an amount the student and/or parent could be expected to contribute and an amount the student "needs" in further aid.

Between September 1, 1974 and August 1, 1975, approximately 510,000 Family Financial Statements were filled out. ACT drew a random sample of about 41,000 and made it available for this study. From this sample, further selection for present purposes includes only dependent students, only cases where the first-choice institution released its budget data for research purposes, and cases which passed several checks for reporting errors (described later).

Parents and students filled out the statements in 1974-75 in order to apply for aid for the school year 1975-76. The statements directed

the respondents to provide income data from their most recent (i.e. 1974 in most cases) tax return; this meant that 1973 income figures were reported. Information on the Family Financial Statements which particularly concerns this study includes:

For both student and parent:

whether a tax return was filed, and whether it was a joint return

if a joint return, the smaller of the two incomes reported

federal income tax paid

adjusted gross income

other income (nontaxable), including welfare, child support, untaxed capital gains, noneducational social security and veterans' benefits

home value (current market value)

home mortgage (unpaid amount)

savings and investments (savings and checking accounts, stocks, bonds, real estate)

debts against savings and investments

business or farm value

business or farm debt

share or ownership of business or farm

total elementary and secondary tuition to be paid for dependents in 1975-76

age

dependents in post-high-school education

marital status

state of residence.

For student only:

educational benefits student will receive in 1975-76 (social security and veterans benefits; monthly amounts and number of months)

level of schooling

number of dependents

whether or not student lives with, receives aid from, or is claimed as tax exemption by parents

other benefits received (welfare, ADC, food stamps).

For parents only:

size of household (including applicant)

months applicant will live at home in 1975-76

total months other post-high-school dependents will live at home in 1975-76

occupation of main family earner.

Problems do exist with this data base. First, it is not a random sample of the U. S. population, nor of the population of parents sending children to college. It only includes cases where students request financial aid. However, upon examination of the data, the income distribution of the ACT population was found to compare closely with that of the United States; this suggests that wealthy families also request financial aid. Presumably they figure that it is worth a try to apply

for it (and due to debts, number of children in school and the expense of the schooling, they may succeed).

One must also assume for the purposes of this study that parents would send their children to their first-choice college (or other institution of higher education) whether or not they received the aid for which they applied. For the majority of cases, this probably holds true; once the family decides its priorities with respect to education and educational institution, the money will usually come from some source if not from the college via scholarships (though the family would prefer the latter). Because ACT analyzes the student's need only in the first-choice situation, the designation of the first-choice institution requires serious intention if the student desires any aid. The inelasticity of college enrollments with respect to tuition found by Campbell and Siegel (6) supports this, although Campbell and Siegel also assumed that loan capital would be available to all students needing it.

Further support for this assumption comes from other studies cited by Jackson and Weathersby (12). In their review of existing literature, they conclude that while cost to the student has a significantly negative effect, the magnitude of the price effect seems relatively small and decreases with increasing income. For elite liberal arts schools in particular, cost affects application decisions, but enrollment decisions do not correlate with financial aid form or availability. Jackson and Weathersby feel that although student financial aid does

improve access to higher education, most students receiving grants would probably enroll anyway.

Parents may also require that their son or daughter contribute to their educational expense. However, this still reflects family investment in the child's education. For simplicity, and because parental financing probably accounts for the majority of cases, educational investment will be considered as by the parent. By assumption, therefore, the cost of the first-choice institution represents the amount parents would be willing to invest. The type of educational institution chosen (college, trade school, etc) is not given; however, this does not seem crucial to the study because, by assumption, cost reflects the investment in human capital, whatever the form. For the sake of convenience, in this study "college" will refer to the institution of higher education chosen.

Another problem with this data arises because of the possibility of inaccurate reporting of some information. Income data can be verified from the IRS (the applicant, by signing the statement, gives this permission), but wealth data and demographic data involve the chance of estimation error, both intentional and unintentional. Five checks may provide some limit on inaccuracy. First, the data tape registers a comment whenever income tax paid deviates more than $50 from the payment on adjusted gross income which would be expected from the other tax data given. All records with such a comment were discarded. While more satisfactory criteria for weeding out inconsistency would possibly be

devised, ACT applies this. This resulted in the rejection of approximately one-third of the records. Second, where reported unpaid home mortgage exceeded reported home market value, the record was discarded. This became necessary due to a preliminary run which yielded several large negative net wealth figures, some traceable to negative net home value. While one can conceive of negative net savings and investments and net business or farm value, a concept of negative net home value presents more difficulty. Many of these errors (which were not widespread) apparently arose from careless decimal places. There no doubt exists a strong temptation to understate both income and wealth, but the extent and the distribution of this error among income classes cannot be known. No adequate basis exists for generalizations concerning any resulting bias in the data, but the income-tax comment may result in a greater rejection rate among the self-employed than among employees.

On occasion, records listed parents' household size (including parents) as equal to the number of dependents in post-high-school education or gave total months at home of other dependents in post-high-school education as greater than the number of other post-high-school dependents time twelve. Sometimes also the budget listed for commuters exceeded the budget listed for residents. The records in which these presumed reporting errors occurred were rejected. In addition, the Statistical Analysis System (SAS) computer regression program which was used automatically rejects for analysis any record with incomplete data. Once the records were sorted by these criteria and by

the dependency and budget release previously mentioned, there remained 11,262 records which comprised the data set for this study.

Definition of Variables

The next step involves defining the variables used. Educational spending (EDS) on children per year, adjusted for the number of children, comprises the dependent variable. Spending on elementary and secondary-age children consists of total elementary and secondary tuition (EST) divided by parents' household size (PHS; total dependents) net of dependents in post-high-school education (DPH) and parent(s). Marital status determined the number of parents in the household. Parents listed as divorced or widowed are assumed not to have remarried, although one cannot tell for certain.

Spending on post-high-school students separates into spending on the student applicant and spending on other dependents. For the student applicant, the first-choice college budget (BUD) determines spending. The colleges submitted to ACT their budgets for both resident and commuter students. If the applicant's months at home were less than or equal to four, the resident budget was used; if months at home exceeded four, the commuter budget applied. Also, a position on the data tape indicated whether the student's state code differed from that of the first-choice institution (in other words, if the student would attend school out of state). If the state codes did differ, ACT listed budgets for out-of-state rather than in-state students.

For other dependents in post-high-school education, national ACT norms yielded average total cost figures (BDO) for both residents and

commuters (1). Resident vs. commuter status was determined by whether months at home per other dependent in post-high-school education was less than or equal to four or greater than four. One must assume here that all other post-high-school dependents have the same status. The corresponding average cost figure ($2783 for residents, $2045 for commuters) was multiplied by the number of dependents in post-high-school education besides the applicant. The applicant's budget was added to this, and the total divided by the number of dependents in post-high-school education. The computation of educational spending then becomes

$$EDS = \frac{EST}{PHS - DPH - parents} + \frac{BUD + BDO}{DPH} .$$

Most of the variation in this measure will come from differences in the budget facing the applicant. Elementary and secondary tuition, in the days of free public education, should be negligible. Spending on other post-high-school dependents, computed from average figures, will not change much; it will depend on commuter status and the number of dependents affected. The division should largely adjust for household size, although, as discussed shortly, the latter may still have an effect. Therefore, the major source of variation in EDS should be the applicant's college budget.

Independent variables include age of parent (AGE) and student (AGS), adjusted gross income of parent (GYP) and student (GYS), other income of parent (OYP) and student (OYS), net wealth of parent (NWP) and student (NWS), educational benefits received by student (EBS), educational level of student (ELS), occupation of main family earner, sex

of student (SX), marital status of parents, returns to education (EDR), region, unemployment rate (UEM) and presence of a smaller income of parents which indicates if both parents hold jobs (BPW).

Adjusted gross income of parent, adjusted gross income of student, other income of parent, whether a smaller income was reported on a joint return, age of parent, and educational level of student, already on the tape, did not need further derivation. Other income of student was considered as nontaxable income plus other benefits (noneducational) received by the student. The year of application minus the year of student's birth defined age of student. Educational benefits of student were obtained by multiplying monthly benefits by number of months received for both social security and veterans' benefits, and adding the amounts of the two sources.

Net wealth of parent was defined as home value minus home mortgage, plus savings and investments minus debts against them, plus ownership share of business or farm multiplied by business or farm value net of debts. Information on the student's finances, similarly computed, yielded net wealth of the student.

The availability of unemployment rates by state (23) meant that for a given state code, an appropriate unemployment rate applied. To test for regional differences in spending, states were then grouped using Census definitions into five regions to serve as dummy variables:

South (RES): Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi,

North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia

New England (REN): Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont

Central Midwest (REC): Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin

Mountain (REM): Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming

Pacific (REP): Alaska, California, Hawaii, Oregon, Washington

Estimates of returns on education for males came from Giora Hanoch's study (10) and differed by region (South vs. North), educational level and race. Hoffer's 1973 study (11) reported returns for females under varying lifestyles, also using breakdown by region, educational level and race and using computational methods very similar to Hanoch's. Hanoch computed the rate of return for a given level of schooling as the rate which equated the present values of estimated earnings streams of that level and the previous level. The relationship between these marginal returns and the amounts of schooling could then approximate the marginal efficiency of investment for years of schooling.

The financial statements did not include data on race. Therefore, returns for whites applied for all races; also, since Hoffer did not report returns for females at the graduate level, the reported returns

for males applied for both sexes at this level. Further necessary assumptions made included that all females investing in higher education do so with the intention of a full-time career (whether or not this materializes); therefore the returns corresponding to the lifestyle most similar to men would apply. Unless the female gets married, she needs the full-time career for self-support; most females no longer attend college with the goal of finding a mate, even those who do have no guarantee of success, and increasing numbers of married women continue their careers. Also by assumption, Northern rates of return applied to all regions outside the South since the South so frequently constitutes an exception to the rest of the nation, although technically not all of the rest of the United States is Northern.

Parents' marital status became four dummy variables, according to whether parents are married (MAR), divorced (MAD), separated (MAP), or widowed (MAW). Further possibilities, both parents deceased and other, were left out of the regression so as to avoid a singular matrix. 202 observations did not fit any of the four dummies used. Sex of student, also a dummy variable, takes on the value of 1 if female, 0 if male.

The main family earner's occupation fell into ten dummy variable classifications:

professional and technical (OCP)

retired and disabled (OCR)

farmers and ranchers (OCF)

managers, proprietors and officials (OCM)

sales workers (OCS)

clerical workers (OCW)

operatives (assembly, drivers, etc.) (OCO)

laborers (OCL)

service workers (OCV)

craftsmen and foremen (OCT)

Other categories, not used in the regression so as to avoid a singular matrix, included homemaker and other unspecified occupation. Some error occurs in the data; 54 of the 11,262 observations apparently reported an occupation code which did not fall into any of the above categories. Because these constituted such a small proportion of the total, this error was ignored.

The regression equation first run then was:

$$\begin{aligned} EDS = {} & b_0 + b_1 AGE + b_2 GYP + b_3 BPW + b_4 OYP + b_5 GYS + b_6 OYS + b_7 EBS \\ & + b_8 NWP + b_9 NWS + b_{10} AGS + b_{11} ELS + b_{12} OCP + b_{13} OCR \\ & + b_{14} OCF + b_{15} OCM + b_{16} OCS + b_{17} OCW + b_{18} OCO + b_{19} OCL \\ & + b_{20} OCV + b_{21} OCT + b_{22} SX + b_{23} EDR + b_{24} RES + b_{25} REN \\ & + b_{26} REC + b_{27} REM + b_{28} REP + b_{29} MAR + b_{30} MAD + b_{31} MAP \\ & + b_{32} MAW + b_{33} UEM + \varepsilon \end{aligned}$$

where b_i, $i = 0 \cdots 33$, are regression coefficients and ε represents the error term. A linear model was specified, since no a priori reason to do otherwise appeared. The availability of computer funds limited the exploration of alternative forms.

Some empirical evidence (4) indicates that the greater the number of siblings the less education a child will receive on the average. Brazer and David in their 1960 study estimated that only-children received an average of .32 years of schooling above the grand mean of 11.82 years; in two-children families, the average was .23 years above the mean; for families with three or four children, the average was .07 years below the mean; and for families with five or more children, .54 years below the mean. Therefore, after performing the overall regression, it was deemed advisable to sort the observations into these four classes and run the above regression for each class separately.

The original number of children in a family is unknown; the data exclude any presently independent. These latter are assumed not to affect spending on those remaining. A parent now spending to educate one remaining child is not restrained by the thought of others yet to be provided for or the uncertainty that he/she will have the resources when the turns of the others come. The existence of other dependents such as relatives besides parents and children is also unknown and therefore assumed away, on the grounds that this should include only a small fraction of total cases.

RESULTS

General Regression

Important items to consider when discussing results include the estimated regression coefficients (b), their t values indicating significance, and the (simple) zero-order correlation coefficients (r) and their levels of significance.

If both the estimated regression coefficient and the simple correlation coefficient of a variable show significance, the significance of the variable becomes obvious. However, the r may significantly differ from zero and the b not, or the b may be significant and the r not. This especially becomes relevant when some of the independent variables correlate with each other.

If r is significant and b is not, one should look at what else the variable correlates with. Two variables may account for the same variance in the dependent variable and therefore correlate with each other. Each by itself may significantly explain the dependent variable, but when taken together neither one may show significance. In the regression, that part of the dependent variable's variance which they both explain gets attributed to neither, and only the unique contribution is attributed to each one, lessening the observed effect of each variable.

If b is significant for an independent variable but r is not, then that variable must correlate with some second independent variable which is correlated with the dependent one. The first mentioned variable suppresses variance contained in the second variable, variance

which is unrelated to the dependent variable. This creates a linear combination which more accurately measures the dependent variable. Of course, with more than two independent variables to consider, the pattern becomes much more complicated than described here and it may become difficult to distinguish between the effects of different variables.

The significance level designated as the criterion for significance in regression was the 1% level. This corresponded to a t value of 2.33. For simple correlation coefficients, a standard of .01% was generally used.

Gross Income of Parent (GYP) and correlates

As expected, gross income of parent claimed by far the most significant effect on EDS (Table 2: $t = 7.88$, $r = .16$). Despite this, the magnitude of the estimated b coefficient was relatively small; a $1 change in income produced only a $0.0084 change in EDS. The computed elasticity of EDS with respect to GYP was only .0376, far below the income elasticity found in other studies.

However, previous studies included the decision to go to college at all as part of the variable explained by income. In the present case, the family has already decided the student will go; the only question becomes how much will it cost. The decision to attend at all may be considerably more income elastic than the choice of institution.

The inclusion in the regression of occupational dummy variables, some of which reached significance (Table 2), may also partially explain the low coefficient on income. For example, the existence of a

Table 1. Definition of variables, notation.

EDS = educational spending by parents on children, per child, per year
AGE = age of parent
BPW = both parents working
GYP = gross income of parent(s)
OYP = other income of parent(s)
GYS = gross income of student
OYS = other income of student
EBS = educational benefits of student
NWP = net wealth of parent(s)
NWS = net wealth of student
AGS = age of student
ELS = educational level of student
OCR = retired/disabled occupation of parent
OCP = professional/technical occupation of parent
OCF = farm occupation of parent
OCM = managerial occupation of parent
OCW = clerical work occupation of parent
OCS = sales work occupation of parent
OCT = craftsman/foreman occupation of parent
OCO = operative occupation of parent
OCV = service work occupation of parent
OCL = laborer occupation of parent
RES = Southern region
REN = New England region
REM = Mountain region
REC = Central Midwest region
REP = Pacific region
SX = sex of student
EDR = returns to education
MAR = parents married
MAD = parents divorced
MAP = parents separated
MAW = parents widowed
UEM = unemployment rate
PHS = parents' household size

Table 2. Regression coefficients, t values, and simple correlation coefficients and significance levels for EDS (r^2 = .099).

Independent variable	b value	t value for H_o: b = 0	Simple r value	Significance level of r
Intercept	2543.37	22.16*		
AGE	-0.40	-0.37	-0.0060	0.5324
BPW	13.46	0.83	0.0493	0.0001
GYP	0.0084	7.88*	0.1649	0.0001
OYP	0.0064	2.00	-0.0075	0.5654
GYS	0.0015	0.62	0.0285	0.0028
OYS	-0.013	-2.62*	-0.0213	0.0221
EBS	0.034	1.85	-0.0062	0.5186
NWP	0.0004	2.43*	0.0653	0.0001
NWS	-0.00005	-0.09	-0.0019	0.8324
AGS	-0.08	-0.03	0.0097	0.3036
ELS	31.88	4.83*	0.0496	0.0001
OCR	3.33	0.09	-0.0412	0.0001
OCP	130.43	4.61*	0.0937	0.0001
OCF	-74.60	-2.12	-0.0175	0.0595
OCM	82.30	2.55*	0.0558	0.0001
OCW	16.16	0.46	0.0016	0.8612
OCS	4.78	0.13	0.0131	0.1580
OCT	20.85	0.58	0.0088	0.6449
OCO	-59.45	-1.76	-0.0384	0.0002
OCV	30.16	0.89	-0.0162	0.0809
OCL	-73.19	-2.10	-0.0511	0.0001
RES	-223.02	-4.59*	-0.2553	0.0001
REN	244.64	4.39*	0.0856	0.0001
REM	-54.75	-1.06	-0.0230	0.0141
REC	196.35	4.04*	0.2183	0.0001
REP	43.59	0.62	-0.0011	0.9043
SX	-58.19	-2.77*	-0.0373	0.0002
EDR	-719.30	-1.84	0.0073	0.5523
MAR	44.73	0.81	0.0577	0.0001
MAD	61.58	1.02	-0.0202	0.0298
MAP	-5.08	-0.07	-0.0387	0.0002
MAW	29.98	0.48	-0.0295	0.0022
UEM	-1166.82	-1.28	-0.0445	0.0001

*Significant at the 1% level.

Table 3. Regression coefficients, t values, and simple correlation coefficients and significance levels for GYP (r^2 = .3228).

Independent variable	b value	t value for H_o: b = 0	Simple r value	Significance level of r
Intercept	8439.37	9.08*		
AGE	-54.75	-5.63*	-0.1060	0.0001
OYP	-0.21	-7.55*	-0.1681	0.0001
BPW	2434.28	17.26*	0.2596	0.0001
NWP	0.03	21.12*	0.2054	0.0001
OCP	4607.04	18.78*	0.2148	0.0001
OCR	-3496.44	-10.97*	-0.2337	0.0001
OCF	-1671.54	-5.41*	-0.0459	0.0001
OCM	3332 88	11.78*	0.1402	0.0001
OCW	2395.26	7.75*	-0.0335	0.0007
OCS	2734.47	8.59*	0.0729	0.0001
OCT	2434.25	7.73*	0.0684	0.0001
OCO	1526.77	5.14*	0.0087	0.6440
OCV	35.32	0.12	-0.0796	0.0001
OCL	520.90	1.70	-0.0133	0.1518
REC	2188.78	5.11*	0.1864	0.0001
RES	-526.23	-1.23	-0.2209	0.0001
REN	1502.65	3.05*	0.0475	0.0001
REM	1285.46	2.81*	0.0237	0.0113
REP	1903.67	3.07*	-0.0135	0.1466
MAR	2825.78	5.92*	0.3542	0.0001
MAD	-2337.22	-4.44*	-0.1755	0.0001
MAP	-2517.85	-4.22*	-0.1356	0.0001
MAW	-3004.94	-5.71*	-0.2422	0.0001
UEM	-596.34	-0.07	-0.0505	0.0001
PHS	95.76	2.77*	0.1177	0.0001

*Significant at the 1% level.

professional or technical occupation of a parent indicates an increase of $130.43 per year spend on the child's education. This presents quite a contrast to the highly significant but small effect of GYP. The studies which found high income elasticities did not control income for type of occupation.

Also, GYP and regions vary significantly together (Table 3); GYP is higher in Central and New England regions and lower in the South. Because most of the regions were significant in their own right, their presence could also have detracted from the magnitude of the GYP effect. Again, other studies generally have not controlled for this.

Marital status also varied with EDS and GYP in simple correlation, though not in regression. Married people both earn the most and spend the most on their children's education, while the divorced, separated and widowed generally have lower incomes (Tables 2, 3). The separated spent significantly less (at the .02% level) on their children's education. This simple correlation would bear out the prediction of the effects of family cohesion (the separated probably experience the greatest current stress); however, as this includes the strongly associated effects of net wealth and especially income, one cannot say with certainty what produced the significance.

The presence of a second parent working was also significant on simple correlation but not in regression (Table 2). As this strongly correlated with gross income (Table 3: $r = .26$), the latter probably overshadows this variable as well.

Net Wealth of Parent (NWP) and correlates

The second major economic variable expected to have a significant effect was net wealth of parent. This also became evident in both regression and simple correlation (Table 2: $t = 2.43$, $r = .07$), although of not nearly as great a significance or correlation as GYP. Like GYP, the estimated b value on the regression was small (.0004). However, in simple correlation net wealth did not vary significantly in the same manner as income with most of the occupations (Tables 3, 4; Appendix). Farmers and managers had significantly greater wealth, and service workers, laborers and operatives had significantly less. Of this group, service workers did not show significant differences in EDS.

Under a regression of NWP on the other variables (Table 4), the last-mentioned three lost their negative significance and sales work, previously insignificant, became positively so at the 3% level. Only a positive correlation with a negatively significant variable or a negative correlation with a positively significant variable could explain this. The only alternatives were both parents working and household size as negatively effective variables (the former more likely an effect than a cause) and age, incomes, and widowed status as positive variables. Sales work negatively correlated with age and widowed status, and positively correlated with both parents working. Operatives correlated negatively with age and other income. Service work varied negatively with gross income. Laborers had larger household sizes, less other income, more likelihood of both parents working, and fewer widow(er)s among them.

Table 4. Regression coefficients, t values, and simple correlation coefficients and significance levels for NWP (r^2 = .1138).

Independent variable	b value	t value for H_o: b = 0	Simple r value	Significance level of r
Intercept	-18899.79	-3.23*		
AGE	321.03	5.25*	0.0730	0.0001
OYP	1.47	8.55*	0.0553	0.0001
BPW	-6044.30	-6.75*	-0.1966	0.0341
GYP	1.33	23.12*	0.2054	0.0001
OCP	-798.74	-0.51	-0.0155	0.0946
OCR	5055.04	2.51*	-0.0068	0.5255
OCF	34884.62	18.20*	0.1963	0.0001
OCM	10783.46	6.04*	0.0781	0.0001
OCW	-149.03	-0.08	-0.0344	0.0005
OCS	4197.62	2.09	0.0104	0.2660
OCT	-499.09	-0.25	-0.0190	0.0407
OCO	-620.69	-0.33	-0.0389	0.0001
OCV	-398.29	-0.21	-0.0546	0.0001
OCL	-169.26	-0.09	-0.0434	0.0001
REC	3569.46	1.32	0.0942	0.0001
RES	-548.04	-0.20	-0.0986	0.0001
REN	3519.30	1.14	0.0219	0.0185
REM	1799.11	0.63	-0.0029	0.7531
REP	-3016.02	-0.77	-0.0152	0.1009
MAR	2272.47	0.75	0.0941	0.0001
MAD	-1785.35	-0.54	-0.0818	0.0001
MAP	-1191.05	-0.32	-0.0569	0.0001
MAW	7969.42	2.41*	-0.0105	0.2639
UEM	71274.82	1.41	-0.0264	0.0051
PHS	-666.30	-3.07*	-0.0074	0.5646

*Significant at the 1% level.

In spite of the differences in occupational effects, net wealth of parent significantly correlated (Appendix) with gross income of parent ($r = .205$) and net wealth of student ($r = .24$). The latter did not show any significance at all; therefore, gross income of parent probably dominated the effect of the parents' wealth.

In addition, there again evinced in simple correlation (Table 4) an association with region (Central positive, South negative) and marital status (married positive, divorced and separated negative). This association probably also contributed to the nonsignificance of the latter variables in the regression.

Occupation

For certain occupational types, the main family earner's occupation significantly affected educational spending on the children (Table 2). If income did not appear as a separate independent variable, one might expect this on grounds of correlation with income. Type of occupation held does affect income. Professionals and managers especially tend to have higher incomes (Table 3 and Appendix: $r = .21, .14$ respectively). Salesmen and craftsmen also had above-average incomes ($r = .07$). On the other hand, service workers, clerical workers and farmers had significantly lower incomes ($r = -.08, -.03, -.05$). Retired and disabled persons, as expected, had the strongest negative correlation with income ($-.23$). As gross income exhibited such a strongly significant effect on educational spending, one would predict those occupations associated with it to have a similar effect.

Interestingly, a regression of GYP on the other variables (Table 3) showed all occupations except farmer, retired and service worker as positively significant, with farmer and retired status negatively significant. The simple correlations indicating otherwise probably arise from the correlation of GYP with marital status, and marital status with occupational type.

Independently of financial ability, the knowledge of the income ranges expected from a certain occupation could influence one's perception of expected future income. If occupation associates with education, as demonstrated (22), occupation could thus influence perceived returns to education.

Since income as distinct from occupation did appear in the equation, occupation must have another kind of effect besides financial. Parallels exist between the father's type of work and the son's chosen occupation (3, 17, 26), between parents' and children's educational levels (21) and between educational level and type of occupation (15, 22). Professional occupations in particular require more education, so one would expect professional parents to invest more in their children's education on these grounds alone.

As predicted, professionals invested more and farmers less in education for their children. While the necessity for managerial education is not quite as obvious, the median of years of school completed for managers exceeds that for all other occupational types except professional. These effects also correspond with what one would predict

on the basis of income. However, effects of other occupational groups did not follow the same pattern as their correlation with income. The separate treatment of income and occupation in regression in itself demonstrates the independent effect of parental occupation.

The status of retired and disabled parents was significant in simple correlation, but not in the regression. This may arise from the correlations with other variables (discussed later), although because retired and disabled parents are older they probably have less education themselves than the other occupational groups.

As only the occupations related to education of the parent significantly affected educational spending on the child, as income and occupation both constituted independent variables in the regression, and as several occupations correlated with income did not carry their influence over to educational spending, one might have grounds for believing occupation to have more of a socialization effect on a child than a financial effect.

Education Level of Student (ELS)

The educational level of the student also turned out quite significant, a somewhat surprising result since a variable with which it rather highly correlated (EDR; Appendix: $r = .40$) became significant at the 6% level (Table 2). EDR does not change until graduation, but then increases substantially. The magnitude of the estimated b coefficient of ELS was relatively large; an advancement in classification of one year meant, on the average, an extra $31.88 in spending

on the student. College costs generally do not change in cross-sectinal data with undergraduate classification, except that students in junior colleges may transfer to higher-cost four-year institutions. This educational level effect may also indicate that applicants in the higher levels of schooling also happen to attend the more expensive schools and therefore need more assistance.

Regions

The region a student comes from has a perhaps not surprisingly large impact on how much his/her parents spend for his/her higher education. Significant effects here (Table 2) occur in the New England (positive), South (negative) and Central (positive) regions.

The regional effect has particular strength as a separate explanatory influence because of its correlation with income, also highly significant. In particular, the Central region positively correlated with GYP (Table 3 and Appendix: $r = .19$), the South had a negative association ($r = -.22$) and New England a positive association ($r = .05$). When one considers the rich farmlands of the Central Midwest and the traditional poverty of the South, this makes some sense. The Central Midwest did contain (Table 6) a significantly higher proportion of farmers as well as of managers and sales workers, and a lower proportion of retired/disabled. The South, on the other hand, had a higher proportion of retired/disabled, operatives, service workers and laborers and a lower proportion of professional/technical, farm, managerial and sales workers. New England had a much more even distribution of occupations, though with significantly fewer farmers.

Although much progress has resulted since World War II, the South still lags behind in both educational emphasis and quality of institutions (3, 7, 19). New England contains most of the "best" schools (Harvard, Yale, Princeton, etc.) as well as many of the more expensive private schools, and many of the South's best graduates end up in the better-paying institutions outside the South. The cultural tradition, income, and the cost of the institutions applied to all may affect educational spending in these regions.

One further explanation may arise from the unemployment rate in each region which, though not significant in the regression, became so in simple correlation (Table 2: $r = -.04$). It was predicted that unemployment rates could either through lowering opportunity cost raise educational investment or, through a threat of loss of income to the breadwinner, reduce spending on children. Apparently this latter effect prevailed; a main family earner, in witnessing high unemployment rates and fearing he/she could be next, becomes more cautious in family spending and sends the children to lower-cost schools. However, unemployment figures, obtainable by state, rather highly correlate with region (Appendix); the Central region has least unemployment ($r = -.43$), New England most ($r = .45$), Pacific also above average ($r = .35$) as well as the South ($r = .10$). The unemployment in the Central and Southern regions concurs with the above hypothesis, although with such a strong exception as in New England one hesitates to strongly advocate it as an explanation. Presumably, with the correlation of unemployment with the

regions, the latter subsumed the former effect in regression. A trial regression which did not include regional dummies resulted in a significant unemployment effect.

An interesting note, though probably not of great relevance in explaining educational spending, concerns the correlation of marital status with region (Table 5). The Central Midwest has significantly more married parents and significantly fewer divorced, separated and widowed; the South has significantly fewer married and more separated and widowed; the Mountains have significantly more divorced; and the Pacific has significantly fewer married and more divorced.

This may partly arise from the association of marital status with occupation (Table 5). Blau and Duncan (3) found that the divorced, separated, and never-married hold lower socioeconomic status jobs than others; they did not advance an explanation. The association of marital status and income, previously mentioned, also reflects this. In the present study, professionals, farmers, managers, sales workers, craftsmen, laborers, and operatives are most likely to be married (of most of which the Central Midwest contains more and the South fewer, as seen in Table 6); clerical workers are relatively most likely to be divorced; service workers to be separated (of which more live in the South and fewer in the Central Midwest); and retired and clerical workers to be widowed (of the former, more live in the South and fewer in the Central Midwest). An explanation of the association of marital status and occupation, as well as marital status and region, exceeds the purpose of this study.

Table 5. Simple correlation coefficients and their levels of significance for marital status vs. occupation and region.

	MAR	MAD	MAP	MAW
OCP	0.0418 (0.0001)	0.0297 (0.0021)	-0.0298 (0.0020)	-0.0677 (0.0001)
OCR	-0.0013 (0.8833)	-0.0346 (0.0005)	-0.0070 (0.5387)	0.0332 (0.0008)
OCF	0.1150 (0.0001)	-0.0727 (0.0001)	-0.0444 (0.0001)	-0.0591 (0.0001)
OCM	0.1114 (0.0001)	-0.0623 (0.0001)	-0.0450 (0.0001)	-0.0666 (0.0001)
OCW	-0.2076 (0.0001)	0.2116 (0.0001)	0.0266 (0.0051)	0.0881 (0.0001)
OCS	0.0432 (0.0001)	-0.0130 (0.1654)	-0.0303 (0.0017)	-0.0351 (0.0004)
OCT	0.1099 (0.0001)	-0.0605 (0.0001)	-0.0463 (0.0001)	-0.0685 (0.0001)
OCO	0.0422 (0.0001)	-0.0297 (0.0021)	-0.0072 (0.5491)	-0.0286 (0.0028)
OCV	-0.0671 (0.0001)	0.0292 (0.0023)	0.0554 (0.0001)	0.0237 (0.0113)
OCL	0.0859 (0.0001)	-0.0604 (0.0001)	-0.0285 (0.0029)	-0.0578 (0.0001)
REC	0.0969 (0.0001)	-0.0573 (0.0001)	-0.0533 (0.0001)	-0.0360 (0.0003)
RES	-0.0964 (0.0001)	0.0245 (0.0093)	0.0600 (0.0001)	0.0548 (0.0001)
REN	0.0215 (0.0213)	-0.0196 (0.0351)	0.0079 (0.5943)	-0.0173 (0.0630)
REM	0.0075 (0.5685)	0.0402 (0.0001)	-0.0297 (0.0020)	-0.0197 (0.0346)
REP	-0.0549 (0.0001)	0.0566 (0.0001)	0.0314 (0.0012)	0.0111 (0.2355)

Table 6. Simple correlation coefficients and their levels of significance for occupation vs. region

	REC	RES	REN	REM	REP
OCP	0.0142 (0.1279)	-0.0574 (0.0001)	0.0298 (0.0020)	0.0429 (0.0001)	-0.0102 (0.2785)
OCR	-0.0764 (0.0001)	0.0715 (0.0001)	-0.0160 (0.0848)	0.0129 (0.1671)	0.0128 (0.1704)
OCF	0.1106 (0.0001)	-0.0537 (0.0001)	-0.0418 (0.0001)	-0.0383 (0.0002)	-0.0276 (0.0038)
OCM	0.0461 (0.0001)	-0.0748 (0.0001)	0.0306 (0.0016)	0.0158 (0.0887)	0.0004 (0.9684)
OCW	0.0102 (0.2791)	-0.0175 (0.0596)	0.0127 (0.1751)	-0.0093 (0.6764)	0.0092 (0.6688)
OCS	0.0371 (0.0002)	-0.0456 (0.0001)	0.0163 (0.0800)	0.0006 (0.9436)	-0.0120 (0.2000)
OCT	0.0185 (0.0468	-0.0172 (0.0636)	0.0065 (0.5022)	0.0013 (0.8847)	-0.0162 (0.0810)
OCO	-0.0149 (0.1099)	0.0409 (0.0001)	0.0011 (0.8992)	-0.0326 (0.0009)	-0.0108 (0.2483)
OCV	-0.0325 (0.0009)	0.0419 (0.0001)	-0.0088 (0.6488)	-0.0019 (0.8375)	0.0058 (0.5475)
OCL	-0.0259 (0.0061)	0.0543 (0.0001)	-0.0362 (0.0003)	-0.0118 (0.2094)	0.0153 (0.1002)

Sex (SX)

The results on sex confirmed the prediction: parents do spend more on the education of male children than on that of female children (Table 2). Although 55% of the applicants were female, their sex indicated $58.19 less per year spent on them (t = -2.77). Female students had less income of their own, were younger than the males, and tended to come from the South but not from New England. The presence of a female parent working apparently had no effect on a female child's educational investment.

Other Income of Student (OYS)

The simple correlation of other income of the student with EDS did not reach significance, but in the regression its coefficient became so (Table 2). This variable suppressed invalid variance in other variables with which it correlated, and so allowed these other variables to increase in significance.

Very little of the information concerning the student had any significant effect on the amount spent on his or her education. Especially of the financial information, only the student's nontaxable income had any influence, and this proved to have a negative effect.

OYS seems also to originate from the retired/disabled, widowed parent with higher nontaxable income. OYS and OYP are negatively related to the gross income of parent (Appendix). Besides these connections, a three-way chain exists between OYS, OYP and net wealth of student, all fairly highly correlated with each other. (Probably OYP

varies with NWS because both vary with OYS.) NWS also positively correlates with GYS and NWP.

As for logical reasons why OYS should have a negative effect, the student who is on transfer payments of some sort (because of the low income of his/her parents) may quite conceivably simply choose less expensive forms of education. In a previously mentioned correlation, the retired/disabled parent spends less on his/her children's education, probably through limited resources. Since OYS relates to the presence of a retired/disabled parent, OYS would naturally emerge as having a negative influence. OYS is probably an indicator of limited resources of the family (borne out by the negative correlation with GYP) and through this mechanism (and because of the presence of GYP and other correlates) appears to have a negative effect of its own when it is actually not the causal factor itself.

Returns to Education (EDR)

Returns to education depended on sex, educational level and region (South vs. non-South). All of the latter variables turned out quite significant, possibly aided by EDR's presence. EDR itself was significant at the 6% level (Table 2) in regression, but not at all in simple correlation.

The interesting problem with EDR concerns the direction of this coefficient. Under all economic analysis, the greater return an individual expects from an investment, the more investment he or she will undertake. The negative sign on EDR indicates precisely the reverse

situation. If EDR is a suppressor variable, as seems evident, this makes statistical sense but not necessarily intuitive sense.

As all of the variables on which it depends are already significant in their predicted directions, the construction of the measure itself becomes the only remaining possibility. Measured returns to an investment depend on both the cost of the investment and the future benefits to be gained from it. The estimates of benefits from given years of schooling came from presumably carefully done studies; suspicion should rather turn to the cost incurred by this schooling.

A reverse causation may operate in this case. Instead of EDR influencing EDS, EDS may have influenced EDR. Association, as expressed in a regression equation, does not indicate the direction of causation. A greater outlay in cost, instead of being in response to a higher return, may quite possibly simply lower the return (since benefit minus cost yields net return). If a college graduate experiences a given increase in income as a result of the degree, a higher sum spent for the college degree will lower the return for that person. In this light, the negative relation between EDS and EDR, even though not quite significant by the standards of this study, seems plausible; the direction of causation, however, runs not from independent to dependent variable but the reverse.

Educational Benefits of the Student (EBS)

Educational benefits of the student also emerged as positive at the 6% level of significance in the regression equation (Table 2).

The positive relation supports the hypothesized positive effect of any income component, but especially matching-type grants. These benefits, not surprisingly, occur most frequently with students whose parents are older, retired or disabled, and widowed. They correlate positively with other income of parent (r = .19) and negatively with gross income of parent (r = .21); positively with other income of student and negatively with both parents working. The presence of EBS probably increased the significance of these other variables, especially that of gross income of parent, as the simple correlation of EBS with EDS is not only very small but slightly negative.

Other Income of Parent (OYP)

Other income of the parent, as expected, also turned out to have some positive effect (significant at the 4% level, Table 2) though, again, not a significant effect in regression nor in simple correlation. This variable's behavior is similar to that of EBS. OYP is again positively associated with age of parent, retired/disabled (r = .24) and widowed (r = .15) status. As this measure includes alimony and child support, a not surprisingly positive relationship to divorced and separated marital status also occurs. Like EBS, OYP negatively correlates with GYP (r = -.17). As its simple correlation with EDS is also very small and slightly negative, one could suppose that the separation from the effects of GYP also contributes to the significance of GYP.

Other variables: age and student financial data

A few variables did not show any kind of significance either in correlation or in regression. For example, neither the age of the parent nor the age of the student, presumably affecting the tendency to invest in the student, in fact had any effect (Table 2). Probably each was too highly correlated with other variables for much individual influence to show. Age of the student correlated highly with educational level of the student and therefore also with EDR (Appendix), and the latter two effects greatly exceeded the former. Older students also tended to be male and have a higher gross income.

Age of the parent was highly correlated with retired/disabled status, and therefore negatively with gross income and positively with other income and widowed status (Appendix). Age of parent also correlated positively with age and therefore educational level and EDR of the student and with educational benefits received by the student. Older parents had also accumulated more net wealth, and comprised a greater proportion of farmers and a lesser proportion of professional, clerical workers, operatives and sales workers. Interestingly, though not surprisingly in terms of changing social norms, older parents were more likely to be married but not to have the second parent working, and less likely to be divorced or separated.

The gross income and net wealth of the student also emerged as totally insignificant, probably because dependent students simply do not have enough income or wealth (at least compared to their parents)

to make much difference in such a large investment as higher education (or in anything else, for that matter). The only significant correlations showed a positive association of student's gross income with the age of the student and the family of its correlates; a positive association with the Central Midwest and a negative association with the South; a negative association with farmer parents; a positive association with gross income of parents; and a positive association with the male sex. All of these seem to determine student income rather than be determined by it. Student wealth is only correlated with parent wealth, student gross income and other income, and parents' other income; again, conditions favorable to student wealth accumulation rather than consequences of it.

Family Size Classes

Contrary to expectations formed from the previously-mentioned Brazer and David study (4), educational spending per child did not decline with the number of other children to provide for. In fact, EDS rose slightly (Table 7), hitting its peak in the 3-4 child family and then declining. However, GYP may explain this; GYP also rose with the number of children until the peak of the 3-4 child family and then declined. Probably families with higher incomes decide they can afford more children, up to three or four; the family with five or more children may consist of more families who do not use birth control through religious teachings or who want large families for reasons entirely unconnected with income. It was found that the occupational

Table 7. Means of variables, in general regression and by family size classes.

Variable	General n=11,262	1 child n=1729	2 child n=2606	3-4 child n=4380	5+ child n=2547
EDS	2656.70	2615.01	2664.43	2692.48	2615.57
AGE	48.69	53.88	49.94	47.18	46.48
BPW	.345	.308	.360	.379	.298
GYP	11,868.91	9748.90	11,860.93	12,598.59	12,061.40
OYP	656.46	840.62	729.86	548.91	641.30
GYS	1012.16	1023.87	1019.21	1021.69	980.62
OYS	135.20	246.90	174.12	83.29	108.84
EBS	135.87	329.93	164.95	90.01	53.24
NWP	19,651.18	21,545.36	20,773.34	19,432.04	17,594.02
NWS	840.72	1145.35	960.35	741.76	681.70
AGS	19.51	19.71	19.50	19.43	19.52
ELS	2.07	2.21	2.09	2.01	2.06
OCP	.188	.117	.191	.220	.179
OCR	.075	.158	.082	.056	.043
OCF	.079	.068	.082	.072	.098
OCM	.104	.094	.097	.111	.103
OCW	.070	.099	.078	.069	.042
OCS	.066	.062	.063	.070	.063
OCT	.069	.067	.070	.071	.068
OCO	.081	.082	.080	.079	.084
OCV	.075	.075	.074	.070	.085
OCL	.074	.059	.068	.073	.093
REC	.414	.395	.404	.427	.411
RES	.357	.389	.363	.342	.353
REN	.076	.069	.086	.075	.071
REM	.107	.102	.102	.110	.112
REP	.023	.021	.024	.021	.026
SX	.553	.549	.524	.554	.585
EDR	.060	.063	.062	.060	.058
MAR	.794	.736	.783	.818	.801
MAD	.081	.092	.099	.078	.060
MAP	.030	.028	.022	.024	.051
MAW	.077	.126	.082	.064	.061
UEM	.049	.049	.049	.049	.050

classes of farmer and laborer had significantly larger household sizes; these occupations also yielded less income. This concurs with the findings that families of lower socioeconomic status tend to have more children. Clerical workers had smaller household sizes.

Another factor operating is the significant presence of the older, retired/disabled, lower-income, widowed parents, most of whom have only one child to support. In fact, retired parents account for more of the single-child families than any other single occupational category. This also accounts for the disproportionately greater share of educational benefits accruing to only-children. Only-children apply for aid at slightly higher levels of schooling than children of other types of families, again probably because of the limited financial resources of the above type of parent.

Interestingly, family size classes differed on which variables had significant effects on spending (Table 8). Only one variable, GYP, showed significance for all classes; others became significant in the general regression but not for some or all family-size classes.

Several of the variables, insignificant for small families, became significant for larger families. This probably results from fewer financial resources available per child, necessitating consideration of other factors in deciding expenditures. These variables included sex, educational level and other income of the student, the Southern region, and the parent's professional occupation.

As the number of dependents for whom parents spend on education increases, family income available with which to provide this spending

Table 8. Regression coefficients and their t values for general regression and each family size class.

Independent variable	General (r^2=.099)	1 child (r^2=.126)	2 child (r^2=.102)	3-4 child (r^2=.095)	5+ child (r^2=.124)
Intercept	2543.37 (22.16)	2595.09 (7.86)	2581.05 (9.67)	2500.48 (12.69)	2558.85 (13.55)
AGE	-0.40 (-0.37)	-4.20 (-1.42)	-0.42 (-0.18)	0.956 (0.49)	-0.224 (-0.11)
BPW	13.46 (0.83)	36.05 (0.77)	32.58 (0.91)	-10.56 (-0.40)	-2.27 (-0.08)
GYP	0.0084 (7.88)	0.0099 (2.83)	0.0105 (4.45)	0.0085 (4.82)	0.0069 (3.95)
OYP	0.0064 (2.00)	0.0057 (0.06)	0.0071 (1.18)	0.0011 (1.51)	0.0085 (1.55)
GYS	0.0015 (0.62)	0.0090 (1.44)	-0.00018 (-0.03)	0.000048 (0.01)	0.00087 (0.21)
OYS	-0.013 (-2.62)	0.0019 (0.18)	-0.0077 (-0.90)	-0.0038 (-0.17)	-0.034 (-0.395)
EBS	0.034 (1.85)	0.074 (2.12)	0.050 (1.30)	-0.019 (-0.48)	0.023 (0.44)
NWP	0.00042 (2.43)	0.00077 (1.72)	0.0002 (0.55)	0.0003 (1.03)	0.00053 (1.47)
NWS	-0.000045 (-0.09)	-0.0013 (-0.78)	0.0010 (0.89)	0.00022 (0.27)	-0.0011 (-1.25)
AGS	-0.081 (-0.03)	0.73 (0.09)	5.09 (0.79)	-4.35 (-0.91)	2.02 (0.46)
ELS	31.88 (4.83)	36.90 (2.07)	18.70 (1.27)	48.13 (4.18)	19.37 (1.81)
OCP	130.43 (4.61)	122.77 (1.42)	55.51 (0.91)	193.06 (4.16)	91.16 (1.87)
OCR	3.33 (0.09)	88.62 (1.04)	-10.40 (-0.13)	-40.01 (-0.60)	3.18 (0.04)
OCF	-74.60 (-2.12	12.16 (0.12)	-119.73 (-1.56)	-24.45 (-0.41)	-120.79 (-2.10)
OCM	82.30 (2.55)	145.81 (1.61)	55.18 (0.77)	92.27 (1.73)	80.63 (1.45)

Table 8. (Continued)

Independent variable	General (r^2=.099)	1 child (r^2=.126)	2 child (r^2=.102)	3-4 child (r^2=.095)	5+ child (r^2=.124)
OCW	16.16	61.22	-66.59	20.65	89.47
	(0.46)	(0.69)	(-0.90)	(0.35)	(1.25)
OCS	4.78	96.66	-41.72	-21.93	75.48
	(0.13)	(0.96)	(-0.52)	(-0.37)	(1.19)
OCT	20.85	99.94	-115.99	70.65	39.97
	(0.58)	(0.99)	(-1.48)	(1.18)	(0.65)
OCO	-59.45	-107.14	-155.50	13.16	-40.05
	(-1.76)	(-1.14)	(-2.09)	(0.23)	(-0.70)
OCL	-73.19	-86.80	-133.55	-59.27	-29.44
	(-2.10)	(-0.84)	(-1.70)	(-1.01)	(-0.54)
REC	196.35	224.89	349.15	148.93	148.76
	(4.04)	(1.69)	(3.05)	(1.87)	(1.84)
RES	-223.02	-297.22	-73.23	-252.61	-228.25
	(-4.60)	(-2.22)	(-0.64)	(-3.17)	(-2.82)
REN	244.64	166.11	499.55	207.73	118.86
	(4.39)	(1.05)	(3.94)	(2.27)	(1.25)
REM	-54.75	-64.50	43.63	-53.17	-108.27
	(-1.06)	(-0.45)	(0.36)	(-0.63)	(-1.25)
REP	43.60	206.78	179.21	30.93	-133.19
	(0.62)	(1.03)	(1.14)	(0.26)	(-1.14)
SX	-58.19	-51.42	-14.81	-90.55	-63.95
	(-2.77)	(-0.97)	(-0.31)	(-2.56)	(-1.74)
EDR	-719.30	-454.32	-1440.11	-525.45	-793.04
	(-1.84)	(-0.47)	(-1.61)	(0.79)	(-1.16)
MAR	44.73	109.39	-114.16	46.74	76.46
	(0.81)	(0.71)	(-0.81)	(0.48)	(0.97)
MAD	61.58	167.08	-133.80	86.06	90.29
	(1.02)	(1.00)	(-0.90)	(0.81)	(0.96)
MAP	-5.08	-40.95	-316.54	4.59	106.52
	(-0.07)	(-0.21)	(-1.80)	(0.04)	(1.11)
MAW	29.98	35.91	-176.19	53.53	173.02
	(0.49)	(0.22)	(-1.17)	(0.48)	(1.82)
UEM	-1166.82	-1739.85	-1879.05	217.59	-2009.42
	(-1.28)	(-0.65)	(-0.92)	(0.14)	(-1.29)

becomes rather limited for each child. Faced with limited resources as the number of children exceeds two, families apparently decide to allocate these resources more heavily to the male children, following the reasoning of greater expected returns for males. Similarly, it appears that children with more than one sibling must, from financial need, apply for aid at higher levels of schooling.

The negative significance of the student's other income in the largest family size probably reflects the family's limited financial resources per child. To qualify for other benefits, the student must show need, which more often occurs in larger families (excluding the retired/disabled association mentioned previously). Students with limited resources available will more likely choose less expensive forms of education. This has been previously discussed under the general regression results.

The negative effects of the Southern region also appear most significant in larger families, as do the positive effects of having a professional parent. Again, it seems that the educational spending pattern of smaller families does not much differ and depends mainly on the family's gross income. In the South, the higher negative correlations of region with income occur in the larger families, especially in those with five or more children ($r = -.32$). Also, large household sizes occur most frequently in laborer families of which the South has significantly more than the United States in general (Table 6, Appendix). This may partially explain the significantly higher negative effect of the Southern region in larger families. Although RES does

not quite reach the .01 level of significance for single-child families, its heavier concentration of retired/disabled parents and the negative effect on educational spending associated with them (as discussed earlier, though not significant for this family size) may contribute to the significance at 2% of RES in this case.

Resources apparently do not become unduly constrained for each child with only two children to provide for. With three or more children, however, the family must balance its limited resources per child against other influences. This appears to happen in the case of professional parents. Professional parents with two or fewer children do not spend significantly larger sums for their education than anyone else. However, for those with more children the value socialization and expected returns effects take over and keep educational spending per child at a significantly higher level even though the spending does drain the family's resources. The professional family simply has a higher priority for education, which becomes evident when income considerations become limiting.

The New England and Central regions showed a peculiar effect of significance for medium-sized families but not for very large or very small ones. Perhaps for the only child relative cost of schooling presents no problem while for the child in a large family finances become a problem no matter what the region. In the intermediate cases perhaps the superior New England schools and Central income take their effects. One should realize that the intercorrelations among these

variables probably affect the relative weights of them, and the weights may shift in different classes simply through statistical chance.

A couple of variables, net wealth of the parent and parent's occupation as manager, showed significance in the general regression but not for any particular family size. This may be due simply to the much larger number of observations in the overall regression.

CONCLUSIONS

As expected, by far the most significant effect on educational spending was gross income of parent. This had so pervasive an effect that it appeared to overshadow or detract from the significance of many related variables, such as age, other types of income, and marital status. However, even with such a highly significant effect, income had a very small quantitative effect on spending.

In view of the strong significance of income, it is perhaps surprising that as many other types of influences emerged as there did. In particular, region exerted a strong influence, not entirely coincident with the income effect; the value socialization of certain types of occupations appears to have a definite effect, again not always in the same direction as income; sex and educational level of the student exerted economically-motivated influence though in themselves unrelated to parent income; and family cohesion as measured by parents' marital status seems salient though not directly significant in itself. Further, it appears that several of these effects become evident only in larger-sized families where family income becomes more of a limiting factor. Perhaps in smaller families sufficient resources can usually be found equally well in all types of families, given income, to send any child anywhere to college once a decision has been made that he or she will attend. Having more children to educate necessitates a more careful examination of family priorities.

Besides income and the above-mentioned other influences, two other major effects seemed to operate. One was the presence of the

retired/disabled parent, who generally was older, widowed, with less gross income and with one child to support. Students in this category, being in more need of aid and therefore applying for it, constituted a disproportionately large share of the sample; this effect contributed to many of the observed results, but since it was not measured by any one variable the statistical significance of any of the related variables did not fully measure its influence.

Another behind-the-scenes effect concerned the interaction of region, occupation, and marital status. Certain types of workers and families appeared in certain regions; this suggests the presence of some cultural characteristic peculiar to a region which would also influence occupational choice and marital status through social attitudes. Some sort of explanation for the South might arise in its social and economic history of wartime defeat and rural poverty, its relatively homogeneous population and in its religious fundamentalism (which according to sociologists and historians most attracts people of lower socioeconomic status and which promotes conservatism and discourages divorce)(3, 7, 19). The Central Midwest and New England have much less cultural distinction as regions. The regional effects observed probably only indicate the operation of some other cultural variable.

In fact, as significant as gross income appeared, most of the explanation of educational spending lies in the noneconomic variables. This study included nearly every type of economic variable conceivable and/or available, but still the variance explained by all the variables taken together reached only 9.9%. This improved to only 12.6% in the

single-child subclass, the highest r^2 of all the regressions. Even considering the cross-sectional nature of the data, this does not explain much.

One important factor left out through lack of data concerned the child's ability. One would expect a greater investment in a more able child, and indeed the literature bears this out (2). Another important variable involves the mother's child-rearing practices. Early training in autonomy especially significantly affects the child's achievement motivation (16), which also affects academic performance and therefore perceived ability and further investment. This early independence training also (positively) relates to the father's occupational status and parents' education (5). Other aspects of early experiences would also influence motivation: role models, early classroom experience, peer behavior and emotional security to name but a few.

One view heard expressed by a long-haired male student held that parents' educational spending on students was inversely proportional to the length of the student's hair. This is not as irrelevant as it sounds; it concerns other psychological variables of family attitudes, socialization processes and cohesiveness. The family financial statements provided data on neither any aspects of ability, motivation or family atmosphere, nor on reasons for student choice of a particular institution. Undoubtedly, if they had provided such data it would have aided greatly in explanation.

Neither did the data describe institutional educational frameworks. The quality of schools can only be inferred by cost, not always

accurately in terms of future economic benefits as seen by the existence of expensive private schools for college flunkouts; school systems may vary in requirements; the availability of college or vocational training may vary by state; college offerings may vary by college. In other words, higher education is not a homogeneous phenomenon. Educational cost cannot reflect all of this, as has been of necessity assumed.

As it stands now, although economic variables are important, they by no means do a thorough job of explaining human behavior, at least in the field of educational spending. To return to the language of the diagram presented in the first chapter, the position of the budget line is influential, but it has no effect on the shapes of the indifference curves which have at least equal importance to the final result. The psycho-sociological variables determine the form of the indifference map, which economic analysis usually assumes as given. Although economic theory provides a very useful theoretical framework for analysis, the low explanatory power seen in this study of the economic variables, even when coupled with a few of the noneconomic variables, demonstrates the inadequacy of traditional economic explanation alone.

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APPENDIX: INTERCORRELATION MATRIX

Table 9. Simple correlation coefficients among other independent variables and their levels of significance in the general regression.

	ELS		AGE		GYS	
ELS	1.0000					
AGE	0.1508	(0.0001)	1.0000			
GYS	0.0820	(0.0001)	0.0002	(0.9784)	1.000	
GYP	0.0078	(0.5839)	-0.1069	(0.0001)	0.0669	(0.0001)
OYP	-0.0139	(0.1363)	0.0839	(0.0001)	-0.0114	(0.2251)
BPW	-0.0030	(0.7508)	-0.0592	(0.0001)	0.0144	(0.1221)
OYS	-0.0019	(0.8310)	0.0255	(0.0069)	-0.0108	(0.2521)
EBS	-0.0194	(0.0372)	0.1510	(0.0001)	-0.0112	(0.2309)
NWP	-0.0063	(0.5088)	0.0730	(0.0001)	0.0130	(0.1641)
NWS	-0.0076	(0.5715)	0.0249	(0.0081)	0.0378	(0.0002)
AGS	0.3625	(0.0001)	0.1118	(0.0001)	0.0663	(0.0001)
OCP	-0.0004	(0.9623)	-0.0885	(0.0001)	-0.0097	(0.3041)
OCR	0.0269	(0.0045)	0.3536	(0.0001)	-0.0167	(0.0728)
OCF	-0.0024	(0.7984)	0.0610	(0.0001)	-0.0357	(0.0004)
OCM	0.0020	(0.8303)	-0.0256	(0.0067)	0.0111	(0.2355)
OCW	0.0202	(0.0301)	-0.0515	(0.0001)	0.0281	(0.0033)
OCS	0.0002	(0.9786)	-0.0361	(0.0003)	0.0123	(0.1902)
OCT	-0.0114	(0.2232)	-0.0174	(0.0615)	0.0138	(0.1398)
OCO	-0.0067	(0.5186)	-0.0423	(0.0001)	0.0081	(0.6055)
OCV	-0.0021	(0.8210)	-0.0163	(0.0794)	0.0052	(0.5859)
OCL	-0.0160	(0.0847)	-0.0222	(0.0174)	-0.0103	(0.2732)
REC	0.0320	(0.0010)	0.0154	(0.0974)	0.0380	(0.0002)
RES	-0.0002	(0.9832)	0.0039	(0.6842)	-0.0337	(0.0007)
REN	0.0103	(0.2731)	0.0032	(0.7329)	0.0133	(0.1557)
REM	-0.0491	(0.0001)	-0.0267	(0.0049)	-0.0050	(0.6045)
REP	-0.0232	(0.0134)	-0.0150	(0.1062)	-0.0103	(0.2751)
SX	-0.0278	(0.0035)	-0.0118	(0.2062)	-0.0701	(0.0001)
MAR	-0.0094	(0.6800)	0.0963	(0.0001)	0.0229	(0.0143)
MAD	-0.0145	(0.1205)	-0.1485	(0.0001)	-0.0074	(0.5639)
MAP	-0.0097	(0.3037)	-0.0885	(0.0001)	-0.0187	(0.0442)
MAW	0.0330	(0.0008)	0.0592	(0.0001)	-0.0117	(0.2120)
EDR	0.3999	(0.0001)	0.0805	(0.0001)	0.0660	(0.0001)
UEM	-0.0055	(0.5660)	-0.0137	(0.1406)	-0.0252	(0.0074)

GYP		OYP		BPW	
1.0000					
-0.1674	(0.0001)	1.0000			
0.2589	(0.0001)	-0.0790	(0.0001)	1.0000	
-0.0448	(0.0001)	0.2521	(0.0001)	-0.0156	(0.0936)
-0.2066	(0.0001)	0.1856	(0.0001)	-0.1099	(0.0001)
0.2045	(0.0001)	0.0548	(0.0001)	-0.0201	(0.0311)
-0.0007	(0.9354)	0.1262	(0.0001)	-0.0118	(0.2060)
-0.0381	(0.0002)	-0.0018	(0.8457)	-0.0294	(0.0022)
0.2140	(0.0001)	-0.0562	(0.0001)	0.0595	(0.0001)
-0.2333	(0.0001)	0.2351	(0.0001)	-0.0945	(0.0001)
-0.0453	(0.0001)	0.0005	(0.9577)	-0.0608	(0.0001)
0.1401	(0.0001)	-0.0458	(0.0001)	0.0383	(0.0002)
-0.0338	(0.0006)	-0.0055	(0.5643)	-0.0315	(0.0012)
0.0725	(0.0001)	-0.0316	(0.0012)	0.0592	(0.0001)
0.0673	(0.0001)	-0.0547	(0.0001)	0.0267	(0.0048)
0.0082	(0.6091)	-0.0490	(0.0001)	0.0238	(0.0111)
-0.0794	(0.0001)	-0.0143	(0.1249)	0.0193	(0.0376)
-0.0140	(0.1346)	-0.0592	(0.0001)	0.0323	(0.0010)
0.1867	(0.0001)	-0.0275	(0.0039)	0.0547	(0.0001)
-0.2211	(0.0001)	0.0160	(0.0865)	-0.0539	(0.0001)
0.0462	(0.0001)	-0.0039	(0.6848)	0.0303	(0.0017)
0.0237	(0.0114)	-0.0019	(0.8352)	-0.0026	(0.7758)
-0.0122	(0.1915)	0.0330	(0.0008)	-0.0404	(0.0001)
-0.0260	(0.0059)	-0.0005	(0.9537)	0.0016	(0.8612)
0.3532	(0.0001)	-0.1534	(0.0001)	0.2578	(0.0001)
-0.1753	(0.0001)	0.0448	(0.0001)	-0.1634	(0.0001)
-0.1358	(0.0001)	0.0543	(0.0001)	-0.0787	(0.0001)
-0.2419	(0.0001)	0.1483	(0.0001)	-0.1533	(0.0001)
0.0040	(0.6761)	-0.0062	(0.5152)	-0.0015	(0.8680)
-0.0501	(0.0001)	0.0197	(0.0341)	-0.0333	(0.0007)

Table 9. (Continued)

	OYS		EBS		NWP	
ELS						
AGE						
GYS						
GYP						
OYP						
BPW						
OYS	1.0000					
EBS	0.0862	(0.0001)	1.0000			
NWP	0.0317	(0.0011)	0.0120	(0.1993)	1.0000	
NWS	0.2182	(0.0001)	0.0206	(0.0268)	0.2369	(0.0001)
AGS	-0.0017	(0.8518)	-0.0026	(0.7816)	-0.0101	(0.2846)
OCP	-0.0197	(0.0344)	-0.0667	(0.0001)	-0.0152	(0.1022)
OCR	0.0414	(0.0001)	0.1945	(0.0001)	-0.0063	(0.5122)
OCF	-0.0052	(0.5906)	-0.0550	(0.0001)	0.1963	(0.0001)
OCM	-0.0024	(0.7958)	-0.0636	(0.0001)	0.0777	(0.0001)
OCW	0.0145	(0.1199)	0.0656	(0.0001)	-0.0343	(0.0005)
OCS	-0.0120	(0.1998)	-0.0305	(0.0016)	0.0105	(0.2621)
OCT	-0.0142	(0.1278)	-0.0632	(0.0001)	-0.0198	(0.0338)
OCO	-0.0148	(0.1113)	-0.0237	(0.0116)	-0.0386	(0.0002)
OCV	-0.0092	(0.6695)	0.0026	(0.7777)	-0.0540	(0.0001)
OCL	-0.0119	(0.2048)	-0.0479	(0.0001)	-0.0452	(0.0001)
REC	-0.0002	(0.9790)	-0.0097	(0.3040)	0.0953	(0.0001)
RES	0.0007	(0.9419)	0.0110	(0.2435)	-0.0984	(0.0001)
REN	0.0129	(0.1659)	0.0055	(0.5670)	0.0202	(0.0302)
REM	-0.0101	(0.2825)	-0.0065	(0.5005)	-0.0037	(0.7006)
REP	-0.0024	(0.7959)	0.0097	(0.3056)	-0.0148	(0.1123)
SX	-0.0221	(0.0182)	-0.0212	(0.0227)	0.0104	(0.2669)
MAR	-0.0595	(0.0001)	-0.3146	(0.0001)	0.0931	(0.0001)
MAD	0.0299	(0.0019)	-0.0557	(0.0001)	-0.0815	(0.0001)
MAP	0.0059	(0.5390)	-0.0221	(0.0179)	-0.0564	(0.0001)
MAW	0.0557	(0.0001)	0.5313	(0.0001)	-0.0099	(0.2922)
EDR	0.0096	(0.3076)	0.0170	(0.0673)	-0.0073	(0.5547)
UEM	0.0207	(0.0261)	0.0180	(0.0533)	-0.0283	(0.0031)

NWS		AGS		SX	
1.0000					
-0.0054	(0.5766)	1.0000			
-0.0197	(0.0345)	0.0055	(0.5689)	-0.0239	(0.0110)
0.0096	(0.3111)	0.0292	(0.0024)	-0.0093	(0.6753)
0.0332	(0.0007)	-0.0057	(0.5526)	0.0244	(0.0095)
-0.0036	(0.7061)	-0.0098	(0.2999)	0.0082	(0.6115)
-0.0112	(0.2334)	0.0035	(0.7109)	-0.0072	(0.5481)
-0.0085	(0.6319)	0.0042	(0.6574)	-0.0082	(0.6110)
-0.0007	(0.9434)	-0.0119	(0.2045)	-0.0014	(0.8737)
0.0076	(0.5749)	-0.0020	(0.8247)	-0.0040	(0.6776)
-0.0104	(0.2681)	0.0038	(0.6682)	-0.0071	(0.5409)
0.0083	(0.6174)	-0.0176	(0.0580)	-0.0024	(0.7979)
-0.0051	(0.5936)	-0.0049	(0.6070)	-0.0244	(0.0095)
0.0006	(0.9452)	0.0196	(0.0349)	0.0531	(0.0001)
0.0013	(0.8844)	0.0029	(0.7574)	-0.0347	(0.0005)
0.0080	(0.5968)	-0.0337	(0.0007)	-0.0033	(0.7230)
0.0023	(0.7995)	0.0095	(0.3152)	-0.0122	(0.1907)
0.0049	(0.6062)	-0.0551	(0.0001)	1.0000	
-0.0019	(0.8306)	-0.0244	(0.0094)	-0.0291	(0.0025)
-0.0128	(0.1694)	-0.0004	(0.9672)	0.0105	(0.2637)
-0.0083	(0.6165)	0.0089	(0.6523)	0.0107	(0.2567)
0.0244	(0.0095)	0.0292	(0.0023)	0.0176	(0.0585)
-0.0052	(0.5864)	0.2161	(0.0001)	-0.6634	(0.0001)
0.0102	(0.2798)	0.0028	(0.7609)	-0.0006	(0.9511)

Table 9. (Continued)

	EDR		UEM	
ELS				
AGE				
GYS				
GYP				
OYP				
BPW				
OYS				
EBS				
NWP				
NWS				
AGS				
OCP	0.0132	(0.1584)	0.0017	(0.8541)
OCR	0.0252	(0.0074)	0.0098	(0.2994)
OCF	-0.0132	(0.1582)	-0.0989	(0.0001)
OCM	-0.0041	(0.6660)	-0.0051	(0.5965)
OCW	0.0105	(0.2624)	0.0049	(0.6100)
OCS	-0.0022	(0.8091)	-0.0164	(0.0783)
OCT	-0.0174	(0.0620)	-0.0140	(0.1340)
OCO	0.0085	(0.6284)	0.0244	(0.0094)
OCV	0.0124	(0.1847)	0.0114	(0.2249)
OCL	0.0010	(0.9139)	0.0085	(0.6312)
REC	-0.0315	(0.0012)	-0.4347	(0.0001)
RES	0.0777	(0.0001)	0.0971	(0.0001)
REN	0.0017	(0.8471)	0.4527	(0.0001)
REM	-0.0536	(0.0001)	-0.0204	(0.0282)
REP	-0.0230	(0.0141)	0.3541	(0.0001)
SX	-0.6634	(0.0001)	-0.0006	(0.9511)
MAR	0.0158	(0.0904)	-0.0625	(0.0001)
MAD	-0.0226	(0.0157)	0.0310	(0.0014)
MAP	-0.0010	(0.6577)	0.0436	(0.0001)
MAW	0.0070	(0.5364)	0.0250	(0.0080)
EDR	1.0000		-0.0120	(0.2015)
UEM	-0.0120	(0.2015)	1.0000	

Table 10. Simple correlation coefficients (r) and their significance levels: Parents' Household Size (PHS) with other variables, from the regressions of GYP on other variables including PHS, and NWP on other variables including PHS.

Variable	r	Significance level of r
AGE	-0.2415	0.0001
GYP	0.1177	0.0001
OYP	-0.0434	0.0001
BPW	0.0185	0.0461
NWP	-0.0074	0.5646
OCP	0.0239	0.0106
OCR	-0.1087	0.0001
OCF	0.0609	0.0001
OCM	0.0240	0.0102
OCW	-0.1105	0.0001
OCS	0.0088	0.6514
OCT	0.0203	0.0286
OCO	0.0128	0.1703
OCV	0.0031	0.7380
OCL	0.0680	0.0001
REC	0.0184	0.0468
RES	-0.0237	0.0113
REN	-0.0096	0.3061
REM	0.0139	0.1345
REP	-0.0047	0.6247
MAR	0.2341	0.0001
MAD	-0.1628	0.0001
MAP	-0.0107	0.2522
MAW	-0.1724	0.0001
UEM	0.0117	0.2099