Human Capital Enhancing-Expenditures: A Comparison of Female-Headed and Married-Couple Households

This study attempted to identify expenditures of contemporary U.S. households on human capital investment and to compare human capital expenditures of female headed households with those of married-couple households. The major results of this study indicated that all other things equal, female-headed households spent less dollars on human capital enhancement than married-couple did. Significant factors that affected human capital expenditures were income, age, members in college, females 6-17, males 6-17, males >65, public assistance income, social security income, education, home ownership, quarter, and interview month. Based on these empirical findings, conclusions and implications of this study were discussed.

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Investment for future consumption or future earnings could be the determinant of future well-being of U.S. families. According to human capital theory, the greater the available human capital that individuals bring to the search for employment, the more likely they are to locate work and the more able they are to command jobs with high salaries and benefits (Becker, 1975).

Since the beginning of the 1970s, whereas the proportion of traditional two-parent families has been in decline, single-parent, predominantly female-headed families have been increasingly prevalent family form in the United States. In 1990, female-headed 28 percent of all households (U.S. Bureau of the Census, 1992). Specially, since the female-headed households has been recognized as the fastest growing segment of the poverty population, it is necessary for these female-headed households to invest in education, develop specific skills, or acquire experience, primarily in the labor force.

There have been some studies that investigated differences in expenditures patterns of married-couple and female-headed household for major expenditure categories (Horton & Hafstrom, 1985; Abdel-Ghany & Schwenk, 1993). However, little research has been devoted to the human capital related expenditures of U.S. families. In as much as no study has investigated how human capital could be developed through household economic activities such as consumption behavior, and little is known about the differences in human capital investment expenditure behavior between female-headed and married-couple households, this study could be a benchmark in terms of the application of the concept of human capital to the area of consumption expenditures.

The essential purpose of this study is to identify human capital investment expenditures of female-headed households by comparing similarities and differences in human capital investment expenditures of married-couple households. A second objective is to determine the effect of household type on human capital enhancement expenditures among the U.S. families, while taking socioeconomic and other demographic characteristics into account.

Literature Review

Schultz (1961) explained that human resources have such qualitative components as skills, knowledge, and similar attributes that affect particular human capabilities to do productive work. Schultz (1961) stated that the quality of human effort can be greatly improved by appropriate expenditures. Schultz (1961) considered five major categories of important activities that improve human capabilities: a) formal education at the elementary, secondary, and higher levels; b) on-the-job training, including old-style apprenticeship organized by firms; c) study programs for adults that are not organized by firms; d) health facilities and services, including all expenditures that affect the life expectancy, strength and stamina, and the vigor and vitality of a people; and e) migration of individuals and families to adjust to changing job opportunities.

Becker (1975) explained that individuals develop characteristics that endow them with value and that this accumulated human capital makes them more employable. Becker (1975) described many forms of human capital investment, including schooling, on-the-job training, medical care, migration, and searching for information about prices and incomes.

In previous research on expenditure behavior, two studies compared the differences in consumption patterns between the single- and two-parent families (Horton & Hafstrom, 1985; Abdel-Ghany & Schwenk, 1993). Horton and Hafstrom (1985) investigated differences in consumption expenditures between single female-headed and two-parent families. The major findings of this study was that only the income elasticities for shelter differed significantly between these two groups.

Abdel-Ghany and Schwenk (1993) also examined differences in consumption patterns between single-parent and two-parent families for major expenditure categories. The major hypothesis of this study was that there was different consumption patterns for major expenditure categories in single-parent and two-parent families. Using the Chow test to test for the equality of the entire set of single-parent and two-parent regression coefficients, it was found that with the exception of shelter expenditures, their consumption patterns are significantly different between the two groups.

Conceptual Framework

Model

The present study adapted a theoretical model from the management system framework (Deacon & Firebaugh, 1981). The model can be mathematically expressed as the following (Heck, 1983):

$$S = s\,(M_i;\ g_1\,(D_{t,b}),\ g_j) \quad (1)$$

Where S=outputs
M_i=family managerial activities, i=1, . . , n
g_1=a goal as an input
g_j=fixed input levels, j = 2. . . , m
$D_{t,b}$=characteristics (b = 1, . . , k) of
the t^{th} family member (t = 1, . . , s)

The equation (1) specifies that output (S) are a function of a set of managerial activities (M_i) and a set of inputs (g_1, g_j). In this model, a goal (g_1), which is used as an input, can be influenced by a set of family socioeconomic and demographic characteristics ($D_{t,b}$). Fixed input levels (g_j) represent value-laden goals that are given as inputs into the managerial system. Since the management system theory suggests that the levels of satisfaction of households result from the family's managerial activities (M_i). Within this framework, the decision-making on major family expenditures, including human capital expenditures, is conceptually considered as a family managerial activity (M_i).

The family system theory suggests that output is viewed as a function of the inputs and the throughput engaged in by the family. However, assuming that more human capital-enhancing expenditures could increase both the quantity and quality of family output (S), this study empirically measures only the relationship between input (g_1) and throughput(M_i).

Method

Data

Data source used in this study are 1990-91 Consumer Expenditure Survey (CES) which are collected by Bureau of Labor statistics (U.S. Department of Labor, 1992). The CES data set is a quarterly interview panel survey in which each household is interviewed every three months for each of five consecutive quarters. The CES data set provides very detailed information on household expenditures and household demographic characteristics at the national level.

Sample

For the present study, with the issue of the importance of human capital investment for youth, the sample was restricted to families with at least one child under age 18. Therefore, the sample of this study included both married-couple households with children and single female-headed households with children. A profile of the economic and demographic profiles for two sub-samples can be found in Table 1.

Empirical Model

The variables included in the statistical analysis were based on theoretical considerations as well as on the results of past research. The dependent variable measures total dollar expenditures on human capital-enhancing categories per quarter. As the explanatory variables, total household expenditures as a proxy for permanent income, age, number of members in enrolled college, and age-sex compositions are included in empirical analyses. Further, a set of dummy variables including family type, education, race, housing tenure, occupation, region, and health insurance type are also included in the analysis. Additionally, the dummy variables for quarter and interview month are included in the empirical model to observe the effect of seasonality on human capital-enhancing expenditures during the 1990-91 period. That is, the quarter and interview month are not explanatory variables, but are control variables to control for time variations due to having five different quarters included in the dataset.

Table 1
Socioeconomic and Demographic Profiles for Two Sub-Samples

Variables	Female-Headed (N=1,391)	Married-Couple (N=7,225)
	Mean(Std.Dev)	**Mean (Std.Dev)**
Totexp.	$4,491.6(3,856)	$9,082.6(6,065)
Age	34.7 (8.4)	37.2 (8.3)
College	0.1 (0.3)	0.1 (0.4)
	Percent(Freq)	**Percent (Freq)**
Education of Head		
Less than high	24.2 (337)	15.2 (1096)
High-school	38.6 (537)	31.3 (2265)
Some college	25.7 (358)	23.1 (1670)
College grad.	6.8 (94)	15.6 (1124)
Advanced deg.	4.7 (65)	14.8 (1070)
Race of Head		
White	54.5 (758)	79.3 (5731)
Afro American	31.9 (443)	7.3 (531)
Asian	3.0 (42)	4.6 (329)
Native American	0.8 (11)	0.3 (25)
Hispanic	9.8 (136)	8.4 (609)
Housing Tenure		
Own w/ mort.	24.4 (340)	64.4 (4653)
Own w/o mort.	8.1 (112)	9.1 (654)
Rent	67.5 (939)	26.5 (1918)
Occupation of Head		
Prof./Managerial	46.9 (653)	47.1 (3402)
Service occu.	12.8 (178)	5.5 (399)
Laborer	12.1 (168)	34.8 (2513)
Self-employed	1.9 (26)	7.7 (558)
Retired	0.7 (10)	1.2 (87)
Non-working	25.6 (356)	3.7 (266)
Region		
Urban northeast	19.9 (227)	18.6 (1342)
Urban midwest	23.9 (338)	22.1 (1600)
Urban west	21.1 (294)	21.1 (1527)
Urban south	28.8 (400)	25.0 (1809)
Rural	6.3 (87)	13.1 (947)

Analytical Method

Tobit analysis is employed for the model estimation because of a significant fraction of zero observation for the dependent variable. This regression method utilizes maximum likelihood estimation (M.L.E.) on a single equation when a set of continuous observations on a dependent variable is truncated. The general form of the tobit model is specified as follows:

$$y^* = \beta X_i + \epsilon_i, \quad \epsilon_i \sim N(0, \sigma^2) \quad (2)$$

where y* is the i^{th} household's optimal expenditures subject to household budget constraint (Chiang, 1994), β is a vector of unknown coefficient, X_i is a vector of explanatory variables, and ϵ_i is a vector of independently and normally distributed error terms with mean zero and variance, σ^2.

Using the LIFEREG procedure in SAS software package, iterative methods were used to obtain the maximum likelihood estimates of β. The significance of the model was tested using the chi-square statistical test. The calculation of the chi-square was obtained by the following:

$$\text{Chi-square} = -2[\log \text{likelihood}_R - \log \text{likelihood}_U] \quad (3)$$

The chi-square statistics compared the model with covariate variables (unrestricted model) with the model with no covariate variables (restricted model). The chi-square test will show whether the independent variables provide a significant improvement in the fit of the model.

Results and Discussion

Table 2 shows that female-headed households spent a significantly smaller amount ($223) on human capital expenditures than did married-couple households ($538). More specifically, female-headed households spent $86 for education, $14 for reading, $27 for leisure, and $96 for health care, while married-couple households spent $170 for education, $38 for reading, $77 for leisure, and $253 for health care.

Table 2 also presents the budget shares of human capital expenditures for both households. In Table 2, the results for the female-headed households show that the budget shares of total human capital expenditures to the education, reading, leisure, and health care are 38.6%, 6.3%, 12.1%, and 43.0%, respectively. On the other hand, the results for the married-couple households reveal that the budget shares of total human capital expenditures to the education, reading, leisure, and health care are 31.6%, 7.1%, 14.3%, and 47.9% respectively.

As for the means of human capital expenditures at per capita level for these two household types, the mean values of all five categories, at the per capital level, were less in the female-headed households, compared to those values in their marital counterpart.

Table 2
Means and Budget Shares of Human Capital-Enhancing Expenditures for Two Sub-Samples

Variables	Female-Headed (N=1,391)	Married-Couple (N=7,225)
Household level:	Mean(Std.Dev)	Mean (Std.Dev)
Education exp.	$85.8 (507.9)	$169.5 (600.9)
Reading exp.	$13.7 (35.7)	$ 40.0 (74.0)
Leisure exp.	$27.2 (125.6)	$ 76.9 (193.2)
Health care exp.	$96.3 (637.6)	$253.2 (708.2)
Human capital	$223.1 (881.3)	$537.6 (1024.9)
Total exp.	$4,491.6(3,856)	$9,082.6(6,065)
Budget share:	Percent	Percent
Education exp.	38.6%	31.6%
Reading exp.	6.3%	7.1%
Leisure exp.	12.1%	14.3%
Health care exp.	43.0%	47.0%
Per capita level:	Mean(Std.Dev)	Mean (Std.Dev)
Education exp.	$85.8 (507.9)	$169.5 (600.9)
Reading exp.	$13.7 (35.7)	$ 40.0 (74.0)
Leisure exp.	$27.2 (125.6)	$ 76.9 (193.2)
Health care exp.	$96.3 (637.6)	$253.2 (708.2)
Human capital	$223.1 (881.3)	$537.6 (1024.9)

Table 3 presents the results of the tobit analyses for human capital expenditures. The negative coefficient on the dummy variable for female-headed households provides evidence that single female-headed households spend significantly less for human capital enhancement, all else being equal, than do married-couple households.

The results for total expenditures show that both total expenditures and the squared term of total expenditures have positive significant effects. The significance of the squared term indicates that it is not a linear relationship between total expenditures and human capital expenditures. In other words, human capital expenditures increase at an increasing rate as total expenditures increase.

Both age and the age squared term show significant effects but in different direction, indicating that human capital expenditures increase as age increases until the age of approximately 58, at which point expenditures begin to decrease as age increases. Not surprisingly, expenditures on human capital related items increase as the number of family members enrolled in college increases.

In this study, twelve age-sex composition variables, reflecting stage in the family life cycle as well as household composition, are included in the empirical model. The results for both female and male family members between 6 and 17 show significant and positive effects on human capital expenditures, indicating that as a household has more grade schoolers or teenagers, the family's expenditures on human capital enhancement increase. It is interesting that the result for male family members over 65 is significant and positive. This result indicates that as a household has more male older adults, the family's expenditures on human capital enhancement increase.

The effects of the existence of five income sources on human capital expenditures are estimated in this study. The results indicate that transfer income has a significant and negative effect on human capital expenditures, while controlling for other factors. This result might imply that families who receive income from public assistance programs spend less on human capital categories of consumption than do families without that form of income. On the other hand, the presence of social security retirement income increases human capital expenditures, indicating that families who receive income from social security retirement benefits spend more on human capital enhancement than do families without that income source.

Among the sociodemographic characteristics, all dummy variables measuring the education of the household head show significant effects on human capital expenditures. As expected, White families spend more for human capital enhancement than do non-White families. Among the four regional variables, only urban south proves to significantly affect human capital enhancement than do household heads living in rural regions.

The empirical model for human capital expenditures include the type of health insurance as a controlling factor because the human capital expenditures represents the sum of the four subgroups of expenditures--education, reading, leisure, and health care. The results indicate that the presence of either Blue Cross/Blue Shield insurance or dental insurance has a positive effect on human capital expenditures. The presence of an HMO is found to have a negative effect on human capital expenditures, while the presence of commercial insurance is found to have no effect.

In addition to type of health insurance, two other controlling factors, quarter and month of interview were present in the analysis. Tobit results indicate that all dummy variables for quarter show significant and positive effects on human capital expenditures. Among the four quarter variables, those interviewed during the fourth quarter show the greatest coefficient. The reference period of the actual human capital

Table 3
Results of Tobit Analysis of
Human Capital Expenditures (N=8,616)

Variables	Coefficients(Std.error)	dy/dx
Constant	-1412.5***(224.89)	-966.69
Female-Headed	-86.9* (45.61)	-59.49
Income		
Total exp.	0.05***(0.003)	3.2E-02
(Total exp.)^2	8.9E-7***(6.88E-8)	6.2E-07
Age of head	25.9** (11.62)	17.75
(Age of head)^2	-0.2* (0.14)	-0.15
College	246.9*** (32.43)	168.98
Age/Sex Compositions		
Females <6	5.3 (21.60)	3.65
Males <6	-14.9 (21.62)	-10.16
Females 6-17	35.4** (15.88)	24.22
Males 6-17	50.4*** (15.52)	34.46
Females 18-22	4.4 (30.10)	3.03
Males 18-22	20.3 (30.45)	13.90
Females 23-29	-11.5 (32.64)	-7.86
Males 23-29	15.8 (32.13)	10.80
Females 30-65	-28.7 (32.61)	-19.61
Males 30-65	-26.2 (33.78)	-17.92
Females >65	52.2 (49.43)	35.74
Males >65	322.5*** (82.90)	20.73
Various Income Sources		
Asset income	5.0 (23.53)	3.48
Child suppor	35.4 (37.83)	24.25
Pension	-91.6 (63.48)	-62.68
Social sec.	135.6** (57.38)	92.79
Transfer	-106.4*** (30.02)	-72.82
Education of Head (Less than high school)		
High-school	183.6*** (34.06)	125.65
Some college	241.6*** (37.56)	165.34
College grad.	359.5*** (43.43)	245.70
Advanced deg.	355.6*** (45.94)	243.33
Race of Head (Non-white)		
White	214.2*** (28.01)	146.56
Housing Tenure (Rent)		
Own w/ mort.	72.2*** (27.16)	49.43
Own w/o mort.	125.4*** (42.95)	85.81
Occupation of Head (Non-prof.)		
Prof/Manager	-2.9 (24.24)	-1.98
Region (Rural)		
Northeast	37.1 (39.23)	25.35
Midwest	57.5 (37.47)	39.35
West	45.7 (39.78)	31.30
South	131.0*** (37.50)	89.67

Table 3 Continued

Variables	Coefficients (Std.error)	dy/dx
Health Insurance Type		
Blue cross	69.1** (31.03)	47.27
Commercial	36.3 (24.05)	24.84
Dental	97.1** (47.83)	66.43
HMO	-67.9*** (34.56)	-46.46
Quarter(1990 Quarter 1)		
1990 quarter 2	96.6*** (32.36)	66.10
1990 quarter 3	134.6*** (32.38)	92.12
1990 quarter 4	174.5*** (32.62)	119.39
1991 quarter 1	79.9** (32.64)	54.67
Month of Interview(Month 1)		
Month 2	57.7** (25.26)	39.52
Month 3	64.8*** (25.17)	44.35
Likelihood ratio	-61959.91	
Chi-square (df=45)	3562.72***	

* Significant at .10 level ** Significant at .05 level
*** Significant at .01 level

expenditures reported in the fourth quarter is from July to November. From these results, it seems that households' spending on human capital enhancement is more likely to occur during the summer or fall seasons compared to during winter or spring seasons. It is also worth noting that both month 2 and month 3 show positive and significant effects, indicating that households interviewed in the second and third months within a quarter spend more on human capital enhancement than do households interviewed in the first month.

The likelihood ratio is computed from the tobit analysis. In Table 3, the likelihood ratio is -61,959.91 and the chi-square statistic of 3,562.72 shows the model is statistically significant at the .01 level. This result supports the rejection of the null hypothesis. It can therefore be concluded that the model of independent variables is appropriate for understanding human capital expenditures.

Conclusions and Implications

The purpose of this study is to identify expenditures of U.S. households on human capital investment and to compare human capital expenditures by single female-headed households as opposed to married-couple households. According to the empirical results of the tobit analyses, human capital

expenditures indicated that holding other factors constant, there existed a significant effect for household type.

Although this study could provide knowledge of human capital investment behavior among current U.S. families, several aspects of human capital investment that were not addressed in this study could offer possibilities for future research. For example, time is a vital component in human capital development in addition to financial resources. Education, reading, leisure, and health care activities all require investments of time in varying degrees, and for many activities time is the only requirement.

Previous studies of families headed by single females have focused on their financial, sociological, and educational problems. Adding the dimension of human capital investment behavior provides valuable information as an aid to solving these economic and related problems.

The current study has attempted to examine effect of household type on human capital-enhancing expenditures. As for the further suggestion, if further research includes the specific marital status of the single-mothers (i.e., divorced, separated, widowed, or never-married) in the analysis, the results might contribute to the design of appropriate programs and services for these single female-headed families.

This study contributes to a better understanding of the effect of household type on human capital enhancement expenditures. Knowledge of factors that affect human capital expenditures provides valuable insight to family practitioners and policy makers in designing programs that could enhance the economic well-being of U.S. households.

Generally speaking, public policies are needed that recognize the returns from investment in human capital. Not only should programs enhance the well-being of female-headed households, but they should also enhance the well-being of all households. Perhaps a comprehensive national education system should be implemented for people of all ages to develop, maintain, and augment, their accumulated knowledge and skills.

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Endnote

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