The Asset Structure of Individual Portfolios and Some Implications for Utility Functions

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I. Introduction

The basic assumptions typically made in capital asset pricing theory imply that investors should hold diversified portfolios of assets. In an earlier paper [2], we developed under these same assumptions theoretical models of investors' behavior at both the micro and macro levels and used these models to assess the form of investors' utility functions. However, new as well as previously unanalyzed data indicate that a large proportion of households do not hold diversified portfolios contrary to the implications of these assumptions.

These data consist of (1) a special sample of 1971 Federal individual income tax returns and (2) the Federal Reserve Board's 1962 Survey of the Financial Characteristics of Consumers (SFCC). The purpose of this paper is to document the degree of diversification in individual portfolios, replicate our previous findings about the form of investors' utility function for households which do hold diversified portfolios, and finally develop an equilibrium condition of the aggregate demand for risky assets under heterogeneous expectations.

II. The Extent of Diversification in Individual Portfolios

A recent analysis [1] of a special sample of 17,056 individual income tax forms filed for the 1971 tax year[1] revealed that a large number of individuals held highly undiversified portfolios of stocks. This section will explore this finding in further detail and analyze more broadly the distribution of assets in individual balance sheets from the 1962 SFCC data.

Any individual or couple filing an individual income tax form for 1971 and having more than $100 in dividends and other distributions was required to list the names of the payers and the associated amounts. Such payers would have included publicly traded and closely held corporations, mutual funds, trusts, and so on.

With appropriate price-dividend ratios, this information permits an estimate of the amount held in each of an individual's dividend-paying items in 1971. With an adjustment for non-dividend-paying items, the market value of an individual's portfolio of stocks can be determined.

Two measures of diversification were constructed for the dividend-paying portion of an individual's portfolio. The first was simply the number of dividend-payers. The second measure attempted to determine how closely an individual portfolio approximated the market portfolio by summing the squared deviations of the proportions invested in each security from the proportions in the market portfolio. Since the proportion of each security in the market portfolio would be small, this measure was approximated as the sum of the square of the proportions invested in each security. Thus, a portfolio of two items with 90 percent in one and 10 percent in the other would have a diversification measure of 0.82, while an equally weighted portfolio of two items would have a diversification measure of 0.5. In general, this second measure will be between 1.0 and the reciprocal of the number of items in the portfolio. The lower this measure, the more diversified the portfolio.

Either of these two measures suggests that a large number of portfolios are highly undiversified (Table 1). Specifically, 34.1 percent of the forms filed which reported dividend sources listed only one payer, and 50.9 percent listed no more than two payers. Only 10.7 percent listed more than ten payers. Further, 60.3 percent of the forms filed had values for the second measure in excess of 0.522--roughly consistent with the level of diversification achieved in an equally weighted portfolio of two securities. Only 5.2 percent of the forms filed had values of this measure of less than 0.140--roughly consistent with the level of diversification achieved in an equally weighted portfolio of seven securities.

If forms with dividends from trusts, agency, custodial or "street name" accounts are excluded, the distributions of these measures are virtually unchanged. Excluding these forms, 51.2 percent of the forms reported no more than two payers, a slight in-

TABLE 1

DIVERSIFICATION MEASURES BY ADJUSTED GROSS INCOME AS ESTIMATED FROM 1971 SPECIAL SAMPLE OF INDIVIDUAL INCOME TAX FORMS FOR FILINGS WITH DIVIDEND SOURCES LISTED

Adjusted Gross Income (dollars)	Number of Dividend Items Per Form								Summation of Portfolio Weights Squared							
	1	2	3-4	5-9	10-14	15-19	Over 19	Total	0.000 -0.140	0.141 -0.233	0.234 -0.323	0.324 -0.423	0.424 -0.522	0.523 -0.875	0.876 -1.000	Total
	A. Percentage of Forms Filed															
Under 5,000	7.34	3.83	3.29	3.17	0.41	0.25	0.27	18.55	0.29	1.50	1.38	1.56	1.84	3.40	8.58	18.55
5,000 Under 10,000	6.25	3.07	5.24	4.23	0.18	0.32	0.51	19.80	0.91	1.07	1.46	2.68	1.18	5.20	7.30	19.80
10,000 Under 15,000	7.59	3.24	3.80	2.65	0.94	0.48	0.51	19.20	1.11	1.12	1.37	1.88	1.51	3.47	8.74	19.20
15,000 Under 25,000	9.14	4.29	4.55	4.57	1.05	0.78	0.82	25.20	1.26	2.08	2.12	2.03	2.44	4.80	10.47	25.20
25,000 Under 50,000	3.18	1.82	2.55	2.50	0.95	0.61	1.06	12.66	1.05	1.35	1.27	1.46	1.18	2.35	4.00	12.66
50,000 Under 100,000	0.53	0.45	0.64	0.89	0.43	0.26	0.48	3.67	0.47	0.44	0.39	0.38	0.38	0.74	0.88	3.67
100,000 and Over	0.09	0.09	0.12	0.20	0.11	0.08	0.23	0.91	0.15	0.10	0.11	0.09	0.09	0.18	0.20	0.91
Total	34.11	16.78	20.17	18.21	4.07	2.77	3.88	100.00	5.25	7.66	8.09	10.08	8.61	20.14	40.17	100.00
	B. Percentage of Stock Held															
Under 5,000	1.55	1.62	1.21	2.84	0.38	0.22	0.38	8.41	0.44	1.46	1.07	0.68	0.59	1.19	2.97	8.41
5,000 Under 10,000	1.03	1.14	2.26	3.04	0.14	0.25	0.41	8.28	0.65	0.82	1.00	1.29	0.51	2.36	1.65	8.28
10,000 Under 15,000	1.14	0.84	1.44	2.67	0.98	0.91	1.07	9.04	1.55	0.96	1.07	1.23	0.38	2.39	1.47	9.04
15,000 Under 25,000	1.86	0.83	2.17	3.36	1.45	1.78	3.00	14.44	3.04	1.94	1.28	0.85	1.38	2.86	3.09	14.44
25,000 Under 50,000	1.39	1.49	1.53	4.25	1.73	1.93	6.13	18.44	3.53	2.16	1.27	2.90	1.33	4.00	3.24	18.44
50,000 Under 100,000	0.99	1.18	2.36	3.28	2.08	1.42	4.84	16.15	2.41	1.55	1.50	1.97	1.55	3.51	3.67	16.15
100,000 and Over	0.81	2.20	3.26	4.56	2.45	2.64	9.33	25.24	2.66	1.18	2.54	2.25	2.82	7.48	6.30	25.24
Total	8.77	9.50	14.22	24.00	9.21	9.17	25.15	100.00	14.29	10.06	9.72	11.18	8.56	23.80	22.39	100.00

crease; while 58.9 percent had values for the second diversification measure in excess of 0.522, a slight decrease. Though no tabulations were prepared for those forms with no holdings in mutual funds, data presented below indicate that holdings in funds would not account for the observed lack of diversification.

A cross-classification of the number of forms filed by adjusted gross income[2] (AGI) and by either measure of diversification shows, as might be expected, that the extent of diversification tends to increase with AGI (Table 1). The more diversified portfolios within an AGI class are typically the larger portfolios. Nonetheless, at all levels of AGI, a substantial number of portfolios appear highly undiversified.

These analyses of diversification are deficient in that the measures make no allowances for stocks paying no dividends. The 1962 SFCC provides a means to verify the conclusions about the extent of diversification in individual portfolios, including the non-dividend paying portion.

The SFCC collected for a stratified sample of households as part of detailed balance sheets and income statements, the price and number of shares of each stock held by any member at the end of 1962. Only an aggregate figure was obtained for the stock held in trust. These data differ from the 1971 data in two principal respects: First, the data covered all households whether individual income tax forms were filed or not. Second, the data include stock held by all members of a household.

Thirteen different diversification measures were calculated and reveal the same lack of diversification (Table 2). The median member of holdings per household owning stock was two in 1971, while the average was 3.41. Even for households with net worth exclusive of homes, associated mortgages, and human wealth in excess of $1,000,000, the median number was only fourteen.

Fifty percent of the households held at least 90 percent of their stock portfolios in one holding. If the largest holding is defined excluding mutual funds, 50 percent of households held at least 63 percent in one holding--still a heavy concentration in

TABLE 2

DISTRIBUTION OF 13 DIVERSIFICATION MEASURES FOR ALL HOUSEHOLDS OWNING STOCK AS ESTIMATED FROM 1962 SURVEY OF CONSUMER FINANCES

Description of Diversification Measure[1]	Number of Households	Fractiles[2] 0.05	0.20	0.50	0.80	0.95	Average
SD 1: Number of NYSE Stocks Held	641	0	0	1	2	7	1.72
SD 2: Number of Holdings	641	1	1	2	4	11	3.41
SD 3: Value of Largest NYSE Holding to All NYSE Holdings	447	0.29	0.54	0.98	1.00	1.00	0.79
SD 4: Value of Largest Holdings to All Holdings	641	0.28	0.50	0.90	1.00	1.00	0.77
SD 5: Value of Largest Holding (Exc. Mutual Funds) to All Holdings	641	0.00	0.24	0.63	1.00	1.00	0.62
SD 6: Value of Largest 2 NYSE Holdings to All NYSE Holdings[3]	447	0.44	0.83	1.00	1.00	1.00	0.91
SD 7: Value of Largest 2 Holdings to All Holdings	641	0.46	0.76	1.00	1.00	1.00	0.89
SD 8: Value of Largest 2 Holdings (Exc. Mutual Funds) to All Holdings	641	0.00	0.36	0.97	1.00	1.00	0.72
SD 9: Value of Largest NYSE Holding to All Holdings	641	0.00	0.00	0.20	0.91	1.00	0.36
SD 10: Value of 2 Largest NYSE Holdings to All Holdings	641	0.00	0.00	0.30	1.00	1.00	0.41
SD 11: Summation of Squared Portfolio Weights (NYSE Only)[3,4]	447	0.16	0.45	0.97	1.00	1.00	0.74
SD 12: Summation of Squared Portfolio Weights (All Holdings)	641	0.16	0.37	0.82	1.00	1.00	0.71
SD 13: Summation of Squared Portfolio Weights (All Holdings Exc. Mutual Funds)[4]	586	0.17	0.40	0.86	1.00	1.00	0.72

[1] Stocks held in trust are not included.

[2] The fractiles and averages take into account the sampling probability associated with each household and thus are estimates of the population statistics.

[3] Only households with NYSE holdings are included.

[4] The proportions in each NYSE holding or in each non-mutual fund holding were rescaled so that their sum was 1.0 before the sum of squares was calculated.

one asset. Furthermore, 50 percent of those households with NYSE holdings have invested at least 98 percent of the NYSE portion of their portfolio in one stock. Even for households with net worth exclusive of homes, associated mortgages, and human wealth in excess of $1,000,000, 50 percent have invested at least 35 percent of the NYSE portion of their portfolio in one stock.

Besides confirming the lack of diversification in a large number of stock portfolios, the 1962 SFCC data can be used to analyze the overall composition of the assets of households. Table 3 presents, cross classified by net worth, distributions of the ratios to net worth of four broad groups of assets: risky and mixed-risk assets, stock, equity in personal residence, and human wealth. A crude estimate of human wealth was derived as the discounted value of the average labor income in 1962 and 1963 which was then assumed to grow at four percent per year until retirement. The discount rate was taken to be ten percent. If a person was less than 65, he was assumed to retire at 65. If working and over 65, he was assumed to retire in four years; if over 69, three years; if over 74, two years; and if over 79, one year. Two definitions of net worth were used: first, a narrow one exclusive of homes, associated mortgages, and human capital; and second, a broad measure including these items.

There are substantial differences in the composition of household assets for different levels of net worth. Using the broadly defined measure of net worth, 80 percent of households with net worth between $100,000 and $200,000 had over 79 percent of their net worth in human wealth. Households with more or less net worth tended to have less of their net worth concentrated in human wealth.

Equity in personal residences appears to be an important part of the net worth of only a limited number of households with net worth inclusive of human wealth of less than $100,000. In contrast, stock was an important part of the net worth of a limited

TABLE 3

DISTRIBUTION OF RATIOS FOR ALL HOUSEHOLDS OF SELECTED ASSETS TO NET WORTH BY NET WORTH CLASS AS ESTIMATED FROM 1962 SFCC[1]

Net Worth Level (dollars)	Inclusive of Human Wealth and Home	Number of Observations	Risky & Mixed Risk[2] Fractiles .20	.50	.80	Average	Stock Assets Fractiles .20	.50	.80	Average	Equity in Housing Fractiles .20	.50	.80	Average	Human Wealth Fractiles .20	.50	.80	Average
1,000 Under 10,000	Yes	114	0.74	0.98	1.01	0.89	0.0	0.0	0.0	0.00	0.0	0.31	0.88	0.42	0.0	0.04	0.87	0.33
10,000 Under 100,000	Yes	819	0.90	1.00	1.06	0.98	0.0	0.0	0.0	0.02	0.0	0.03	0.24	0.14	0.06	0.86	0.99	0.66
100,000 Under 200,000	Yes	485	0.98	1.01	1.07	1.01	0.0	0.0	0.00	0.02	0.0	0.04	0.10	0.06	0.79	0.93	0.98	0.85
200,000 Under 500,000	Yes	200	0.93	1.0	1.06	0.99	0.0	0.00	0.07	0.08	0.02	0.05	0.10	0.07	0.21	0.82	0.92	0.65
500,000 Under 1 Million	Yes	90	0.90	0.98	1.02	0.97	0.0	0.05	0.34	0.17	0.03	0.06	0.09	0.07	0.06	0.34	0.62	0.35
1 Million and Over	Yes	135	0.94	0.98	1.02	1.00	0.02	0.12	0.48	0.25	0.02	0.03	0.06	0.04	0.00	0.11	0.26	0.15
All[1]	Yes	1843	0.92	1.00	1.06	0.98	0.0	0.0	0.0	0.02	0.02	0.04	0.22	0.15	0.08	0.87	0.99	0.67
1,000 Under 10,000	No	523	0.0	0.0	0.63	0.31	0.0	0.0	0.0	0.05								
10,000 Under 100,000	No	477	0.24	0.76	0.97	0.66	0.0	0.0	0.18	0.11								
100,000 Under 200,000	No	68	0.75	0.90	1.00	0.88	0.0	0.08	0.70	0.27								
200,000 Under 500,000	No	100	0.83	0.96	0.99	0.94	0.0	0.11	0.83	0.36								
500,000 Under 1 Million	No	69	0.85	0.96	1.04	0.94	0.02	0.16	0.54	0.28								
1 Million and Over	No	103	0.92	0.98	1.00	1.00	0.02	0.13	0.73	0.32								
All	No	1340	0.0	0.33	0.92	0.47	0.0	0.0	0.06	0.08								

[1]The number 0.00 implies that the observed value is less than 0.005, while 0.0 implies a true zero.

[2]Excluding homes and human wealth, risky and mixed assets for the narrow definition of net worth cover all assets including those held in trust accounts other than the four categories of "risk-free" assets: cash balances; savings bonds; cash surrender value of life insurance; and a miscellaneous group of "risk-free" assets consisting of U.S. Treasury bills, notes and certificates, the withdrawal value of profit sharing and retirement plans, and credit balances in brokerage accounts. For the broad definition of net worth, risky and mixed assets include the equity value of housing and human wealth.

number of households with net worth in excess of $500,000 again inclusive of human wealth.

III. Characteristics of Investors with Undiversified Portfolios

A substantial proportion of households thus appear to hold highly undiversified portfolios of equity issues. This section will use data from the 1962 SFCC to estimate the relationships between different diversification measures, including measures covering non-equity assets, and various sociodemographic and financial characteristics of households.

Measures of asset diversification were derived as follows: Excluding human wealth which in a one-period model can be taken as exogeneous, the aggregate asset structure of all households was estimated from the 1962 SFCC. Each asset was classified into one of four risk-free categories as defined in Table 3 or one of five other categories. These other categories are bonds other than savings bonds, stock, equity in unincorporated business, equity in homes, and all other "risky" assets. If possible, "risky" assets held in trust accounts were included in the appropriate category; if not, they were included in the all other "risky" category. The asset diversification measures were then defined as the sum of the squared deviations of the proportions invested by the household in each category from the market proportions as derived from the aggregate structure.

Four variants of these asset diversification measures were calculated: The first, AD1, covered marketable assets, i.e., all nine categories. Since housing involves major transaction costs and is held partly for consumption reasons, the second measure, AD2, excluded housing and thereby covered only financial assets. Capital asset pricing theory, however, argues that long and short positions in riskfree assets are used to alter the risk of a diversified portfolio of risky assets, so that diversification should be defined only over risky assets. The last two measures, AD3 and AD4, cover only risky marketable (five categories) and risky financial assets (four categories)

respectively. Unlike the stock diversification measures, each of these measures was normalized by the number of categories. As noted previously, the larger these measures, the less diversified the portfolio of assets.

Unweighted regressions of these measures upon household characteristics show that none of these characteristics have across the four measures both a statistically significant as well as a strong consistent effect as assessed by the potential explanatory power of the variable (Table 4). A high ratio of housing equity to net worth is associated with high asset diversification when the measure of asset diversification includes housing equity but not otherwise. Net worth, as in all of the analyses in this section, was broadly defined to include human wealth.

A high ratio of human wealth to net worth is also associated with somewhat greater asset diversification when the diversification measure includes housing equity, especially for "risky"assets only, but with quite low asset diversification otherwise. When "risky" and "non-risky" assets are combined, net worth has a statistically significant but not a strong positive association with the degree of asset diversification. This association however loses much of its significance when the analysis is confined to "risky" assets.[3]

Of the other household characteristics covered, none seems to have a strong effect on asset diversification though several are statistically significant. Generally, the larger the number of dependents in a household, the greater the degree of asset diversification. At least for some measures of diversification, households with male heads exhibited a more diversified asset structure. Somewhat surprisingly, the self-employed generally had a more diversified and the retired a less diversified asset structure than other occupational groups. The age of the head seems to have little effect on the degree of asset diversification.

These measures of asset diversification are deficient both because of the small number of separate major asset categories for which information is available and the

TABLE 4

REGRESSIONS OF FOUR DIVERSIFICATION MEASURES OF MARKETABLE ASSETS

ON HOUSEHOLD CHARACTERISTICS AS ESTIMATED FROM THE 1962 SCFF

Independent Variables			Dependent Variables[2]							
Characteristic	Mean[1]	Standard Deviation[1]	AD1: All Marketable Assets		AD2: All Financial Assets		AD3: All Risky Marketable Assets		AD4: All Risky Financial Assets	
			Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant			0.093	11.47	0.135	12.40	0.116	9.84	0.223	7.08
Human Wealth/Net Worth	0.580	0.393	0.001	0.46	0.039	9.96	-0.012	-2.96	0.083	7.52
Ln(Net Worth)	11.540	1.418	-0.003	-5.83	-0.006	-8.35	-0.001	-1.36	-0.004	-2.01
Housing Equity/Net W.	0.127	0.198	-0.051	-11.80	0.005	0.83	-0.076	-12.00	0.043	1.99
Female Head[3]	0.126		0.008	3.66	0.006	1.84	0.014	4.26	0.007	0.63
2 Dependents[3]	0.270		-0.012	-5.09	-0.006	-1.89	-0.006	-1.62	-0.006	-0.53
3 Dependents[3]	0.172		-0.016	-6.32	-0.008	-2.27	-0.012	-3.09	-0.035	-2.91
4 or more Dep.[3]	0.437		-0.016	-6.27	-0.009	-2.51	-0.014	-3.84	-0.027	-2.35
Age 56-65[3]	0.201		-0.001	-0.69	-0.001	-0.35	-0.001	-0.35	-0.008	-1.03
Age > 65[3]	0.139		0.000	0.03	0.002	0.47	-0.002	-0.06	0.008	0.71
Self-Employed[3]	0.183		0.001	0.65	-0.020	-7.07	-0.013	-4.29	-0.075	-10.45
Retired[3]	0.084		0.013	3.92	0.017	3.76	0.018	3.71	0.010	0.78
Not Gainfully Employed[3]	0.032		0.030	3.47	0.019	3.82	0.016	2.88	0.056	3.46
Employer Unknown[3]	0.008		0.007	1.06	0.010	0.97	0.007	0.77	0.015	0.47
Farm Operator[3]	0.040		0.019	5.25	-0.016	-3.28	0.029	5.73	-0.057	-4.75
Ancillary Statistics										
Dependent Variable Mean			0.040		0.075		0.078		0.166	
Standard Deviation			0.028		0.041		0.038		0.098	
$\bar{R}^2$			0.184		0.354		0.180		0.353	
N			1809		1712		1735		1016	

[1] The means and standard deviations are unweighted and based upon the 1809 households used in the regression on AD1. Net worth here and in subsequent tables includes human capital.

[2] See text for explicit definitions.

[3] These are dummy variables assuming the value of 1.0 if the characteristic is applicable to the household; otherwise, 0.0. Number of dependents include the head of the household.

differences in the expected returns and risks of the individual assets within each category. With respect to equity securities, the data from 1962 SFCC make it possible to control for these differences.

The analysis of stock diversification began with an examination of the relationship between the ratio of the stock of a household to its net worth (S/W) and other characteristics regarded as exogenous. It then proceeded to regress both the beta coefficient of the household's stock portfolio and the different measures of stock diversification described in Section II, SD1 - SD13, on the S/W ratio as estimated from the first stage regression and a large number of other explanatory variables.

Table 5 presents the relationship between the S/W ratio and various household characteristics.[4] As expected, the relative importance of stock in an household's net worth is strongly negatively related to the relative importance of human wealth and, in lesser degree, to that of equity in homes. The relative importance of stock is, again as might be expected, positively related to the level of net worth. The only other significant household characteristic is the occupational status of the head. Households headed by self-employed including farm operators have a significantly lower ratio of stock to net worth than other households and the retired have a higher ratio.

The final column in Table 5 shows that only one variable, net worth, is even moderately related to the average risk of securities contained in a household's stock portfolio as measured by the beta coefficient. The richer families did evidence some tendency to hold stocks with larger betas, but this effect is not substantial and the explanatory power of all the variables included in the beta regressions is extremely small.

Table 6 presents unweighted regressions of four measures of stock diversification (SD2, SD3, SD11 and SD12) on the S/W ratio as estimated from the first stage regression and other explanatory variables. Similar relationships for the other measures of stock diversification lead to the same qualitative conclusions as these regressions.

TABLE 5

REGRESSIONS OF STOCK TO NET WORTH RATIOS AND PORTFOLIO BETAS ON HOUSEHOLD CHARACTERISTICS

AS ESTIMATED FROM THE 1962 SCFF

Independent Variables			Dependent Variables			
			Stock/Net Worth		Beta for Stock Portfolio[4]	
Characteristic	Mean[1]	Standard Deviation[1]	Coefficient	t-value	Coefficient	t-value
Constant			0.039	0.41	0.683	4.44
E(Stock/Net Worth)[2]	0.179	---	---	---	-0.050	-0.35
Human Wealth/Net Worth	0.397	0.362	-0.425	-13.70	---	---
Ln(Net Worth)	12.540	1.362	0.029	4.61	0.029	2.26
Housing Equity/Net Worth	0.106	0.126	-0.320	-4.92	---	---
Female Head[3]	0.086	---	0.053	1.68	-0.068	-1.20
2 Dependents[3]	0.329	---	0.039	1.27	0.038	0.72
3 Dependents[3]	0.161	---	0.005	0.14	0.035	0.57
4 or more Dependents[3]	0.420	---	0.019	0.57	0.058	0.97
Age 56-65[3]	0.248	---	0.002	0.13	-0.001	-0.03
Age > 65[3]	0.161	---	0.029	1.05	-0.047	-0.90
Self-Employed[3]	0.346	---	-0.171	-9.20	-0.016	-0.56
Retired[3]	0.073	---	0.079	2.38	-0.020	-0.32
Not Gainfully Employed[3]	0.036	---	0.035	0.86	0.015	0.21
Employer Unknown[3]	0.008	---	0.044	0.58	-0.137	-0.92
Farm Operator[3]	0.011	---	-0.347	-5.22	-0.107	-0.83
Turnover[5]	0.121	0.597			-0.049	-1.02
Squared Turnover[5]	0.371	3.889			0.008	1.25
Ancillary Statistics						
Dependent Variable Mean			0.179		1.057	
Standard Deviation			0.235		0.252	
$\bar{R}^2$			0.515		0.030	
N			641		416	

[1]The means and standard deviations are unweighted and based upon 641 households owning stock.

[2]Estimated from Stock/Net Worth regression.

[3]Dummy variables as defined in Table 4.

[4]The beta coefficient for a household is calculated as a weighted average of the available beta coefficients of NYSE stocks, where the weights are proportional to the value of these stocks in the household's portfolio on December 31, 1962. The beta coefficients themselves were estimated with monthly data over the period 1958-62 using the S&P Composite Index, providing there were at least 30 months of data.

[5]Turnover is defined as the minimum of purchases and sales divided by the value of the stock portfolio at the beginning of the year.

TABLE 6

REGRESSIONS OF FOUR MEASURES OF STOCK DIVERSIFICATION ON HOUSEHOLD CHARACTERISTICS AS ESTIMATED FROM 1962 SCFF

Independent Variables	Dependent Variables[4]							
	SD2: Total Number of Holdings		SD3: Largest NYSE Holding to All NYSE Holdings		SD11: Summation of Squared Portfolio Weights (NYSE only)		SD12: Summation of Squared Portfolio Weights (All Holdings)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Constant	-46.156	-3.91	1.329	7.58	1.383	7.13	0.859	4.89
E(Stock/Net Worth)[1]	22.943	2.17	-0.619	-3.95	-0.738	-4.26	-0.831	-5.30
Ln(Net Worth)	4.089	4.23	-0.039	-2.75	-0.048	-3.04	-0.022	-1.56
Stock in Trust to Other Stock	1.641	0.17	-0.049	-0.35	-0.053	-0.34	-0.073	-0.52
Beta[2]	-2.947	-0.79	0.023	0.41	0.047	0.76	0.066	1.18
Female Head[3]	-0.002	-0.00	-0.005	-0.07	-0.021	-0.30	0.022	0.35
2 Dependents[3]	1.739	0.44	-0.011	-0.18	-0.253	-0.39	0.068	1.15
3 Dependents[3]	1.637	0.36	-0.036	-0.53	-0.054	-0.72	-0.002	-0.02
4 or more Dependents[3]	2.196	0.49	-0.047	-0.72	-0.055	-0.75	0.012	0.18
Age 56-65[3]	0.388	0.14	-0.000	-0.01	-0.008	-0.19	-0.046	-1.15
Age > 65[3]	9.125	2.31	-0.070	-1.20	-0.070	-1.07	-0.023	-0.39
Self-Employed[3]	6.062	2.87	-0.162	-5.16	-0.174	-5.01	-0.193	-6.15
Retired	-9.044	-1.92	0.153	2.19	0.148	1.91	0.176	2.51
Not Gainfully Employed[3]	5.349	1.03	-0.001	-0.02	0.037	0.43	0.156	2.01
Employer UnKnown[3]	16.684	1.50	0.010	0.06	-0.017	-0.09	-0.050	-0.30
Farm Operator[3]	0.316	0.03	-0.217	-1.52	-0.218	-1.38	-0.118	-0.82
Turnover	-0.275	-0.08	-0.015	-0.28	-0.018	-0.31	-0.069	-1.29
Squared Turnover	-0.044	-0.09	0.005	0.61	0.005	0.56	0.011	1.45
Ancillary Statistics								
Dependent Variable Mean	12.815		0.632		0.556		0.427	
Standard Deviation	20.758		0.314		0.351		0.321	
$\bar{R}^2$	0.198		0.226		0.246		0.258	
N	416		416		416		416	

[1] Estimated from Stock/Net Worth Regressions in Table 5.
[2] See Table 5 for definition.
[3] Dummy Variables as defined in Table 4.
[4] These regressions are for stockholders only.

Stock diversification tends to increase with both the estimated S/W ratio and net worth. However, with one exception the level of wealth seems to have less effect than the estimated S/W ratio on the degree of stock diversification. The comparatively unimportant role of wealth is especially evident for SD12, the most comprehensive measure of stock diversification, for which the wealth effect is insignificant. Yet, the simple correlation between the log of net worth and SD12 for all households owning stock is -0.36, significant at the usual five percent level.

Of the other household or asset characteristics, only occupation seems to have a consistently significant effect on diversification. Households with self-employed heads systematically had a more diversified stock portfolio than other families even though their expected S/W ratios are smaller than average. Several other variables not used in the analysis of asset diversification had no discernible effect on stock diversification. These variables are: the ratio of the household's stock assets held in trust, the stock portfolio turnover rate, and the beta coefficient of the household's stock portfolio.

The regression explaining SD11 and SD12 were reestimated including one at a time the four measures of asset diversification as an additional independent variable. The estimated S/W ratio is still the most important single variable in explaining the degree of stock diversification, with relatively large stock holdings associated with higher than average stock diversification. The degree of stock diversification tends to be correlated directly with the degree of asset diversification. This effect is statistically significant in 2 out of 8 regressions. The influence of wealth on stock diversification, weak in the earlier regressions, is not affected appreciably when the degree of asset diversification is held constant. The regression coefficient on net worth remains negative and is generally statistically significant.

Finally, to determine whether the ratio of human wealth to net worth has any impact on stock diversification other than through the S/W ratio and the degree of asset diversification, the regression with SD11 as its dependent variable was recomputed

after substituting the actual for the estimated S/W ratio and adding AD4 and human wealth as explanatory variables. The regression coefficients of both the asset diversification measure and the human wealth to net worth ratio are statistically insignificant.

None of these regressions explain a high proportion of the variation in the household's stock diversification. What follows is a non-exhaustive list of possible reasons for this lack of diversification.

One of the most obvious factors is transaction costs but these costs, unless broadly defined, cannot be of sufficient magnitude to explain the lack of diversification for NYSE stocks observed for many of the households with both substantial and limited means. Moreover, the lack of diversification evidenced in investments in NYSE stocks could be attributed to motives of control only for a few households. These few households should have little effect on the estimated coefficients in the regressions.

A factor which theoretically may have a substantial effect on the extent of diversification is the relative importance of human wealth in a household's net worth and the covariability of return on the household's human wealth with return on different marketable assets. Yet, our analysis reveals no consistent relationship between the degree of diversification of marketable assets and the ratio of human wealth to net worth. Human wealth also seems to have no net effect on stock diversification once the relative importance of stock in net worth and various household characteristics are held constant.

Another factor which might be important is "locked-in" capital gains. It might be argued that the turnover variables should serve as a proxy (inverse) for the presence of such gains. The coefficients were insignificant, but this test is quite tenuous.

Other plausible explanations of the frequent lack of stock diversification are either that investors hold heterogeneous expectations as to expected return and risk[5] or that they do not properly aggregate risks of individual assets to measure the risk of an entire portfolio--two of the basic assumptions typically

made in capital asset pricing theory. A recent analysis [3] of a survey of stockowners indicates that age is the only characteristic which seems to explain a substantial part of the annual rate of return thought obtainable from investments in common stocks. However, the preceding analysis finds that age is not strongly associated with variations in the degree of diversification of either marketable assets or stocks. Thus, we do not have direct evidence that the frequent lack of diversification is attributable to heterogeneous expectations.

IV. Replication of Constant Elasticity Findings

In the framework of a continuous time model, we have in a prior paper [2] developed demand functions for risky assets both at the household level and the macro-level. By using the household data from the SCFF to estimate the parameters in these functions, that paper found that "the assumption of constant proportional risk aversion is not a bad first approximation" though this conclusion hinges upon the definition of risky and non-risky assets. Furthermore, that paper found that the average coefficient of proportional risk aversion is probably well in excess of one and perhaps in excess of two.

One of the assumptions made in the development of these functions and in the empirical work was that households had homogeneous expectations about the distribution of future returns. If the separation theorem holds with respect to marketable assets, this assumption permits the portfolio of each household to be decomposed into an investment in the market portfolio of all risky assets and a long or short position in the risk-free asset. The evidence in the last two sections calls into question this implication of homogeneous expectations. The remainder of this section will examine subsets of the SCFF sample for which this assumption is more plausible to reassess the validity of the finding of constant proportional risk aversion.

If human capital, a non-marketable asset, is ignored, the proportion of household k's net worth placed in the market portfolio of risky assets, α_k, is related to the Pratt's coefficient of relative risk aversion for household k, C_k, by the expression:

$$(1) \quad \alpha_k \, (1-t_k) \, C_k = \frac{E(r_m - r_f)}{\sigma_m^2}$$

where t_k is the average tax rate for household k, $E(r_m)$ and σ_m^2 are the expected return and variance of returns respectively on the market portfolio of risky assets, and r_f is the risk-free rate at which households can borrow or lend.[6]

Since the market price of risk $E(r_m - r_f)/\sigma_m^2$ under homogeneous expectations is the same for everybody, the way in which C_k varies with net worth, NW_k, can be inferred from regressions of $a_k(1-t_k)$ on $\ln(NW_k)$. Table 7 presents for households with net worth of $1000 or more the estimated coefficients on $\ln(NW_k)$ from both simple regressions and regressions including dummy variables for age, education, and occupation for the entire SCFF sample and selected subsets. Net worth was defined in three ways as indicated in the table.

Though perhaps questionable for all stockholders, the assumption of homogeneous expectations may be more viable for stockholders with the more diversified portfolios. Therefore, these regressions were run on a subset of households holding NYSE stocks in the most diversified portfolios as judged by the diversification measure calculated as the sum of the squared proportion in each NYSE stock (SD11). The 50 percent of housholds with the most diversified portfolio as determined by this measure were included. For comparison purposes, the corresponding regression for all stockholders and for the entire SCFF sample are presented.

These regressions make the assumption that all households hold the market portfolio of risky assets or a portfolio of risky assets perfectly correlated with the market portfolio and with the same variance. To allow for differences in the variances of the portfolio of risky assets held by households, α_k was redefined as the product of the beta coefficient for the portfolio times the previously defined α_k. For instance a household with half of its net worth in a portfolio of risky assets with a beta of

TABLE 7

REGRESSIONS OF $(1-t_k)\ \alpha_k$ ON THE LOGARITHMS OF NET WORTH FOR VARIOUS SUBSAMPLES OF THE 1962 SCFF[1]

Net Worth Including Homes	Housing Measured by	Type of Households	Simple Regression: Coefficient on ln(NW)	Simple Regression: t-value	Simple Regression: $\bar{R}^2$	Simple Regression: Number	Regression with Dummy Variables for Age Education, and Occupation[2]: Coefficient on ln(NW)	Regression with Dummy Variables for Age Education, and Occupation[2]: t-value	Regression with Dummy Variables for Age Education, and Occupation[2]: $\bar{R}^2$
No		All Households	0.062	11.09	0.08	1320	0.054	7.64	0.16
		All Stockholders	0.037	6.93	0.07	615	0.029	4.42	0.13
		Most Diversified Stockholders	0.007	0.86	0.00	220	0.000	0.04	0.02
		Most Diversified Stockholders Adjusted for Beta[3]	0.008	0.76	0.00	205	0.001	0.10	0.11
Yes	Equity	All Households	-0.007	-1.84	0.00	1550	-0.003	-0.58	0.06
		All Stockholders	-0.002	-0.41	0.00	625	-0.002	-0.33	0.03
		Most Diversified Stockholders	-0.019	-2.64	0.03	221	-0.022	-2.85	0.05
		Most Diversified Stockholders Adjusted for Beta[3]	-0.012	-1.14	0.00	205	-0.017	-1.52	0.02
Yes	Full Value	All Households	-0.187	-15.39	0.13	1550	-0.157	-9.89	0.19
		All Stockholders	-0.102	-11.11	0.16	625	-0.071	-6.37	0.23
		Most Diversified Stockholders	-0.060	-5.89	0.13	221	-0.063	-5.78	0.14
		Most Diversified Stockholders Adjusted for Beta[3]	-0.064	-4.23	0.08	205	-0.071	-4.35	0.09

[1]The variable α_k includes mixed and risky assets as defined in Table 3. Human wealth is excluded in the analyses of this table.

[2]The dummy variables, assuming the value of 1.0 if the characteristic is applicable to the head of the household and 0.0 otherwise, are for age (less than or equal to 25 and 5-year intervals from 25 to 65), for education (grade school or less, some high school, high school graduate, some college, and college graduate), and for occupation (self-employed, employed by others, retired, farm operator, not gainfully employed, and employer unknown).

[3]The beta coefficient was defined as in Table 5.

2.0 would achieve the same risk level with all of its net worth in the market portfolio. This adjustment still requires the assumption of perfect correlation. Table 7 contains these adjusted regressions for the most diversified set of stockholders.

The coefficients on net worth are quite similar however the sample is defined or whether an adjustment is made for beta. If net worth is defined to exclude housing, there is a slight tendency for decreasing relative risk aversion through it is not significant at the 5 percent level for the most diversified stockholders. If net worth is defined more broadly to include homes, there is some evidence of increasing relative risk aversion, but the tendency is not great. For example, if $(1-t_k)\alpha_k$ were around 0.8, and if the coefficient on ln(NW) were -0.02, as it is when housing is measured by its equity value, a straightforward calculation shows that the coefficient of relative risk aversion would increase by slightly less than 5 percent with a change in net worth from one thousand to one million dollars.

If explicit account is taken of human wealth and its non-marketability, our prior paper [2] showed that the proportion of net worth attributable to marketable assets placed in risky assets, α_k, is related to the coefficient of relative risk aversion by:

$$(2) \quad (1-h_k)\ (1-t_k)\alpha_k = \frac{E(r_m-r_f)}{\sigma_m^2} \cdot \frac{1}{C_k} - \beta_{hk,m} h_k (1-t_k)$$

where h_k is the ratio of human wealth to net worth and $\beta_{hk,m}$ is the slope coefficient in the regression of the return from human capital on the return from the market portfolio of risky assets. If within a narrow range of net worth, it can be assumed that $(C_k)^{-1} = (C)^{-1} + \eta_{ck}$ and $\beta_{hk,m} = \beta_{hm} + \eta_{hk}$, where η_{ck} and η_{nk} are mean-zero independent disturbances, the following estimatable regression can de derived:[7]

$$(3) \quad (1-h_k)\ (1-t_k)\ \alpha_k = \frac{E(r_m-r_f)}{\sigma_m^2} \quad \frac{1}{C} - \beta_{hm} h_k\ (1-t_k) + \mu_k.$$

The disturbance μ_k is a function of η_{ck} and η_{hk}.

For each of the samples from the SCFF described above and for each of five net worth classes, regression (3) was estimated with housing measured by equity value. The results are shown in Table 8. For the most diversified stockholders, α_k was also adjusted for differences in beta. Regardless of the sample, the regression coefficients are similar. Even before an adjustment for potential bias, the extent of increasing proportional risk aversion is not great. The estimate of $(C)^{-1}$ for those households with net worth in excess of one million dollars is 29 percent less than the estimate for those households with net worth between ten and one hundred thousand dollars using the entire sample and 10 percent less using the most diversified stockholders sample adjusted for beta.

Our prior paper [2] examined the potential biases in the estimates for the entire sample and concluded that the most important source of bias is the omission of housing subsidies and benefits from social security and pension funds. As that paper showed, correcting for this omission would lead to a reduction in the magnitude of the increase in relative risk aversion and might even lead to a conclusion of decreasing proportional risk aversion.

V. Implications of Results

Our analysis confirms that a large number of households hold poorly diversified portfolios. One possible reason is that investors have heterogeneous expectations. As pointed out above, a previous paper concluded that the coefficients of relative risk aversion of investors did not vary substantially with wealth. This conclusion required the assumption of homogeneous expectations on the part of all investors. In view of the lack of diversification evidenced in many portfolios, we replicated in this paper our prior analysis on a sample of households which may more plausibly be characterized by homogeneous expectations. This replication yielded the same result of constant proportional risk aversion as our earlier study.

We have shown previously that the assumptions of constant proportional risk aversion and homogeneous expectations as well as the existence of a mechanism for

TABLE 8

ESTIMATED REGRESSIONS OF THE FORM

$$(1-h_k)\ (1-t_k)\ a_k = \frac{E(r_m-r_f)}{\sigma_m^2}\ \frac{1}{C}\ -\ \beta_{hm}h_k\ (1-t_k) + \mu_k$$

FOR VARIOUS SUBSAMPLES OF 1962 SCFF[1]

Net Worth Class ($000)	Estimates of $\frac{E(r_m-r_f)}{\sigma_m^2}\ \frac{1}{C}$				Estimates of β_{hm}				Range of	
	All Households	All Stockholders	Most Diversified Stockholders	Most Diversified Stockholders Adjusted for Beta	All Households	All Stockholders	Most Diversified Stockholders	Most Diversified Stockholders Adjusted for Beta	Number of Observations	$\bar{R}^2$
10-100	0.707 (0.009)	0.635 (0.019)	0.667 (0.036)	0.621 (0.046)	0.774 (0.014)	0.735 (0.042)	0.840 (0.086)	0.804 (0.121)	32-819	0.58-0.80
100-200	0.611 (0.010)	0.581 (0.015)	0.533 (0.028)	0.577 (0.035)	0.697 (0.013)	0.657 (0.025)	0.595 (0.050)	0.651 (0.065)	46-485	0.69-0.85
200-500	0.612 (0.016)	0.609 (0.020)	0.641 (0.028)	0.647 (0.043)	0.743 (0.030)	0.747 (0.040)	0.806 (0.066)	0.784 (0.099)	50-200	0.56-0.76
500-1000	0.529 (0.020)	0.529 (0.019)	0.505 (0.034)	0.530 (0.038)	0.613 (0.072)	0.616 (0.069)	0.543 (0.127)	0.577 (0.143)	31-90	0.34-0.49
Over 1000	0.499 (0.021)	0.499 (0.022)	0.506 (0.025)	0.558 (0.038)	0.603 (0.146)	0.594 (0.153)	0.646 (0.160)	0.658 (0.266)	49-135	0.10-0.23

[1] The numbers in parentheses are the standard errors of the coefficients.

borrowing and lending at the same rate imply a simple aggregate equilibrium relationship between the relative demand for risky assets and the market price of risk. A similar kind of aggregate demand function allowing for the possibility of heterogeneous expectations will now be developed which encompasses as a special case our previously derived function.

Let $E(r_k)$ and σ_k^2 be the expected return and variance of the subjective distribution of returns attributed by investor k to his portfolio of risky assets. With the replacement of r_m by r_k in the development leading to equation (1), it follows that

$$(4) \quad (1-t_k)\ \alpha_k\ (C_k) = E(r_k - r_f)/\sigma_k^2$$

To develop an aggregate equilibrium relationship, define γ_k as the proportion of total wealth attributable to investor k. By rearranging (4), multiplying by γ_k and aggregating over k, the following is obtained

$$(5) \quad \Sigma\gamma_k\alpha_k\sigma_k = \Sigma\gamma_k \quad E(r_k-r_f)/\sigma_k \quad (1-t_k)^{-1}(C_k)^{-1}$$

If the quantities $\sigma_k, (C_k)^{-1}$, and $E(r_k-r_f)/\sigma_k$ are independent of γ_k[8] and have expected values of σ_c, $(C)^{-1}$, and P_c, (5) can be rewritten after taking expected values as

$$(6) \quad (1-t)\ \alpha C = \frac{1}{\sigma_c} \cdot P_c$$

where (1-t) is a weighted harmonic mean of $(1-t_k)$.

Intuitively, the assumptions required in deriving (6) mean that in each wealth class there are an equal range of heterogeneous expectations, an equal range of variances of returns, and an equal range of coefficients of relative risk aversion. The independence of σ_k, $(C_k)^{-1}$, and $E(r_k-r_f)/\sigma_k$ from γ_k implies that σ_c, $(C)^{-1}$, and P_c can be interpreted as either wealth weighted or unweighted expected values. If all investors have the same expectations, σ_c will be σ_m and P_c will be $E(r_m-r_f)/\sigma_m$. In this case, (6) reduces to our previously derived function.

If individuals have heterogeneous expectations and do not hold the market portfolio

of risky assets in conjunction with risk-free assets, P_c will be greater than $E(r_m-r_f)/\sigma_m$, the average expectation for the market portfolio. This statement holds even if every investor agree on the value of $E(r_m-r_f)/\sigma_m$. As one implication, if investors on average view their portfolios as no more risky than the market, heterogeneous expectations imply for the same physical stock of total wealth, ceteris paribus, that risky assets will be priced so as to represent a greater proportion of the value of total wealth than under homogeneous expectations. Thus, an aggregate demand function for risky assets under heterogeneous expectations can be developed although it would be difficult, if not impossible, without additional structure to estimate $E(r_c-r_f)/\sigma_c$ and σ_c.

If many investors, perhaps in addition to heterogeneous expectations, do not properly assess the risks of the portfolios they hold, the model upon which we based our conclusion of constant proportional risk aversion may yield a poor description of investors' behavior. In this case, our conclusion about the form of investors' utility function and by inference the aggregate demand function for risky assets is suspect. Yet in assessing the validity of our findings, it should be recalled that households holding the most diversified portfolios of stocks display evidence of constant proportional risk aversion, and it is precisely these households for which the underlying model is most likely to hold.

FOOTNOTES

*The authors are respectively Professor of Finance and Richard K. Mellon Professor of Finance and Economics at the Wharton School, University of Pennsylvania. We wish to acknowledge the financial support of the Rodney L. White Center for Financial Research.

[1]Detailed descriptions of the sampling design and the procedures used in estimating specific statistics and in preserving the confidentiality of the individual forms are contained in [1].

[2]Adjusted gross income is defined by the tax law and is only an imperfect measure of what an economist might mean by earnings.

[3]The simple correlation coefficients between the log of net worth and AD1, AD2, AD3, and AD4 are -0.22, -0.37, 0.11 and -0.18 respectively.

[4]This analysis is confined to families owning stock. The relationships between asset diversification and household characteristics for such families are fairly close to those presented for all households.

[5]It should be noted that formally a number of other factors associated with a low degree of diversification--such as "locked-in" capital gains--can be treated as special cases of heterogeneous expectations.

[6]Pratt's coefficient of relative risk aversion is the same as the wealth elasticity of the marginal utility of wealth. Friend and Blume [2] estimated $E(r_m-r_f)/\sigma_m^2$ from historical data and found it to be in the neighborhood of 2.0.

[7]In [2] this regression is developed under slightly less restrictive assumptions about the distributions of η_{ck} and η_{nk}.

[8]The assumption that σ_k is independent of γ_k may be questioned and tests of this assumption are now under way. Strictly speaking, the development of (C) also requires the independence of σ_k and α_k. Even if not correct, the covariance between σ_k and α_k would be expected to be small though again this is subject to empirical verification.

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TABLE 2

DISTRIBUTION OF 13 DIVERSIFICATION MEASURES FOR ALL HOUSEHOLDS OWNING STOCK AS ESTIMATED FROM 1962 SURVEY OF CONSUMER FINANCES

Description of Diversification Measure[1]	Number of Households	Fractiles[2] 0.05	0.20	0.50	0.80	0.95	Average
SD 1: Number of NYSE Stocks Held	641	0	0	1	2	7	1.72
SD 2: Number of Holdings	641	1	1	2	4	11	3.41
SD 3: Value of Largest NYSE Holding to All NYSE Holdings	447	0.29	0.54	0.98	1.00	1.00	0.79
SD 4: Value of Largest Holdings to All Holdings	641	0.28	0.50	0.90	1.00	1.00	0.77
SD 5: Value of Largest Holding (Exc. Mutual Funds) to All Holdings	641	0.00	0.24	0.63	1.00	1.00	0.62
SD 6: Value of Largest 2 NYSE Holdings to All NYSE Holdings[3]	447	0.44	0.83	1.00	1.00	1.00	0.91
SD 7: Value of Largest 2 Holdings to All Holdings	641	0.46	0.76	1.00	1.00	1.00	0.89
SD 8: Value of Largest 2 Holdings (Exc. Mutual Funds) to All Holdings	641	0.00	0.36	0.97	1.00	1.00	0.72
SD 9: Value of Largest NYSE Holding to All Holdings	641	0.00	0.00	0.20	0.91	1.00	0.36
SD 10: Value of 2 Largest NYSE Holdings to All Holdings	641	0.00	0.00	0.30	1.00	1.00	0.41
SD 11: Summation of Squared Portfolio Weights (NYSE Only)[3,4]	447	0.16	0.45	0.97	1.00	1.00	0.74
SD 12: Summation of Squared Portfolio Weights (All Holdings)	641	0.16	0.37	0.82	1.00	1.00	0.71
SD 13: Summation of Squared Portfolio Weights (All Holdings Exc. Mutual Funds)[4]	586	0.17	0.40	0.86	1.00	1.00	0.72

[1] Stocks held in trust are not included.

[2] The fractiles and averages take into account the sampling probability associated with each household and thus are estimates of the population statistics.

[3] Only households with NYSE holdings are included.

[4] The proportions in each NYSE holding or in each non-mutual fund holding were rescaled so that their sum was 1.0 before the sum of squares was calculated.

TABLE 3

DISTRIBUTION OF RATIOS FOR ALL HOUSEHOLDS OF SELECTED ASSETS TO NET WORTH BY NET WORTH CLASS AS ESTIMATED FROM 1962 SFCC[1]

Net Worth Level (dollars)	Inclusive of Human Wealth and Home	Number of Observations	Risky & Mixed Risk[2] Fractiles .20	.50	.80	Average	Stock Assets Fractiles .20	.50	.80	Average	Equity in Housing Fractiles .20	.50	.80	Average	Human Wealth Fractiles .20	.50	.80	Average
1,000 Under 10,000	Yes	114	0.74	0.98	1.01	0.89	0.0	0.0	0.0	0.00	0.0	0.31	0.88	0.42	0.0	0.04	0.87	0.33
10,000 Under 100,000	Yes	819	0.90	1.00	1.06	0.98	0.0	0.0	0.0	0.02	0.0	0.03	0.24	0.14	0.06	0.86	0.99	0.66
100,000 Under 200,000	Yes	485	0.98	1.01	1.07	1.01	0.0	0.0	0.00	0.02	0.0	0.04	0.10	0.06	0.79	0.93	0.98	0.85
200,000 Under 500,000	Yes	200	0.93	1.0	1.06	0.99	0.0	0.00	0.07	0.08	0.02	0.05	0.10	0.07	0.21	0.82	0.92	0.65
500,000 Under 1 Million	Yes	90	0.90	0.98	1.02	0.97	0.0	0.05	0.34	0.17	0.03	0.06	0.09	0.07	0.06	0.34	0.62	0.35
1 Million and Over	Yes	135	0.94	0.98	1.02	1.00	0.02	0.12	0.48	0.25	0.02	0.03	0.06	0.04	0.00	0.11	0.26	0.15
All[1]	Yes	1843	0.92	1.00	1.06	0.98	0.0	0.0	0.0	0.02	0.02	0.04	0.22	0.15	0.08	0.87	0.99	0.67
1,000 Under 10,000	No	523	0.0	0.0	0.63	0.31	0.0	0.0	0.0	0.05								
10,000 Under 100,000	No	477	0.24	0.76	0.97	0.66	0.0	0.0	0.18	0.11								
100,000 Under 200,000	No	68	0.75	0.90	1.00	0.88	0.0	0.08	0.70	0.27								
200,000 Under 500,000	No	100	0.83	0.96	0.99	0.94	0.0	0.11	0.83	0.36								
500,000 Under 1 Million	No	69	0.85	0.96	1.04	0.94	0.02	0.16	0.54	0.28								
1 Million and Over	No	103	0.92	0.98	1.00	1.00	0.02	0.13	0.73	0.32								
All	No	1340	0.0	0.33	0.92	0.47	0.0	0.0	0.06	0.08								

[1]The number 0.00 implies that the observed value is less than 0.005, while 0.0 implies a true zero.

[2]Excluding homes and human wealth, risky and mixed assets for the narrow definition of net worth cover all assets including those held in trust accounts other than the four categories of "risk-free" assets: cash balances; savings bonds; cash surrender value of life insurance; and a miscellaneous group of "risk-free" assets consisting of U.S. Treasury bills, notes and certificates, the withdrawal value of profit sharing and retirement plans, and credit balances in brokerage accounts. For the broad definition of net worth, risky and mixed assets include the equity value of housing and human wealth.

TABLE 5

REGRESSIONS OF STOCK TO NET WORTH RATIOS AND PORTFOLIO BETAS ON HOUSEHOLD CHARACTERISTICS AS ESTIMATED FROM THE 1962 SCFF

Independent Variables			Dependent Variables			
			Stock/Net Worth		Beta for Stock Portfolio[4]	
Characteristic	Mean[1]	Standard Deviation[1]	Coefficient	t-value	Coefficient	t-value
Constant			0.039	0.41	0.683	4.44
E(Stock/Net Worth)[2]	0.179	---	---	---	-0.050	-0.35
Human Wealth/Net Worth	0.397	0.362	-0.425	-13.70	---	---
Ln(Net Worth)	12.540	1.362	0.029	4.61	0.029	2.26
Housing Equity/Net Worth	0.106	0.126	-0.320	-4.92	---	---
Female Head[3]	0.086	---	0.053	1.68	-0.068	-1.20
2 Dependents[3]	0.329	---	0.039	1.27	0.038	0.72
3 Dependents[3]	0.161	---	0.005	0.14	0.035	0.57
4 or more Dependents[3]	0.420	---	0.019	0.57	0.058	0.97
Age 56-65[3]	0.248	---	0.002	0.13	-0.001	-0.03
Age > 65[3]	0.161	---	0.029	1.05	-0.047	-0.90
Self-Employed[3]	0.346	---	-0.171	-9.20	-0.016	-0.56
Retired[3]	0.073	---	0.079	2.38	-0.020	-0.32
Not Gainfully Employed[3]	0.036	---	0.035	0.86	0.015	0.21
Employer Unknown[3]	0.008	---	0.044	0.58	-0.137	-0.92
Farm Operator[3]	0.011	---	-0.347	-5.22	-0.107	-0.83
Turnover[5]	0.121	0.597			-0.049	-1.02
Squared Turnover[5]	0.371	3.889			0.008	1.25
Ancillary Statistics						
Dependent Variable Mean			0.179		1.057	
Standard Deviation			0.235		0.252	
$\bar{R}^2$			0.515		0.030	
N			641		416	

[1] The means and standard deviations are unweighted and based upon 641 households owning stock.

[2] Estimated from Stock/Net Worth regression.

[3] Dummy variables as defined in Table 4.

[4] The beta coefficient for a household is calculated as a weighted average of the available beta coefficients of NYSE stocks, where the weights are proportional to the value of these stocks in the household's portfolio on December 31, 1962. The beta coefficients themselves were estimated with monthly data over the period 1958-62 using the S&P Composite Index, providing there were at least 30 months of data.

[5] Turnover is defined as the minimum of purchases and sales divided by the value of the stock portfolio at the beginning of the year.

TABLE 8

ESTIMATED REGRESSIONS OF THE FORM

$$(1-h_k)\ (1-t_k)\ \alpha_k = \frac{E(r_m-r_f)}{\sigma_m^2}\ \frac{1}{C} - \beta_{hm} h_k\ (1-t_k) + \mu_k$$

FOR VARIOUS SUBSAMPLES OF 1962 SCFF[1]

Net Worth Class ($000)	Estimates of $\frac{E(r_m-r_f)}{\sigma_m^2}\ \frac{1}{C}$				Estimates of β_{hm}				Number of Observations	Range of $\bar{R}^2$
	All Households	All Stockholders	Most Diversified Stockholders	Most Diversified Stockholders Adjusted for Beta	All Households	All Stockholders	Most Diversified Stockholders	Most Diversified Stockholders Adjusted for Beta		
10-100	0.793 (0.014)	0.717 (0.025)	0.721 (0.046)	0.678 (0.080)	0.835 (0.020)	0.803 (0.056)	0.861 (0.109)	0.814 (0.159)	32-819	0.45-0.68
100-200	0.634 (0.011)	0.600 (0.016)	0.538 (0.028)	0.583 (0.037)	0.672 (0.015)	0.616 (0.027)	0.543 (0.051)	0.600 (0.067)	46-485	0.63-0.80
200-500	0.623 (0.017)	0.623 (0.021)	0.657 (0.031)	0.662 (0.044)	0.705 (0.032)	0.721 (0.044)	0.784 (0.072)	0.748 (0.103)	50-200	0.51-0.71
500-1000	0.530 (0.020)	0.529 (0.020)	0.506 (0.034)	0.530 (0.038)	0.582 (0.073)	0.585 (0.070)	0.518 (0.128)	0.546 (0.144)	31-90	0.31-0.46
Over 1000	0.500 (0.022)	0.500 (0.023)	0.507 (0.025)	0.560 (0.038)	0.582 (0.147)	0.574 (0.155)	0.615 (0.160)	0.626 (0.267)	49-135	0.09-0.21

[1] The numbers in parentheses are the standard errors of the coefficients.

TABLE 8

ESTIMATED REGRESSIONS OF THE FORM

$$(1-h_k)\ (1-t_k)\ \alpha_k = \frac{E(r_m-r_f)}{\sigma_m^2}\ \frac{1}{C} - \beta_{hm} h_k\ (1-t_k) + \mu_k$$

FOR VARIOUS SUBSAMPLES OF 1962 SCFF[1]

Net Worth Class ($000)	Estimates of $\frac{E(r_m-r_f)}{\sigma_m^2}\ \frac{1}{C}$				Estimates of β_{hm}				Range of	
	All Households	All Stockholders	Most Diversified Stockholders	Most Diversified Stockholders Adjusted for Beta	All Households	All Stockholders	Most Diversified Stockholders	Most Diversified Stockholders Adjusted for Beta	Number of Observations	$\bar{R}^2$
10-100	0.793 (0.014)	0.717 (0.025)	0.721 (0.046)	0.678 (0.080)	0.835 (0.020)	0.803 (0.056)	0.861 (0.109)	0.814 (0.159)	32-819	0.45-0.68
100-200	0.634 (0.011)	0.600 (0.016)	0.538 (0.028)	0.583 (0.037)	0.672 (0.015)	0.616 (0.027)	0.543 (0.051)	0.600 (0.067)	46-485	0.63-0.80
200-500	0.623 (0.017)	0.623 (0.021)	0.657 (0.031)	0.662 (0.044)	0.705 (0.032)	0.721 (0.044)	0.784 (0.072)	0.748 (0.103)	50-200	0.51-0.71
500-1000	0.530 (0.020)	0.529 (0.020)	0.506 (0.034)	0.530 (0.038)	0.582 (0.073)	0.585 (0.070)	0.518 (0.128)	0.546 (0.144)	31-90	0.31-0.46
Over 1000	0.500 (0.022)	0.500 (0.023)	0.507 (0.025)	0.560 (0.038)	0.582 (0.147)	0.574 (0.155)	0.615 (0.160)	0.626 (0.267)	49-135	0.09-0.21

[1] The numbers in parentheses are the standard errors of the coefficients.