ASSET MANAGEMENT, HUMAN CAPITAL,
AND THE MARKET FOR RISKY ASSETS

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ABSTRACT

The dominant approach to financial markets views them to be informationally efficient. Less work has been done on how they get to reveal information. The answer we give stresses information acquisition at the micro level and the role of human capital in accommodating asset, or risk, management. Following the noisy rational-expectations-equilibrium approach, we derive equilibrium prices under costly information, but base the analysis on more complete micro foundations. We focus on the role of human capital endowments, indicators of "management" experience, and opportunity cost of time in explaining optimal asset management and risky-asset demand at the micro level, as well as the impact of these factors on the level and volatility of risky-asset prices. We implement our propositions using numerical simulations as well as regression analyses of individual data concerning portfolio choices and time allocation. We find that the rate of return to human capital in generating non-wage income is non-trivial.

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INTRODUCTION

The standard assumption that equilibrium prices of financial assets reveal all the relevant information about the profitability of these assets raises a puzzle at the micro level: It leaves no incentive for individuals to collect any private information (see, e.g., Grossman and Stiglitz, 1980). But how, then, do prices become "fully revealing"? Indeed, as recent stock market scandals indicate, information gleaned from security prices can often be inaccurate, if not misleading. To resolve this puzzle, it seems necessary to augment the equilibrium theory of efficient markets by complementary micro foundations, which is what we do in this paper.

The idea is that individuals' demand for risky assets, and hence their overall portfolio returns, are partly influenced by effort and ability to gather and assess information about the likely realizations of future returns on these assets. In the context of centrally traded homogeneous assets, the hypothesis is that the public information revealed by market prices is incomplete or imperfect, leaving room for some "asset management" by individuals.[1]

The hypothesis is a natural extension of the "costly information" literature. Notable contributions include Darby (1976), Grossman and Stiglitz (1980), Hellwig (1980), Verrecchia (1982), Admati and Ross (1985), and Kim and Verrecchia (1991a, b). These studies allow for noisy prices which justify private information acquisition, but take information to be vested with a single group of investors, or allow for its acquisition by all investors at an abstract cost of unspecified origin. In this paper, we specify the underlying information cost and link objective determinants of individual heterogeneity and asset management with equilibrium outcomes.

As in earlier costly information papers, the market for risky assets in this paper retains its efficiency under a competitive equilibrium. But since the information gleaned from prices is incomplete, and prices are subject to exogenous "supply" shocks that convey little or no information, an incentive remains to collect private information. The incentive is a reduction in

conditional risk bearing. Investors who are more productive at asset management, or for whom it is less costly to undertake it, wind up bearing relatively lower "subjective" risk. They thus tend to hold objectively riskier portfolios and obtain commensurate expected portfolio returns.

We offer new insights about the sources of diversity in individual portfolio compositions and the level and volatility of market prices. We expect education or experience in managing assets to enhance asset management productivity and the demand for risky (manageable) assets. We expect labor market experience and favorable employment conditions, in contrast, to raise wages, which lowers risky-asset demand. At the market level we expect human capital to raise the relative valuation of risky assets and lower the equilibrium "risk premium", but the volatility of risky assets' prices may rise or fall as a result, depending upon the relative magnitudes of information precision and assets' supply and return variances.

The rationale for individual asset management applies even when potential economies in information collection generate specialized agents, or "analysts", who offer their services for sale to less specialized investors. This is because analysts are themselves heterogeneous, producing information signals of varying quality. As learning about the reliability and precision of analysts is time consuming, it becomes part of individual asset, or risk, management. Furthermore, successful asset managers have an incentive to internalize potential externalities from information sharing by selling equity in their enterprises, rather than the information itself (cf. Leland and Pyle, 1977). Investors then need to assess the information value of such equities.

In section I we introduce the basic model. Our formulation extends Hellwig (1980), Verrecchia (1982), and Kim and Verrecchia (1991 a,b). In section II we present the optimization and equilibrium analyses concerning portfolio choices and asset management. In sections III and IV we derive behavioral propositions and simulate the model at the individual and market levels, and in section V we test some propositions using individual data. The results support our model.

I. THE ECONOMY, OPPORTUNITIES, AND PREFERENCES

We consider a competitive exchange economy with a continuum of heterogeneous investors-traders (i = 1,….n) who differ just in their endowments of human capital, H_i, market wages, w_i, and initial wealth endowments, W_{0i}. There are two assets in the economy: a risky asset and a safe bond, and two sources of uncertainty in the assets market: the uncertain return on the risky asset, and the endowed aggregate (and individual) supply of the asset, each of which is subject to random fluctuations. The risky asset can also be thought of as a portfolio of financial assets that are traded in a centralized market. The existence of random supply fluctuations or "noise" implies that the equilibrium price of the risky asset is not fully revealing of the aggregate information available to all investors, which leaves investors an incentive to devote resources to acquire private information. Specifically, investors are assumed to be operating in two sectors − a market sector, where they obtain labor-market earnings, and a household sector, where they can choose to "manage" their risky assets by seeking information signals to better forecast future returns on these assets, over two periods of time. In the first, they make all resource allocations decisions, including portfolio choices, and in the second, market realizations of portfolio returns dictate the outcomes of these choices.

The varying human capital, or educational attainments H_i across investors are elements of the compact set $[\underline{H}, \overline{H}]$ and their distribution is characterized by the density function $f : [\underline{H}, \overline{H}] \rightarrow \mathbf{R}_+$ such that for all $H_i \in [\underline{H}, \overline{H}]$, $f(H_i) \geq 0$ and $\int_{\underline{H}}^{\overline{H}} f(H_i) dH_i = 1$. The assumed distinct attribute of human capital in our model is that it enhances the productivity of working time devoted to information collection, or "asset management", as well as to earning generation.

Each trader in the economy possesses an endowment of a normally distributed supply of the risky asset,

(1) $\tilde{x}_i \sim \mathrm{N}(\bar{x}, t^{-1})$,

with mean $\bar{x}$ and inverse variance t, known to all investors. The realized return on the risky asset in the second period is also normally distributed and independent of $\tilde{x}_i$,

(2) $\tilde{\mu} \sim \mathrm{N}(\bar{\mu}, h^{-1})$,

with mean $\bar{\mu}$ and inverse variance h, known to all investors. While the realized return (price plus dividend) is not observable at the time of purchase, investors can devote asset management time to identify a private information signal ($\tilde{z}_i$), which will help forecast it:

(3) $\tilde{z}_i = \tilde{\mu} + \tilde{\varepsilon}_i$,

where $\tilde{\varepsilon}_i \sim \mathrm{N}(0, s_i^{-1})$ denotes a normally distributed random prediction error with mean 0 and inverse variance or "precision", s_i, which is independent of both $\tilde{\mu}$ and $\tilde{x}_i$.

Initial wealth, W_{0i}, consists of the risky asset valued at the stochastic first-period market price $\tilde{P}$, a riskless bond, B_{0i}, and a safe level of wage income, $w_i(T-q_i)$, which vary across investors. Total productive time, T, can be used as an input into asset management, q_i, or earning generation $(T-q_i)$ at a non-stochastic wage rate, w_i. For simplicity, we abstract from leisure.[2] The return on, and initial price of, bonds are normalized as 1. Bonds can thus be viewed as either savings or a numeraire. The investor chooses implicitly between risky assets and bonds, as well as between asset management and labor market activity. The budget constraint is:

$$\tilde{P}\tilde{D}_i + \tilde{B}_{1i} = \tilde{P}\tilde{x}_i + B_{0i} + w_i(T - q_i) - C_0$$

where $\tilde{D}_i$ denotes investor i's demand for risky assets, and $[w_i(T-q_i) - C_0]$ denotes his labor market earnings net of the fixed cost of asset management (see equation 8 below). Since this is a two-period model, we assume that all realized wealth is consumed in the second period. The consumption level is given by the realized wealth in that period: $\tilde{W}_{1i} = \tilde{\mu}\tilde{D}_i + \tilde{B}_{1i}$, which can be re-written:

(4) $\widetilde{W}_{1i} = B_{0i} + \widetilde{P}(\widetilde{x}_i - \widetilde{D}_i) + \widetilde{\mu}\widetilde{D}_i + w_i(T - q_i) - C_0$.

The optimal bond holdings is thus given implicitly by $\widetilde{B}_{1_i} = B_{0i} + \widetilde{P}(\widetilde{x}_i - \widetilde{D}_i) + w_i(T - q_i) - C_0$,

where $\widetilde{B}_{1_i}$ is a stochastic variable, since the net addition to the risky asset stock is stochastic.

Consistent with human capital theory, we specify the wage rate, w_i, as an exponential function of an investor's attained level of education, H_i, and a vector of idiosyncratic factors, $\delta=(\delta_1, \delta_2)$ such as individual health status or specific labor market conditions:

(5) $w_i = w_i(H_i, \delta) = w_0(\delta_1) \exp\{\eta(\delta_2) [H_i - H(0)]\}$,

where H(0) is a minimal level of knowledge and η is the labor-income rate of return on H_i.

We think of asset management as a quest for information signals that can improve one's forecast of the risky asset's future returns. The idea is that while all investors know the probability distribution of $\widetilde{\mu}$, private information can help forecast its realization with greater **precision, s_i** thus reducing its conditional risk. The signal could vary from a publicly available data composite, a sharp financial analyst, or "inside information" about corporate performance. By "inside information", however, we do not mean information available to technical insiders who are legally proscribed from disseminating it. We take private information acquisition to result, more generally, from tracking relevant information sources, including reliable analysts. Educational attainments, H_i, as well as specific skill, ability, and experience in managing assets (subsumed under $A(\tau)$ below) augment the productivity of all inputs devoted to such activities.

The information-precision production function is specified as a Cobb-Douglas function:

(6) $s_i = F(q_i, H_i) = A(\tau) q_i^{\alpha} H_i^{\beta}$, where $A > 0$, $0 < \alpha, \beta \leq 1$,

and τ is a vector comprising all exogenous factors affecting asset management's productivity at both the market and individual levels. The conditional asset management time input becomes:

$$(7)\ \ q_i = s_i^{1/\alpha} A(\tau)^{-(1/\alpha)} H_i^{-(\beta/\alpha)}.$$

Using equations (5) and (7), the total cost of asset management is thus given by

$$(8)\ \ C(s_i) = w_i q_i + C_0 = w_i(H_i, \delta)\,[s_i^{1/\alpha} A(\tau)^{-(1/\alpha)} H_i^{-(\beta/\alpha)}] + C_0\ ,$$

where C_0 includes possible fixed cost or fees associated with asset management.

With this opportunity set, the investor determines both optimal asset management and risky-asset demand by maximizing the expected utility of final period consumption or wealth, $\widetilde{W}_{1i}$ in (4). In line with earlier literature, utility is assumed to be an exponential function of wealth,

$$(9)\ U(W_{1i}) = -\exp(-W_{1i}/r)\,,$$

where W_{1i} is the realization of $\widetilde{W}_{1i}$, and r denotes risk tolerance, or the inverse value of one's absolute risk aversion. To keep the analysis focused on the main theme of the paper, we assume, unlike preceding literature, that risk tolerance r does not vary across investors. We do so in order to derive differences in personal risk-taking behavior based on **objective** personal indicators of human capital and labor market returns, rather than subjective preferences. Our analysis can be generalized, however, to allow for heterogeneity in both human capital and risk preferences.

II. ASSET DEMAND AND MANAGEMENT UNDER RATIONAL EXPECTATIONS

In the context of the basic framework, which we borrow from Hellwig (1980) and KV (1991a), investors' behavior can be described **heuristically** as a two-step choice process. In the second step, the investor chooses the demand for the risky asset, D_i^*, conditional on optimal asset management intensity q_i and the information precision it yields, s_i, as well as the observed market price, P. Investors are assumed to form rational expectations about the stochastic properties of $\widetilde{P}$ as a market-clearing price. In the first step the investor determines optimal asset management, q_i^*, taking into account the second-step solutions for the risky-asset demand. These choices are shown to be consistent with a fixed-point, rational-expectations equilibrium.

A. Conditional Individual Demand and the Equilibrium Price for the Risky Asset

In step 2 of the optimization process, the investor makes use of the realizations of the public signal P and the (optimally chosen) private signal z_i to derive the posterior probability distribution of future returns and the conditional expected utility function. The investor then determines the conditional demand for the risky asset by maximizing this function:

(10) $\underset{D_i}{Maximize}\, E[U(\tilde{W}_{1i} | z_i, P)]$.

To solve equation (10) investors must know the joint probability distribution of the stochastic variables $(\tilde{\mu}, \tilde{z}_i, \tilde{P})$. By equations (1)-(3), the return, private signal, and the supply of risky asset are normally distributed. A simplifying assumption is that investors **conjecture** that the competitive market-clearing price, $\tilde{P}$, in a rational-expectations equilibrium (REE) is linearly related to the publicly shared information about future returns, $\tilde{\mu}$, their acquired private information signals, $\tilde{z}_i$ (or $\tilde{\varepsilon}_i$), and the supply shocks, $\tilde{x}_i$. In this case, the triplet $(\tilde{\mu}, \tilde{z}_i, \tilde{P})$ would be normally distributed as well. The conjecture can be further simplified to show that the REE competitive price would converge in probability to[3]:

(11) $\tilde{P} = \theta + \lambda\tilde{\mu} - v\tilde{x}$,

where $\tilde{x} \equiv (1/n)\sum_{i=1}^{n} \tilde{x}_i$. The conjecture implies that trader i's posterior probability distribution of the return, conditional on the **observed** market price (P) and a private signal (z_i), is also normally distributed, with mean $\mu_i = E(\tilde{\mu} \mid z_i, P) = [\, h\bar{\mu} + s_i z_i + t(\lambda/v)^2 (1/\lambda)(P - \theta + v\bar{x})]/[h + s_i + (\lambda/v)^2 t]$ and variance $V_i \equiv Var(\tilde{\mu} \mid z_i, P) = 1/[h + s_i + (\lambda/v)^2 t]$. The conditional demand for the risky asset by investor i can then be derived as follows:

(12) $D_i(z_i, P) = r\dfrac{\mu_i - P}{V_i} = r\{h\bar{\mu} + s_i z_i + [t(\lambda/v)^2][(1/\lambda)(P - \theta + v\bar{x})] - [h + s_i + t(\lambda/v)^2]P\}$.

The private demand for the risky asset at any point is thus responsive to the investor's private information embedded in V_i, and the public information embedded in the market price, $\widetilde{P}$.

The assumption underlying the REE analysis is that the conjectured asset prices are consistent in probability with the market-clearing prices. Indeed, we verify by application of the fixed-point theorem that a REE exists. This requires that the conjectured coefficients θ, λ, and ν, in equation (11) satisfy the market-equilibrium conditions:

$$\sum_{i=1}^{n} \widetilde{D}_i\left(\widetilde{z}_i, \widetilde{P}\right) = \sum_{i=1}^{n} \widetilde{x}_i = n\widetilde{x}\ .$$

We can show that this is indeed the case. The parameter (λ/ν) in equation (12) becomes (rs).[4] The market clearing price and the individual's risky-asset demand thus become stochastic variables:

(13) $\widetilde{P} = \{h\overline{\mu} + rst\overline{x} + (s + r^2s^2t)\widetilde{\mu} - [(1/r) + rst]\widetilde{x}\} / \{h + s_i + r^2s^2t\}$,

(14) $\widetilde{D}_i = r\,[h\overline{\mu} + rst\overline{x} + s_i\widetilde{z}_i + r^2s^2t\widetilde{\mu} - rst\widetilde{x} - \widetilde{P}(h + s_i + r^2s^2t)]$,

where: $s = \int_{\underline{H}}^{\overline{H}} s_i f(H_i)\,dH_i$ is the weighted average of information precision acquired by investors.[5]

Note that by equation (12) or (14) the investor's private information precision s_i can either **increase** or **lower** quantity demanded of the risky asset at any given point in time depending on $s_i(\widetilde{z}_i - \widetilde{P})$, i.e., whether the realized private signal exceeds or falls short of the realized price. The role of "asset management" thus becomes essentially that of "risk management". The **expected** demand level, however, will later be shown to be unambiguously rising with s_i.

B. Individual Derived Demand for Asset Management

Having thus determined the demand for the risky asset, $\widetilde{D}_i$, conditional on exogenously given values of asset management time, q_i, the investor can solve for the latter by maximizing the expected utility of terminal wealth, $\widetilde{W}_{1i}$ conditional on $\widetilde{D}_i$, $E[U(\widetilde{W}_{1i} | \widetilde{D}_i(\cdot))]$, with respect to

q_i. Since by equation (6) information precision is a monotonically increasing function of asset management, $s_i = s_i(q_i)$, we proceed for convenience to maximize $E[U(\widetilde{W}_{1i} | \widetilde{D}_i(\cdot))]$ with respect to the indirect choice of $s_i(q_i)$, (as in Verrecchia (1982), and Kim and Verrecchia (1991a)), and then extricate the optimal solution for q_i. We first write the terminal consumption level $\widetilde{W}_{1i}$ in equation (4) as $\widetilde{W}_{1i} = W_{0i} + \widetilde{P}\widetilde{x}_i + \widetilde{D}_i(\widetilde{\mu} - \widetilde{P}) - C(s_i)$, where $W_{0i} \equiv B_{0i} + w_i T$. The expected utility to be maximized can then be derived from equation (10), using the properties of the log-normally distributed mean return: $\widetilde{\mu}$

$$(15)\ \underset{s_i(q_i)}{Max}\ E\{-\exp[-(1/r)(W_{0i} - C(s_i) - \widetilde{P}\widetilde{x}_i) - (1/2)((\mu_i - \widetilde{P})^2 / V_i))] \mid \widetilde{z}_i, P\}.$$

Using the bivariate normal distribution of $\widetilde{z}_i$ and P to define the expected utility operator and inserting the value of $C(s_i)$ from equation (8), the first-order optimality condition for an **interior** solution for information precision is found to be:

$$(16)\ C'(s_i) = (1/\alpha)\, w_i(H_i,\delta)\, s_i^{(1-\alpha)/\alpha} A(\tau)^{-1/\alpha} H_i^{-\beta/\alpha} = .5r\,(h + s_i + r^2 s^2 t)^{-1}.$$

In equation (16), $C_i'(s_i)$ denotes investor i's marginal cost of generating private information. The corresponding marginal revenue is inversely related to the variance of investor i's posterior distribution of the risky return, V_i (see equation 12 and footnote 4).[6] Rearranging terms, we obtain an implicit, non-linear solution for optimal information precision as follows:

$$(17)\ s_i^{(1-\alpha)/\alpha}(h + r^2 s^2 t) + s_i^{1/\alpha} - .5rA(\tau)^{1/\alpha}\ H_i^{\beta/\alpha}\ \alpha\ w_i(H_i,\delta)^{-1} = 0.$$

By equation (17) an interior solution for s_i exists if $0 < \alpha < 1$. If $\alpha = .5$, e.g., (17) becomes quadratic in s_i, with positive solutions for private information and asset management:

$$(18)\quad s_i^* = .5\{[(h + r^2 s^2 t)^2 + (rA(\tau)^2 H_i^{2\beta} w_i(H_i,\delta)^{-1})]^{.5} - (h + r^2 s^2 t)\} > 0, \text{ and}$$

$$(19)\quad q_i^* = .25\{[(h + r^2 s^2 t)^2 + (rA(\tau_i)^2 H_i^{2\beta} w_i(H_i,\delta)^{-1})]^{.5} - (h + r^2 s^2 t)\}^2 A(\tau)^{-2} H_i^{-2\beta} > 0.$$

Alternatively, if we let $\alpha = 1$, the cost function in equation (8) becomes linear. Here, if a positive solution for optimal asset management time exists, it is given by

(20) $q_i = .5rw_i^{-1} - (h + r^2s^2t)A(\tau)^{-1}H_i^{-\beta}$,

Note that our solutions for private information precision and asset management are deterministic, since the production and earnings functions in equations (5) and (6) are non-stochastic.

III. BEHAVIORAL IMPLICATIONS AT THE MICRO LEVEL

Equations (19) and (20) show asset management intensity to be a function of varying personal characteristics and market supply and demand noises, (H_i, δ, A(τ), 1/t, 1/h). Expected portfolio holdings will thus also vary systematically across investors. To show this, we insert equation (13) into (14) to derive **expected** individual demand and market price:

(21) $E(\tilde{D}_i) = r\,[(s_i - s)(\bar{\mu} - E(\tilde{P})) + (1/r)\bar{x}]$, where

(22) $E(\tilde{P}) = \bar{\mu} - [(1/r)\bar{x} \;/\; (h + s + r^2s^2t)]$.

Alternatively, by inserting equation (22) into (21) the latter can be rewritten:

(21a) $E(\tilde{D}_i) = \bar{x}\,[(h + s_i + r^2s^2t)/\,(h + s + r^2s^2t)] > 0$,

which indicates that expected demand for the risky asset is positive for all investors. The square-bracketed term represents the ratio of the variance of the posterior distribution of the stochastic return of the average-informed investor $[1/\,(h + s + r^2s^2t)]$ to that of investor i, $[1/(h + s_i + r^2s^2t)]$. Expected demand as a fraction of the average supply of the risky asset per investor, $\bar{x}$, is thus seen to be positive and monotonically increasing with private information precision, s_i.

By equation (22), the expected future return or price, $\bar{\mu}$, is always greater than the expected purchase price of the asset in period 1, due to risk aversion. Equation (21) also implies that, abstracting from any systematic differences in risk tolerance, investors who are better informed relative to the average can be expected to have relatively greater demand for the risky asset. So while at any point in time, those with superior knowledge may use it to either buy or sell the risky asset, as equation (14) indicates, over many periods or independent groups of informed investors, risky asset demand would **average out** to be relatively larger for the better informed (s_i>s), as their **conditional** risk from holding risky assets, given private information, is lower.

A. Participation in Asset Management

If the elasticity of information production with respect to search time were unitary, or $\alpha = 1$, then equation (17) would allow for a corner solution whereby the marginal benefit from asset management would be below its marginal cost, and investor i would eschew asset management i.e., $q_i = s_i = 0$, even if there were no fixed costs in information collection. In this special case, equation (21a) implies that expected demand for the risky asset approaches a threshold level:

(23) $E(D_i)^0 \rightarrow \bar{x}\,[(h+ r^2s^2t)/(h+s+r^2s^2t)]$, as q_i and thus $s_i \rightarrow 0$,

so all investors with expected demand at or below $E(D_i)^0$ would then eschew asset management and rely just on the market price as information signal. A numerical simulation of this case, using equation (5) and the baseline parameters in Table 1, sets this fraction at 18% of all investors.

In the more general case, where $0 < \alpha < 1$, the marginal cost of asset management is increasing and convex from the origin, which implies that all investors allocate at least some positive time to asset management, absent any fixed entry costs. In this case, we can alternatively estimate the fraction of "minimally informed investors" (m) whose private information $s_i \leq$ s(min) is at least a full standard deviation below average s. Using our baseline parameters, this fraction is 19.79%. It varies from 18.78% to 20.07% when we change α from 0.34 to 0.58.

B. Comparative-static implications at the micro level

For interior solutions for asset management, we can derive analytically or via numerical simulations testable propositions about the impact of basic parameter shifts on the demand for information, s_i^*, the derived-demand for asset management, q_i*, the expected demand for risky assets, $E(\tilde{D}_i)$, and the rates of return to human capital in generating wage and financial income for individuals of different educational levels. Table 1 illustrates the results using a specified parameter set and an assumed truncated log-normal distribution of educational attainments H_i.[7]

a. Shifts in human capital endowments, (H_i):

We take educational attainments – our implicit proxy for human capital – to be of the "general" type, i.e., one that raises the productivity of time in both labor market and asset management. Since shifts in individual-specific parameters do not affect the market prices of our financial assets, or the average level of private information, the impact of shifts in H_i can be analyzed by differentiating equation (17) with respect to H_i, using equations (5) and (7). The results can be summarized as follows (see Appendix 1 for proofs):

(24a) sgn ds_i^*/dH_i = sgn $d[E(\widetilde{D}_i)^* / dH_i]$ = sgn $[(\beta/\alpha) - \varepsilon_{w_i,H_i}]$, where $\varepsilon_{w_i,H_i} > 0$ by equation (5);

(24b) sgn dq_i^*/dH_i = sgn $(\varepsilon_{s_i,H_i} - \beta)$, where $\varepsilon_{s_i,H_i} \equiv (ds_i^*/dH_i)(s_i^*/H_i)$;

(24c) sgn $(\partial s_i^* / \partial H_i)|_{w_i=const}$ = sgn $\partial[E(\widetilde{D}_i)^* / \partial H_i]|_{w=const_i} > 0$;

(24d) sgn $(\partial q_i^* / \partial H_i)|_{w_i=const}$ = sgn $(E_{s_i,H_i} - \beta)$, where $E_{s_i,H_i} \equiv [(\partial s_i / \partial H_i)(s_i / H_i)]|_{w_i=const} > 0$.

Proposition 1: An "unconditional" increase in endowed individual human capital, which allows wages to vary with H_i , increases private information precision, s_i^*, thus expected demand for the risky asset, $E(\widetilde{D}_i)^*$, if the elasticity of the wage rate with respect to human capital, ε_{w_i,H_i} , is lower than the ratio of the elasticity of information production with respect to human capital relative to asset management time (β/α). It would increase time allocation to asset management q_i^*, however, only if the uncompensated elasticity of information **demand** s_i^* with respect to H_i rose more than the elasticity of s_i^* with respect to H_i in **production,** or $\varepsilon_{s_i,H_i} > \beta$.

Proposition 2: A "conditional" increase in H_i, that left the wage rate $w_i(H_i, \delta)$ intact would unambiguously raise s_i^*, and $E(\widetilde{D}_i)^*$. A conditional increase in H_i thus generates a larger increase in s_i^* and $E(\widetilde{D}_i)^*$ than an unconditional one, but the derived demand for asset management time would again rise only if the **compensated** elasticity of s_i^* with respect to H_i in

demand is larger than that with respect to H_i in **production**, or $E_{s_i,H_i} > \beta$.

The ambiguity regarding the impact of an unconditional increase in individual educational endowment stems from its opposing effects on the marginal benefit from information precision and the opportunity cost of time in asset management. The latter effect is absent when the opportunity cost of asset management is held constant. Therefore, a conditional increase in H_i leads to an unambiguous increase in desired information precision and thus the demand for the risky asset, as the two are monotonically related by equation (21a). The impact on the derived-demand for asset management time, q_i*, however, could still be offset because a higher H_i also augments the productivity of any unit of time already spent managing assets. In our simulations, ε_{w_i,H_i} and E_{s_i,H_i} are found to be sufficiently low and high, respectively, to assure that $ds_i^*/dH_i > 0$, while dq_i^*/dH_i ultimately turns negative at higher levels of education.

b. Idiosyncratic shifts in the opportunity cost $w_i(\delta_i)$ and "technology" $A(\tau)_i$ of asset management:

The vector δ represents external labor market conditions for specific occupations or locations that affect individual wages and thus the opportunity cost of asset management time at any given level of educational attainments. Likewise, the vector τ represents various external or internal cost-saving "technologies" that augment the impact of both education and time in acquiring relevant information signals. These may include indicators of "specific human capital", like specific occupational training and experience bearing on financial-market related transactions, as opposed to "general human capital" like schooling, or external technological innovations in the services sector that affect the efficiency of information processing.

Although our equilibrium solutions in equations (13) and (14) assumed a uniform A(τ) and δ across investors, we can here allow for the possibility of idiosyncratic shifts in $w(\delta)_i$ and $A(\tau)_i$ which do not alter the average private information level, s. Differentiating equation (17) with respect to $A(\tau)_i$ or $w(\delta)_i$ and using equations (7) and (21), we prove in Appendix 1 that:

Proposition 3: A higher opportunity cost of time $w(\delta)_i$ will lower asset management and demand **for** risky assets. The converse holds for improved efficiency in information production, $A(\tau)_i$.

(25.a) $\text{sgn}\ (ds_i^*/dw_i) = \text{sgn}\ d[E(\tilde{D}_i)/dw_i] = \text{sgn}\ (dq_i^*/dw_i) < 0$, as long as $s_i^* > 0$.

(25.b) $\text{sgn}\ (ds_i^*/dA_i) = \text{sgn}\ d[E(\tilde{D}_i)/dA_i] = \text{sgn}\ (dq_i^*/dH_i) > 0$, as long as $s_i^* > 0$.[8]

d. "Initial Wealth" effects:

The exponential utility function exhibiting constant absolute risk aversion inherently precludes any "wealth effects" $(\tilde{W}_{1i})$ on the demand for risky assets. Also, the model does not recognize any borrowing constraints or bankruptcy, so initial wealth does not constrain $E(\tilde{D})_i^*$. However, the vector τ shifting the "technology variable" $A(\tau)_i$ can be interpreted as a distinct idiosyncratic "efficiency" factor, since larger portfolios, accumulated or inherited, signal more past experience in managing assets, and they may also lower the "fixed costs" of asset management.[9] By equation (25.b), a larger portfolio size would induce higher q_i* and s_i*, and hence, $E(\tilde{D}_i)^*$.

Proposition 4: Propositions 1-3 concerning the impact of specific parameter shifts on information and risky asset demand are expected to hold for the overall portfolio returns as well. The rationale is that added educational premiums on overall portfolio returns can come about in our model only through informed shifts in the composition of the overall portfolio of assets. Thus DEMAND and RETURN regression results should be qualitatively symmetrical, when estimated through the same regression specification.

e. Return to human capital in generating wage and non-wage income:

Proposition 4: Propositions 1-3 concerning the impact of specific parameter shifts on information and risky asset demand are expected to hold for the overall portfolio returns as well. The rationale is that added educational premiums on overall portfolio returns can come about in our model strictly as a result of shifts in portfolio composition from "bonds" to "stocks", i.e., from higher $E(\widetilde{D}_i)^*$ induced by information precision. Thus DEMAND and RETURN regression results should be qualitatively similar when estimated through the same regression specification.

A related important implication feature of our model is our ability to predict via numerical simulations the rate of return to human capital in generating added financial, as well as wage income at, say, the mean level of the distribution of human capital endowments. Numerical estimates of the impact of H_i on the log of earnings can be obtained by simulating equation (5), while estimates of the impact of an unconditional increase in H_i on the log of the expected **net** return on financial income can be obtained by simulating equation (4) and computing $d \ln\{E[\widetilde{D}_i(\widetilde{\mu} - \widetilde{P}) - C(s_i)]\} / dH_i$. Table 1 presents estimates of expected rates of return to human capital in generating financial as well as labor income.[10]

C. Human Capital as a Non-Tradable Asset

We treat human capital in our model as a store of predetermined knowledge which increases one's productivity of time, but it can also be conceived of as a non-tradable component of one's **total** portfolio of assets, incorporating both tradable and non-tradable assets. As such, it may have an independent effect on the composition of one's "financial" portfolio. Treating the wage flow generated by human capital as a stochastic return, Mayers (1974), e.g., demonstrated, however, that wage-flow risk would have no impact on optimal portfolio selection if the correlation between the wage rate and the return on the tradable portfolio were nil. A positive (negative) covariance between the stochastic elements of wage income and the return on risky assets, in contrast, would lower (raise) the demand for risky assets.

Although in our model wage income is treated as non-stochastic, we can relax this assumption using a simplified, Grossman-Stiglitz (1980)-type framework. In this case, we find that the demand for the risky asset becomes a function of two additive effects: the impact of information-signal precision generated by asset management, and the correlation between the stochastic wage flow and the risky-asset return. As in Mayers' (1974), the latter effect vanishes if there is no correlation between the stochastic components of wage income and our composite risky asset. This is more likely to be the case in the empirical implementation of our model, where we focus on salaried workers when testing our propositions at the individual level.

IV. MARKET-LEVEL IMPLICATIONS

A. Private information, Price level, and Price Volatility

Under our competitive equilibrium, small changes in individual parameters will not alter the average private information level, s, or the risky asset's expected market price, E[$\tilde{P}$]. But changes in investors' average parameter levels could affect both variables, as well as price volatility and the risk premium. From equation (13), the realizations of the risky asset's price can be rewritten as a linear function of "supply" and "return" shocks as follows:

$\tilde{P} = k_0 + k_1\tilde{\mu} - k_2\tilde{x}$, where

$k_0 = [1/(h + s + r^2 s^2 t)][h\bar{\mu} + rst\bar{x}]$; $k_1 = [(s+r^2s^2t)/(h+s+r^2s^2t)]$; and $k_2 = [(1/r)+rst]/(h+s+r^2s^2t)$.

By equation (22), the **expected** market price is given by

E[$\tilde{P}$] = $\bar{\mu}$ - [(1/r)$\bar{x}$ / (h + s + r^2s^2t)]. It follows that any change in average parameter level that affects exclusively average information precision (s) will increase the expected price level by virtue of enhanced demand (under fixed supply). The price **variance**, in turn, is given by

(26) $Var(\tilde{P}) = k_1^2 Var(\tilde{\mu}) + k_2^2 Var(\tilde{x}) - 2k_1k_2 Cov(\tilde{\mu}, \tilde{x})$,

where Var($\tilde{\mu}$) ≡ (1/h), and Var($\tilde{x}$) ≡ (1/t). Since "return shocks" ($\tilde{\mu}$), are not linked to unpredictable "supply" shocks ($\tilde{x}$), $Var(\tilde{P})$ simplifies to

(26a) $Var(\tilde{P}) = k_1^2(\frac{1}{h}) + k_2^2(\frac{1}{t}) = k_1^2(\frac{1}{h} + \frac{1}{r^2s^2t})$,

and price volatility, defined as the ratio variance to expected price, becomes:

$$(27)\ \ v(\tilde{P}) \equiv Var(\tilde{P})/E(\tilde{P}) = \{k_1^{\,2}(\frac{1}{h}) + k_2^{\,2}(\frac{1}{t})\}/\{k_0 + k_1\bar{\mu} - k_2\bar{x}\}.$$

Movements in all three price-related measures are thus seen to be controlled by our model's basic parameters either directly or through their influence on private information collection.

Our simulations in Table 2 offer comparative static implications about the effects of shifts in common or mean-level parameters on three sets of market level outcomes: average asset management intensity and information precision, $\bar{q}$ and s; the risky asset's expected price, E($\tilde{P}$), price variance, and price volatility, $Var\,(\tilde{P})$ and $v\,(\tilde{P})$; and the market risk premium R (to be discussed in section B). As we see below, the outcomes of such parameter shifts depend largely on whether they enhance or lower average private information acquisition.

The impact of improvements in the efficiency of asset management: $\overline{H}$ *and* A(τ)

We first address the impacts of "unconditional" shifts in average human capital and the "technology" of information production, $\overline{H}$ and A(τ), since these shift $Var\,(\tilde{P})$ and $v\,(\tilde{P})$ just through their impact on average information precision, s (see equation 26a). Increases in $\overline{H}$ stemming from a uniform increase in investors' educational attainments raise monotonically the average private information level, s (given that $E_{w\overline{H}} < \beta/\alpha$ in equation 24b) and thus the expected price E($\tilde{P}$) of the risky asset. Note that a higher $\overline{H}$ consistently lowers average asset management intensity $\bar{q}$ in our simulations, partly because of a feedback effect stemming from a higher private information level, s, which lowers the derived-demand for q_i by the relatively more informed investors. Increments in the external technology of information production, A(τ), have similar effects on market outcomes: they raise s and E($\tilde{P}$), and lower $\bar{q}$ (contrary to outcome for q_i at the individual level), because of the feedback effect of s on q_i.

How do continuous (unconditional) improvements in average educational attainments,

$\overline{H}$, or in the technology of information production A, affect the risky asset's variance and price volatility, $Var(\widetilde{P})$ and $v(\widetilde{P})$? The answer depends on basic-parameter levels and the value of s.

Three cases are relevant: a. If $r^2ht<1$, as would be the case if the variances of the supply noise and unconditional return are sufficiently high, Var($\widetilde{P}$) would be a U-shaped function of s as it rises from zero; b. If $1< r^2ht<(5/4)$, as would be the case if $Var(\widetilde{x})$ and $Var(\widetilde{\mu})$ are relatively lower, Var($\widetilde{P}$) will assume a humped shape: first rising, then falling, then rising again as s increases; c. If $r^2ht>5/4$, which would be the case if $Var(\widetilde{x})$ and $Var(\widetilde{\mu})$ were sufficiently low, Var($\widetilde{P}$) would be continuously rising. [11] The common feature applying to all cases is that as $\overline{H}$ or A increase s, at least beyond some positive level, Var($\widetilde{P}$) would begin rising monotonically. Since an increasing s also raises the expected price, $E(\widetilde{P})$, the behavior of price volatility $v(\widetilde{P}) = Var(\widetilde{P}) / E(\widetilde{P})$ is in principle uncertain. However, in all simulations performed with alternative parameter sets, price volatility mimics the shape of the price variance, essentially because expected price rises at a lower rate than price variance.

The rationale for these implications is that greater private information (s) implies greater precision in forecasting fluctuations in future returns, which has two competing consequences: on the one hand it increases the willingness to disregard fluctuations in market prices which convey no information; on the other hand, it raises the incentive to take advantage of relevant information signals by appropriately adjusting the share of the risky asset in their portfolios upward or downward, i.e., by trading on the strength of these signals. The second effect becomes more important as the level of private information accuracy rises. If $Var(\widetilde{x}) = 1/t$, or $Var(\widetilde{\mu}) = 1/h$, and thus Var($\widetilde{P}$) in equation (26a) are sufficiently high, so that $r^2ht<1$, optimal s would be quite low at any given levels of $\overline{H}$ and A (see table 2), and hence the first effect would dominate initially as $\overline{H}$ or A, hence s, increase. These cases are illustrated in figure 1. [12] Note that by the same reasoning, increments in average labor market wages, w_i, as a result of external conditions (δ), would produce inverted charts of $E(\widetilde{P})$, Var($\widetilde{P}$), and v($\widetilde{P}$) in figure 1.

The Impact of increments in mean supply and return values and their variances:

Shifts in the risky asset's mean supply and return levels, $\overline{x}$, $\overline{\mu}$, given the variances of the their stochastic terms, have no impact on asset management, but they predictably lower and raise the asset's market price [E($\widetilde{P}$)], respectively, and hence affect the market risk premium (R) in opposite directions (see below). Shifts in the variances of supply and returns shocks – 1/t and 1/h – in contrast, have a more complex effect on asset management and expected price: On the one hand, higher h and t lower the marginal benefits from information collection to all investors (see equation 16), which reduces $\overline{q}$, s and increases E($\widetilde{P}$). On the other hand, they directly contribute to a lower variance of the market price, as seen from equations (26a). In our simulations, the latter effect dominates when h rises, so Var($\widetilde{P}$) continuously falls as h increases, but continuous increases in t cause Var($\widetilde{P}$) to first fall but ultimately rise as t continues to increase.

B. Asset management and the market risk premium

Since our model formally recognizes only one risky asset, we have assumed for convenience that the return on the safe asset (bonds) is zero. The risk premium for the risky asset would thus be its expected rate of return, as indicated by the relative difference between the expected value of the posterior distribution of the second-period return and the expected equilibrium price (see footnote 4 and eq. 22), R ≡ [E($\widetilde{\mu}$) $- E(\widetilde{P})] / E(\widetilde{P})$, or

$$(28)\ R = \frac{(\frac{1}{r})\overline{x}}{(h + s + r^2 s^2 t)\overline{\mu} - (\frac{1}{r})\overline{x}} > 0.$$

Equation (28) shows that under given distributions of supply and returns, $\widetilde{\mu}$, $\widetilde{x}$, and a risk aversion parameter, r, there is an inverse relationship between the risk premium and average information precision resulting from higher values of $\overline{H}$ and A. This is because the inverse variance of the posterior distribution of returns to the average investor, $V^{-1}(\widetilde{\mu} \mid \widetilde{z}, P)$, is necessarily a decreasing function of average information precision. Higher levels of education and asset-management technologies are thus expected to lower the equilibrium risk premium.

V. EMPIRICAL EVIDENCE

Some of our key predictions are testable empirically. At the individual level we expect that:

1. Consistent with our comparative-static propositions, "conditional" increases in personal educational attainments (EDU), with personal wage rate held constant, will raise the expected demand for risky assets, and hence the overall portfolio return on financial assets.
2. Indicators of "technological efficiency", such as a management-related occupation or accumulated portfolio size which decreases the marginal cost of asset management, will also raise risky-assets demand and management time, and hence overall portfolio returns.
3. In contrast, higher "conditional" wage rates, given education, will unambiguously lower asset management time and expected demand for risky assets, thus overall portfolio returns.
4. "Unconditional" increases in educational attainments will have weaker effects on risky- assets demand and management, as they also raise the opportunity cost of asset management.

We test the preceding implications using two data sets, the first of which includes 8 samples.

A. First Data Set: Individual Portfolio Holdings and Portfolio Returns

The first set consists of data from eight surveys of individual asset holdings and realized returns for the years, 1963-64, 1983, 1989, 1992, 1995, 1998, 2001, and 2004 that are reported in the *Survey of Consumer Finances* of corresponding years based on separate national probability samples. These data sets, spanning four decades, contain data critical to testing our specific hypotheses. All data sets contain information about household initial portfolio composition by asset categories, realized portfolio returns in the same year (for 1963-1964 the returns are on the previous year's holdings), household wage income, and personal characteristics of household heads and their spouses. The national probability samples from the early years (through 1989) represent relatively affluent and older investors, as these are more likely to own marketable assets, but in the later years attempts were made to sample the entire population. Since there are also differences in the personal characteristics included in different samples, we analyze them separately. We report the results in a single table, however, to facilitate qualitative comparisons.

A number of empirical studies sought to identify factors that explain household decisions to hold risky assets. Several of the studies rely on data sets similar to the ones we examine here, and although they use different structural specifications, some of their results are similar to ours (see especially Bertaut (1998)).[13] Also, like other studies we define as risky assets corporate and international stocks and bonds.

Where we differ is in our model specification, which is designed to test specific implications of our comparative static analysis concerning the effects of measures of education, experience in managing assets and, especially, the opportunity cost of time on risky-assets demand. While some studies also include disposable income as a regressor, they do not ascribe a theoretical justification for its inclusion, except that it is a proxy for increments of net wealth. They also treat this variable as exogenous, although market earnings are a product of the wage rate and time allocated to labor-market activities, which are endogenous to our model.

Our theoretical analysis assumes that all investors have positive expected demands for the risky asset (see equation 21a). We have thus restricted the regressions to include individuals with positive net wealth and risky-asset holdings.

We base our specification of the risky assets demand ("DEMAND") regression on our theoretical analysis. The dependent variable is the log value of risky assets holdings (defined as all publicly tradable stocks and corporate and foreign bonds), lnRASST. Implicitly, we treat the remainder of the portfolio as a "safe" asset. The explanatory variables account for determinants of productivity at, and opportunity cost of, asset management by household heads, as implied by our model. They include, the household head's number of years of schooling EDU (average schooling of husbands and wives yields similar results), the investor's portfolio size or net worth, lnTASST as an indicator of experience in managing assets, or lower fixed costs of asset management [14], and the predicted wage rate of the household's head (see below), lnWAGE*. They also include an indicator of "managerial and professional-specialty occupations" lumping together managers of all types, and specialty occupations varying from speech therapists to nuclear engineers, some of which might be conducive to asset management (PROF), and self-employment vs. salaried status which may need to be examined separately for reasons we explain later in this section. Investors also provide self-assessments of their relative risk aversion intensity (RAV) in 7 of our annual samples (the only exception is 1963-64) using 4 categories (1-4) in ascending order of risk aversion. We therefore introduce this categorical variable as a robustness check on the validity of our hypotheses, which do not rely on differences in attitudes toward risk in explaining risky assets demand and management. However, it is difficult to ascertain whether RAV measures genuine risk preferences, or just mimics the risk-taking **behavior** of individual investors. And although our theoretical model abstracts from life-cycle dynamics, we add the investor's age (AGE) as a regressor to account for the "vintage" effect of schooling or see if one's life-cycle position has an independent effect on risky asset demand.

The basic regression model is thus:

(29) $\ln RASST = a_0 + a_1 \ln EDU + a_2 \ln TASST + |a_3 \ln WAGE^*| + a_4 AGE + a_5 PROF + a_6 RAV + |a_7 SELF|$.

Equation (29) allows for two basic specifications: one that excludes WAGE in the regression, to allow for estimation of the theoretical "unconditional" effect of EDU on

DEMAND, and one that includes WAGE to allow for conditional effects of both education and wage effects. It also allows for regressions based on just wage and salary workers or for all investors, by including the dummy variable SELF as a separate regressor. While the exact functional form of equation (29) cannot be pinned down theoretically, our theoretical simulations indicate that the effect of education on the demand for information-precision, and hence the demand for risky assets, may be subject to diminishing returns, which is why we enter EDU in log form. Variables defined in continuous dollar values are also introduced in log form, while those defined as discrete-step variables are entered in natural form. Extensive Box-Cox tests support the log transformation of the dependent variables and other dollar variables in both equations (29) and (30) below. As for the education variable, the Box-Cox tests support a logarithmic, or other non-linear transformations of EDU in most sample years. We have thus chosen lnEDU as the regressor in our benchmark specification.

We employ a similar specification to test if the realized overall portfolio returns ("RETURN") likewise responds to the theoretical determinants of asset management.[15] This reported measure misses, of course, unrealized capital gains, which our two-period model abstracts from, so our implicit assumption is that the realized gains are monotonically related to the unrealized gain:

(30) $\text{lnRETURN} = b_0 + b_1\text{lnEDU} + b_2\text{lnTASST} + |b_3\text{lnWAGE*}| + b_4\text{AGE} + b_5\,\text{PROF} + b_8\text{RAV} + |b_7\text{lnSHARE}\,| + |b_6\text{SELF}|$.

Equation (30) includes another distinct regression variant where SHARE, denoting the share of risky assets in the portfolio (RASST/TASST), is introduced as a proxy for portfolio composition. Recall that by our model, more effective asset management is expected to raise overall portfolio returns **only** through its impact on the demand for a single risky asset, which yields a higher return than the safe assets (our theoretical "bonds") in the overall portfolio (see equation 28). The empirical counterpart we use, however, is an **aggregate** portfolio of risky financial assets. If we could actually control for precise portfolio composition in terms of all specific risky assets, the impact of our determinants of asset management might vanish. But since lnSHARE distinguishes between broad composites of risky and non-risky assets, asset management could still raise the overall portfolio returns, but to a **lesser** degree than when lnSHARE is accounted for.

There are important reasons to separate self-employed from all investors in both our DEMAND and RETURN regressions for two main reasons: first, wage and non-wage income reported by members of this group may be arbitrary, as they are determined largely by the person's decision to declare business income as either wages or business profits. This difficulty can be alleviated by projecting the expected wage of self-employed persons based on the conventional human-capital earnings function (see below). Another difficulty, however, is that the self-employed are also heavily invested in their own business assets, which represent non-financial manageable risky assets in which salaried workers have comparatively trivial shares. We therefore pursue two types of regressions: for all investors, and just for salary workers.

Measuring the opportunity cost of asset management presents a special challenge. The conventional proxy we seek is the person's wage rate, but no consistent "wage rate" data are reported. The surveys report consistently annual wage and salary income, WAS, for all investors. This measure is, in principle, the product of the wage rate and hours worked. Our challenge thus is to produce an effective measure of the individual's wage rate that would eliminate measurement and simultaneity errors. This would be especially important in the case of retired persons who report zero earnings, workers in high managerial positions, whose wage earnings may contain bonuses based on company profits, and self-employed persons who make arbitrary decision how to divide their total compensation between profits and wage income.

Also, since asset management time is an endogenous variable, hours worked is in principle also an endogenous variable, and the estimated coefficient of WAS (or the earnings rate) may thus be subject to biases stemming from simultaneity and measurement errors.

We provide 2 alternative estimation methods to overcome these potential biases: 2SLS and a "projected wage rate" [PW] method. In the 2SLS method we derive a predicted wage rate (lnWAGE*) based on lnWAS from a first-stage regression incorporating as instruments EXP (job experience = AGE – EDU – 5), EXP^2, GENDER (of household head), RACE (of household head), MARRIED (marital status of household head), and HEALTH status (available in all samples other than 1963-4). In the second method we regress our lnWAS on EDU, EXP, EXP^2, GENDER, RACE, MARRIED, and HEALTH to estimate an "extended Mincer model" just for salaried workers (i.e., excluding self-employed, retirees, and people not in the work force). We then use the estimated coefficients of this model to **project** lnWAGE* for **all investors.** The estimated regression equations (29) and (30) for our 8 sample years are reported in Tables A.1-A.6 in Appendix 2 (A.5-A.6 including lnSHARE as a regressor). They are summarized for the three basic variables of interest: EDU, lnWAGE* and TASST (portfolio size) in Tables 3 - 5.

These results are quite consistent with our theoretical predictions. We choose as our benchmark case the regressions for wage and salary workers because the definition of risky assets, as well as our projections of the expected wage rate, lnWAGE* are more accurate for salaried workers than for the self-employed. However, the qualitative results are quite similar across salaried workers and all investors.

***Education effects*:** In all DEMAND regressions for salaried workers, all lnEDU coefficients are positive and significant in the regressions estimated via the 2SLS and the PW methods and the same holds in virtually all the OLS regressions. The estimates derived via OLS are typically smaller in magnitude than those based on 2SLS and the projected-wage method, which are often similar. The unconditional estimates (not controlling for lnWAGE*) are generally **smaller** in magnitude than the conditional estimates. This supports our theoretical propositions 1 and 2, since an increase in education is expected to raise the wage rate, which produces an offsetting effect on asset management and the demand for risky assets. (The omitted variable bias is likely to work in the same direction as proposition 2 because we expect H and w to be positively correlated.) The same qualitative effects are obtained in the "all investors" regressions in all years, where the OLS estimates are insignificant. The estimates derived from the projected-wage method, however, are significant everywhere.

In the RETURN regressions, where we do not control for SHARE, the "unconditional" as well as "conditional" effects of EDU (i.e., controlling for lnWAGE*) are significant, as predicted, for both salaried workers and all investors. Note that our predicted effects of EDU on the overall portfolio returns are not conditional on our definition of "risky manageable assets", which are likely to be different in practice for self-employed v. salaried workers. In the case of the self-employed, the returns are thus coming from both the realized returns on stocks and bonds, as well as business assets. Again, the "conditional" education effects are larger in absolute magnitudes than the "unconditional" effects in **all** the RETURN regressions.

As expected by our theoretical analysis, adding lnSHARE to the RETURN equation **lowers** the estimated coefficient of EDU, significantly in the case of salaried workers (in the 1963/64 regression EDU becomes insignificant), essentially because controlling (perfectly) for portfolio composition can eliminate the mechanism – a change in portfolio composition – through which superior private information can yield larger portfolio returns. Since SHARE is a crude proxy for the exact share of risky manageable assets in the portfolio (especially for the self-employed), however, education can still induce larger overall portfolio returns for investors.

WAGE Effects: Our theoretical proposition that an increase in the wage rate, education held constant, would **lower** the demand for, hence the returns on, risky assets, is our most discriminating hypothesis stemming from the asset management hypothesis. As Tables 3 and 4 show, this prediction is confirmed in all of our 16 DEMAND and RETURN samples with no exception for salaried workers as well as for all investors (except for the 2001 RETURN results). Specifically, the predicted wage rate affects the demand and return equations in an opposite direction to that of a compensated increase in EDU. It is also noteworthy that estimated wage effect is more pronounced when estimated via the projected-wage rather than the 2SLS method.

***Portfolio Size* effect:** Portfolio size as defined by ln(TASST), unambiguously and significantly enhances both the demand and returns on risky assets. While TASST includes RASST as a component, we derive very similar effects using (TASST-RASST) as our measure. The results are consistent with our conjecture that accumulated portfolio size captures size economies or is a proxy for "on the job" experience in asset management, both of which are expected to enhance the demand for and returns on risky assets.

The complete regression results for the other regressors entering equations (29) and (30) are reported in Tables A.1-A.6 in the appendix. We here provide a summary for each.

***Risk Aversion*:** This self-assessed variable has somewhat inconsistent effects across different samples. In the DEMAND equation for salaried workers, e.g., RAV has a significantly negative coefficient in years 1983, 1989, 1992, and 2004 (no data exist for 1963), and negative, but insignificant effects in 1995, 1998, and 2001. In the RETURN equations, RAV has negative and significant coefficients in 1983 and 2004, insignificant one in 1992, and a positive one in 1989, and negative and significant signs in 1995, 1998, and 2001. The inconsistent signs may indicate that this variable is not a pure measure of aversion to risk, especially because in years of market retreat, we find average RAV increasing while in boom years average RAV is decreasing. The inconsistent signs may also be the result of growth of 401K plans dominated by mutual funds, which are relatively diversified and thus induce risk-averse people to invest more in risky financial assets. This may also explain the inconsistent pattern in the RETURN regressions in the 90s, since the 401k plans do not yield immediate distributions for most investors.

Age**:** Although mostly negative, the AGE coefficients fluctuate in sign across pre-1990s samples, and even in the same sample year based on different estimation techniques. In contrast, in most of the 1992-2001 samples, AGE has a consistently negative and significant coefficient in the DEMAND equations. A similar, though not identical, pattern is seen in the RETURN equations. Our model does not offer testable implications for AGE, which we control for essentially as a robustness check. The inconsistent pattern of results for AGE may be due to changes in the composition of investors in the post-1989 samples when SCF surveys attempted to target an increasingly representative sample of the entire population, as opposed to the tendency in earlier years to sample wealthy individuals, who tend to be older in age. Also, AGE in the RETURN equations may account for age differences in the incentive to realize capital gains.

Professional status: The effect of PROF is generally insignificant and inconsistent in the DEMAND regressions. In the RETURN regressions, its coefficients are positive and significant in 1995 and 2001, but negative and significant in 1989, 1992, 1998, and 2004. The reason apparently is that this variable does not offer a sharp and consistent distinction between occupational and professional status which represents experience in asset management.

Self-employment**:** The coefficients associated with SELF in the full sample do not exhibit a consistent pattern as well in the DEMAND and RETURN equations. Our explanation is that since the self-employed invest heavily in own business assets, identifying financial assets with variable returns as the relevant measure of “risky assets” is not suitable for the self-employed. It is largely for this reason that wage and salary workers serve as our benchmark group.

The impact of education on added portfolio returns. In Table 6, we report the estimated premium to schooling from investment in financial assets. The estimated contribution of education is computed by assessing the overall net percentage returns to 2 levels of schooling in our samples − 12 years (HS) and 16 years (COL) − over the return obtained by a reference educational group for each: for those with EDH=12 years, the reference group is those with average education within a category (salaried or all investors), while for those with 16 years, the reference group is those with 12 years of schooling within the category.[16] The assessed **net** expected return for each group is based on the regression results for EDU and lnWAGE* in equation (30). Clearly, the ratio (minus 1) of the estimated expected return to investors with 16 relative to 12 years of schooling indicates the "educational premium" to 4 years of schooling in percentage terms; dividing this figure by 4 yields the marginal premium per schooling year. To indicate the robustness of the results, Table 6 presents 6 alternative estimates of such "net premiums" for the three estimation methods and the two investor groups we use in Tables 3 and 4. While the estimates fluctuate from year to year, as is to be expected, the variations are consistent across the alternative regression methods.

Note that in equation (30) we control for the self-assessed personal risk aversion measure, RAV. In other words, the estimated premiums are ascribed by our analysis strictly to education, not to risk preference, although empirically EDU and RAV are inversely related in all samples. In the last column of Table 6, we also present, for comparison, the rate of return to schooling in terms of wage income, based on the extended "Mincer regression". The interesting finding is that the estimated marginal educational premiums in terms of financial returns are mostly somewhat higher than those in terms of wage income. For salaried workers, for example, the estimated marginal educational premiums in terms of financial returns are 11.56% in 1989, 20.88% in 1995, 10.6% in 1998, 7.44% in 2001, and 11.4% in 2004, while the returns in terms of wage income in these respective years are 11.2%, 10.3%, 8.86%, 6.84%, and 12.9%.

B. Second Data Set: Time Spent at Asset Management

This data set contains the results of a national survey conducted by Barlow et al. in 1966. The survey of 1051 households of high income and wealth contains mostly qualitative information about individual portfolio holdings by different types of assets as well as a set of personal characteristics. In this regard, the survey is similar to data set 1. It also contains, however, a unique datum: a proxy measure of a key variable in our theoretical analysis which data set 1 lacks. Individuals were asked to respond to the question: "how frequently do you review where your savings are invested to determine if you would like to make any changes?" The response options range from never (1) to daily (7), and these comprise a polychotomous, ordered-response variable we name AMT. Since monitoring of portfolio holdings is time consuming and may lead to portfolio adjustments, especially higher categorical values of AMT may be a meaningful proxy for our theoretical time spent at asset management, q. Establishing a direct link between this variable and the household head's education, business-related occupation, or portfolio size, would provide **direct** support to the asset management hypothesis.

The survey gives the overall value of individual portfolios as a categorical variable (by 5 classes), and the reported portfolios generally contain the same range of assets included in the FRB data, but excluding own homes. We thus refer to the portfolio size measure as TASST'. The survey also reports the schooling level attained by the family head (EDH), and the head's "proximity" to a business-related occupation. We define the latter by distinguishing distinctly business-related occupational categories (businessmen, corporate officials, traders, stock brokers, auditors and financial consultants) (BUS=1) from all other occupations. We also have information on whether they are self-employed (SELF=1) or salaried, and the household head's age (AGE). Insufficient information is provided in the survey, however, about wage income, personal risk aversion or portfolio returns to duplicate those available in data set 1.

In Table 7 we have implemented the basic comparative-static predictions of our model concerning the derived demand for asset management time, by running ordered-probit regressions of AMT on a set of covariates including the net worth proxy TASST', and indicators of human capital, experience, age and occupational status:

(31) $AMT = a_{0j} + a_1 TASST' + a_2 EDH + a_3 AGE + |a_4 BUS| + |a_5 SELF|$,

where a_{0j} denotes a categorical constant term associated with the different AMT categories.

Note that our model predicts that education may increase the demand for asset-management **time** only if the elasticity of information acquisition with respect to human capital is larger than β. Thus it is not necessary to find that EDU would necessarily or significantly increase AMT for all investors, especially for those with the highest education levels, as our simulations indicate. However, evidence that EDH significantly increases asset management **time**, AMT, would certainly be consistent with the asset management hypothesis, as our numerical simulations are consistent with such effect for most education levels. Also, indicators of skills conducive to information production or economies of scale in asset management (as indicated by BUS and TASST') should, by proposition 3, unambiguously increase AMT. This is generally what we find using our ordered-probit regressions.

In column 1 of Table 7 we report the full-sample results for all individuals, including "all salaried" and self-employed workers. The estimated coefficients of TASST', EDH and BUS all have positive and significant signs. Self-employment status also raises asset management intensity, and AGE generally reduces it, although neither effect is significant at the 5 % level.

In column 2, the reported results are for strictly self-employed investors and in column 3 they cover all salaried workers. For the self-employed investors, the overall portfolio size is statistically significant, although education and professional status are not significant in enhancing time spent at asset management. For the salaried employees, however, portfolio size, education, and managerial status are all significant. These different results are to be expected, since the self-employed own their businesses, and are more likely to acquire business-assets management skills, or “specific” entrepreneurial capital, through learning-by-doing in various entrepreneurial activities, rather than through formal education, or even training for a specific occupation. This weakens the importance of “general” schooling (EDH) as a determinant of asset management for the self-employed. However, business-related training does have a significant effect (at the 10% level) on AMT even for the self-employed.

Column 4 reports the results for salaried workers in business-related occupations, while column 5 shows the results for all other salaried workers. For the small sample of workers in business-related occupations, schooling has a favorable but insignificant effect on asset management time, AMT. These results are due partly to the small variability in the categorical regressor in this sub-sample, especially in schooling attainments among the business-related salaried workers, which all have relatively high levels of education. (The average categorical value of EDH for the BUS workers is 5.39 while it is 4.53 for non-BUS workers, where 4 stands for 12 graders with non-college training, 5 stands for college training with no degree, and 6 stands for college degree). Indeed, even portfolio size is significant only at the 10% level. For non-managerial salaried workers, in contrast, EDH has a favorable and significant impact on asset management intensity, along with portfolio size (TASST’). As is the pattern in Tables 3 and 4, the AGE effect is generally insignificant and inconsistent in Table 7.

Data set 2 allows us also to directly estimate the proportion of investors with negligible levels of AMT i.e., those reporting that they never engage in monitoring their savings, or seldom do it. The combined percentage of these investors is 21.25%. This fraction is surprisingly close to the fractions of those with zero or trivial amounts of asset management in our simulations (see section III.A.) In contrast those reporting very active monitoring (daily or weekly) constitute

60% of the sample. The average educational attainments and business-oriented occupational status of the latter group are substantially higher than those of the former group.

CONCLUSION

We have pursued our asset-management hypothesis at both the micro and the market levels. At the micro level, we linked optimal asset management by investors varying in educational attainments, portfolio sizes, job experience, and opportunity costs of time to demand for information precision, demand for risky assets, and the derived-demand for asset management time. At the market level we have linked theoretically and through numerical simulations asset-management enhancing educational attainments and "information technology" to the variance and volatility of market prices, as well as the likely influence of these variables on market risk premiums. More important, we have been able to derive estimates of the "education premium", or marginal rate of return to schooling in terms of added (realized) financial returns, which enables us to assess the contribution of human capital in generating financial income as well as wage income. To our knowledge, this is the first attempt to come up with such estimates.

The results of our empirical analyses using the 8 SCF samples spanning 4 decades, and the single sample reporting data on a proxy measure of asset management time are remarkably consistent with our theoretical predictions concerning both inactive investors and those who are active in asset management activities. Propositions 1-4 concerning the effects of conditional and unconditional increments in education, portfolio size, and indicators of occupational status on the expected demand and returns for risky assets are strongly supported by the regression results from data sets 1 and 2. To wit: expected demand for risky assets as a share of the total portfolio and overall portfolio returns is predicted to rise with a conditional increase in lnEDU, holding the predicted wage constant. This prediction is overwhelmingly supported by the regression results in virtually all 8 samples. We expect the impact of an unconditional increase in education on the demand for risky assets (allowing the wage rate to rise with EDU) to depends on whether the elasticity of information production with respect to human capital relative to search time (β/α) exceeds the elasticity of the wage rate with respect to human capital. This condition apparently holds for both salary workers and all investors, including the self-employed. Similarly, an increase in education (unconditional as well as conditional) is expected to raise the derived-demand for asset-management time only if the elasticity of the demand for information precision exceeds the elasticity of its production with respect to education. The results of our data 2 regressions indicate that this tends to be the case, at least for wage and salary workers. Moreover, as predicted by proposition 4, the pattern of the RETURN regressions is found to be quite symmetrical to that of the DEMAND equations when estimated via identical specifications.

The most discriminating hypothesis of the model, that a rise in the predicted wage rate of individual investors would lower the demand for risky assets, time spent managing assets, as well as total portfolio returns is confirmed with no exception in all our regressions. The natural interpretation of this finding is that the predicted wage accounts for the magnitude of the opportunity cost of asset management time, consistent with proposition 3. This finding is robust not just to use of alternative procedures for estimating expected individual wage rates, but also to use of alternative raw data with which to predict wage rates: in addition to using reported annual wage and salary data for this purpose, we have also used reported wage rates per period as raw data. The results were identical qualitatively (to save space, we skipped the latter).

At the market level we show that increments in education and technology of information production at given supplies of risky assets, generate upward pressure on market prices, and corresponding U-shaped paths of variance and volatility. They generate opposite effects on market risk premiums. Empirical verification of these predictions is a challenge for future work.

Perhaps the most intriguing results of the model concern our estimation of the magnitude of the rate of return to education in generating financial income. We find that the education premium per schooling year in terms of financial income is quite comparable to, and in fact in most sample years larger than, the estimated rate of return to education in terms of labor income. Furthermore, the order of magnitude of the estimated financial rate of return to education in our simulations and in our empirical regressions is also similar, although our simulations results depend on our assumed distribution function of education attainments in the population.

Clearly the results of this paper are subject to a number of important caveats. Theoretically, we pursue a partial-equilibrium model where the supply of assets, initial portfolio sizes, and human capital endowments are exogenous variables. We also explore the role of human capital in a purely exchange economy, although the information value of asset management extends to the real economy as well. We also abstract from the separate role of specialized agents who offer asset management services for sale. Empirically, the basic limitation of the Surveys of Consumer Finances as a source of data on portfolio composition and returns is that they are reported only for broad asset categories at market values assessed by the investors, and the reported portfolio returns include only realized returns on these broad asset categories. More detailed information on individual assets and unrealized returns would certainly make our tests of the asset-management hypothesis more compelling.

Yet the overall consistency of our story with empirical evidence assembled in 9 independent samples indicates that the line of thought we pursue in this paper may produce new and important insights about both specific features of the investors' choices, such as the well-known "home-bias" in investment decisions, and the rate of return to human capital in generating non-wage income – a heretofore neglected subject in the literature on human capital.

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ENDNOTES

[1] The term is borrowed from Ehrlich and Ben-Zion (1976) who suggested that asset management alters saving and time-allocation choices over the life cycle. They assumed risk neutrality, however, and therefore did not address portfolio selection and risky-asset pricing.

[2] Entering leisure to the utility function will greatly complicate the formal analysis, but will not alter our basic inferences if we view "asset management" and "leisure" as neutral or complementary inputs into non-market (or "home-production") activities.

[3] Following Hellwig's derivation of the REE competitive price, we can write the conjecture as: (9a) $\widetilde{P}(n) = \theta(n) + \sum_{i=1}^{n} \lambda_i(n)\widetilde{\mu} + \sum_{i=1}^{n} \lambda_i(n)\widetilde{\varepsilon}_i(n) - v(n)\widetilde{x}(n)$. The second and third terms on the RHS of (9a) are the weighted averages of traders' perceptions of the public information on returns, and the private information signals they pursue, respectively. As the number of traders, n approaches infinity, the term involving the random private signals vanishes and equation (9a) converges in probability to $\widetilde{P} \rightarrow \theta + \lambda\widetilde{\mu} - \nu\widetilde{x}$, where $\lambda = \lim_{n\to\infty}(1/n)\sum_{1}^{n} \lambda_i$.

[4] The variance of the return for an informed investor, conditional on the observed price and private signal thus becomes $V_i \equiv Var(\widetilde{\mu} \mid z_i, P) = 1/[h + s_i + r^2 s^2 t]$. In equilibrium, this conditional variance is thus inversely related to the investor's own private information, s_i, and the collective information by all other investors, $r^2 s^2 t$.

[5] These solutions do not precisely match those of KV (1991a), since in our analysis, the mean supply of the risky asset is assumed to be positive, $\bar{x} > 0$, while they assumed $\bar{x} = 0$. Note that by equations (13), $\widetilde{P}$ is determined partly by the specific (non-stochastic) distributions of H_i and $w_i(H_i, \delta)$ across investors, which determine the distribution of private precision levels, s_i.

[6] The second-order conditions are thus assured by virtue of the concavity of the objective function and the convexity of the cost function with $0 < \alpha \leq 1$.

[7] In our simulation in Tables 1 and 2 we assume that H_i follows a truncated lognormal distribution over the interval [1, 5], with parameters M and s and a shift parameter, a. The probability density function is:

$$f(H_i) = \frac{1}{G\sqrt{2\pi s^2}} \exp\{-\frac{[\ln(H_i - a) - M]^2}{2s^2}\}$$, where $G = \int_1^5 g(u)du$ is a normalization factor and

$$g(u) = \frac{1}{\sqrt{2\pi s^2}} \exp\{-\frac{[\ln(u - a) - M]^2}{2s^2}\}.$$

[8] The proof is illustrated for a change in A_i but the same analysis applies to a shift in $w_i(\delta_i)$. We can similarly allow for idiosyncratic shifts in the risk-tolerance parameter, r, starting from its assumed initial uniform value across investors. From equations (14) or (15) we can see immediately that an upward shift in r for a specific individual or group i that does not affect s would result in unambiguous upward shifts in s_i^*, q_i^*, and $E(\widetilde{D}_i)^*$.

[9] This would be the case if we allow the fixed cost component of the cost function in equation (8), C_0 to be a decreasing function of one's total portfolio size because of economies of scale in obtaining financial services per dollar of financial assets, although for convenience we do not specify asset management costs as a function of portfolio size. In either interpretation, portfolio size affects the demand for risky assets through its impact on the cost side of asset management.

[10] Note that while $d\ln(w_i)/dH_i = \eta$, based on equation (5), yields the conventional "internal rate of return to human capital", $d\ln\{E[\tilde{D}_i(\tilde{\mu} - \tilde{P}) - C(s_i)]\}/dH_i$ (net rate of financial return) is not the rate of return on investment in risky financial assets, but the percentage net addition to it (after deducting the opportunity costs of asset management, $C(s_i)$) due to an unconditional rise in H_i.

[11] In all cases, as $\overline{H}$ (thus s) $\rightarrow \infty$, Var($\tilde{P}$) $\rightarrow$ 1/h and v($\tilde{P}$) $\rightarrow$ 1/(h$\overline{\mu}$), while as $\overline{H} \rightarrow 0$, Var($\tilde{P}$) $\rightarrow$ ($1/r^2h^2t$) and v($\tilde{P}$) $\rightarrow$ 1/($r^2h^2t\overline{\mu}$ -rht$\overline{x}$). Thus, if r^2ht <1, e.g., both Var($\tilde{P}$) and v($\tilde{P}$) are higher at $\overline{H}$ =0 than at $\overline{H} = \infty$. In this case, Var($\tilde{P}$) is a U-shaped function of s, and v($\tilde{P}$) likewise first falls with $\overline{H}$ and **ultimately** rises toward 1/(h$\overline{\mu}$) as s $\rightarrow \infty$. Since E($\tilde{P}$) is continuously rising with $\overline{H}$, the shape of v($\tilde{P}$) is indeterminate whenever Var($\tilde{P}$) is also rising with $\overline{H}$, but in our simulations it mimicked the shape of Var ($\tilde{P}$) for all values of $\overline{H}$ >0. The parameter values used in the simulations that produce Figure 1 where r^2ht<1 are: h=0.033, r=1, t=30, A(τ) = 0.04, $\overline{\mu}$=160, and $\overline{x}$ =1.

[12] We smooth out the impact of discrete increments in $\overline{H}$ and A to produce continuous charts.

[13] These inlude studies by Uhler and Cragg (1971), Friend and Blume (1975), Feldstein (1976), Agell et. al., (1990), Ioannides (1992), Haliassos and Bertaut (1995), Bertaut (1998), King and Leape (1998) and Perraudin and Sorensen (2000). This last study also reported a negative wage effect on risky portfolio shares, but did not offer a systematic analysis to explain the result.

[14] This measure incorporates six major categories of tradable assets: liquid assets (checking and savings accounts and U.S. savings bonds), investment assets (all marketable securities, investment real-estate, and mortgages), business/professional assets, miscellaneous assets held in personal trusts, homes, and automobiles.

[15] RETURN is defined as the sum of taxable and non-taxable interests, dividend income, gains from sale of stocks/bond or real estate, and rent, trust income, royalties from other investment.

[16] We estimate the expected rate of return on financial assets for each education group (J=12, 16) in each year (t) as: $R_t^J = R_t^{ref(J)} \exp\{b_1 [\ln(J_t - EDU_t^{ref(J)})] + b_3\eta[J_t - EDU^{ref(J)}]$, where $R^{ref(J)}$ is the rate of return on the financial portfolio (excluding homes business assets, and vehicles), of the reference group relevant for J. For J=12 the reference group is the one with average schooling attainments, which may be below or above 12, and $R^{ref(J)}$ is the average portfolio return for all investors. For J=16, the reference group is the one with 12 years of schooling and $R^{ref(J)}$ is its projected return.

Table 1: Effects of Individual Parameter Shifts on Asset Management Outcomes at the Micro level

AM outcomes at the micro level[1]	Educational Attainment Value (H_i)[2]			
	1 (no HS)	2.159	2.895	5 (Col.deg)
s_i	0.0083	0.0215	0.0301	0.0500
q_i	0.0199	0.0374	0.0448	0.0467
$E(\tilde{D}_i)$	0.8949	0.9619	1.0056	1.1071
Wage income (level)	0.9801	1.1722	1.3183	1.8818
Financial income (level)	0.5783	0.7713	0.8972	1.1897
ds_i/dH_i	0.0109	0.0116	0.0010	0.0081
$\varepsilon_{w_i H_i}$	0.17	0.367	0.492	0.85
$(\partial s_i / \partial H_i)\|_{w_i=\text{const}}$	0.0118	0.0139	0.0140	0.0130
dq_i/dH_i	0.0206	0.0116	0.0062	-0.0021
E_{s_i, H_i}	1.3065	1.1664	1.0556	0.8088
$(\partial q_i / \partial H_i)\|_{w_i=\text{const}}$	0.0257	0.0214	0.0175	0.0093
$ds_i/dA(\tau)_i$	0.3283	0.8329	1.1296	1.8062
$dq_i/dA(\tau)_i$	0.7162	1.2873	1.4125	1.2990
Net rate of return (financial multiplier)[3]	19.69%	18.30%	17.02%	14.42%
Rate of return, η (wage income)[3]	14.90%	15.80%	16.35%	17.22%

Notes: 1. The outcomes are computed using a truncated log-normal distribution of H_i over the range 1-5 (see footnote 7) and the following set of underlying model parameters: $h = 0.033$, $t = 40$, $\bar{\mu} = 35$, $\bar{x} = 1$, $r= 2$, $A(\tau) = 0.04$, $\alpha = 0.4$, $\beta = 0.9$, $a = 1$, $s= 1$, $M = 1$, $w_0 = 1$, and $\eta = 0.17$. 2. The educational attainment values were picked to match the percentage of people with no high school (1), HS (2), college without a degree (3) and College degree (4) among salaried workers with positive risky assets holdings in the 2004 SCF sample. 3. See footnote 10 in the text.

Table 2: Effects of Common Parameter Shifts on Asset Management Outcomes at the Market Level

Upward Parameter Shifts	Outcomes*					
	$\bar{q}$	s	E(P)	Var(P)	v	R
t	-	-	+	-/+	-/+	-
h	-	-	+	-	-	-
r	+/-	+/-	+	-/+	-/+	-
α	+	-	-	-	-	+
$A(\tau)$	-	+	+	-/+	-/+	-
$\bar{\mu}$	0	0	+	0	-	-
$\bar{x}$	0	0	-	0	+	+
w_0	-	-	-	-	-	+
η	-	-	-	-	-	+
$\bar{H}$ (uncompensated)#	-	+	+	-/+	-/+	-

See note 1 in Table 1. Comparative statics are illustrated for the case where the variances of supply noise and unconditional return are sufficiently large so $r^2ht < 1$.

* Negative (positive) signs indicate that increments in parameter values consistently lower (raise) the endogenous outcomes. Negative/positive or positive/negative signs indicate that increments in parameters first lower and then raise the endogenous outcomes.

Illustrated for increments in $\bar{H}$ as a result of uniform increments in all H_i.

Table 3: Summary of Regressions Results for Three Key Variables
SALARIED WORKERS, Eight Independent SCF Samples

	log(EDU)			log(wage)		log(TASST)		
	Uncon-	Conditional[1]				Uncon-	Conditional[1]	
year	Ditional[1]	2SLS	PW[2]	2SLS	PW[2]	Ditional[1]	2SLS	PW[2]
DEMAND for Risky Assets Regressions[3]								
1963	0.641	1.342	1.150	-0.312	-0.780	1.101	1.132	1.129
	(3.34)	(5.64)	(5.28)	(-5.43)	(-4.60)	(17.1)	(16.8)	(17.8)
1983	1.304	1.286	1.811	-0.207	-0.470	0.613	0.712	0.707
	(4.63)	(4.32)	(6.09)	(-4.98)	(-4.77)	(13.6)	(13.8)	(14.6)
1989	0.812	0.980	1.538	-0.239	-0.567	0.701	0.837	0.827
	(4.57)	(5.41)	(8.23)	(-11.6)	(-10.7)	(23.8)	(26.0)	(26.5)
1992	1.580	1.880	1.965	-0.128	-0.263	0.746	0.800	0.802
	(8.47)	(9.74)	(10.1)	(-6.82)	(-6.60)	(29.5)	(30.0)	(30.2)
1995	0.434	0.527	1.087	-0.166	-0.480	0.941	1.028	1.037
	(2.66)	(3.21)	(6.23)	(-9.68)	(-9.64)	(39.2)	(39.8)	(40.3)
1998	0.162	0.375	0.786	-0.169	-0.500	0.934	0.998	1.022
	(1.31)	(2.97)	(5.94)	(-10.1)	(-11.9)	(46.9)	(47.3)	(48.8)
2001	0.532	0.902	1.085	-0.236	-0.547	0.945	1.054	1.055
	(4.35)	(7.04)	(8.63)	(-14.1)	(-14.2)	(45.7)	(46.7)	(48.7)
2004	1.026	1.237	1.734	-0.134	-0.333	0.787	0.828	0.832
	(6.52)	(7.53)	(9.82)	(-8.56)	(-8.55)	(38.7)	(38.4)	(39.9)
RETURN on Total Portfolio of Assets Regressions[3]								
1963	0.523	1.572	1.393	-0.467	-1.334	1.081	1.127	1.128
	(1.65)	(3.71)	(3.87)	(-4.56)	(-4.76)	(10.1)	(9.36)	(10.8)
1983	1.764	1.736	2.598	-0.323	-0.771	0.860	1.014	1.013
	(4.05)	(3.86)	(5.65)	(-5.15)	(-5.07)	(12.4)	(13.0)	(13.5)
1989	1.641	1.925	3.123	-0.405	-1.157	1.128	1.359	1.386
	(6.03)	(6.85)	(11.1)	(-12.7)	(-14.5)	(25.0)	(27.3)	(29.4)
1992	4.421	5.202	5.559	-0.334	-0.776	1.117	1.258	1.281
	(13.2)	(14.9)	(16.1)	(-9.77)	(-11.0)	(24.6)	(26.0)	(27.2)
1995	2.160	2.303	3.139	-0.254	-0.718	1.315	1.448	1.460
	(7.84)	(8.19)	(10.6)	(-8.66)	(-8.50)	(32.4)	(32.8)	(33.4)
1998	1.214	1.721	2.230	-0.402	-0.813	1.210	1.361	1.352
	(4.47)	(6.20)	(7.60)	(-11.0)	(-8.71)	(27.6)	(29.4)	(29.2)
2001	0.869	1.258	1.486	-0.248	-0.610	1.288	1.403	1.411
	(3.58)	(5.07)	(5.86)	(-7.63)	(-7.84)	(31.4)	(32.1)	(32.3)
2004	1.096	1.472	2.450	-0.238	-0.637	1.447	1.520	1.533
	(3.15)	(4.18)	(6.26)	(-7.10)	(-7.38)	(32.2)	(32.9)	(33.2)

Notes: 1. Unconditional regressions exclude lnWAGE as a regressor. Conditional include lnWAGE* as a regressor. 2. PW denotes the projected-wage method. 3. Numbers in parentheses are z-values. 4. See corresponding tables in Appendix for full results.

Table 4: Summary of Regressions Results for Three Key Variables
All Investors, Eight Independent SCF Samples

	log(EDU)			log(wage)		log(TASST)		
	uncon-	Conditional				uncon-	Conditional	
Year	ditional	2SLS	PW	2SLS	PW	ditional	2SLS	PW
DEMAND for Risky Assets Regressions								
1963	0.752	1.298	1.263	-0.312	-0.765	1.059	1.089	1.086
	(4.84)	(6.75)	(7.04)	(-6.07)	(-5.38)	(20.4)	(19.1)	(21.3)
1983	1.574	1.607	2.107	-0.203	-0.474	0.629	0.718	0.717
	(5.93)	(5.66)	(7.44)	(-4.95)	(-4.99)	(14.8)	(14.7)	(15.7)
1989	0.793	0.997	1.512	-0.222	-0.521	0.726	0.830	0.821
	(5.72)	(6.88)	(10.2)	(-12.9)	(-12.4)	(33.0)	(34.2)	(35.7)
1992	0.762	1.180	1.127	-0.294	-0.341	0.791	0.825	0.832
	(5.17)	(7.11)	(7.23)	(-7.37)	(-6.91)	(36.5)	(35.3)	(37.2)
1995	0.143	0.134	0.550	-0.256	-0.381	0.870	0.918	0.914
	(0.91)	(0.80)	(3.25)	(-6.37)	(-6.28)	(42.6)	(39.8)	(42.4)
1998	0.468	0.966	1.319	-0.411	-0.664	0.847	0.914	0.929
	(2.71)	(4.82)	(7.27)	(-11.0)	(-13.4)	(47.0)	(43.0)	(49.5)
2001	0.554	0.921	1.072	-0.564	-0.624	0.888	0.967	0.973
	(4.81)	(6.56)	(8.89)	(-11.1)	(-12.7)	(50.3)	(43.8)	(52.1)
2004	0.894	0.987	1.365	-0.195	-0.327	0.797	0.831	0.834
	(6.51)	(6.80)	(9.09)	(-7.18)	(-7.54)	(49.3)	(47.0)	(49.6))
RETURNS on Total Portfolio of Assets Regressions								
1963	0.521	1.263	1.325	-0.424	-1.202	0.970	1.011	1.012
	(1.98)	(3.79)	(4.33)	(-4.76)	(-4.96)	(11.0)	(10.2)	(11.6)
1983	1.574	1.629	2.470	-0.331	-0.796	0.907	1.053	1.056
	(3.88)	(3.76)	(5.72)	(-5.29)	(-5.50)	(13.9)	(14.1)	(15.2)
1989	1.709	2.057	3.199	-0.380	-1.080	1.113	1.291	1.311
	(7.71)	(8.74)	(13.6)	(-13.6)	(-16.3)	(31.6)	(32.8)	(36.0)
1992	1.908	2.751	2.661	-0.593	-0.703	1.241	1.309	1.326
	(7.17)	(9.15)	(9.48)	(-8.21)	(-7.92)	(31.7)	(30.9)	(32.9)
1995	2.148	2.146	2.289	-0.067	-0.131	1.478	1.490	1.493
	(8.16)	(8.16)	(8.03)	(-1.07)	(-1.29)	(43.2)	(41.3)	(41.2)
1998	2.883	3.617	4.051	-0.606	-0.912	1.157	1.257	1.270
	(7.55)	(8.75)	(10.0)	(-7.86)	(-8.27)	(29.1)	(28.7)	(30.4)
2001	1.877	1.918	1.873	-0.064	0.005	1.152	1.161	1.152
	(7.96)	(7.90)	(7.47)	(-0.73)	(0.05)	(31.8)	(30.4)	(29.7)
2004	2.787	2.986	3.782	-0.413	-0.689	1.243	1.316	1.322
	(8.81)	(9.11)	(10.9)	(-6.76)	(-6.89)	(33.4)	(33.0)	(34.0)

See notes to Table 3

Table 5: Summary of Regressions Results for Three Key Variables with lnSHARE included as a regressor. Eight Independent SCF Samples

	log(EDU)			log(wage)		log(TASST)		
	uncon-ditional	Conditional				uncon-ditional	Conditional	
Year		2SLS	PW	2SLS	PW		2SLS	PW
SALARIED WORKERS								
1963	-0.033	0.478	0.444	-0.213	-0.690	0.994	1.020	1.022
	(-0.12)	(1.33)	(1.38)	(-2.46)	(-2.77)	(10.9)	(10.4)	(11.2)
1983	1.177	1.203	1.837	-0.238	-0.574	1.034	1.133	1.136
	(2.79)	(2.81)	(4.07)	(-3.97)	(-3.87)	(14.9)	(15.2)	(15.4)
1989	1.386	1.681	2.738	-0.345	-1.015	1.222	1.400	1.429
	(5.19)	(6.11)	(9.72)	(-10.9)	(-12.7)	(27.2)	(28.7)	(30.6)
1992	3.735	4.439	4.765	-0.282	-0.669	1.227	1.339	1.361
	(11.4)	(12.9)	(14.0)	(-8.47)	(-9.67)	(27.4)	(28.4)	(29.4)
1995	1.989	2.111	2.740	-0.194	-0.542	1.339	1.438	1.446
	(7.42)	(7.74)	(9.42)	(-6.72)	(-6.49)	(33.8)	(33.6)	(33.9)
1998	1.164	1.624	2.019	-0.358	-0.679	1.231	1.362	1.347
	(4.33)	(5.91)	(6.90)	(-9.76)	(-7.21)	(28.3)	(29.8)	(29.2)
2001	0.714	1.029	1.210	-0.188	-0.471	1.304	1.389	1.397
	(2.97)	(4.17)	(4.77)	(-5.72)	(-5.97)	(32.1)	(32.1)	(32.2)
2004	0.657	0.974	1.752	-0.184	-0.503	1.539	1.590	1.601
	(1.92)	(2.81)	(4.50)	(-5.57)	(-5.87)	(34.5)	(34.9)	(35.0)
ALL INVESTORS								
1963	-0.135	0.175	0.261	-0.162	-0.558	0.918	0.936	0.939
	(-0.59)	(0.63)	(0.95)	(-2.19)	(-2.59)	(12.1)	(11.8)	(12.4)
1983	0.860	0.951	1.575	-0.245	-0.594	1.076	1.172	1.176
	(2.18)	(2.32)	(3.70)	(-4.16)	(-4.23)	(16.7)	(16.6)	(17.3)
1989	1.448	1.781	2.783	-0.318	-0.937	1.203	1.338	1.360
	(6.66)	(7.78)	(11.9)	(-11.5)	(-14.1)	(34.4)	(34.9)	(37.7)
1992	1.522	2.177	2.109	-0.450	-0.536	1.347	1.394	1.408
	(5.95)	(7.68)	(7.76)	(-6.61)	(-6.24)	(35.5)	(34.8)	(36.1)
1995	2.111	2.111	2.146	-0.001	-0.032	1.511	1.512	1.515
	(8.12)	(8.12)	(7.61)	(-0.01)	(-0.32)	(44.6)	(42.3)	(42.3)
1998	2.767	3.412	3.774	-0.519	-0.772	1.195	1.275	1.285
	(7.29)	(8.40)	(9.32)	(-6.76)	(-6.92)	(30.0)	(29.6)	(30.8)
2001	1.749	1.703	1.618	0.068	0.153	1.178	1.169	1.158
	(7.45)	(7.01)	(6.45)	(0.77)	(1.49)	(32.6)	(30.7)	(30.1)
2004	2.404	2.579	3.219	-0.333	-0.554	1.330	1.385	1.390
	(7.70)	(8.07)	(9.37)	(-5.58)	(-5.61)	(35.9)	(35.5)	(36.1)

See notes to Table 3.

Table 6: Total Portfolio Expected Returns by Education

	OLS			2SLS			PW			RoR
	HS	COL	EDU prem.	HS	COL	EDU prem.	HS	COL	EDU prem.	in Wages
SALARIED WORKERS										
1963	2.70	3.23	4.92	2.70	3.81	10.28	2.70	2.96	2.43	5.77
1983	10.15	15.94	14.27	10.41	15.43	12.05	9.86	16.17	15.99	8.20
1989	9.47	13.32	10.19	9.26	13.44	11.28	9.11	13.32	11.56	11.20
1992	2.38	8.43	63.68	2.14	8.73	76.92	2.16	8.66	75.09	6.83
1995	2.79	4.98	19.70	2.83	4.94	18.67	2.71	4.98	20.88	10.30
1998	3.35	4.58	9.17	3.25	4.63	10.57	3.23	4.61	10.60	8.86
2001	4.51	5.60	6.04	4.26	5.72	8.55	4.35	5.65	7.44	6.84
2004	2.33	2.90	6.11	2.18	2.95	8.77	2.05	2.98	11.42	12.90
ALL INVESTORS										
1963	2.55	3.00	4.47	2.52	3.29	7.60	2.55	2.83	2.73	
1983	11.97	18.39	13.40	12.36	17.72	10.84	11.75	18.41	14.19	
1989	9.14	14.05	13.43	9.15	13.95	13.11	8.97	13.88	13.68	
1992	6.13	10.76	18.88	5.83	10.93	21.91	6.05	10.73	19.36	
1995	3.72	6.59	19.32	3.67	6.62	20.09	3.63	6.65	20.76	
1998	3.61	8.21	31.87	3.58	8.17	32.09	3.53	8.18	33.04	
2001	3.94	6.74	17.74	3.95	6.73	17.65	3.93	6.75	17.91	
2004	3.32	7.11	28.44	3.60	6.86	22.69	3.36	6.99	27.01	

Notes: All returns are in percentage terms. The education premium is the ratio of expected (realized) rates of return on the total portfolio of assets of investors with 16 relative to 12 years of schooling. The rates of return in wage income are the estimated EDU coefficient in the extended “Mincer model”.

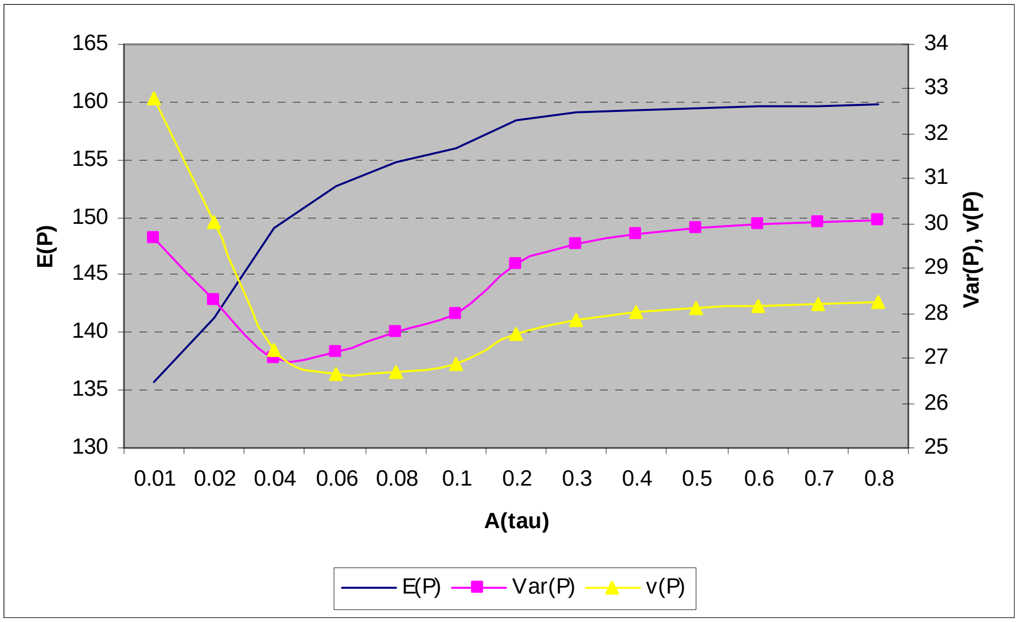
Table 7: Ordered-Probit Regressions with Management Time as dependent variable

	Full Sample All Investors	Self-employed Investors	**Salaried Workers** All	BUS-related	Non-BUS related
TASST'	0.2764	0.2554	0.2867	0.1779	0.4447
	(0.0506)	(0.0621)	(0.0880)	(0.1195)	(0.1314)
EDH	0.0594	0.0289	0.0852	0.0269	0.0795
	(0.0222)	(0.0278)	(0.0402)	(0.0830)	(0.0469)
AGE	-0.0011	-0.0010	-0.0020	0.0157	-0.0140
	(0.0037)	(0.0044)	(0.0067)	(0.0107)	(0.0088)
BUS	0.3440	0.1912	0.5297		
	(0.0830)	(0.1056)	(0.1443)		
SELF	0.0221				
	(0.0861)				
N	804	513	291	113	178

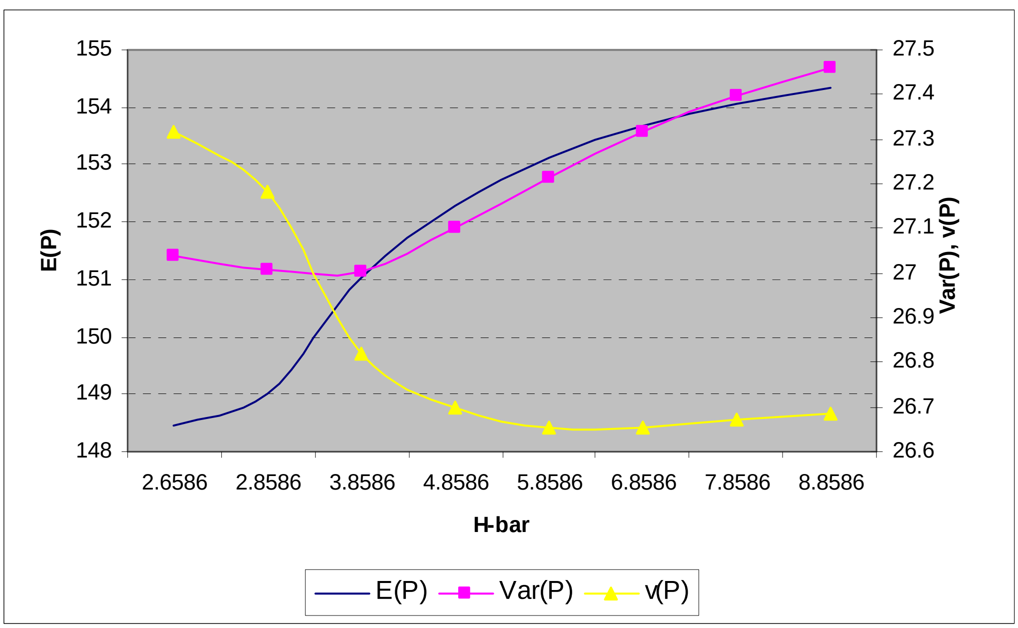
Notes: standard errors in parentheses

Figure 1: Private Information and Price Volatility: Effects of "Uncompensated" Shifts in Determinants of Efficiency in Asset Management*

A. Increments in Average Educational Attainments



B. Increments in "External Technology"



The v(P) values are magnified 150 times their actual values to fit the scale.
Parameter values used: $h = 0.033$, $t = 40$, $\overline{\mu} = 35$, $\overline{x} = 1$, $r = 2$, $\alpha = 0.4$, $\beta = 0.9$, $a = 1$, $s = 1$, $M = 1$, $w_0 = 1$, and $\eta = 0.17$ * Illustrations conditional on $r^2ht < 1$.

Appendix 1: Comparative Statics at the Individual Level

1. The impact of shifts in individual human capital endowments H_i on s_i^* and q_i^*.

a. We first differentiate equation (15) with respect to H_i, using equations (5) and (6), to derive its "uncompensated" effect on s_i*. By collecting terms we obtain:

(A.1) $(1/\alpha)\, s_i^{(1-\alpha)/\alpha} [(1-\alpha)(h + r^2s^2t)\, s_i^{-1} + 1] (ds_i/dH_i) =$

$= .5r\, A(\tau)^{1/\alpha} H_i^{\beta/\alpha} w_i(H_i)^{-1}[\beta H_i^{-1} - \alpha w_i(H_i,\delta)^{-1}] (\partial w_i / \partial H)$.

Since $(1–\alpha) > 0$,

(A.2) $\text{sgn } (ds_i / dH_i) = \text{sgn } \{\beta H_i^{-1} - \alpha w_i(H_i)^{-1}[\partial w_i / \partial H_i]\}$.

The RHS of (A.2) would have a positive sign if

$[\partial w_i / \partial H_i][H_i / w_i(H_i)] \equiv E_{w_i H_i} < (\beta / \alpha)$. Thus,

(A.3) $(ds^*_i/dH_i) > 0$ if $E_{w_i H_i} < (\beta / \alpha)$.

b. To derive the impact of an "uncompensated" shift in H_i on the optimal value of q_i^*, we substituting equation (7) into (15) and differentiate the latter with respect H_i:

(A.3) $(dq_i^*/dH_i) = \quad (1/\alpha) s_i^{(1-\alpha)/\alpha} A(\tau)^{-1/\alpha} H_i^{-(\beta-\alpha)/\alpha}[H_i(ds_i / dH_i) - \beta s_i)]$; thus,

(A.4) $(dq_i^*/dH_i) > 0$ if $(d\ln s_i /d\ln H_i) \equiv E_{si,\, Hi} > \beta$.

c. The "compensated" effects of H_i, on s_i^* and q_i^*, with $w_i(H_i, \delta)$ held constant, are

(A.5) $\partial s_i^* / \partial H_i |_{w_i = const} > 0$,

as can be seen directly from equation (A.2); while from (A.3) and (A.4):

(A.6) $(\partial q_i^*/\partial H_i)|_{w_i=const} > 0$ if $(\partial \ln s_i / \partial \ln H_i)|_{w_i=const} \equiv \varepsilon_{si,\, Hi} > \beta$.

2. The impact of shifts in idiosyncratic "technology" factors $A(\tau)_i$ on s_i^* and q_i^*

a. Note that the first-order (15) condition can be expressed in terms of q_i as

(A.7) $\quad A(t)^{(1-\alpha)/\alpha} q_i^{1-\alpha} H_i^{\beta(1-\alpha)/\alpha}(h + r^2s^2t) + A(t)^{1/\alpha} q_i H_i^{\beta/\alpha} - .5rA(t)^{1/\alpha} H_i^{\beta/\alpha} \alpha w_i^{-1} = 0$.

Differentiating equation (7) with respect to A_i and collecting terms, we obtain:

(A.8) $[A(t)^{(1-\alpha)/\alpha}(1-\alpha) q_i^{-\alpha} H_i^{\beta(1-\alpha)/\alpha}(h+r^2s^2t) + A(t)^{1/\alpha} H_i^{\beta/\alpha}](dq_i/dA)$

$= .5rA(t)^{(1-\alpha)/\alpha} H_i^{\beta/\alpha} w_i^{-1} - [(1-\alpha)/\alpha] A(t)^{[(1-\alpha)/\alpha]-1} q_i^{1-\alpha} H_i^{\beta(1-\alpha)/\alpha}(h+r^2s^2t) - (1/\alpha) A(t)^{(1-\alpha)/\alpha} q_i H_i^{\beta/\alpha}$

Using (A.7), the RHS of (*), can be rewritten as $A(t)^{(1-\alpha)/\alpha} H_i^{\beta/\alpha}[.5\alpha\, r w_i^{-1} - q_i]$

The RHS of (A.8) would be positive in sign if $.5\alpha r w_i^{-1} - q_i > 0$. Since coefficient of (dq_i/dA_i) on the LHS of (A.8) is positive in sign, it follows that $(dq_i^*/dA_i) > 0$, if

(A.9) $q_i < .5\alpha r w_i^{-1}$.

We now prove that this condition is always satisfied at optimal values of s_i^*. From equation (15) in the text s_i^* must satisfy:

(15) $\quad s_i^{(1-\alpha)/\alpha} (h + r^2s^2t) + s_i^{1/\alpha} - .5r\, A^{1/\alpha}\, H_i^{\beta/\alpha}\, \alpha\, w_i^{-1} = 0$,

Multiplying (A.9) through by $A^{1/\alpha}\, H_i^{\beta/\alpha}$ we obtain:

(A.10) $q_i\, A^{1/\alpha}\, H_i^{\beta/\alpha} < .5r\, A^{1/\alpha}\, H_i^{\beta/\alpha}\, \alpha\, w_i^{-1}$

Inserting the value of q_i from equation (7) in the text into (A.10), the condition becomes:

(A.11) $s_i^{1/\alpha} < .5r\, A^{1/\alpha}\, H_i^{\beta/\alpha}\, \alpha\, w_i^{-1}$,

This equation necessarily holds for an optimal value of s_i^* since by equation (15),

$s_i^{1/\alpha} < s_i^{(1-\alpha)/\alpha} (h + r^2s^2t) + s_i^{1/\alpha} = .5r\, A^{1/\alpha}\, H_i^{\beta/\alpha}\, \alpha\, w_i^{-1}$. Thus, using (A.9) and (6):

(A.12) $\text{sgn } (dq_i^*/dA_i) = \text{sgn } (dq_i^*/dA_i) > 0$.

Table A.1. DEMAND for risky Assets: SALARIED WORKERS, Independent SCF Samples

Year	1963				1983				1989				1992			
Model[1]	Original	No-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW
Constant	-4.731	-5.709	-3.339	0.147	-2.064	-2.634	-0.214	0.252	-0.084	-1.415	0.788	2.012	-3.792	-4.331	-3.384	-2.568
	(-6.55)	(-7.84)	(-3.81)	(0.1)	(-2.32)	(-3.04)	(-0.21)	(0.24)	(-0.16)	(-2.72)	(1.4)	(3.33)	(-6.97)	(-8.05)	(-6.05)	(-4.29)
log(EDU)	0.941	0.641	1.342	1.150	1.277	1.304	1.286	1.811	0.676	0.812	0.980	1.538	1.620	1.580	1.880	1.965
	(4.89)	(3.34)	(5.64)	(5.28)	(4.55)	(4.63)	(4.32)	(6.09)	(3.86)	(4.57)	(5.41)	(8.23)	(8.71)	(8.47)	(9.74)	(10.11)
log(TA)	1.114	1.101	1.132	1.129	0.632	0.613	0.712	0.707	0.761	0.701	0.837	0.827	0.767	0.746	0.800	0.802
	(17.86)	(17.05)	(16.75)	(17.8)	(13.95)	(13.64)	(13.82)	(14.56)	(25.72)	(23.81)	(26.04)	(26.5)	(30.12)	(29.48)	(29.98)	(30.22)
log(WAGE)	-0.127		-0.312	-0.780	-0.043		-0.207	-0.470	-0.105		-0.239	-0.567	-0.051		-0.128	-0.263
	(-5.72)		(-5.43)	(-4.6)	(-2.76)		(-4.98)	(-4.77)	(-10)		(-11.62)	(-10.73)	(-5.7)		(-6.82)	(-6.6)
AGE	0.001	0.020	-0.026	0.008	0.025	0.033	-0.005	0.022	0.006	0.027	-0.024	0.006	0.012	0.022	-0.004	0.007
	(0.11)	(3.07)	(-2.39)	(1.16)	(5.15)	(8.23)	(-0.59)	(4.69)	(1.73)	(10.44)	(-4.71)	(2.07)	(4.26)	(9.82)	(-0.96)	(2.42)
RAV	*	*	*	*	-0.319	-0.319	-0.314	-0.321	-0.478	-0.513	-0.461	-0.519	-0.322	-0.319	-0.329	-0.340
					(-4.65)	(-4.62)	(-4.3)	(-4.71)	(-10.35)	(-10.97)	(-9.64)	(-11.28)	(-8.46)	(-8.35)	(-8.54)	(-8.91)
PROF	-0.379	-0.338	-0.192	-0.209	0.397	0.351	0.416	0.418	0.110	-0.183	-0.026	-0.065	0.036	-0.058	-0.023	-0.027
	(-2.26)	(-1.94)	(-1.05)	(-1.21)	(2.76)	(2.45)	(2.73)	(2.93)	(1.34)	(-2.36)	(-0.33)	(-0.85)	(0.52)	(-0.85)	(-0.33)	(-0.4)

Year	1995				1998				2001				2004			
Model[1]	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW
Constant	-2.853	-3.874	-1.963	-0.771	-1.651	-2.632	-0.806	1.033	-2.804	-3.855	-1.824	0.356	-3.209	-3.483	-2.020	-1.685
	(-5.77)	(-8.01)	(-3.74)	(-1.34)	(-4.33)	(-7.1)	(-1.94)	(2.16)	(-7.3)	(-10.18)	(-4.4)	(0.75)	(-6.88)	(-7.72)	(-4.07)	(-3.41)
log(EDU)	0.387	0.434	0.527	1.087	0.201	0.162	0.375	0.786	0.537	0.532	0.902	1.085	1.009	1.026	1.237	1.734
	(2.4)	(2.66)	(3.21)	(6.23)	(1.65)	(1.31)	(2.97)	(5.94)	(4.46)	(4.35)	(7.04)	(8.63)	(6.41)	(6.52)	(7.53)	(9.82)
log(TA)	0.977	0.941	1.028	1.037	0.947	0.934	0.998	1.022	0.986	0.945	1.054	1.055	0.792	0.787	0.828	0.832
	(40.4)	(39.19)	(39.83)	(40.28)	(47.95)	(46.93)	(47.31)	(48.84)	(47.67)	(45.71)	(46.66)	(48.71)	(38.72)	(38.69)	(38.42)	(39.91)
log(WAGE)	-0.073		-0.166	-0.480	-0.072		-0.169	-0.500	-0.092		-0.236	-0.547	-0.017		-0.134	-0.333
	(-8.39)		(-9.68)	(-9.64)	(-9.5)		(-10.14)	(-11.88)	(-11.52)		(-14.08)	(-14.19)	(-2.32)		(-8.56)	(-8.55)
AGE	-0.005	0.010	-0.025	-0.008	-0.005	0.007	-0.026	-0.014	-0.009	0.007	-0.038	-0.016	0.015	0.018	-0.010	0.005
	(-1.76)	(4.88)	(-6.07)	(-2.87)	(-2.21)	(3.77)	(-6.78)	(-5.38)	(-3.65)	(3.67)	(-9.92)	(-6.23)	(6.16)	(9.07)	(-2.53)	(1.89)
RAV	-0.037	-0.034	-0.042	-0.054	-0.044	-0.035	-0.044	-0.056	-0.031	-0.023	-0.042	-0.043	-0.226	-0.223	-0.219	-0.223
	(-0.95)	(-0.88)	(-1.05)	(-1.4)	(-1.34)	(-1.07)	(-1.33)	(-1.74)	(-0.87)	(-0.62)	(-1.12)	(-1.2)	(-6.11)	(-6.03)	(-5.74)	(-6.08)
PROF	-0.124	-0.244	-0.240	-0.247	0.103	-0.014	-0.008	-0.010	0.035	-0.156	-0.085	-0.077	0.061	0.010	0.059	0.058
	(-1.8)	(-3.59)	(-3.51)	(-3.69)	(1.75)	(-0.23)	(-0.13)	(-0.17)	(0.56)	(-2.55)	(-1.34)	(-1.27)	(1)	(0.17)	(1.02)	(1.03)

[1] Model refers to the way the log(WAGE) measure is treated in the regression (see text). * RAV is absent in the 1963-64 sample.

Table A.2. DEMAND for risky Assets: ALL INVESTORS, Independent SCF Samples

Year	1963				1983				1989				1992			
Model[1]	OLS	no-wage	2SLS	PW	OLS	no-wage	2SLS	PW	OLS	no-wage	2SLS	PW	OLS	no-wage	2SLS	PW
Constant	-5.083	-5.772	-3.013	-0.111	-3.184	-3.571	-1.353	-0.689	-0.991	-1.852	0.207	1.374	-2.543	-2.579	-0.440	-0.017
	(-8.75)	(-9.93)	(-3.86)	(-0.09)	(-3.81)	(-4.35)	(-1.37)	(-0.69)	(-2.35)	(-4.47)	(0.45)	(2.84)	(-5.55)	(-5.69)	(-0.79)	(-0.03)
log(EDU)	0.927	0.752	1.298	1.263	1.573	1.574	1.607	2.107	0.740	0.793	0.997	1.512	0.775	0.762	1.180	1.127
	(5.99)	(4.84)	(6.75)	(7.04)	(5.94)	(5.93)	(5.66)	(7.44)	(5.37)	(5.72)	(6.88)	(10.19)	(5.2)	(5.17)	(7.11)	(7.23)
log(TA)	1.086	1.059	1.089	1.086	0.640	0.629	0.718	0.717	0.755	0.726	0.830	0.821	0.792	0.791	0.825	0.832
	(21.34)	(20.43)	(19.13)	(21.28)	(14.97)	(14.77)	(14.65)	(15.7)	(34.15)	(32.96)	(34.2)	(35.68)	(36.35)	(36.46)	(35.25)	(37.16)
log(WAGE)	-0.095		-0.312	-0.765	-0.032		-0.203	-0.474	-0.067		-0.222	-0.521	-0.007		-0.294	-0.341
	(-5.7)		(-6.07)	(-5.38)	(-2.32)		(-4.95)	(-4.99)	(-8.81)		(-12.88)	(-12.4)	(-0.56)		(-7.37)	(-6.91)
AGE	0.009	0.024	-0.021	0.013	0.028	0.033	-0.002	0.022	0.015	0.028	-0.016	0.010	0.017	0.017	0.006	0.010
	(1.65)	(4.56)	(-2.26)	(2.41)	(6.25)	(8.69)	(-0.25)	(5.13)	(6.44)	(14.22)	(-4)	(4.22)	(6.62)	(6.86)	(2.04)	(3.56)
RAV	*	*	*	*	-0.296	-0.294	-0.291	-0.293	-0.472	-0.483	-0.447	-0.491	-0.341	-0.342	-0.358	-0.363
					(-4.64)	(-4.59)	(-4.25)	(-4.64)	(-13.19)	(-13.42)	(-11.91)	(-13.84)	(-10.12)	(-10.13)	(-10.03)	(-10.78)
PROF	-0.346	-0.375	-0.243	-0.260	0.234	0.215	0.273	0.274	0.085	-0.077	0.032	0.010	0.114	0.113	0.118	0.125
	(-2.6)	(-2.76)	(-1.62)	(-1.92)	(1.82)	(1.67)	(1.97)	(2.14)	(1.39)	(-1.31)	(0.52)	(0.17)	(2.02)	(2.01)	(1.99)	(2.24)
SELF	-0.983	-0.652	-1.680	-0.582	-0.710	-0.603	-1.293	-0.542	-0.424	-0.461	-0.311	-0.402	-0.438	-0.427	-0.865	-0.428
	(-5.49)	(-3.76)	(-6.61)	(-3.42)	(-4.34)	(-3.84)	(-5.92)	(-3.47)	(-5.79)	(-6.26)	(-4.02)	(-5.53)	(-6.35)	(-6.44)	(-9.41)	(-6.49)

Year	1995				1998				2001				2004			
Model[1]	OLS	no-wage	2SLS	PW	OLS	no-wage	2SLS	PW	OLS	no-wage	2SLS	PW	OLS	no-wage	2SLS	PW
Constant	-2.215	-2.076	0.409	0.586	-2.174	-2.240	0.728	2.396	-2.482	-2.810	2.179	2.098	-3.301	-3.226	-1.442	-1.095
	(-4.68)	(-4.49)	(0.65)	(0.94)	(-4.53)	(-4.72)	(1.21)	(4.13)	(-6.75)	(-7.96)	(3.55)	(4.03)	(-8.4)	(-8.43)	(-3.05)	(-2.31)
log(EDU)	0.155	0.143	0.134	0.550	0.474	0.468	0.966	1.319	0.555	0.554	0.921	1.072	0.899	0.894	0.987	1.365
	(0.98)	(0.91)	(0.8)	(3.25)	(2.74)	(2.71)	(4.82)	(7.27)	(4.83)	(4.81)	(6.56)	(8.89)	(6.54)	(6.51)	(6.8)	(9.09)
log(TA)	0.863	0.870	0.918	0.914	0.851	0.847	0.914	0.929	0.896	0.888	0.967	0.973	0.795	0.797	0.831	0.834
	(41.34)	(42.6)	(39.75)	(42.44)	(46.02)	(47)	(43.01)	(49.54)	(50.25)	(50.26)	(43.75)	(52.12)	(48.76)	(49.32)	(47)	(49.57)
log(WAGE)	0.014		-0.256	-0.381	-0.010		-0.411	-0.664	-0.034		-0.564	-0.624	0.007		-0.195	-0.327
	(1.37)		(-6.37)	(-6.28)	(-0.96)		(-10.98)	(-13.43)	(-3.17)		(-11.12)	(-12.7)	(0.83)		(-7.18)	(-7.54)
AGE	0.002	0.001	-0.005	-0.002	-0.003	-0.002	-0.016	-0.016	-0.010	-0.009	-0.024	-0.018	0.002	0.001	-0.006	-0.004
	(0.68)	(0.47)	(-1.71)	(-0.7)	(-1.21)	(-1.03)	(-5.84)	(-6.84)	(-4.39)	(-3.95)	(-8.09)	(-7.8)	(0.9)	(0.76)	(-2.73)	(-2.18)
RAV	-0.028	-0.028	-0.020	-0.028	-0.009	-0.009	-0.025	-0.039	-0.018	-0.016	-0.018	-0.019	-0.014	-0.014	0.002	0.002
	(-0.8)	(-0.82)	(-0.54)	(-0.81)	(-0.33)	(-0.31)	(-0.77)	(-1.37)	(-0.6)	(-0.53)	(-0.5)	(-0.62)	(-0.46)	(-0.45)	(0.07)	(0.07)
PRO	0.034	0.036	-0.004	0.010	0.142	0.142	0.123	0.119	0.155	0.142	0.138	0.150	0.193	0.197	0.194	0.210
	(0.62)	(0.66)	(-0.07)	(0.18)	(2.83)	(2.84)	(2.17)	(2.41)	(3.05)	(2.81)	(2.31)	(3)	(4.04)	(4.16)	(3.89)	(4.45)
SELF	-0.033	-0.080	-0.878	-0.128	0.109	0.127	-0.522	0.145	-0.151	-0.091	-0.982	-0.153	0.073	0.058	-0.339	0.019
	(-0.44)	(-1.19)	(-6.07)	(-1.89)	(1.75)	(2.15)	(-5.85)	(2.48)	(-2.42)	(-1.53)	(-9.22)	(-2.61)	(1.34)	(1.13)	(-4.39)	(0.37)

[1] Model refers to the way the log(WAGE) measure is treated in the regression (see text). * RAV is absent in the 1963-64 sample.

Table A.3. RETURNS-on-Total-Portfolio-of-Assets: SALARIED WORKERS, Independent SCF Samples

Year	1963				1983				1989				1992			
Model[1]	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW
Constant	-8.678	-9.185	-5.638	0.827	-7.969	-9.446	-5.666	-4.707	-11.245	-13.263	-9.530	-6.277	-19.182	-20.481	-18.020	-15.273
	(-7.02)	(-7.63)	(-3.61)	(0.34)	(-5.84)	(-7.04)	(-3.61)	(-2.91)	(-13.83)	(-16.6)	(-10.91)	(-6.89)	(-19.7)	(-21.19)	(-17.74)	(-14.37)
log(EDU)	0.678	0.523	1.572	1.393	1.696	1.764	1.736	2.598	1.436	1.641	1.925	3.123	4.518	4.421	5.202	5.559
	(2.06)	(1.65)	(3.71)	(3.87)	(3.94)	(4.05)	(3.86)	(5.65)	(5.34)	(6.03)	(6.85)	(11.05)	(13.58)	(13.19)	(14.85)	(16.08)
log(TA)	1.088	1.081	1.127	1.128	0.909	0.860	1.014	1.013	1.220	1.128	1.359	1.386	1.167	1.117	1.258	1.281
	(10.2)	(10.12)	(9.36)	(10.77)	(13.06)	(12.36)	(13.03)	(13.51)	(26.88)	(25.02)	(27.25)	(29.39)	(25.62)	(24.57)	(25.95)	(27.16)
log(WAGE)	-0.066		-0.467	-1.334	-0.111		-0.323	-0.771	-0.159		-0.405	-1.157	-0.123		-0.334	-0.776
	(-1.73)		(-4.56)	(-4.76)	(-4.66)		(-5.15)	(-5.07)	(-9.88)		(-12.68)	(-14.48)	(-7.67)		(-9.77)	(-10.97)
AGE	0.012	0.022	-0.045	0.002	0.025	0.046	-0.014	0.027	0.006	0.037	-0.048	-0.004	0.016	0.039	-0.028	-0.003
	(1.03)	(2.09)	(-2.39)	(0.17)	(3.34)	(7.31)	(-1.08)	(3.75)	(1.12)	(9.57)	(-6.12)	(-0.77)	(3.12)	(9.89)	(-3.52)	(-0.51)
RAV	*	*	*	*	-0.204	-0.203	-0.195	-0.206	0.219	0.166	0.254	0.155	-0.049	-0.042	-0.067	-0.103
					(-1.93)	(-1.9)	(-1.76)	(-1.96)	(3.09)	(2.31)	(3.43)	(2.24)	(-0.71)	(-0.61)	(-0.96)	(-1.52)
PROF	-0.475	-0.454	-0.236	-0.234	0.375	0.256	0.357	0.365	-0.100	-0.545	-0.279	-0.305	-0.580	-0.806	-0.715	-0.715
	(-1.65)	(-1.57)	(-0.72)	(-0.82)	(1.7)	(1.15)	(1.55)	(1.66)	(-0.8)	(-4.57)	(-2.24)	(-2.61)	(-4.65)	(-6.6)	(-5.74)	(-5.94)

Year	1995				1998				2001				2004			
Model[1]	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW
Constant	-16.995	-17.945	-15.021	-13.301	-10.946	-13.483	-9.150	-7.522	-13.026	-14.517	-12.384	-9.821	-14.530	-16.470	-13.866	-13.032
	(-20.19)	(-21.93)	(-16.69)	(-13.61)	(-13.1)	(-16.53)	(-10.03)	(-7.10)	(-16.93)	(-19.28)	(-15.42)	(-10.25)	(-14.18)	(-16.51)	(-13.01)	(-11.9)
log(EDU)	2.117	2.160	2.303	3.139	1.317	1.214	1.721	2.230	0.876	0.869	1.258	1.486	0.977	1.096	1.472	2.450
	(7.7)	(7.84)	(8.19)	(10.6)	(4.92)	(4.47)	(6.2)	(7.6)	(3.63)	(3.58)	(5.07)	(5.86)	(2.83)	(3.15)	(4.18)	(6.26)
log(TA)	1.349	1.315	1.448	1.460	1.242	1.210	1.361	1.352	1.347	1.288	1.403	1.411	1.486	1.447	1.520	1.533
	(32.75)	(32.36)	(32.78)	(33.4)	(28.71)	(27.62)	(29.42)	(29.15)	(32.52)	(31.35)	(32.06)	(32.28)	(33.06)	(32.2)	(32.89)	(33.22)
log(WAGE)	-0.068		-0.254	-0.718	-0.187		-0.402	-0.813	-0.130		-0.248	-0.610	-0.121		-0.238	-0.637
	(-4.58)		(-8.66)	(-8.5)	(-11.21)		(-10.96)	(-8.71)	(-8.16)		(-7.63)	(-7.84)	(-7.49)		(-7.1)	(-7.38)
AGE	0.038	0.051	-0.002	0.025	0.011	0.043	-0.035	0.008	0.023	0.046	-0.001	0.020	-0.014	0.008	-0.040	-0.016
	(8.4)	(15.04)	(-0.33)	(5.45)	(2.17)	(10.14)	(-4.24)	(1.44)	(4.73)	(11.54)	(-0.2)	(3.87)	(-2.62)	(1.96)	(-4.95)	(-3.02)
RAV	-0.308	-0.306	-0.317	-0.336	-0.381	-0.359	-0.380	-0.394	-0.325	-0.313	-0.334	-0.336	-0.058	-0.036	-0.030	-0.036
	(-4.66)	(-4.61)	(-4.69)	(-5.1)	(-5.36)	(-4.98)	(-5.23)	(-5.5)	(-4.51)	(-4.31)	(-4.59)	(-4.65)	(-0.71)	(-0.44)	(-0.36)	(-0.44)
PROF	0.771	0.659	0.665	0.654	0.098	-0.203	-0.189	-0.197	0.986	0.715	0.790	0.804	0.037	-0.324	-0.235	-0.232
	(6.58)	(5.74)	(5.68)	(5.75)	(0.76)	(-1.59)	(-1.47)	(-1.55)	(7.87)	(5.87)	(6.47)	(6.62)	(0.28)	(-2.6)	(-1.88)	(-1.86)

[1] Model refers to the way the log(WAGE) measure is treated in the regression (see text). * RAV is absent in the 1963-64 sample.

Table A.4. RETURNS on Total Portfolio of Assets: ALL INVESTORS, Independent SCF Samples

Year	1963				1983				1989				1992			
Model[1]	OLS	no-wage	2SLS	PW	OLS	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW
Constant	-8.301	-8.650	-4.901	0.252	-8.240	-9.104	-5.492	-4.262	-12.104	-13.278	-9.758	-6.586	-13.821	-14.097	-9.779	-8.809
	(-8.23)	(-8.76)	(-3.61)	(0.12)	(-6.47)	(-7.26)	(-3.66)	(-2.81)	(-17.91)	(-20.09)	(-13.11)	(-8.62)	(-16.74)	(-17.23)	(-9.63)	(-8.38)
log(EDU)	0.610	0.521	1.263	1.325	1.572	1.574	1.629	2.470	1.636	1.709	2.057	3.199	2.006	1.908	2.751	2.661
	(2.27)	(1.98)	(3.79)	(4.33)	(3.9)	(3.88)	(3.76)	(5.72)	(7.42)	(7.71)	(8.74)	(13.64)	(7.46)	(7.17)	(9.15)	(9.48)
log(TA)	0.983	0.970	1.011	1.012	0.933	0.907	1.053	1.056	1.153	1.113	1.291	1.311	1.250	1.241	1.309	1.326
	(11.13)	(11.01)	(10.23)	(11.63)	(14.31)	(13.94)	(14.09)	(15.16)	(32.58)	(31.64)	(32.78)	(36.04)	(31.81)	(31.7)	(30.88)	(32.87)
log(WAGE)	-0.048		-0.424	-1.202	-0.070		-0.331	-0.796	-0.091		-0.380	-1.080	-0.053		-0.593	-0.703
	(-1.67)		(-4.76)	(-4.96)	(-3.38)		(-5.29)	(-5.5)	(-7.5)		(-13.57)	(-16.27)	(-2.41)		(-8.21)	(-7.92)
AGE	0.025	0.033	-0.029	0.016	0.029	0.041	-0.017	0.023	0.029	0.046	-0.028	0.010	-0.007	-0.005	-0.027	-0.020
	(2.54)	(3.65)	(-1.77)	(1.68)	(4.27)	(7.01)	(-1.31)	(3.42)	(7.68)	(14.82)	(-4.41)	(2.54)	(-1.5)	(-1.05)	(-4.88)	(-4.13)
RAV	*	*	*	*	-0.257	-0.252	-0.247	-0.251	0.007	-0.008	0.054	-0.024	0.070	0.068	0.033	0.023
					(-2.64)	(-2.57)	(-2.37)	(-2.6)	(0.13)	(-0.15)	(0.89)	(-0.43)	(1.16)	(1.11)	(0.52)	(0.37)
PROF	-0.246	-0.261	-0.082	-0.079	0.189	0.146	0.241	0.245	-0.014	-0.234	-0.048	-0.054	-0.013	-0.018	-0.007	0.008
	(-1.07)	(-1.13)	(-0.31)	(-0.35)	(0.96)	(0.74)	(1.14)	(1.26)	(-0.14)	(-2.5)	(-0.48)	(-0.58)	(-0.13)	(-0.18)	(-0.07)	(0.08)
SELF	-0.861	-0.693	-2.090	-0.583	-0.607	-0.370	-1.492	-0.266	-0.252	-0.303	-0.046	-0.180	0.420	0.502	-0.382	0.499
	(-2.77)	(-2.35)	(-4.74)	(-2.01)	(-2.44)	(-1.54)	(-4.48)	(-1.12)	(-2.16)	(-2.58)	(-0.37)	(-1.57)	(3.38)	(4.2)	(-2.3)	(4.2)

Year	1995				1998				2001				2004			
Model[1]	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW
Constant	-18.673	-19.364	-18.709	-18.445	-16.056	-16.319	-11.942	-9.954	-14.599	-14.745	-14.180	-14.783	-18.291	-18.934	-15.147	-14.441
	(-23.59)	(-25.01)	(-19)	(-17.52)	(-15.17)	(-15.58)	(-9.65)	(-7.69)	(-19.34)	(-20.36)	(-13.35)	(-13.67)	(-20.2)	(-21.47)	(-14.18)	(-13.2)
log(EDU)	2.092	2.148	2.146	2.289	2.906	2.883	3.617	4.051	1.878	1.877	1.918	1.873	2.743	2.787	2.986	3.782
	(7.95)	(8.16)	(8.16)	(8.03)	(7.61)	(7.55)	(8.75)	(10.01)	(7.96)	(7.96)	(7.9)	(7.47)	(8.67)	(8.81)	(9.11)	(10.91)
log(TA)	1.507	1.477	1.490	1.493	1.173	1.157	1.257	1.270	1.156	1.152	1.161	1.152	1.258	1.243	1.316	1.322
	(43.18)	(43.24)	(41.28)	(41.24)	(28.74)	(29.09)	(28.67)	(30.37)	(31.58)	(31.79)	(30.35)	(29.69)	(33.51)	(33.37)	(32.97)	(34.04)
log(WAGE)	-0.071		-0.067	-0.131	-0.040		-0.606	-0.912	-0.015		-0.064	0.005	-0.057		-0.413	-0.689
	(-4.05)		(-1.07)	(-1.29)	(-1.72)		(-7.86)	(-8.27)	(-0.69)		(-0.73)	(0.05)	(-3.11)		(-6.76)	(-6.89)
AGE	0.006	0.009	0.007	0.008	0.011	0.012	-0.008	-0.006	0.028	0.028	0.027	0.028	0.005	0.008	-0.009	-0.005
	(1.34)	(2.01)	(1.54)	(1.74)	(2.23)	(2.65)	(-1.36)	(-1.24)	(6.18)	(6.36)	(5.3)	(6.05)	(1.17)	(1.77)	(-1.65)	(-1)
RAV	0.135	0.138	0.141	0.138	-0.361	-0.360	-0.384	-0.401	-0.395	-0.394	-0.395	-0.394	0.059	0.056	0.089	0.089
	(2.32)	(2.38)	(2.41)	(2.38)	(-5.69)	(-5.67)	(-5.73)	(-6.33)	(-6.23)	(-6.21)	(-6.22)	(-6.21)	(0.85)	(0.81)	(1.24)	(1.28)
PROF	0.750	0.738	0.727	0.729	0.073	0.075	0.046	0.043	0.700	0.694	0.694	0.694	-0.005	-0.042	-0.048	-0.015
	(8.28)	(8.14)	(7.99)	(8.02)	(0.67)	(0.68)	(0.4)	(0.39)	(6.73)	(6.7)	(6.69)	(6.7)	(-0.05)	(-0.38)	(-0.43)	(-0.14)
SELF	-0.089	0.143	-0.067	0.126	0.107	0.180	-0.778	0.204	0.087	0.113	0.013	0.114	0.396	0.523	-0.319	0.441
	(-0.71)	(1.26)	(-0.3)	(1.11)	(0.78)	(1.37)	(-4.23)	(1.57)	(0.68)	(0.93)	(0.07)	(0.93)	(3.18)	(4.43)	(-1.83)	(3.74)

[1] Model refers to the way the log(WAGE) measure is treated in the regression (see text). * RAV is absent in the 1963-64 sample.

Table A.5. RETURNS-on-Total-Portfolio-of-Assets: ALL INVESTORS, Independent Samples from Eight Years

Year	1963				1983				1989				1992			
Model[1]	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW
Constant	-3.773	-3.611	-2.374	0.346	-6.825	-7.484	-4.922	-3.969	-11.794	-12.668	-9.815	-6.964	-12.536	-12.792	-9.565	-8.801
	(-4.13)	(-3.98)	(-2.15)	(0.19)	(-5.56)	(-6.19)	(-3.52)	(-2.72)	(-17.78)	(-19.54)	(-13.63)	(-9.25)	(-15.77)	(-16.24)	(-10.05)	(-8.7)
log(EDU)	-0.216	-0.135	0.175	0.261	0.873	0.860	0.951	1.575	1.405	1.448	1.781	2.783	1.614	1.522	2.177	2.109
	(-0.91)	(-0.59)	(0.63)	(0.95)	(2.22)	(2.18)	(2.32)	(3.7)	(6.48)	(6.66)	(7.78)	(11.93)	(6.24)	(5.95)	(7.68)	(7.76)
log(TA)	0.907	0.918	0.936	0.939	1.093	1.076	1.172	1.176	1.229	1.203	1.338	1.360	1.355	1.347	1.394	1.408
	(11.93)	(12.13)	(11.78)	(12.39)	(16.95)	(16.71)	(16.56)	(17.26)	(34.99)	(34.41)	(34.93)	(37.74)	(35.58)	(35.49)	(34.84)	(36.06)
log(WAGE)	0.037		-0.162	-0.558	-0.056		-0.245	-0.594	-0.070		-0.318	-0.937	-0.049		-0.450	-0.536
	(1.43)		(-2.19)	(-2.59)	(-2.82)		(-4.16)	(-4.23)	(-5.85)		(-11.54)	(-14.12)	(-2.34)		(-6.61)	(-6.24)
AGE	0.017	0.012	-0.011	0.005	0.017	0.026	-0.016	0.013	0.024	0.037	-0.024	0.007	-0.015	-0.013	-0.030	-0.025
	(1.96)	(1.5)	(-0.84)	(0.56)	(2.51)	(4.48)	(-1.34)	(2.05)	(6.52)	(11.91)	(-3.84)	(1.83)	(-3.47)	(-3.08)	(-5.79)	(-5.29)
RAV	*	*	*	*	-0.126	-0.119	-0.125	-0.127	0.155	0.151	0.178	0.111	0.243	0.240	0.208	0.201
					(-1.33)	(-1.26)	(-1.27)	(-1.35)	(2.71)	(2.63)	(2.98)	(1.97)	(4.12)	(4.07)	(3.38)	(3.4)
PROF	0.062	0.066	0.122	0.139	0.085	0.049	0.126	0.129	-0.040	-0.209	-0.057	-0.056	-0.070	-0.075	-0.065	-0.054
	(0.31)	(0.33)	(0.58)	(0.69)	(0.45)	(0.26)	(0.64)	(0.69)	(-0.42)	(-2.27)	(-0.58)	(-0.62)	(-0.72)	(-0.77)	(-0.64)	(-0.55)
SELF	0.015	-0.124	-0.681	-0.093	-0.291	-0.096	-0.947	-0.036	-0.120	-0.152	0.040	-0.070	0.642	0.718	0.039	0.709
	(0.05)	(-0.48)	(-1.85)	(-0.36)	(-1.21)	(-0.41)	(-3)	(-0.16)	(-1.04)	(-1.31)	(0.33)	(-0.62)	(5.36)	(6.23)	(0.25)	(6.18)
log(SHARE)	0.891	0.873	0.839	0.843	0.445	0.454	0.422	0.425	0.313	0.329	0.277	0.275	0.506	0.506	0.487	0.490
	(15.45)	(15.49)	(13.78)	(14.71)	(9.9)	(10.1)	(8.92)	(9.42)	(14.02)	(14.82)	(11.75)	(12.43)	(20.19)	(20.2)	(18.6)	(19.55)

Year	1995				1998				2001				2004			
Model[1]	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW
Constant	-18.092	-18.823	-18.815	-18.598	-15.519	-15.764	-12.096	-10.459	-14.027	-14.096	-14.691	-15.282	-16.873	-17.552	-14.553	-13.989
	(-23.08)	(-24.55)	(-19.3)	(-17.88)	(-14.73)	(-15.11)	(-9.97)	(-8.1)	(-18.63)	(-19.48)	(-13.89)	(-14.2)	(-18.86)	(-20.13)	(-14.02)	(-12.99)
log(EDU)	2.051	2.111	2.111	2.146	2.789	2.767	3.412	3.774	1.750	1.749	1.703	1.618	2.357	2.404	2.579	3.219
	(7.89)	(8.12)	(8.12)	(7.61)	(7.34)	(7.29)	(8.4)	(9.32)	(7.45)	(7.45)	(7.01)	(6.45)	(7.55)	(7.7)	(8.07)	(9.37)
log(TA)	1.543	1.511	1.512	1.515	1.210	1.195	1.275	1.285	1.180	1.178	1.169	1.158	1.347	1.330	1.385	1.390
	(44.56)	(44.58)	(42.25)	(42.29)	(29.65)	(30.03)	(29.61)	(30.82)	(32.34)	(32.6)	(30.72)	(30.05)	(36.01)	(35.86)	(35.46)	(36.09)
log(WAGE)	-0.075		-0.001	-0.032	-0.037		-0.519	-0.772	-0.007		0.068	0.153	-0.060		-0.333	-0.554
	(-4.32)		(-0.01)	(-0.32)	(-1.63)		(-6.76)	(-6.92)	(-0.33)		(0.77)	(1.49)	(-3.32)		(-5.58)	(-5.61)
AGE	0.005	0.008	0.008	0.008	0.011	0.013	-0.004	-0.003	0.030	0.030	0.032	0.033	0.005	0.007	-0.006	-0.003
	(1.24)	(1.96)	(1.85)	(1.87)	(2.38)	(2.79)	(-0.77)	(-0.59)	(6.7)	(6.84)	(6.38)	(6.95)	(1.02)	(1.66)	(-1.19)	(-0.62)
RAV	0.142	0.146	0.146	0.146	-0.359	-0.358	-0.379	-0.393	-0.391	-0.391	-0.390	-0.390	0.065	0.062	0.088	0.088
	(2.48)	(2.53)	(2.53)	(2.53)	(-5.69)	(-5.67)	(-5.76)	(-6.23)	(-6.2)	(-6.19)	(-6.18)	(-6.18)	(0.95)	(0.91)	(1.27)	(1.29)
PROF	0.741	0.728	0.728	0.726	0.038	0.040	0.020	0.018	0.664	0.661	0.661	0.659	-0.088	-0.126	-0.128	-0.101
	(8.29)	(8.13)	(8.09)	(8.09)	(0.35)	(0.36)	(0.18)	(0.16)	(6.43)	(6.42)	(6.41)	(6.39)	(-0.82)	(-1.18)	(-1.17)	(-0.94)
SELF	-0.081	0.164	0.161	0.160	0.080	0.148	-0.668	0.173	0.122	0.134	0.243	0.150	0.365	0.498	-0.179	0.433
	(-0.64)	(1.47)	(0.72)	(1.42)	(0.59)	(1.14)	(-3.68)	(1.34)	(0.96)	(1.11)	(1.31)	(1.24)	(2.98)	(4.3)	(-1.06)	(3.73)
log(SHARE)	0.263	0.261	0.261	0.260	0.247	0.248	0.212	0.211	0.231	0.231	0.234	0.237	0.430	0.429	0.412	0.412
	(10.97)	(10.86)	(10.81)	(10.79)	(8.3)	(8.32)	(6.74)	(6.98)	(8.72)	(8.74)	(8.73)	(8.86)	(14.57)	(14.52)	(13.63)	(13.94)

[1] Model refers to the way the log(WAGE) measure is treated in the regression (see text). * RAV is absent in the 1963-64 sample.

Table A.6. RETURNS on Total Portfolio of Assets Conditional on log(SHARE): SALARIED WORKERS, Independent SCF Samples

Year	1963				1983				1989				1992			
Model[1]	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW
Constant	-4.448	-4.235	-2.915	0.706	-7.077	-8.260	-5.577	-4.813	-11.221	-12.818	-9.727	-6.780	-17.602	-18.600	-16.646	-14.235
	(-4.01)	(-3.85)	(-2.26)	(0.34)	(-5.39)	(-6.4)	(-3.78)	(-3.08)	(-14.03)	(-16.37)	(-11.42)	(-7.53)	(-18.46)	(-19.65)	(-16.86)	(-13.71)
log(EDU)	-0.163	-0.033	0.478	0.444	1.144	1.177	1.203	1.837	1.249	1.386	1.681	2.738	3.843	3.735	4.439	4.765
	(-0.56)	(-0.12)	(1.33)	(1.38)	(2.73)	(2.79)	(2.81)	(4.07)	(4.72)	(5.19)	(6.11)	(9.72)	(11.75)	(11.37)	(12.93)	(13.96)
log(TA)	0.986	0.994	1.020	1.022	1.068	1.034	1.133	1.136	1.286	1.222	1.400	1.429	1.265	1.227	1.339	1.361
	(10.78)	(10.87)	(10.38)	(11.2)	(15.42)	(14.92)	(15.19)	(15.43)	(28.5)	(27.24)	(28.68)	(30.58)	(28.2)	(27.44)	(28.35)	(29.41)
log(WAGE)	0.048		-0.213	-0.690	-0.092		-0.238	-0.574	-0.130		-0.345	-1.015	-0.102		-0.282	-0.669
	(1.42)		(-2.46)	(-2.77)	(-4.02)		(-3.97)	(-3.87)	(-8.09)		(-10.85)	(-12.65)	(-6.49)		(-8.47)	(-9.67)
AGE	0.012	0.005	-0.025	-0.005	0.014	0.031	-0.012	0.018	0.004	0.029	-0.042	-0.005	0.011	0.030	-0.026	-0.006
	(1.14)	(0.56)	(-1.58)	(-0.46)	(1.95)	(4.95)	(-0.98)	(2.54)	(0.83)	(7.46)	(-5.49)	(-1.13)	(2.19)	(7.64)	(-3.41)	(-1.09)
RAV	*	*	*	*	-0.066	-0.059	-0.065	-0.071	0.351	0.327	0.369	0.285	0.086	0.097	0.067	0.034
					(-0.64)	(-0.57)	(-0.62)	(-0.69)	(4.95)	(4.57)	(5.03)	(4.08)	(1.28)	(1.44)	(0.97)	(0.52)
PROF	-0.136	-0.161	-0.079	-0.061	0.203	0.098	0.184	0.190	-0.131	-0.487	-0.272	-0.288	-0.595	-0.781	-0.706	-0.704
	(-0.55)	(-0.65)	(-0.3)	(-0.25)	(0.95)	(0.46)	(0.85)	(0.89)	(-1.06)	(-4.17)	(-2.24)	(-2.51)	(-4.9)	(-6.59)	(-5.86)	(-6.00)
log(SHARE)	0.894	0.867	0.816	0.825	0.432	0.450	0.414	0.420	0.276	0.314	0.249	0.250	0.417	0.434	0.406	0.404
	(12.59)	(12.65)	(10.71)	(11.84)	(8.74)	(9.07)	(8.1)	(8.41)	(10.19)	(11.69)	(8.85)	(9.38)	(14.43)	(15.03)	(13.76)	(14.07)

Year	1995				1998				2001				2004			
Model[1]	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW	Original	no-wage	2SLS	PW
Constant	-15.900	-16.420	-14.304	-13.018	-10.511	-12.662	-8.942	-7.799	-12.305	-13.395	-11.922	-9.912	-13.183	-14.979	-13.053	-12.353
	(-19.3)	(-20.46)	(-16.39)	(-13.64)	(-12.64)	(-15.58)	(-9.91)	(-7.41)	(-16.03)	(-17.78)	(-14.99)	(-10.43)	(-13.04)	(-15.2)	(-12.51)	(-11.45)
log(EDU)	1.968	1.989	2.111	2.740	1.264	1.164	1.624	2.019	0.738	0.714	1.029	1.210	0.554	0.657	0.974	1.752
	(7.34)	(7.42)	(7.74)	(9.42)	(4.75)	(4.33)	(5.91)	(6.9)	(3.08)	(2.97)	(4.17)	(4.77)	(1.62)	(1.92)	(2.81)	(4.5)
log(TA)	1.358	1.339	1.438	1.446	1.256	1.231	1.362	1.347	1.350	1.304	1.389	1.397	1.573	1.539	1.590	1.601
	(33.83)	(33.83)	(33.61)	(33.88)	(29.21)	(28.33)	(29.78)	(29.23)	(32.87)	(32.06)	(32.11)	(32.19)	(35.22)	(34.45)	(34.92)	(35)
log(WAGE)	-0.040		-0.194	-0.542	-0.168		-0.358	-0.679	-0.107		-0.188	-0.471	-0.114		-0.184	-0.503
	(-2.74)		(-6.72)	(-6.49)	(-10.03)		(-9.76)	(-7.21)	(-6.63)		(-5.72)	(-5.97)	(-7.17)		(-5.57)	(-5.87)
AGE	0.040	0.047	0.007	0.028	0.012	0.041	-0.028	0.012	0.025	0.044	0.008	0.024	-0.020	0.001	-0.036	-0.018
	(9.03)	(14.25)	(0.99)	(6.21)	(2.45)	(9.69)	(-3.46)	(2.1)	(5.23)	(11.1)	(1.1)	(4.67)	(-3.85)	(0.21)	(-4.58)	(-3.42)
RAV	-0.294	-0.292	-0.302	-0.316	-0.370	-0.348	-0.369	-0.378	-0.317	-0.307	-0.323	-0.325	0.037	0.059	0.059	0.054
	(-4.56)	(-4.53)	(-4.61)	(-4.91)	(-5.23)	(-4.88)	(-5.13)	(-5.32)	(-4.43)	(-4.27)	(-4.49)	(-4.54)	(0.46)	(0.74)	(0.73)	(0.67)
PROF	0.818	0.755	0.752	0.745	0.071	-0.199	-0.187	-0.194	0.977	0.761	0.811	0.823	0.011	-0.328	-0.259	-0.255
	(7.17)	(6.75)	(6.62)	(6.69)	(0.56)	(-1.57)	(-1.47)	(-1.54)	(7.86)	(6.31)	(6.72)	(6.83)	(0.09)	(-2.69)	(-2.12)	(-2.09)
log(SHARE)	0.384	0.394	0.365	0.367	0.263	0.312	0.259	0.268	0.257	0.291	0.254	0.254	0.420	0.428	0.403	0.403
	(14.35)	(14.83)	(13.38)	(13.74)	(7.82)	(9.27)	(7.55)	(7.87)	(8.64)	(9.87)	(8.4)	(8.45)	(12.71)	(12.9)	(12.05)	(12.08)

[1] Model refers to the way the log(WAGE) measure is treated in the regression (see text). * RAV is absent in the 1963-64 sample.