# Equity Capital: A Puzzle?*

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**Abstract**

In almost any equilibrium model, shifts in sectoral wealth have direct implications for asset returns so as to induce investors to hold more or less of their wealth in the sector. For an expanding sector, these inducements can be in the form of higher mean or lower volatility of asset. In this paper, we document that shifts in sectoral financial wealth have virtually no bearing on the subsequent mean and volatility of sectoral returns. About 90% of the wealth share fluctuations are due to movements in net payouts and 10% due to changes in expected returns. Our evidence is that sectoral wealth and asset returns show no relation—this leads to the equity capital puzzle. Why then are investors willing to hold more (less) wealth share of an expanding (contracting) sector?

# 1 Introduction

Sectoral wealth (industry portfolios) changes across time — in 1950 the equity capital of the health sector was 9% of total market capitalization, while in 2004 it stands at 20%. This is shown in Figure 1 which displays the variation in sectoral shares over time for 12 different industries. We show that relative wealth shifts are due either to differential changes in expected returns and/or to changes in sectoral output shares. The latter can happen due to expansions or contractions of different sectors. In equilibrium, agents have to hold all equity wealth; hence, shifts in sectoral equity wealth must contain information about shifts in expected returns and/or about return volatility. That is, in sectors in which wealth is expanding, either the sector's mean equity return should be rising or its volatility falling to provide investors with better trade-offs to hold the expanded sector. More generally, in equilibrium, sectoral shifts in wealth should have implications for the distribution of asset returns. Our empirical evidence indicates that sectoral shift in wealth have almost no information about subsequent asset returns–leading to an equity wealth reallocation puzzle. That is, what inducements does the market offer to investors to hold more wealth in an expanding sector and less in a contracting one?

To provide some intuition, consider the implications when agents in the economy use mean and variance for their portfolio choice. In this case, the equilibrium wealth shares, $w_t$, equal $\frac{1}{\gamma}\Sigma_t^{-1}\mu_t$, where $\gamma$ is aggregate risk aversion, $\Sigma_t$ is the variance-covariance matrix, and $\mu_t$ the expected return vector. Equilibrium allocations of wealth, that is the shares of market capitalization, are pinned down by the conditional mean of returns and their joint second moment properties. In this setup consider the implications of the rise in the market capitalization share of telecommunications sector, which rose during the 90's from 3% to 10%. For investors to be willing to hold more and more of their financial wealth in this sector, the market has to provide additional inducements; the Sharpe ratio must be rising or more generally the mean and variance must adjust to make it more attractive to invest in the telecommunications sector. That is, market clearing conditions require that sectoral wealth share shifts must predict the mean and variance (or covariances) of returns. As wealth shares fluctuate, so should the empirical distribution of asset returns. While the focus on the mean and variance is motivated by the implications of the CAPM—these dimensions (i.e., the mean and variance) continue in theory to be the first order effects that drive portfolio choice even in more general settings. Additional dimensions, such as hedging demands, may also play a role in determining portfolio choice; however, in this paper we concentrate on these first order effects.

The equilibrium implications of the CAPM and sectoral shifts are also considered in Rosenberg and Ohlson (1979), Menzly, Santos and Veronesi (2004), and Cochrane, Longstaff, and Santa-Clara (2004). Bansal, Dittmar, and Lundblad (2002), and Hansen, Heaton and Li (2004) look at properties of sectoral dividend shares to explain differences in mean returns. As in the CAPM, Cochrane, Longstaff, and Santa-Clara (2004) theoretically show that the asset betas and hence the mean returns and Sharpe Ratios for expanding sectors typically tend to rise; this is the inducement that the market provides for the agents to hold more current wealth in a given sector. In economies with more general preferences, such as Epstein and Zin (1989) preferences, wealth share allocation across assets will reflect the usual myopic Sharpe Ratio considerations as well as hedging demands. The first order effects are driven by the variation in mean and variance. It is important to note that the ability to explain differences in mean expected returns across assets, as some of the aforementioned papers claim to do, is not sufficient to explain the variation in wealth shares. The reason being that, in equilibrium, variation in wealth shares is determined, as per theory, by the *entire* joint distribution of returns and not just the means. Hence, explaining the equity capital puzzle that we highlight in this paper goes above and beyond explanations of mean returns.

The issue of optimal allocation of wealth across different sectors of the economy is also important from the perspective of production based multi-sector models. An important margin in these models connects holdings of sectoral wealth and return distribution. Therefore, much of our empirical work and its implications also have direct bearing on this research. For example, Long and Plosser (1983), Boldrin, Christiano and Fisher (2001) consider multi-sector model but do not explore the connection between sectoral wealth and returns. Investors in these economies hold sectoral wealth largely along the mean and variance dimension, and thus the equity capital puzzle we highlight in this paper provides an important challenge for this literature as well.

The current equity wealth of a given sector is determined by the market value of existing equity shares plus the dollar value of new equity capital created in a given sector. We provide an important relationship between current wealth shares, sectoral net flows (net payouts), and expected returns.[1] In section 2.2, we show that discounting the net outflow equals the

[1] The traditional approach is to discount the dividends that an investor holding one share would receive. This is fine for asking questions about risk premia and returns. This approach assumes that the sectoral

payouts from a sector minus the inflow of resources for each sector, via entry of new firms or expansion of existing ones, and thus provides the link to wealth shares. This result implies that variation in wealth shares reflects variation in the expected sectoral net payouts growth and the variation in expected returns over the market. This decomposes the variation in sectoral wealth shares into a component that reflects its long run covariation with sectoral net payout growth and the long run covariation with long run sectoral excess returns. Notice that this decomposition has to account for the fact that during periods of large inflows into the equity markets, the net outflow to investors can be negative. Other sources of household income finance, (e.g., labor income) finance the expansion of equity capital. The fact that net payoffs can become negative implies that new investments in sectors are important for understanding sectoral wealth shifts.

Given the wealth share decomposition, one should expect that variation in the wealth shares is significantly explained by variation in the expected excess return. However, wealth shares have no predictive power for future returns and almost all of wealth share fluctuations are due to variation in expected net outflow growth and close to zero due to variation in expected return. In fact, our results indicate that expanding sectors offer lower Sharpe ratios and poor expected returns in the future. Sectors that have a positive share shock experience lower subsequent expected returns and a lower Sharpe ratio. The projection coefficient of future returns on current shares (or share changes) yield negative to zero slope coefficients. Hence mean returns adjustments, while there, are quite the opposite to what one might expect based on model predictions. Bansal (2004) argues that even if expected returns are constant for all assets, then the margin of adjustment for sectoral reallocation will be in the volatility of returns—that is expanding sectors should have lower return variance and via that a higher Sharpe ratio. While expanding sectors do have a lower variance, it is not the case that they have higher Sharpe ratios.

One possibility that we entertain and find is that when wealth shares are defined relative to aggregate wealth that includes human capital, these shares move very little. This is robust for different plausible aggregate wealth measures. In this case, again, movements in the first two moments of returns cannot account for wealth shifts. This leads to the puzzle: If sectoral wealth is moving about, what induces agents, in a competitive market, to hold these in their equity portfolios?

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scale is exogenous and the traditional dividend-per-dollar invested discounting specification does not provide the evolution of sectoral wealth across time.

The remainder of the paper is as follows: Section 2 describes the relationship between wealth shares, net payouts that account for investments into and out of a sector, and returns. In Section 3, we provide a simple example that demonstrates the general equilibrium link between shares and the first two moments of returns. Section 4 describes our data, while Section 5 contains the empirical analysis. Section 6 provides concluding remarks.

# 2 Wealth Shares, Growth, and Expected Return

In this section, we develop a decomposition that links wealth shares to sectoral growth and expected returns. Consider the return per share,

$$R_{t+1} = \frac{(n_t d_{t+1} + n_t p_{t+1} - n_{t+1} p_{t+1} + n_{t+1} p_{t+1})}{n_t p_t} \tag{1}$$

The market value of existing shares is $V_t \equiv n_t p_t$, which is the market capitalization or equity wealth in a given firm/sector. Price per share is $p_t$, dividends per share are $d_t$, and the number of outstanding shares at $t$, is $n_t$. The above equation implies that

$$R_{t+1} = \frac{D_{t+1} - I_{t+1} + V_{t+1}}{V_t} \tag{2}$$

where

$$D_{t+1} = n_t d_{t+1} + (n_t - n_{t+1})^- p_{t+1}, \quad D_{t+1} \geq 0 \tag{3}$$

are the repurchase adjusted cash-dividends paid out by the equity markets. The minus reflects reduction in shares – the second term lights up when $n_{t+1}$ is less than or equal to $n_t$, and

$$I_{t+1} = (n_{t+1} - n_t)^+ p_{t+1}, \quad I_{t+1} \geq 0 \tag{4}$$

is the inflow of resources at date $t+1$ into the corporate sector, reflecting new investments in equity when $n_{t+1}$ is greater than $n_t$.

We refer to $\frac{D_t}{V_{t-1}}$ as the payout yield; this includes outflows from firms to investors (cash+repurchases) relative to market capitalization. Similarly, we name $\frac{I_t}{V_{t-1}}$ as the investment yield, and it corresponds to inflows from investors into firms. These two yields, measure the actual quantities on aggregate inflows and outflows, into and from the corporate sector.

The equation above implies two equivalent expressions

$$\frac{V_{t+1}}{V_t} = R_{t+1} - \frac{D_{t+1}}{V_t} + \frac{I_{t+1}}{V_t} \tag{5}$$

That is equity market capitalization growth in a sector rises with equity returns and greater investment, and falls with larger payouts. A present value representation of returns implies that

$$V_t = \sum_{j=1}^{\infty} \exp^{(-\sum_{k=1}^{j} \log R_{t+k})}(D_{t+j} - I_{t+j}) \tag{6}$$

That is, the current market capitalization reflects the discounted sum of the aggregate payouts less aggregate inflows (investments) into the sector. The *aggregate* net dividend yield (or net payouts) is

$$y_{t+1} \equiv \frac{D_{t+1} - I_{t+1}}{V_t}.$$

It is important to note that future dividends are expected to rise due to current investments $I$—these expectations are reflected in the current market value of the sector.

## 2.1 Wealth Shares and Payout Shares

As the previous discussion suggests, the appropriate measurement of wealth shares is crucial for trying to link them to the return distribution. It is important to acknowledge that wealth shares are determined by the shares of net payouts (e.g., equation (6). One has to recognize that these can be fundamentally different from the standard dividend share models (e.g. Cochrane, Longstaff, and Santa-Clara (2004), Santos and Veronesi (2003)). In those models, the dividends of sectors cannot become negative; however, as we show below, even for the aggregate market the total net payouts can become negative. That is, equilibrium models for aggregate dividends ought to allow for negative payouts (or net dividends). The dividend shares in Bansal, Dittmar, and Lundblad (2004) and Hansen, Heaton, and Li (2004) can become negative; however, these papers do not deal with the issue of aggregate payouts. To the best of our knowledge, no other papers provide such measurements. Our measures indicate that any theory about wealth shares should also incorporate the possibility of negative payouts. The time-periods of negative net payouts are the time periods when investors inject more resources into the various sectors than what they receive from these sectors.

## 2.2 The Return-Shares Decomposition

In this section we provide the present value based decomposition that links wealth shares to future asset returns and expected net payout growth. This decomposition helps interpret the sources of variation in wealth shares.

To achieve this decomposition, note that Equation (2) can conveniently be rewritten as

$$R_{t+1} = \frac{D_{t+1} + V_{t+1}(1 - \chi_{t+1})}{V_t}$$

where $\chi_{t+1} = I_{t+1}/V_{t+1}$ is the investment rate. Taking logs and factoring out dividends, this equation can be stated as

$$r_{t+1} = g_{t+1} - vd_t + \log[\exp\{vd_{t+1} + \log(1 - \chi_{t+1})\} + 1] \tag{7}$$

with $g_{t+1} \equiv \log(D_{t+1}/D_t)$, $vd_t \equiv \log(V_t/D_t)$. We now we make two approximations. First, the variable $\chi_{t+1}$ is very small for all sectors, hence $\log(1 - \chi_{t+1}) \approx -\chi_{t+1}$. Second, using a first order Taylor series expansion around $vd_{t+1} - \chi_{t+1}$, it follows that

$$r_{t+1} = \kappa_0 + g_{t+1} - vd_t + \kappa_1(vd_{t+1} - \chi_{t+1}) \tag{8}$$

where $\kappa_1$ is an approximation constant based on the average values of $vd$ and $\chi$, namely $\kappa_1 = \frac{\exp(\bar{v}d - \bar{\chi})}{1+\exp(\bar{v}d - \bar{\chi})}$ and $\kappa_0 = \log[\exp(\bar{v}d - \bar{\chi}) + 1]$. The above expression implies that,

$$vd_t = \frac{\kappa_0}{1 - \kappa_1} + \sum_{j=1}^{\infty} \kappa_1^{j-1}[(g_{t+j} - \kappa_1\chi_{t+j}) - r_{t+j}] \tag{9}$$

Hence we have the usual formula, but with the modified growth rate $g_{t+j} - \kappa_1\chi_{t+j}$.

An expression for wealth shares is also easy to derive. Relative to total market capitalization, $V_{m,t}$, (assuming, as in the data, that all $\kappa_1$'s are about the same)

$$\log\frac{V_t}{V_{m,t}} = \log\frac{D_t}{D_{m,t}} + \sum_{j=1}^{\infty} \kappa_1^{j-1}[(g_{t+j} - \kappa_1\chi_{t+j}) - (g_{m,t+j} - \kappa_1\chi_{m,t+j}) - (r_{t+j} - r_{m,t+j})] \tag{10}$$

Clearly sectors that are expected to grow (dividend growth net of investments) more rapidly see a rise in the relative wealth share. The above equation implies that for relative wealth share or market capitalization share, $w_t$,

$$\begin{aligned} Var(\log w_t) &= cov(\log \frac{D_t}{D_{m,t}} + \sum_{j=1}^{\infty} \kappa_1^{j-1}[(g_{t+j} - \kappa_1 \chi_{t+j}) - (g_{m,t+j} - \kappa_1 \chi_{m,t+j})], \log w_t) \\ & \quad - cov(\sum_{j=1}^{\infty} \kappa_1^{j-1}(r_{t+j} - r_{m,t+j}), \log w_t) \end{aligned} \tag{11}$$

The above decomposition shows that variation in wealth shares is due to variation in net payoff growth or due to variation in expected excess returns. That is, fluctuations in wealth shares should predict relative (to the market) outflow growth or excess returns. The decomposition also provides a basis for thinking about what data dimensions explain the variation in wealth share fluctuations. Is the dominant influence variation in net outflows, or is it expected excess returns? Equilibrium models, such as the CAPM, imply that wealth shares and Sharpe ratios are very tightly related; intuitively, and as in Cochrane, Longstaff, and Santa-Clara (2004) an increase in the wealth share should increase the Sharpe ratio. We recognize that there are pathological situations, such as when one sector starts to dominate the market (shares close to one), in which case the implications for the Sharpe ratio may change. However, given the large number of sectors that we entertain in our empirical work, we do not think that these extreme share outcomes are empirically important.

The decomposition is also useful in demonstrating the intuitive notion that an increase in sectoral output share should translate into higher mean returns. As a given sector expands in relative output, it also finances a bigger share of the income and consumption — expanding sectors contribute more to aggregate income and consumption and hence systematic risks. The exposure to systematic risks of the expanding sector increases, which, in equilibrium, translates to larger betas and ex-ante risk premium. Imagine, for example, that portfolio choice is governed by mean-variance arithmetic; it can be easily shown (see the Appendix for details) that in equilibrium, the expected return vector, $\bar{\mathbf{r}}_\mathbf{t}$ approximately follows

$$\bar{\mathbf{r}}_\mathbf{t} = [\mathbf{1} + \eta_\mathbf{t} + \tau \bar{\mathbf{r}}_{\mathbf{m,t}}][\frac{\mathbf{1}}{\alpha}\boldsymbol{\Sigma}_\mathbf{t}^{-\mathbf{1}} + \tau \mathbf{I}]^{-\mathbf{1}}$$

where $\eta_t$ are the expected future output shares given in equation (11), $\Sigma$ is the variance-covariance matrix of returns, and $\tau$ is an approximating constant. This equation shows that under the CAPM-style assumptions, the ex-ante mean return is increasing in the output share (dividend share). The mean return of expanding sectors rises as the assets' $\beta$ rises. This intuition is also captured in Cochrane, Longstaff, and Santa-Clara (2004) in their log utility example, wherein mean-variance aspects determine the portfolio choice. As will be clear from our equilibrium discussion in the next section, this argument also goes through for more general preferences.

Throughout the paper, we will assume that wealth shares and payoff shares are stationary. That is, we assume that that they have unit cointegration with the aggregate payoffs and with aggregate wealth.

# 3 Equilibrium Implications for Returns and Wealth Shares

## 3.1 A Model for Wealth Share Evolution

The above derivation provides non-parametric implications of movements in wealth shares for future net payoff growth rates and expected returns. In this section we highlight the link between wealth shares and asset returns in a general equilibrium model with investments.

Let preferences be the standard log utility. Sector (firm) $j$ can offer additional shares at date $t$ at a price of $p_{j,t}$. This corresponds to share issuance and expansion of capital in the firm. When a sector expands, the net new equity capital it receives is $p_{j,t}(n_{j,t} - n_{j,t-1})$. The value of the sector (market capitalization) at date $t$ is $V_{j,t} = p_{j,t}n_{j,t}$, and the sector's aggregate dividends are $D_{j,t} = d_{j,t}n_{j,t-1}$.[2] The new investment relative to market capitalization for sector $j$ is $\chi_{j,t} = \frac{p_{j,t}(n_{j,t}-n_{j,t-1})}{p_{j,t}n_{j,t}} \leq 1$. Thus, the budget constraint the investor faces is

$$C_t + \sum_j p_{j,t}n_{j,t} + q_t v_{o,t} = \sum_j p_{j,t}n_{j,t-1} + \sum_j d_{j,t}n_{j,t-1} + q_{t-1}[o_t + v_{o,t}] \tag{12}$$

where other sources of income are $o_t$ and the per-share value of this claim is $v_{o,t}$, with the number of shares being $q_{o,t}$. $V_{o,t}$ is the market value of aggregate other income, $O_t = q_{t-1}o_t$.

The return for sector (firm) $j$ is

$$R_{j,t+1} = \frac{p_{j,t+1}n_{j,t+1} + p_{j,t+1}n_{j,t} - p_{j,t+1}n_{j,t+1} + d_{j,t+1}n_{j,t}}{p_{j,t}n_{j,t}} = \frac{V_{j,t+1}(1-\chi_{j,t+1}) + D_{j,t+1}}{V_{j,t}} \tag{13}$$

[2]To alleviate extraneous notation, we ignore the + operator displayed in the definition of $I_t$ in section 2, effectively assuming $D$ already subsumes any repurchases.

The pricing condition for a given sector (firm) that yields its market capitalization is

$$\frac{V_{j,t}}{C_t} = \beta E_t[\frac{V_{j,t+1}(1-\chi_{j,t+1})}{C_{t+1}} + \frac{D_{j,t+1}}{C_{t+1}}]. \tag{14}$$

When a sector expands, it is quite possible that $V_{j,t}\chi_{j,t}$ exceeds $D_{j,t}$, yielding a net negative cash-flow to the investor in that time period. This investment expands the sector and increases the scale of aggregate dividends that this sector pays in subsequent time periods. The log growth of aggregate dividends is the sum of the growth of dividends per share and the growth in the number of shares. Note that $\chi_{j,t}$ is strictly less than one. This ensures that the firm's value is strictly positive as the present value of $V_{j,t+1}(1-\chi_{j,t+1})$ and $D_{j,t+1}$ is strictly positive.

The equilibrium for this model is as follows. First, the aggregate capitalization of the equity market is simply, $V_{a,t} = \sum_j V_{j,t}$. The aggregate capitalization of other income is $V_{o,t}$. It then follows,

$$\frac{V_{a,t}+V_{o,t}}{C_t} = \beta E[\frac{V_{a,t+1} - I_{t+1} + D_{a,t+1} + O_{t+1} + V_{o,t+1}}{C_{t+1}}] \tag{15}$$

Throughout, we will assume that $O_t > I_t$, a very reasonable assumption, as equity and capital market investments fall much short of aggregate labor and other capital income. The exogenous income processes are $D_a$ and $O_t - I_t$; equilibrium requires that

$$C_t = O_t - I_t + D_{a,t}. \tag{16}$$

Hence, the above equilibrium condition yields

$$\frac{V_{a,t}+V_{o,t}}{C_t} = \beta E[\frac{V_{a,t+1} + V_{o,t+1} + C_{t+1}}{C_{t+1}}] \tag{17}$$

which implies that aggregate $\frac{V_{a,t}+V_{o,t}}{C_t}$ is a constant, equal to $\frac{\beta}{(1-\beta)}$.

Note that ownership of all equity and all other income entitles the owner to the cash-flow $C_{t+j},\ j = 1\cdots\infty$. While this is adequate for computing the aggregate wealth, the more extensive formula (14) is needed to compute the value of each firm. The wealth, net of consumption, $W_t - C_t$, equals $V_{a,t} + V_{o,t}$, which implies $W_t = \frac{1}{1-\beta}C_t$.

The portfolio choice of the problem is now also implicitly solved. The solution to,

$$\max_{\mathbf{w}} E[\log(r_{f,t} + \mathbf{w_t}'(\mathbf{R_{t+1}} - \mathbf{r_{f,t}}))] \tag{18}$$

is provided by the portfolio weights $\frac{v_{j,t}}{W_t - c_t} = w_{j,t}$. After including the portfolio share of investment in the $O_t$ claim, these weights sum to one. The approximate (conditionally normal) solution to the portfolio choice problem after including the risk free rate in the asset menu is that the financial investment shares satisfy

$$\mathbf{w_t} = 0.5\mathbf{\Sigma_t^{-1}E_t}[\mathbf{R_{t+1}} - \mathbf{r_{f,t}}].$$

Since bonds are in zero net supply, the financial investment position in each of the sectors is $\frac{V_{j,t}}{W_t - c_t}$, which sum to one. This ensures that the portfolio of the investor has a zero investment in the riskless asset, which is assumed to be in zero net supply.

To solve the above model, one needs to specify the exogenous processes for the aggregate dividend share of consumption, $s_{j,t} = \frac{D_{j,t}}{C_t}$, and the process for $\chi_{j,t}$. These two processes for each sector, along with the process for aggregate consumption, are sufficient to imply the other income process, $O_t$ that satisfies the condition that $O_t = C_t + I_t - D_t$.[3]

There are important differences between the model we discuss above and the interesting models discussed in Menzly, Santos, and Veronesi (2004) and Cochrane, Longstaff, and Santa-Clara (2004). These papers ignore the role of new investments in the sector–which consequently ignores the role of $\chi_{j,t+1}$ in determining the scale of a sector. The Euler equation (14) shows that it is discounting aggregate dividends net of new investments that determines the wealth of a sector. Hence, analysis that attempts to explain the relative wealth evolution must crucially accommodate this possibility. In our empirical work, we further show that investments, through their effect on net-payouts, are important for interpreting the data. Another important difference relates to the share of dividends to aggregate consumption. In their empirical work, Menzly, Santos and Veronesi (2004) assume that dividends per share to aggregate consumption is stationary (i.e, the two series are cointegrated at one). Bansal, Dittmar, Lundblad (2005) show that in the data, this is not the case for per share dividends. Theory does not impose that dividends per share and aggregate consumption be cointegrated; however, the aggregate dividends of any given sector cannot deviate permanently from aggregate consumption (or output) and hence have to be cointegrated with aggregate

[3]Note that $\chi_{j,t}$ for each firm is less than one. Further we also have that $I_t/V_{a,t} < 1$, which is ensured by the fact that $I_t/V_{a,t} = \sum_j \frac{V_{j,t}}{V_{a,t}}\chi_{j,t}$; as the weights $\frac{V_{j,t}}{V_{a,t}}$ sum to one, and are all less than one. This also implies that the weighted sum of $\chi_{j,t}$ (that is $I_t/V_{a,t}$) is also less than one. The process for $\chi_{j,t}$ can be modelled in a manner similar to the dividend shares or simply as an affine process for $\log \chi_{j,t}$ and then taking the $exp(\log \chi_t)$ of this affine process. For tractable processes that are bounded between zero and one, see Menzly, Santos, and Veronesi (2004).

consumption. Empirically, aggregate dividends do seem to be cointegrated with aggregate consumption. In sum, the main difference relative to earlier work is that we include investments. This, as we show below, turns out to be quantitatively very important to measuring the inflows and outflows from different sectors and for evaluating the implications of sectoral wealth expansion and contraction.

## 3.2 Alternative Preferences

The above model does not allow for hedging demands in equilibrium. However, the analysis can be extended to generalized preferences that do allow for hedging demands. For example, habit models (as in Campbell and Cochrane (1999)) or long run risks models (as in Bansal and Yaron (2004), Bansal, Khatacharian and Yaron (2005)) entertain hedging demands in equilibrium.

If $M_{t+1}$ is the IMRS in any one of these models then, the pricing condition for evolution of wealth is

$$\frac{V_{j,t}}{C_t} = E_t[M_{t+1}\frac{C_{t+1}}{C_t}(\frac{V_{j,t+1}}{C_{t+1}}(1-\chi_{j,t+1}) + \frac{D_{j,t+1}}{C_{t+1}})] \tag{19}$$

The aggregate wealth in the economy corresponds to the market value of the stream of aggregate consumption. Each of these models also has a well defined portfolio choice problem, the solution to which, as in the log utility case, will be given by the equilibrium wealth shares of the different sectors determined by the above pricing condition.

A particularly useful case is when the representative agent is assumed to have Epstein and Zin (1989) preferences. In the specialized case where these preferences are restricted to having an inter-temporal elasticity of substitution of one and risk aversion, $\gamma$, is a free parameter, then Campbell and Viciera (2001) show that the portfolio shares are characterized by,

$$\mathbf{w_t} = \frac{1}{\gamma}\mathbf{\Sigma_t^{-1}}(\mathbf{E_t r_{t+1}} - r_{f,t}\mathbf{1} + \sigma_{\mathbf{t}}^{\mathbf{2}}/2) + (1-\frac{1}{\gamma})\mathbf{\Sigma_t^{-1}}\sigma_{\mathbf{ht}} \tag{20}$$

where $\sigma_t$ is the main diagonal of $\Sigma_t$, $\sigma_{ht} \equiv Cov_t(\mathbf{r_{t+1}} - (E_{t+1} - E_t)\sum_{j=1}^{\infty}\kappa^j r_{c,t+j})$, $r_c$ is the return on overall wealth, and $\gamma$ denotes risk aversion. The first term in the portfolio formula above is usually referred to as the myopic term and corresponds to the mean-variance effects on portfolio choice, while the second term reflects demands from intertemporal hedging motives. This equation highlights that equilibrium wealth allocations for different sectors are determined by the joint distribution of returns and other state variables and not merely by the mean returns of assets.[4]

In equilibrium, the vector $\mathbf{w_t}$ corresponds to the market wealth shares of different sectors. If sectoral wealth rises for sector $j$ then the demand for this sector's assets rises either due to a better mean-variance deal (i.e., a rise in myopic demand) or due to an increase in hedging demands. For positive net supply assets, such as equities, it is very unlikely that hedging demands are the dominant influence. If they were, then this would imply that the value weighted market return, with an equity premium of about 7% per annum, in held by investors to hedge other income, such as income from labor or from the non-traded corporate sector. While this is a possibility, models that can account for the observed premiums via such hedging demands are hard to imagine. Hence, theory and intuition suggest that the myopic mean-variance dimensions seem to be the first order effect. Despite the more extensive preferences, one should, as in the log utility case, suspect that in equilibrium shifts in sectoral wealth also translate to shifts in the distribution of asset returns (changing mean and variance). These are the main dimensions that we empirically explore.

# 4 Data

Here we describe the construction of the various measures of interest. Our quarterly data is on 12 industries and covers the time period from 1948.1 to 2003.4 and includes firms from NYSE, AMEX and NASDAQ. The return can always be stated as,

$$R_{t+1} = h_{t+1} + y_{c,t+1} \tag{21}$$

where $h_{t+1}$ is the price per-share capital gain and $y_{c,t+1}$ is the conventional cash-dividend yield. To construct $D_{t+1}$, the total aggregate dividends from a sector, the approach presented in Bansal, Dittmar and Lundblad (2004) is pursued. First, the re-purchase adjusted capital gain is defined for each stock in the portfolio,

$$h^{\star}_{t+1} = [\frac{p_{t+1}}{p_t}] \cdot \min[(\frac{n_{t+1}}{n_t}), 1]. \tag{22}$$

[4]It should be emphasized that even in an economy without any aggregate uncertainty and thus zero equity premia and Sharpe ratios, but with non trivial movements in sectoral wealth (e.g., Hopenhyan (1992), Jovanovic (1982)), sectoral wealth shifts must be accompanied by changes in sectoral volatility – that is expanding sectors should see reduction in volatility . This observation helps motivate, empirically, treating volatility separately from expected returns rather than just concentrating on Sharpe ratios.

Then the payout (cash dividends plus repurchases) yield is $y_{o,t+1} = R_{t+1} - h^{\star}_{t+1}$, which implies that aggregate dividends are,

$$D_{t+1} = y_{o,t+1} V_t \tag{23}$$

where $V_t$ is the market value of all stocks in the portfolio. Further, the yield that reflects both inflows and outflows, $y_{t+1}$ is constructed via,

$$y_{t+1} \equiv \frac{D_{t+1} - I_{t+1}}{V_t} = R_{t+1} - \frac{V_{t+1}}{V_t} \tag{24}$$

Hence, $y_{t+1}$ can be computed by subtracting the growth in market capitalization from gross returns. Now, given $y_{t+1}$, the inflow yield, the investment ratio $y_{n,t+1}$, can be computed as follows,

$$y_{n,t+1} \equiv \frac{I_{t+1}}{V_t} = (y_{o,t+1} - y_{t+1}) \tag{25}$$

and therefore $I_{t+1}$ can be computed by multiplying $y_{n,t+1}$ by $V_t$.

# 5 Empirical Results

Table 1 provides the sectoral means and standard deviations of returns, the dividend yield, the repurchase adjusted dividend yield as well as wealth shares. All the data is quarterly and have seasonals. The deseasonalized levels of $D_t$ and $I_t$ are constructed by using a trailing four quarter sum. The reported yields are based on these deseasonalized quantities.[5] Table 2 provides similar summary statistics for the investment yield $i_t$, the investment ratio, $\chi$, and the sectoral $\kappa$s.

Table 1 shows that the average share of the 12 sectors ranges from 5% to 14%. Figure 1 and Table 1 display the dramatic time series variation of the industries' wealth share. It is important to note, however, that none of the sectors dominate the market—hence situations where one of the sectors becomes very large or very small relative to the market portfolio are not critical to our discussion.[6] As an example for the large variation in wealth share, the

[5] In practice, we construct $D$, and measure the quantity $D_{t+1} - I_{t+1}$, these are summed for four quarters, and then $I_{t+1}$ is extracted using these de-seasonalized measures

[6] Note that for a few sectors the wealth shares may be high autocorrelated. As in the earlier literature on the predictability of returns with price-dividend ratios, a concern may be the persistence of the right-hand-side variable (which in our case is wealth shares). The earlier work on predictability of returns with price-dividend ratios highlights large $R^2$; our evidence is just the opposite using wealth shares. Hence, the

one standard deviation range for capturing this variation is from 2.2% to 7.8% for the health industry and from 9.3% to 18.3% for the manufacturing industry. Manufacturing's share has fallen across time and that of health care and financial services has increased considerably over time. These variations imply that returns distributions have to potentially be changing sizeably. The mean returns for these 12 industries range from 8% to 12%.

Figure 2 shows the aggregate payout yield from the market (aggregate dividends minus aggregate investment), which corresponds to the equilibrium flows from the market to the households. It is important to note that the payout yield can be negative and fall during expansions of the equity markets. During periods of expansion, labor and other income of households is used to inject money into the equity markets. The payout yields of various sectors (not shown for brevity) behave in a similar fashion and also become negative and vary considerably across time. Table 3 presents the sample autocorrelation function of the aggregate payout yield, the standard cash-dividend yield as well as the investment ratio. The payout yield is quite stationary, unlike the cash-dividend yield that is traditionally used. While the traditional dividend yield is very persistent and arguably predicts future returns, the well behaved payout yield mostly predicts future growth rates as we document below. This is a significant difference in terms of the information content of these two variables.

## 5.1 Share Fluctuations and Subsequent Returns

To explore if share fluctuations contain information about subsequent mean returns, we present in Table 4 the projection coefficient from the regression,

$$\sum_{j=1}^{k} \kappa_1^{j-1}(r_{i,t+j} - r_{m,t+j}) = a_i + b_i \log(w_{i,t}) + \epsilon_{i,t+k} \tag{26}$$

where $r_{i,t+j}$ and $r_{m,t+j}$ are the one-period log real returns for industry $i$ and the market portfolio at time $t+j$, respectively. This projection is motivated by the second covariance term in equation (11). The slope coefficients of this equation provide the percentage of the share variation attributable to fluctuations in expected equity returns.

Table 4 shows that almost all the slope coefficients are both economically and statistically close to being insignificant. This apparent lack of fit is confirmed by the scatter-plots of

usual concern about spurious regressions are not warranted. Finally note is also corroborated with event studies that are immune to these potential problems associated with regression techniques.

expected returns and log shares by industry as displayed in Figure 3. For most industries there is a visible negative relation between current wealth shares and subsequent average returns. Consistent with this, almost all of the slope coefficients in Table 4 are negative. This implies that increases in shares are associated with a decline in long run mean excess returns. This result is robust to considering excess returns over the risk free rate. The $R^2$s of these projections of both short and long horizons are quite small. The average slope coefficient indicates that only about 10% of the variation in shares is due to fluctuations in expected excess returns.

## 5.2 Wealth Shares and Output Shares

As the variation in shares must be due to either variations in expected returns or cash flows, Table 5 reports the projection coefficient from the regression,

$$\log(\frac{D_{i,t}}{D_{m,t}}) + \sum_{j=1}^{k} \kappa_1^{j-1}[(g_{t+j} - \kappa_1 \chi_{t+j}) - (g_{m,t+j} - \kappa_1 \chi_{m,t+j})] = a_i + b_i \log(w_{i,t}) + \epsilon_{i,t+k} \quad (27)$$

This projection is motivated by the first covariance term of equation (11). Table 5 shows that most the variation in shares is due to expectation about future net-payoffs (cashflows). On average the slope coefficients are positive and significant and the $R^2$s are sizeable for most industries. The average coefficient across industries is about 0.75, that is about 75% of the variation in shares is due to net payoff variation. This pronounced relationship is also confirmed by the industry scatter-plots relating log-shares and cashflows displayed in Figure 4. There is a strong positive relation between wealth shares and future output shares. This result underscores again the importance of using the adjusted net payout series.

## 5.3 Volatility

Recall that it is possible that it is not the mean, but the variance, that could fall subsequent to an expansion. This in turn could increase the Sharpe ratio of expanding sectors. Table 6 explores if current shares predict future return volatility. Specifically we consider the projection,

$$\sigma_{i,t+k} = a_i + b_i \log(w_{i,t}) + \epsilon_{i,t+k} \quad (28)$$

where volatility is measured as the sum of the absolute value of unconditional residuals, that is $\sigma_{i,t+k} = \sum_{j=0}^{k} |r_{i,t+j} - \bar{r}_i|$, and $\bar{r}_i$ is the unconditional mean of quarterly returns for asset $i$. The main result from Table 6 is that the share do not predict in any measurable manner future volatility of returns. The slope coefficients and the adjusted $R^2$ are virtually zero. We also measured the volatility by fitting an EGARCH volatility model, and the results are similar and hence not reported.

An argument can be made that the influence of shifts in shares on returns and volatility are hard to measure in short time series. To address this point, Table 7 reports a pooled cross sectional time series approach to measure the effects of share levels and share changes on expected returns and volatility. The message from the pooled regression is virtually identical to the univariate time series evidence discussed above. A rise in shares significantly predicts a reduction in future mean returns, and in terms of volatility predictability the slope coefficients are negative but are not statistically significant. This is robust to alternative measures of volatility such as EGARCH. In practice we use the integrated volatility measures of Anderson, Bollerslev, and Diebold (2004). Table 8 also reports the results using the *ex-post* Sharpe ratio as the left hand side variable. As discussed earlier, any portfolio choice problem would to a first order effect depend on the Sharpe ratio of the menu of assets. Specifically, we ask if ex-post excess return normalized by its standard deviation is predicted by wealth shares. We regress this on current wealth share and find that it has very little information about expected returns divided by their standard deviation. This confirms our earlier findings in projections (26) and (28) where future returns and volatility were used independently.

An additional robustness check that accounts for correlations across returns is to solve for the equilibrium shares based on the solution to the CAPM portfolio weights. In executing this, we compute conditional mean returns by regressing future returns onto the market shares of 11 industries. We rely on the unconditional variance-covariance matrix of the residuals. We solve the mean variance portfolio choice problem where the target mean equals the average return on the market portfolio. The implied wealth shares from this analysis contain very little information about observed value weights in the data. That is the implied shares and the observed wealth shares have very small correlations. As this evidence is consistent with the above results, for brevity we do do not report details.

## 5.4 Wealth and Investment Sorted Portfolios

As an additional experiment, we sort portfolios by growth of market share and analyze whether such growth characteristics are associated with subsequent mean expected returns and volatility. Table 9 provide the results. The columns are for low, middle, high (i.e., LG, MG, HG) and where the growth rate is computed over the *preceding* horizon of 4, 8, and 12 quarters. The rows provide information about the mean and variance of the *subsequent* returns of the three sorted portfolios up to 12 quarters in the future. By looking at longer horizons for computing the wealth share changes, we ensure that the changes in wealth shares are sizable − that is the event is economically large. With the sorting window of $L = 4$ the subsequent returns in excess of the market portfolio (that is, $\bar{r}_2$) with horizon of $K = 4$, are consistent with the economic argument that the low growth sectors have lower mean returns and larger volatility. However, as the holding period is increased to $K = 8$ or 12, the pattern reverses. The sectors that see the most relative wealth expansion have the worst returns which in excess of the market are actually negative. Further, when we measure the event over longer horizons, that is $L = 12$, the changes in wealth shares are quite large (see $\Delta w_i$ in column one) and range from a -23% reduction to to a 25% expansion across the low growth and high growth sectors. The subsequent returns at virtually all holding horizons are reversed—in that the low growth sectors have positive average excess returns while the high growth sectors have negative average excess returns.

This evidence is puzzling from the perspective of theory, and is consistent with the projection evidence that we discussed earlier. The results clearly indicate that the high growth sector has the lowest subsequent returns on average, in fact mostly negative in excess of the market, while the low growth sector has the highest return. In terms of Sharpe ratios, the evidence indicates the Sharpe ratio of the high-growth sector is the lowest. This evidence is consistent with our earlier evidence and highlights that wealth shares contain very little information about the future distribution of returns, at least for the mean and variance. Indeed, the deviation from theory in terms of the directions is very sharp.

Table 10 repeats the analysis above, except that this time portfolios are sorted with respect to the investment ratio $\chi_{i,t}$, of a sector. That is, the event on which we sort is based on the rate of new equity investment. This analysis focuses on the event that an expansion is driven by new investments, and not via alternative channels such as a decline in expected returns, which may potentially be underlying any gain in market capitalization. Again, the columns are for low, middle, high (i.e., LG, MG, HG) rates of investment, and are computed over the preceding horizon of 4, 8, and 12 quarters. As in the previous table, the results clearly indicate that the high investment ratio sector has the lowest subsequent returns on average, while the low investment ratio sectors have the highest return. The evidence shows that high expansion sectors do not provide a better mean or a higher Sharpe Ratio, in fact the opposite is true. High expansion provides the lowest Sharpe Ratio and the low expansion sectors the highest. This evidence is consistent with our earlier findings and highlights the difficulty in reconciling from an equilibrium perspective the mapping from investments in sectors to their subsequent returns.

## 5.5 Augmenting to Include Human Capital

One issue that can be of some concern is that we have reported results defining wealth as the financial capital. To account for this consider the following wealth measure—$W_{a,t} = V_{a,t} + \lambda L_t$, where $\lambda$ is a multiple of observed aggregate labor income and $V_{a,t}$ is the level of market capitalization. The magnitude $\lambda L_t$ is a measure of human capital as in Jagannathan and Wang (1996). We set $\lambda$ at 32 representing the average human capital to labor income ratio; the results are robust to altering this magnitude of $\lambda$.

The measure of $W_{a,t}$ also allows us to think about the implications for the aggregate market returns as the wealth share of the Equity Capital to overall wealth fluctuates. In particular, we ask what are the implications for expected value weighted returns as the share of the financial wealth changes—this share corresponds to the ratio $\frac{V_{a,t}}{W_{a,t}}$. Table 11 shows the projection for various horizons. The message is consistent with our earlier evidence, current aggregate equity capital barely predicts future returns — and to the extend it does it predicts is negatively. That is, an expansion of equity capital tends to predict a lower future market returns. Hence, the evidence documented above for the 12 industries carries over to the aggregate market as well. In addition computing wealth shares relative to the aggregate wealth does not alter the evidence discussed above.

In addition to the projection based evidence, Figure 5 displays the same scatter plots as Figure 3 except that log shares are now with respect to total wealth inclusive of human capital. The pronounced negative relationship is even more pronounced. Notice that even the share of the whole financial market relative to the overall economy (the top left scatter plot) has a pronounced negative relationship with its subsequent future returns. We have also carried out our event study reported in Table 9 using this as the measure of aggregate wealth and characterizing high, medium, and low growth sectors by computing the wealth share relative to this aggregate wealth measure. Our results, in terms of their implications, are virtually identical to those in Table 9. Hence, we do not believe that measuring wealth relative to aggregate market capitalization is restrictive.[7]

In sum, the channels that lead to this evidence, along with the broader implications for the sectoral wealth shifts pose a considerable challenge to theory. One possibility, as discussed earlier is that most of the portfolio demand shifts are driven by hedging motives– this however is in sharp contrast to the prominent role that mean and variance play in thinking about portfolio choice. Further, for positive net supply assets such as equities it is hard to believe that all agents in the economy hold them to hedge other income risks, such as labor income risks.

## 6 Conclusion

In this paper we inquire about the market forces that motivate economic agents to hold more of their wealth in an expanding sector (or firm) and less in a contracting one. Traditional theory suggests that the markets provide agents a "better deal" in the form of higher mean returns or lower volatility, and potentially a higher Sharpe ratio, to induce greater investments in expanding sectors. We find that this is not the case in the data. Indeed expanding sectors seems to typically offer a "bad" Sharpe ratio deal relative to contracting sectors. One possibility is that these sectors hedge other risks for agents. However, quantitatively, these hedging demands would, our evidence shows, have to account for almost all of the reason for agent's willingness to hold more wealth in an expanding sector–we find the magnitudes of this to be quite implausible. Traditional economic motivations have difficultly in accounting for the sectoral wealth shifts, and this leads to the equity capital puzzle. What are the market forces that induce agents to hold more aggregate wealth in expanding sectors and

[7]An additional measurement issue may also arise from the fact that the different measures of sectoral equity wealth shares we use do not include the fraction of wealth from debt claims on the firm. First, there are severe data limitations on getting *market value* of outstanding debt. Second, empirically, there is no substantive evidence which shows that shifts in debt to equity ratio have tangible effects on the return distribution at the portfolio level in the time series. Given this we believe the above empirical evidence would be robust to the inclusion of debt adjusted wealth measures.

less in shrinking sectors?

# References

[1] Anderson Torben, Bollerslev Tim, and Francis Diebold, 2004, Parameteric and non-parameteric volatility measurement, forthcoming in L.P. Hansen and Y. Ait-Sahalia (eds.), Handbook of Financial Econometrics. Amsterdam: North-Holland.

[2] Bansal Ravi, and Amir Yaron, 2004, Risks For the Long Run: A Potential Resolution of Asset Pricing Puzzles, *Journal of Finance*, 8, 21-40.

[3] Bansal Ravi, Varoujian Khatacharian, and Amir Yaron, 2005, *European Economic Review*, 49, 531-560.

[4] Bansal Ravi, Robert Dittmar, and Christian Lundblad, 2005, Forthcoming, *Journal of Finance*.

[5] Boldrin Michele, Christiano Lawerence, and Jonas Fisher, 2001, Habit Persistence, Asset Returns, and the Business Cycle, *American Economic Review*, 90, 149-166.

[6] Cochrane, John H., Francis Longstaff and Pedro Santa Clara, 2004, Two Trees: Asset Price Dynamics Induced by Market Clearing, Working Paper, University of Chicago.

[7] Cambpell John and Louis Viciera, 2001,"Strategic Asset Allocation: Portfolio Choice for Long-Term Investors," Oxford University Press.

[8] Epstein Larry, and Stanley Zin, 1989, Substitution, risk aversion and the temporal behavior of consumption and asset returns: A theoretical framework, *Econometrica*, 57, 937-969.

[9] Fama, Eugene F., and Kenneth R. French, 1996, Multifactor Explanations of Asset Pricing Anomalies, *Journal of Finance*, 51, 55–84.

[10] Hansen, Lars Peter, John Heaton and Nang Li, 2004, Consumption Strikes Back?, Working Paper, University of Chicago.

[11] Hopenhayn Hugo, 1992, Entry, Exit, and Firm Dynamics in Long Run Equilibrium, *Econometrica*, 60, 1127-1150.

[12] Jagannathan Ravi and Naryana Kocherlakota, 1996, Why Should Older People Invest Less in Stocks than Younger People? *Quarterly Review, Federal Reserve at Minneapolis*,

[13] Jagannathan, Ravi, and Zhenyu Wang, 1991, The Conditional CAPM and the Cross-Section of Expected Returns *Journal of Finance*, Vol. 51 No. 1, 3-53.

[14] Jovanovic Boyan, 1982, Selection and Evolution of Industry, *Econometrica*, 50, 649-670.

[15] Long John and Charles Plosser, 1983, Real Business Cycles, *Journal of Political Economy*, 91, 39-69.

[16] Menzly Lior, Santos Jesus, and Pietro Veronesi, 2004 Understanding Predictability, *Journal of Political Economy*, February, 1-47.

[17] Rosenberg, B. and J.A. Ohlson, 1976, The stationary distribution of returns and portfolio separation in capital markets:a fundamental contradiction, Journal of Finance and Quantitative Analysis,11 393-401.

[18] Santos Tano and Pietro Versonesi, 2003, Labor Income and Predictable Stock Returns, Forthcoming, *Review of Financial Studies.*

# 7 Appendix: Growth and Expected Returns

For notational brevity, let the dividend share plus the (discounted) anticipated aggregate payout variable be denoted by $\eta_t$ where

$$\eta_t = E_t\{\log \frac{D_t}{D_{m,t}} + \sum_{j=1}^{\infty} \kappa_1^{j-1}[(g_{t+j} - \kappa_2\chi_{t+j}) - (g_{m,t+j} - \kappa_2\chi_{m,t+j})]\}$$

and the discounted excess return on the market be

$$\varphi_t = E_t \sum_{j=1}^{\infty} \kappa_1^{j-1}[(r_{t+j} - r_{m,t+1})]$$

Hence $\log w_t = \eta_t - \varphi_t$

We can subtract the risk free rates from the return and the market return; this does not change the expression for $\eta$. We further assume that the expected excess returns (risk premia) on the asset and the market are time varying $AR(1)$ processes, then, it follows that

$$\varphi_t = \kappa_1[\frac{\bar{r}_t}{1-\kappa_1\rho} - \frac{\bar{r}_{m,t}}{1-\kappa_1\rho_m}].$$

For simplicity we also assume that all the $\rho$'s are the same, in which case

$$\varphi_t = \tau[\bar{r}_t - \bar{r}_{m,t}], \quad \text{where } \tau = \frac{\kappa_1}{1-\kappa_1\rho}$$

.

With the CAPM assumptions,

$$\mathbf{w_t} = \frac{\mathbf{1}}{\alpha}\mathbf{\Sigma_t^{-1}\bar{r}_t}$$

where $\bar{r}_t$ is the vector of expected excess returns, and $\Sigma_t$ is the variance-covariance matrix of returns. For small shares, we have, $\log(1 + w - 1) \approx w - 1$, hence, the vector of wealth shares, $\mathbf{w_t}$ is

$$\mathbf{w_t} = \mathbf{1} + \eta_\mathbf{t} - \tau(\mathbf{\bar{r}_t} - \mathbf{\bar{r}_{m,t}})$$

where $\eta_\mathbf{t}$ is dividend share plus expected relative growth vector for the different sectors and the vector of ex-ante expected excess returns is $\mathbf{r_t}$. We assume that the risk-free rate is constant. Setting the left hand side equal to the CAPM portfolio implications, in equilibrium, it follows that

$$\frac{1}{\alpha}\mathbf{\Sigma_t^{-1}\bar{r}_t} = \mathbf{1} + \eta_\mathbf{t} - \tau(\mathbf{\bar{r}_t} - \mathbf{\bar{r}_{m,t}})$$

and it follows that

$$\mathbf{\bar{r}_t} = [\mathbf{1} + \eta_\mathbf{t} + \tau\mathbf{\bar{r}_{m,t}}][\frac{\mathbf{1}}{\alpha}\mathbf{\Sigma_t^{-1}} + \tau\mathbf{I}]^{-\mathbf{1}}$$

Table 1: Summary Statistics

| Industry | $R_i$ | $Std(R_i)$ | $y^{bdl}$ | $Std(y^{bdl})$ | $y^{mvg}$ | $Std(y^{mvg})$ | $w_i$ | $Std(w_i)$ |
|---|---|---|---|---|---|---|---|---|
| Market | 0.023 | 0.081 | 0.035 | 0.013 | 0.016 | 0.021 | 1.000 | 0.000 |
| Bus. Equipment | 0.028 | 0.122 | 0.021 | 0.014 | -0.001 | 0.029 | 0.095 | 0.043 |
| Chemicals | 0.023 | 0.085 | 0.033 | 0.010 | 0.026 | 0.024 | 0.067 | 0.026 |
| Durables | 0.027 | 0.104 | 0.043 | 0.020 | 0.036 | 0.031 | 0.064 | 0.016 |
| Energy | 0.025 | 0.085 | 0.040 | 0.011 | 0.028 | 0.034 | 0.127 | 0.046 |
| Health | 0.030 | 0.096 | 0.024 | 0.010 | 0.009 | 0.025 | 0.050 | 0.028 |
| Manufacturing | 0.022 | 0.094 | 0.034 | 0.015 | 0.022 | 0.030 | 0.138 | 0.045 |
| Money | 0.026 | 0.089 | 0.036 | 0.011 | 0.015 | 0.033 | 0.112 | 0.080 |
| Non-Durables | 0.025 | 0.084 | 0.035 | 0.014 | 0.028 | 0.018 | 0.074 | 0.018 |
| Other | 0.021 | 0.101 | 0.031 | 0.017 | 0.008 | 0.046 | 0.075 | 0.019 |
| Shops | 0.024 | 0.100 | 0.028 | 0.016 | 0.020 | 0.027 | 0.063 | 0.015 |
| Telecom | 0.020 | 0.085 | 0.044 | 0.020 | 0.014 | 0.140 | 0.061 | 0.017 |
| Utilities | 0.020 | 0.072 | 0.058 | 0.020 | 0.018 | 0.025 | 0.073 | 0.023 |

Means and standard deviations for the market and 12 industries. The data is quarterly observation from 1947.2 to 2003.4. $R_i$ is the simple real return of asset i. $y^{bdl}$ is the dividend yield calculated by Bansal, Dittmar and Lundblad (2005) approach–see the text. $y^{mvg}$ is the dividend-yield calculated by market value growth approach–see text. $w_i$ is the market share for industry $i$. All dividends are deseasonalized by 4-quarter moving sum. The quantities are at annual rate.

Table 2: Summary Statistics for Investment Yield ($y_n$), Investment Ratio (IR) and $\kappa$s

| Industry | $\bar{y_n}$ | std | $\bar{\chi}$ | std | $\kappa$ |
|---|---|---|---|---|---|
| Market | 0.034 | 0.023 | 0.033 | 0.023 | 0.954 |
| Bus. Equipment | 0.030 | 0.023 | 0.029 | 0.025 | 0.974 |
| Chemicals | 0.019 | 0.019 | 0.019 | 0.020 | 0.958 |
| Durables | 0.018 | 0.015 | 0.018 | 0.014 | 0.950 |
| Energy | 0.025 | 0.026 | 0.024 | 0.026 | 0.951 |
| Health | 0.025 | 0.018 | 0.024 | 0.018 | 0.970 |
| Manufacturing | 0.025 | 0.018 | 0.025 | 0.018 | 0.958 |
| Money | 0.048 | 0.088 | 0.044 | 0.064 | 0.950 |
| Non-Durables | 0.020 | 0.011 | 0.019 | 0.011 | 0.956 |
| Other | 0.043 | 0.045 | 0.042 | 0.041 | 0.952 |
| Shops | 0.023 | 0.016 | 0.022 | 0.015 | 0.964 |
| Telecom | 0.062 | 0.047 | 0.061 | 0.048 | 0.942 |
| Utilities | 0.044 | 0.028 | 0.043 | 0.027 | 0.941 |

Means and standard deviations of the investment yield, $y_n$, the investment ratio, $\chi$ and their $\kappa$s, for the 12 industries. The data is quarterly observation from 1947.2 to 2003.4. The quantities are at annual rate. $\kappa = \frac{exp(\bar{vd}-\bar{\chi})}{1+exp(\bar{vd}-\bar{\chi})}$.

Table 3: Autocorrelation for $D/C$, $d_{bdl}/C$ and $I/C$

| | $D/C$ | | | $d_{bdl}/C$ | | | $I/V$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 4 | 8 | 1 | 4 | 8 | 1 | 4 | 8 |
| Market | 0.979 | 0.884 | 0.856 | 0.999 | 0.990 | 0.974 | 0.893 | 0.528 | 0.554 |
| Bus. Equipment | 0.931 | 0.512 | 0.396 | 0.996 | 0.966 | 0.908 | 0.904 | 0.458 | 0.279 |
| Chemicals | 0.933 | 0.764 | 0.770 | 0.996 | 0.986 | 0.970 | 0.750 | 0.076 | 0.009 |
| Durables | 0.906 | 0.631 | 0.620 | 0.983 | 0.898 | 0.782 | 0.799 | 0.250 | 0.164 |
| Energy | 0.961 | 0.848 | 0.806 | 0.996 | 0.982 | 0.963 | 0.842 | 0.496 | 0.542 |
| Health | 0.989 | 0.954 | 0.925 | 0.999 | 0.997 | 0.993 | 0.828 | 0.274 | 0.295 |
| Manufacturing | 0.936 | 0.741 | 0.751 | 0.961 | 0.804 | 0.784 | 0.848 | 0.396 | 0.344 |
| Money | 0.900 | 0.580 | 0.548 | 0.998 | 0.989 | 0.976 | 0.742 | -0.029 | -0.006 |
| Non-Durables | 0.988 | 0.945 | 0.921 | 0.995 | 0.982 | 0.978 | 0.766 | 0.011 | -0.085 |
| Other | 0.813 | 0.256 | 0.223 | 0.945 | 0.720 | 0.568 | 0.847 | 0.436 | 0.381 |
| Shops | 0.943 | 0.771 | 0.859 | 0.965 | 0.832 | 0.790 | 0.902 | 0.608 | 0.403 |
| Telecom | 0.911 | 0.533 | 0.359 | 0.977 | 0.866 | 0.767 | 0.913 | 0.541 | 0.423 |
| Utilities | 0.996 | 0.981 | 0.963 | 0.998 | 0.982 | 0.945 | 0.923 | 0.652 | 0.554 |

This table shows the autocorrelation coefficients at 1, 4, 8 lags for $D/C$, $d_{bdl}/C$ and $I/V(\chi)$.

Table 4: Return Predictability by Market Share

| Industry | q4 | $\bar{R}^2$ | q8 | $\bar{R}^2$ | q12 | $\bar{R}^2$ | q20 | $\bar{R}^2$ |
|---|---|---|---|---|---|---|---|---|
| Bus. Equipment | -0.124 | 0.102 | -0.255 | 0.220 | -0.347 | 0.302 | -0.433 | 0.288 |
| | 0.049 | | 0.079 | | 0.100 | | 0.162 | |
| Chemicals | -0.029 | 0.015 | -0.057 | 0.035 | -0.070 | 0.042 | -0.070 | 0.037 |
| | 0.026 | | 0.045 | | 0.051 | | 0.060 | |
| Durables | -0.065 | 0.024 | -0.143 | 0.069 | -0.195 | 0.115 | -0.224 | 0.177 |
| | 0.038 | | 0.061 | | 0.063 | | 0.062 | |
| Energy | -0.037 | 0.011 | -0.072 | 0.029 | -0.073 | 0.027 | -0.021 | -0.002 |
| | 0.031 | | 0.057 | | 0.074 | | 0.087 | |
| Health | -0.015 | 0.002 | -0.035 | 0.013 | -0.048 | 0.019 | -0.078 | 0.045 |
| | 0.029 | | 0.055 | | 0.077 | | 0.098 | |
| Manufactoring | -0.005 | -0.004 | -0.013 | -0.002 | 0.006 | -0.004 | 0.092 | 0.062 |
| | 0.027 | | 0.050 | | 0.062 | | 0.072 | |
| Money | 0.002 | -0.004 | 0.007 | -0.002 | 0.013 | 0.005 | 0.014 | 0.012 |
| | 0.009 | | 0.015 | | 0.018 | | 0.018 | |
| Non-Durables | -0.174 | 0.133 | -0.323 | 0.245 | -0.419 | 0.322 | -0.480 | 0.350 |
| | 0.070 | | 0.104 | | 0.111 | | 0.113 | |
| Other | -0.001 | -0.005 | -0.025 | -0.001 | -0.046 | 0.003 | -0.058 | 0.003 |
| | 0.040 | | 0.068 | | 0.095 | | 0.142 | |
| Shops | -0.074 | 0.033 | -0.153 | 0.079 | -0.222 | 0.139 | -0.349 | 0.277 |
| | 0.034 | | 0.057 | | 0.071 | | 0.086 | |
| Telecom | -0.200 | 0.152 | -0.367 | 0.267 | -0.438 | 0.341 | -0.424 | 0.380 |
| | 0.079 | | 0.135 | | 0.143 | | 0.080 | |
| Utilities | -0.055 | 0.028 | -0.090 | 0.059 | -0.121 | 0.093 | -0.069 | 0.019 |
| | 0.036 | | 0.056 | | 0.071 | | 0.090 | |

The entries are from regressing future returns in excess of the market return onto current log market share. Specifically we regress

$$\sum_{j=1}^{k} \kappa_1^{j-1}(r_{i,t+j} - r_{m,t+j}) = a_i + b_i \log(w_{i,t}) + \epsilon_{i,t+k}$$

where $r_{i,t+j}$ and $r_{m,t+j}$ are the one-period log real return for industry $i$ and the market portfolio at time $t+j$, respectively, and $w_{i,t}$ is the market share at time $t$ for industry $i$. The market share, $w_{i,t}$ is the fraction of industry $i$'s market value to total financial wealth. The regression uses quarterly observations from 1948.1 to 2003.4. The standard errors under the estimated coefficients are Newey-West adjusted standard errors with 4 lags.

Table 5: Predicting Future Cashflows by Market Share

| Industry | q4 | $\bar{R}^2$ | q8 | $\bar{R}^2$ | q12 | $\bar{R}^2$ | q20 | $\bar{R}^2$ |
|---|---|---|---|---|---|---|---|---|
| Bus. Equipment | 0.621 | 0.389 | 0.511 | 0.266 | 0.442 | 0.198 | 0.417 | 0.131 |
| | 0.175 | | 0.147 | | 0.148 | | 0.220 | |
| Chemicals | 0.793 | 0.543 | 0.738 | 0.557 | 0.723 | 0.617 | 0.674 | 0.652 |
| | 0.104 | | 0.096 | | 0.092 | | 0.087 | |
| Durables | 1.310 | 0.561 | 1.162 | 0.530 | 0.979 | 0.469 | 0.811 | 0.478 |
| | 0.169 | | 0.134 | | 0.132 | | 0.131 | |
| Energy | 0.793 | 0.675 | 0.832 | 0.716 | 0.862 | 0.744 | 0.996 | 0.858 |
| | 0.088 | | 0.087 | | 0.085 | | 0.087 | |
| Health | 0.945 | 0.847 | 0.939 | 0.837 | 0.928 | 0.814 | 0.905 | 0.769 |
| | 0.079 | | 0.094 | | 0.110 | | 0.129 | |
| Manufactoring | 1.084 | 0.763 | 1.000 | 0.723 | 1.004 | 0.748 | 1.022 | 0.747 |
| | 0.084 | | 0.082 | | 0.091 | | 0.095 | |
| Money | 0.922 | 0.850 | 0.913 | 0.843 | 0.910 | 0.843 | 0.894 | 0.851 |
| | 0.046 | | 0.046 | | 0.043 | | 0.041 | |
| Non-Durables | 0.699 | 0.453 | 0.620 | 0.373 | 0.603 | 0.327 | 0.750 | 0.348 |
| | 0.134 | | 0.169 | | 0.191 | | 0.224 | |
| Other | 1.012 | 0.347 | 1.002 | 0.377 | 0.847 | 0.319 | 0.506 | 0.153 |
| | 0.195 | | 0.184 | | 0.162 | | 0.096 | |
| Shops | 0.684 | 0.316 | 0.692 | 0.356 | 0.644 | 0.335 | 0.453 | 0.178 |
| | 0.190 | | 0.195 | | 0.164 | | 0.167 | |
| Telecom | 0.506 | 0.122 | 0.392 | 0.082 | 0.272 | 0.039 | 0.308 | 0.039 |
| | 0.143 | | 0.106 | | 0.150 | | 0.211 | |
| Utilities | 0.647 | 0.571 | 0.641 | 0.568 | 0.660 | 0.609 | 0.728 | 0.576 |
| | 0.095 | | 0.083 | | 0.066 | | 0.074 | |

The entries are from regressing future cashflows onto current log market share. Specifically the regression is

$$\log(\frac{D_{i,t}}{D_{m,t}}) + \sum_{j=1}^{k} \kappa_1^{j-1} \left[(g_{i,t+j} - \kappa_1 \chi_{i,t+j}) - (g_{m,t+j} - \kappa_1 \chi_{m,t+j})\right] = a_i + b_i \log(w_{i,t}) + \epsilon_{i,t+k}$$

where the term, $(D_{i,t}/D_{m,t})$, is the total payout of sector $i$ during period $t$ relative to the market; the arguments in the second term $(g_{i,t+j} - \kappa_1 \chi_{i,t+j}) - (g_{m,t+j} - \kappa_1 \chi_{m,t+j})$, are the investment-adjusted payout growth of sector $i$ relative to the market. The market share, $w_{i,t}$ is the fraction of industry $i$'s market value of total financial wealth. The regression uses quarterly observations from 1948.1 to 2003.4. The standard errors under the estimated coefficients are Newey-West adjusted standard errors with 4 lags.

Table 6: Predicting Volatility by Market Share

| Industry | q4 | $\bar{R}^2$ | q8 | $\bar{R}^2$ | q12 | $\bar{R}^2$ | q20 | $\bar{R}^2$ |
|---|---|---|---|---|---|---|---|---|
| Bus. Equipment | 0.340 | 0.348 | 0.678 | 0.476 | 0.956 | 0.529 | 1.209 | 0.363 |
| | 0.104 | | 0.209 | | 0.294 | | 0.522 | |
| Chemicals | -0.036 | 0.013 | -0.080 | 0.031 | -0.118 | 0.045 | -0.197 | 0.068 |
| | 0.025 | | 0.046 | | 0.068 | | 0.120 | |
| Durables | -0.077 | 0.011 | -0.058 | -0.001 | 0.083 | 0.000 | 0.419 | 0.066 |
| | 0.071 | | 0.146 | | 0.223 | | 0.357 | |
| Energy | 0.074 | 0.059 | 0.134 | 0.083 | 0.197 | 0.122 | 0.344 | 0.199 |
| | 0.032 | | 0.059 | | 0.073 | | 0.103 | |
| Health | 0.034 | 0.027 | 0.066 | 0.048 | 0.090 | 0.063 | 0.108 | 0.062 |
| | 0.020 | | 0.041 | | 0.063 | | 0.099 | |
| Manufactoring | -0.026 | 0.000 | -0.029 | -0.003 | 0.008 | -0.005 | 0.143 | 0.013 |
| | 0.064 | | 0.132 | | 0.194 | | 0.306 | |
| Money | 0.022 | 0.021 | 0.037 | 0.028 | 0.051 | 0.035 | 0.076 | 0.046 |
| | 0.012 | | 0.024 | | 0.036 | | 0.059 | |
| Non-Durables | 0.028 | -0.002 | 0.045 | -0.002 | 0.022 | -0.004 | -0.147 | 0.002 |
| | 0.064 | | 0.115 | | 0.174 | | 0.300 | |
| Other | 0.053 | 0.004 | 0.056 | -0.001 | 0.054 | -0.002 | 0.199 | 0.014 |
| | 0.083 | | 0.153 | | 0.190 | | 0.159 | |
| Shops | 0.053 | 0.002 | 0.096 | 0.003 | 0.114 | 0.002 | 0.043 | -0.004 |
| | 0.076 | | 0.164 | | 0.258 | | 0.390 | |
| Telecom | -0.010 | -0.004 | -0.029 | -0.004 | -0.051 | -0.003 | -0.435 | 0.041 |
| | 0.072 | | 0.150 | | 0.224 | | 0.149 | |
| Utilities | -0.118 | 0.164 | -0.240 | 0.248 | -0.350 | 0.283 | -0.526 | 0.213 |
| | 0.029 | | 0.051 | | 0.061 | | 0.114 | |

The entries are from regressing future volatility onto current log market share. Specifically the regression is

$$\sigma_{i,t+k} = a_i + b_i \log(w_{i,t}) + \epsilon_{i,t+k}$$

where the volatility is measured as the sum of absolute unconditional residuals. i.e.,

$$\sigma_{i,t+k} = \sum_{j=0}^{k} |r_{i,t+j} - \bar{r}_i| \ ,$$

and $\bar{r}_i$ is the unconditional mean of the returns for asset $i$. The market share, $w_{i,t}$ is the fraction of industry $i$'s market value of total financial wealth. The regression uses quarterly observations from 1948.1 to 2003.4. The standard errors under the estimated coefficients are Newey-West adjusted standard errors with 4 lags.

Table 7: Panel Regression with Fixed Effects

| | $\sum_{j=1}^{K}(r_{i,t+j} - r_{m,t+j})$ | | $\sum_{j=1}^{K}\lvert\epsilon_{i,t+j} - \epsilon_{m,t+j}\rvert$ | |
|---|---|---|---|---|
| $K$ | $\log(w_{i,t})$ | $\Delta w_i$ | $\log(w_{i,t})$ | $\Delta w_i$ |
| 1 | -0.007 | -0.012 | -0.002 | -0.006 |
| | (0.003) | (0.005) | (0.003) | (0.006) |
| 4 | -0.033 | -0.067 | -0.005 | -0.024 |
| | (0.011) | (0.022) | (0.013) | (0.024) |
| 8 | -0.069 | -0.146 | -0.007 | -0.031 |
| | (0.021) | (0.039) | (0.025) | (0.047) |
| 12 | -0.090 | -0.195 | -0.007 | -0.023 |
| | (0.028) | (0.047) | (0.033) | (0.060) |

The table reports slope coefficients in panel regressions with portfolio-specific fixed effects. The four columns correspond to the following 2 sets of regressions respectively.

$$\sum_{j=1}^{K}(r_{i,t+j} - r_{m,t+j}) = \alpha_i + \beta \log(w_{i,t}) + \epsilon_{i,t+K}$$

$$\sum_{j=1}^{K}(r_{i,t+j} - r_{m,t+j}) = \alpha_i + \beta \Delta w_{i,t} + \epsilon_{i,t+K}$$

and

$$\sum_{j=1}^{K}\lvert\epsilon_{i,t+j} - \epsilon_{m,t+j}\rvert = \alpha_i + \beta \log(w_{i,t}) + \epsilon_{i,t+K}$$

$$\sum_{j=1}^{K}\lvert\epsilon_{i,t+j} - \epsilon_{m,t+j}\rvert = \alpha_i + \beta \Delta w_{i,t} + \epsilon_{i,t+K}$$

where $\Delta w_i = \log(w_{i,t}) - \log(w_{i,t-12})$ and $K$ is the future holding horizon in number of quarters. $\epsilon_{i,t+j}$ and $\epsilon_{m,t+j}$ are the demeaned log returns of industry $i$ and the market portfolio, respectively, in period $t + j$. The Newey-West adjusted standard errors are in the parentheses under the slope coefficients. The number of lags in the Newey-West adjustment is equal to the number of the holding periods $K$.

Table 8: Sharpe Ratio Projection

| Industry | q4 | $\bar{R}^2$ | q8 | $\bar{R}^2$ | q12 | $\bar{R}^2$ | q20 | $\bar{R}^2$ |
|---|---|---|---|---|---|---|---|---|
| Bus. Equipment | -0.549 | 0.086 | -0.647 | 0.224 | -0.710 | 0.327 | -0.884 | 0.449 |
| | 0.202 | | 0.195 | | 0.196 | | 0.182 | |
| Chemicals | 0.262 | 0.020 | 0.268 | 0.040 | 0.264 | 0.059 | 0.227 | 0.055 |
| | 0.161 | | 0.160 | | 0.168 | | 0.189 | |
| Durables | -0.037 | -0.004 | -0.124 | -0.002 | -0.287 | 0.019 | -0.386 | 0.059 |
| | 0.335 | | 0.353 | | 0.324 | | 0.297 | |
| Energy | -0.054 | -0.004 | -0.012 | -0.005 | 0.040 | -0.003 | -0.001 | -0.005 |
| | 0.193 | | 0.204 | | 0.194 | | 0.160 | |
| Health | -0.262 | 0.060 | -0.300 | 0.138 | -0.285 | 0.180 | -0.241 | 0.206 |
| | 0.110 | | 0.113 | | 0.115 | | 0.115 | |
| Manufactoring | 0.069 | -0.003 | 0.077 | -0.001 | 0.064 | -0.002 | -0.014 | -0.005 |
| | 0.233 | | 0.211 | | 0.226 | | 0.238 | |
| Money | -0.078 | 0.008 | -0.091 | 0.027 | -0.081 | 0.033 | -0.058 | 0.023 |
| | 0.084 | | 0.087 | | 0.085 | | 0.079 | |
| Non-Durables | -0.003 | -0.005 | -0.135 | -0.001 | -0.147 | 0.003 | -0.106 | 0.001 |
| | 0.259 | | 0.262 | | 0.271 | | 0.297 | |
| Other | -0.287 | 0.008 | -0.167 | 0.005 | -0.146 | 0.006 | -0.140 | 0.009 |
| | 0.241 | | 0.218 | | 0.202 | | 0.171 | |
| Shops | -0.122 | -0.003 | -0.186 | 0.005 | -0.127 | 0.003 | -0.023 | -0.004 |
| | 0.279 | | 0.262 | | 0.233 | | 0.207 | |
| Telecom | -0.122 | -0.003 | -0.287 | 0.013 | -0.350 | 0.030 | -0.263 | 0.023 |
| | 0.366 | | 0.333 | | 0.279 | | 0.271 | |
| Utilities | 0.413 | 0.042 | 0.368 | 0.057 | 0.281 | 0.043 | 0.199 | 0.014 |
| | 0.237 | | 0.213 | | 0.202 | | 0.279 | |

The entries are from regressing *ex-post* Sharpe ratios onto the current log market share. Specifically we regress

$$\frac{\sum_{j=1}^{k} r_{i,t+j} - r_{f,t+j-1}}{\sigma_{t+k}} = a_i + b_i \log(w_{i,t}) + \epsilon_{i,t+k}$$

where $r_{i,t+j} - r_{f,t+j-1}$ are the one-period log excess (relative to the risk free rate) returns for industry $i$, $\sigma_{t+k}$ is the a non-parametric measure for the conditional volatility of the excess return using a trailing sum of past 4-quarters squared returns, $w_{i,t}$ is the market share at time $t$ for industry $i$. The market share, $w_{i,t}$ is the fraction of industry $i$'s market value to total financial wealth. The regression uses quarterly observations from 1948.3 to 2003.4. The standard errors under the estimated coefficients are Newey-West adjusted standard errors with 4 lags.

Table 9: Event Study: Market Share Changes and Future Returns

| | | $L=4$ | | | $L=8$ | | | $L=12$ | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | LG | MG | HG | LG | MG | HG | LG | MG | HG |
| | $\Delta w_i$ | -12.45 | -0.65 | 12.71 | -18.94 | -1.09 | 19.66 | -23.98 | -1.43 | 25.18 |
| | $s.e.$ | 0.76 | 0.62 | 0.72 | 1.11 | 1.07 | 1.24 | 1.35 | 1.30 | 1.76 |
| $K=1$ | $\bar{r}_1$ | -0.27 | 0.07 | 0.55 | 0.11 | 0.02 | 0.47 | 0.08 | 0.28 | -0.06 |
| | $s.e.$ | 0.57 | 0.56 | 0.60 | 0.59 | 0.58 | 0.61 | 0.57 | 0.56 | 0.65 |
| | $\bar{r}_2$ | -0.38 | -0.03 | 0.51 | -0.10 | -0.18 | 0.34 | -0.03 | 0.18 | -0.09 |
| | $s.e.$ | 0.24 | 0.17 | 0.16 | 0.26 | 0.17 | 0.18 | 0.25 | 0.20 | 0.19 |
| | $\bar{\sigma}^2$ | 1.72 | 0.87 | 0.88 | 1.93 | 0.84 | 0.98 | 1.70 | 1.06 | 0.96 |
| | $s.e.$ | 0.32 | 0.15 | 0.09 | 0.45 | 0.17 | 0.13 | 0.33 | 0.24 | 0.13 |
| $K=4$ | $\bar{r}_1$ | 0.24 | 0.56 | 0.87 | 0.88 | 0.26 | 0.25 | 0.57 | 1.03 | -1.01 |
| | $s.e.$ | 1.81 | 1.80 | 2.02 | 1.80 | 1.81 | 2.14 | 1.77 | 1.90 | 2.16 |
| | $\bar{r}_2$ | -0.33 | 0.06 | 0.58 | 0.33 | -0.20 | 0.05 | 0.34 | 0.87 | -0.90 |
| | $s.e.$ | 0.81 | 0.50 | 0.51 | 0.86 | 0.59 | 0.62 | 0.90 | 0.67 | 0.64 |
| | $\bar{\sigma}^2$ | 7.55 | 3.59 | 3.72 | 7.78 | 3.58 | 3.75 | 7.44 | 4.08 | 3.73 |
| | $s.e.$ | 2.16 | 0.71 | 0.48 | 2.06 | 0.77 | 0.46 | 1.72 | 0.90 | 0.42 |
| $K=8$ | $\bar{r}_1$ | 1.45 | 1.10 | -0.85 | 1.98 | 0.54 | -1.90 | 1.38 | 1.40 | -3.40 |
| | $s.e.$ | 3.15 | 3.24 | 3.81 | 3.05 | 3.30 | 4.03 | 3.02 | 3.50 | 3.99 |
| | $\bar{r}_2$ | 0.82 | 0.61 | -0.93 | 1.65 | 0.38 | -1.53 | 1.55 | 1.72 | -2.55 |
| | $s.e.$ | 1.07 | 0.97 | 1.04 | 1.28 | 1.07 | 1.26 | 1.34 | 1.22 | 1.15 |
| | $\bar{\sigma}^2$ | 14.10 | 7.60 | 7.67 | 14.44 | 7.74 | 7.78 | 13.85 | 8.33 | 7.76 |
| | $s.e.$ | 4.16 | 1.71 | 1.00 | 3.89 | 1.95 | 0.97 | 3.47 | 1.90 | 0.86 |
| $K=12$ | $\bar{r}_1$ | 2.38 | 1.05 | -2.71 | 2.49 | 0.32 | -3.60 | 2.31 | 0.62 | -5.07 |
| | $s.e.$ | 4.59 | 4.95 | 5.61 | 4.50 | 5.02 | 5.83 | 4.43 | 5.29 | 5.88 |
| | $\bar{r}_2$ | 2.04 | 0.92 | -2.22 | 2.58 | 0.68 | -2.45 | 2.97 | 1.52 | -3.41 |
| | $s.e.$ | 1.30 | 1.30 | 1.44 | 1.60 | 1.35 | 1.64 | 1.84 | 1.55 | 1.39 |
| | $\bar{\sigma}^2$ | 19.48 | 11.42 | 11.72 | 19.50 | 11.40 | 11.86 | 19.05 | 12.09 | 11.49 |
| | $s.e.$ | 5.30 | 2.60 | 1.42 | 5.06 | 2.97 | 1.33 | 4.60 | 2.97 | 1.20 |

This table provides evidence on the relationship between value share changes and log future returns for aggregate industry portfolios. Portfolios of industries are formed in each quarter by sorting on growth of market share in the past $L$ quarters which are held for $K$ quarters. 'LG','MG' and 'HG' represent the low, medium,and high share growth portfolios respectively. In each portfolio there are 4 industries. $K$ is the number of quarters over which the returns and volatilities are calculated. $\omega_{i,t}$ is the ratio of the market capitalization of industry $i$ with respect to total market capitalization. $\Delta\omega_i = (1/L)[\log(\omega_{i,t}) - \log(\omega_{i,t-L})]$.

$\bar{r}_1 \equiv$ average demeaned cumulative holding period portfolio log returns. Unconditional means are removed from the log returns of each industry. Portfolio returns are the equal-weighted average of demeaned industry returns in the portfolio. $\bar{r}_1$ equal to the time-series average of demeaned portfolio returns.

$\bar{r}_2 \equiv$ is average holding-period portfolio returns in excess of the market return. Log market returns are subtracted from log returns from each industry. Portfolio returns are the equal-weighted average of excess industry returns in the portfolio. $\bar{r}_2$ equal to the time-series average of portfolio excess returns.

$\sigma^2_{t+K} \equiv$ integrated volatility of a given portfolio in the holding period. Calculation follows 3 steps: 1) calculate the squares of sums of demeaned industry excess log returns within a given portfolio for each quarter in the holding period; 2) Add up the squares of sums over the holding period for portfolios formed in each quarter; 3) average the quarterly time-series from step 2 for each portfolio. The sample covers quarterly data from 1948.1 to 2003.4. Newey-West standard errors are reported underneath the means. The number of lags in the Newey-West adjustment is equal to the number of holding periods $K$.

Table 10: Event Study: Investment Ratio ($\chi_t$) and Future Returns

| | | $L=4$ | | | $L=8$ | | | $L=12$ | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | LG | MG | HG | LG | MG | HG | LG | MG | HG |
| | $\chi_i$ | 1.26 | 2.36 | 5.35 | 1.28 | 2.39 | 5.39 | 1.30 | 2.43 | 5.43 |
| | *s.e.* | 0.13 | 0.25 | 0.57 | 0.13 | 0.25 | 0.58 | 0.13 | 0.25 | 0.59 |
| $K=1$ | $\bar{r}_1$ | 0.09 | -0.09 | 0.01 | 0.17 | 0.02 | 0.09 | 0.07 | -0.10 | 0.01 |
| | *s.e.* | 0.58 | 0.60 | 0.62 | 0.59 | 0.61 | 0.62 | 0.59 | 0.62 | 0.63 |
| | $\bar{r}_2$ | 0.06 | -0.16 | -0.15 | 0.05 | -0.15 | -0.16 | 0.05 | -0.17 | -0.14 |
| | *s.e.* | 0.22 | 0.19 | 0.22 | 0.22 | 0.19 | 0.22 | 0.23 | 0.19 | 0.23 |
| | $\bar{\sigma}^2$ | 1.29 | 0.93 | 1.06 | 1.31 | 0.94 | 1.08 | 1.32 | 0.96 | 1.09 |
| | *s.e.* | 0.31 | 0.18 | 0.15 | 0.31 | 0.19 | 0.15 | 0.32 | 0.19 | 0.15 |
| $K=4$ | $\bar{r}_1$ | 0.82 | -0.45 | -0.27 | 0.74 | -0.49 | -0.32 | 0.39 | -0.90 | -0.49 |
| | *s.e.* | 1.78 | 2.07 | 2.07 | 1.79 | 2.09 | 2.10 | 1.80 | 2.10 | 2.13 |
| | $\bar{r}_2$ | 0.60 | -0.87 | -1.03 | 0.57 | -0.86 | -1.04 | 0.54 | -0.95 | -0.89 |
| | *s.e.* | 0.67 | 0.56 | 0.73 | 0.69 | 0.57 | 0.74 | 0.70 | 0.57 | 0.75 |
| | $\bar{\sigma}^2$ | 4.93 | 3.22 | 4.00 | 4.99 | 3.25 | 4.04 | 5.05 | 3.29 | 4.00 |
| | *s.e.* | 1.35 | 0.50 | 0.46 | 1.37 | 0.51 | 0.47 | 1.40 | 0.52 | 0.48 |
| $K=8$ | $\bar{r}_1$ | 0.80 | -1.19 | -1.12 | 0.35 | -1.66 | -1.33 | -0.10 | -2.33 | -1.57 |
| | *s.e.* | 3.14 | 3.79 | 3.79 | 3.12 | 3.78 | 3.85 | 3.14 | 3.79 | 3.91 |
| | $\bar{r}_2$ | 0.87 | -1.53 | -2.13 | 0.78 | -1.63 | -1.99 | 0.83 | -1.80 | -1.75 |
| | *s.e.* | 1.16 | 0.85 | 1.18 | 1.18 | 0.85 | 1.18 | 1.20 | 0.86 | 1.18 |
| | $\bar{\sigma}^2$ | 9.98 | 5.99 | 7.55 | 10.08 | 6.05 | 7.53 | 10.21 | 6.09 | 7.46 |
| | *s.e.* | 3.01 | 0.77 | 0.81 | 3.07 | 0.78 | 0.82 | 3.12 | 0.80 | 0.83 |
| $K=12$ | $\bar{r}_1$ | 0.09 | -1.74 | -1.71 | -0.42 | -2.47 | -2.06 | -0.96 | -3.19 | -2.31 |
| | *s.e.* | 4.61 | 5.52 | 5.46 | 4.62 | 5.51 | 5.54 | 4.66 | 5.53 | 5.63 |
| | $\bar{r}_2$ | 0.80 | -1.65 | -2.62 | 0.82 | -1.81 | -2.44 | 0.84 | -1.99 | -2.17 |
| | *s.e.* | 1.51 | 1.04 | 1.39 | 1.54 | 1.02 | 1.38 | 1.57 | 1.02 | 1.38 |
| | $\bar{\sigma}^2$ | 15.27 | 8.89 | 11.30 | 15.41 | 8.98 | 11.28 | 15.62 | 9.06 | 11.26 |
| | *s.e.* | 4.95 | 1.10 | 1.14 | 5.04 | 1.11 | 1.16 | 5.13 | 1.12 | 1.18 |

This table provides evidence on the relationship between investment shares $\chi_{it}$, and log future returns for aggregate industry portfolios. Portfolios of industries are formed in each quarter by sorting on growth of investment share in the past $L$ quarters which are held for $K$ quarters. 'LG','MG' and 'HG' represent the low, medium,and high investment share growth portfolios respectively. In each portfolio there are 4 industries. $K$ is the number of quarters over which the returns and volatilities are calculated. $\chi_{i,t}$ is the investment ratio of sector $i$, and $\chi_i = (1/L)[\log(\chi_{i,t}) - \log(\chi_{i,t-L})]$.

$\bar{r}_1 \equiv$ average demeaned cumulative holding period portfolio log returns. Unconditional means are removed from the log returns of each industry. Portfolio returns are the equal-weighted average of demeaned industry returns in the portfolio. $\bar{r}_1$ equal to the time-series average of demeaned portfolio returns.

$\bar{r}_2 \equiv$ is average holding-period portfolio returns in excess of the market return. Log market returns are subtracted from log returns from each industry. Portfolio returns are the equal-weighted average of excess industry returns in the portfolio. $\bar{r}_2$ equal to the time-series average of portfolio excess returns.

$\sigma^2_{t+K} \equiv$ integrated volatility of a given portfolio in the holding period. Calculation follows 3 steps: 1) calculate the squares of sums of demeaned industry excess log returns within a given portfolio for each quarter in the holding period; 2) Add up the squares of sums over the holding period for portfolios formed in each quarter; 3) average the quarterly time-series from step 2 for each portfolio. The sample covers quarterly data from 1948.1 to 2003.4. Newey-West standard errors are reported underneath the means. The number of lags in the Newey-West adjustment is equal to the number of holding periods $K$.

Table 11: Long-Run Return Projection on Value Share (Human-Capital Included)

| Industry | q4 | $\bar{R}^2$ | q8 | $\bar{R}^2$ | q12 | $\bar{R}^2$ | q20 | $\bar{R}^2$ |
|---|---|---|---|---|---|---|---|---|
| Market | -0.120 | 0.085 | -0.236 | 0.169 | -0.340 | 0.225 | -0.549 | 0.263 |
| | 0.050 | | 0.089 | | 0.113 | | 0.179 | |
| Bus. Equipment | -0.106 | 0.089 | -0.222 | 0.184 | -0.327 | 0.252 | -0.511 | 0.272 |
| | 0.050 | | 0.087 | | 0.109 | | 0.170 | |
| Chemicals | -0.107 | 0.031 | -0.195 | 0.055 | -0.240 | 0.060 | -0.372 | 0.085 |
| | 0.064 | | 0.130 | | 0.168 | | 0.212 | |
| Durables | -0.168 | 0.095 | -0.337 | 0.186 | -0.473 | 0.251 | -0.699 | 0.311 |
| | 0.064 | | 0.117 | | 0.143 | | 0.189 | |
| Energy | -0.236 | 0.151 | -0.417 | 0.252 | -0.506 | 0.290 | -0.700 | 0.340 |
| | 0.072 | | 0.128 | | 0.160 | | 0.228 | |
| Health | -0.045 | 0.048 | -0.098 | 0.110 | -0.142 | 0.144 | -0.223 | 0.176 |
| | 0.024 | | 0.048 | | 0.070 | | 0.119 | |
| Manufactoring | -0.180 | 0.096 | -0.316 | 0.167 | -0.444 | 0.232 | -0.695 | 0.325 |
| | 0.051 | | 0.109 | | 0.141 | | 0.219 | |
| Money | -0.027 | 0.027 | -0.052 | 0.053 | -0.068 | 0.060 | -0.088 | 0.051 |
| | 0.017 | | 0.033 | | 0.049 | | 0.082 | |
| Non-Durables | -0.079 | 0.033 | -0.153 | 0.067 | -0.201 | 0.084 | -0.335 | 0.125 |
| | 0.040 | | 0.076 | | 0.100 | | 0.168 | |
| Other | -0.201 | 0.159 | -0.356 | 0.278 | -0.510 | 0.368 | -0.799 | 0.436 |
| | 0.041 | | 0.062 | | 0.070 | | 0.118 | |
| Shops | -0.072 | 0.033 | -0.132 | 0.061 | -0.165 | 0.070 | -0.269 | 0.087 |
| | 0.038 | | 0.072 | | 0.094 | | 0.169 | |
| Telecom | -0.110 | 0.082 | -0.235 | 0.163 | -0.346 | 0.217 | -0.412 | 0.193 |
| | 0.062 | | 0.111 | | 0.142 | | 0.136 | |
| Utilities | -0.089 | 0.039 | -0.173 | 0.082 | -0.246 | 0.117 | -0.463 | 0.223 |
| | 0.043 | | 0.077 | | 0.103 | | 0.139 | |

The dependant variables are market and sector returns in excess of risk-free rate over the different future horizons. The regressor are wealth shares relative to total wealth which includes equity market wealth and human capital wealth – namely, $W_{a,t} = V_{a,t} + \lambda L_t$, where $L_t$ is aggregate labor earnings and $\lambda = 32$.

Figure 1: **Sectoral Wealth Shares**

This figure presents the relative market shares of various industry portfolios over the time period 1948.1 – 2004.3.

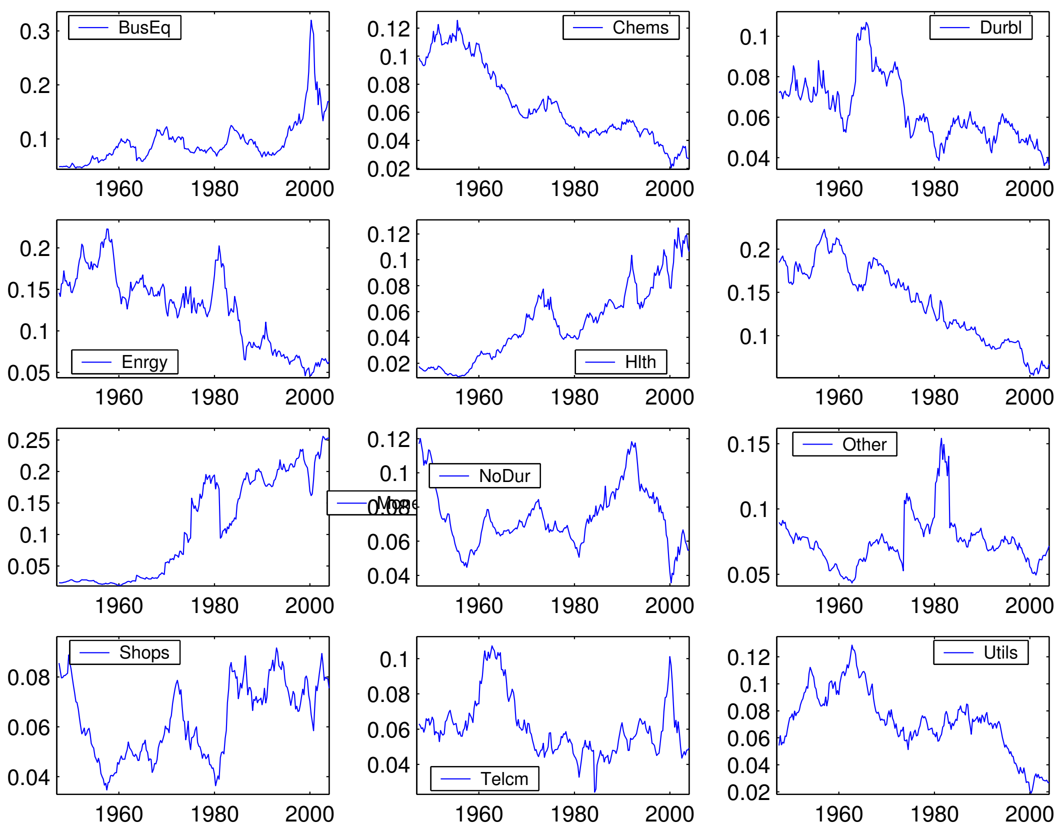

Figure 2: **Aggregate Market Payout Yields**

This figure presents the payouts corresponding to the aggregate market portfolio. The red line depicts the standard dividend yield $y_o$, while the blue line depicts the net payout yield reflecting net inflows and outflows, $y$.

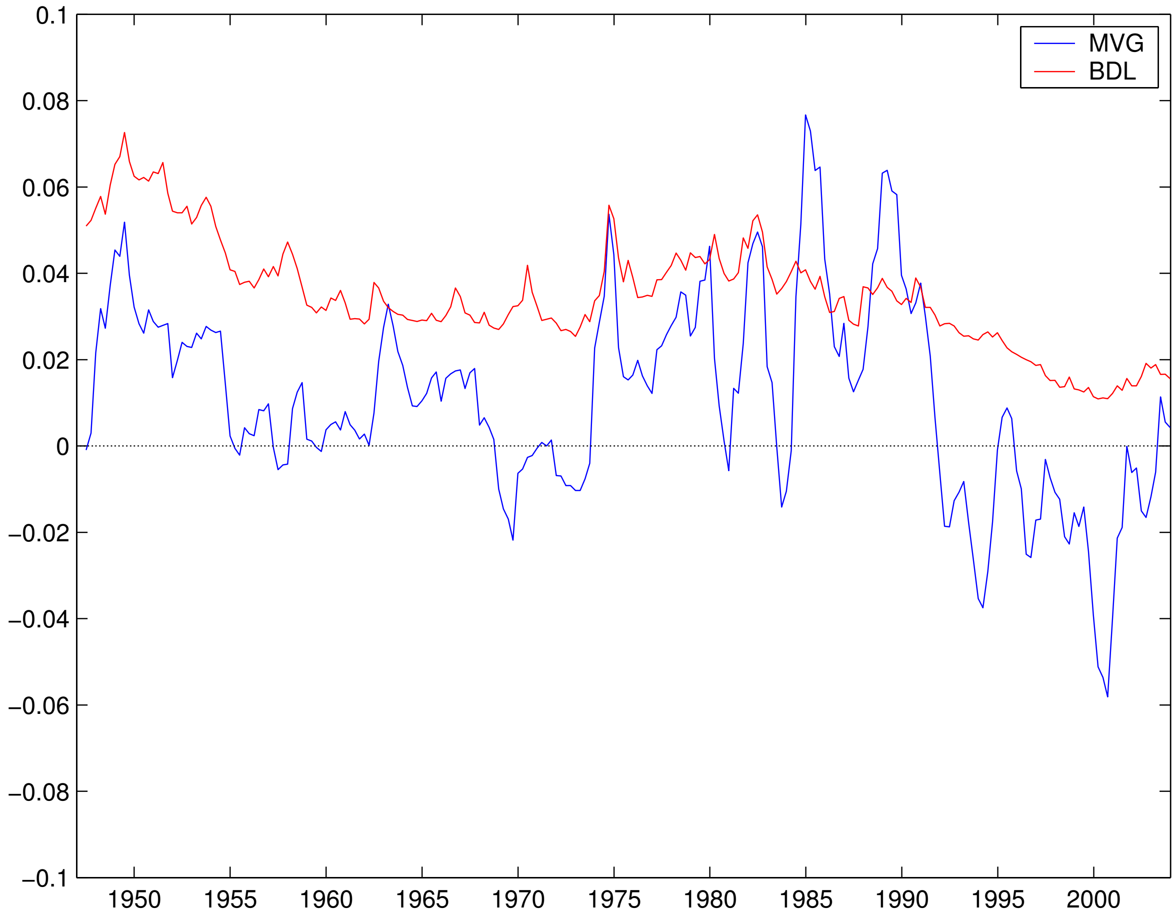

Figure 3: **Scatter-plot of expected returns and log market shares**

Each scatter-plot provides the log market share (horizontal axis) and the 4-year cumulative expected return (vertical axis)

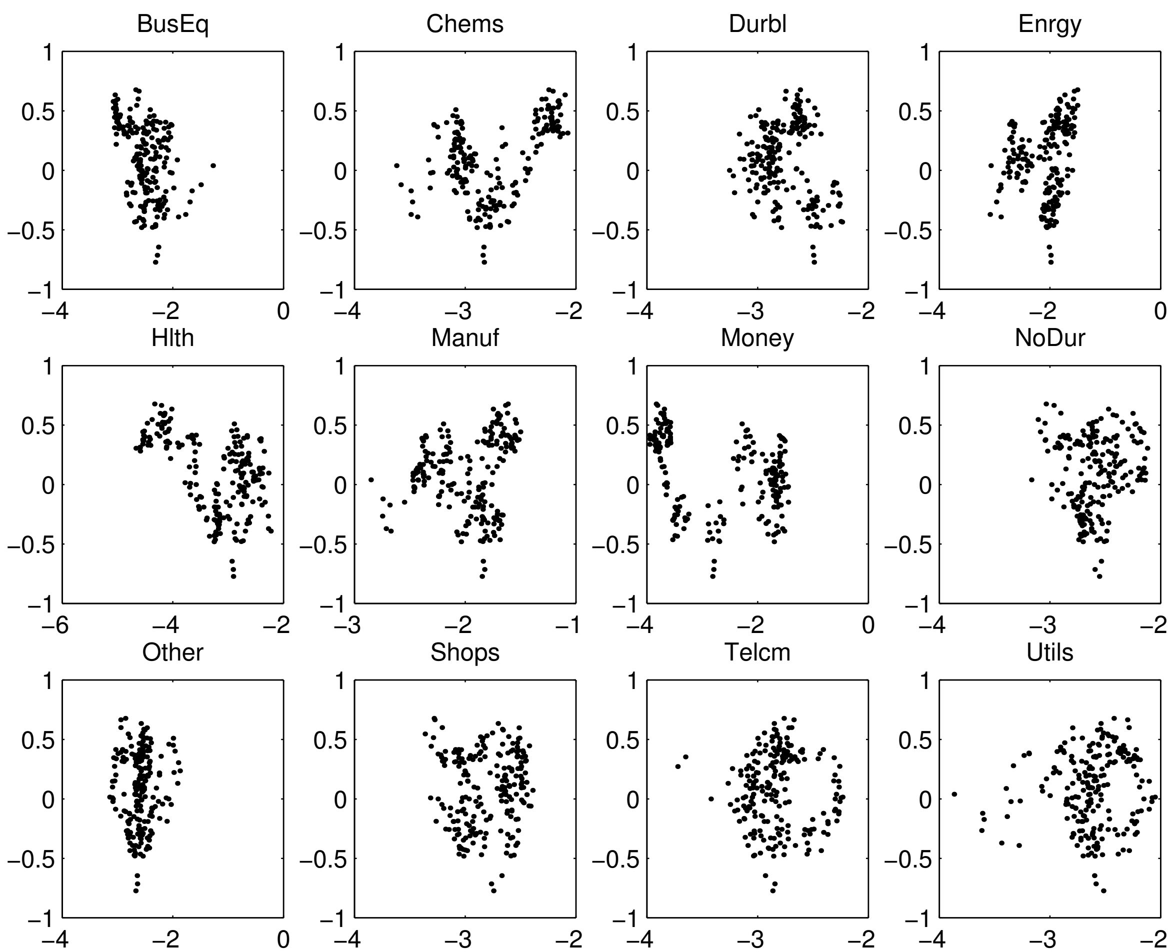

Figure 4: **Scatter-plot of log adjusted payouts and log market shares**

Each scatter-plot provides the log market share (horizontal axis) and 4 years of adjusted payouts (vertical axis)

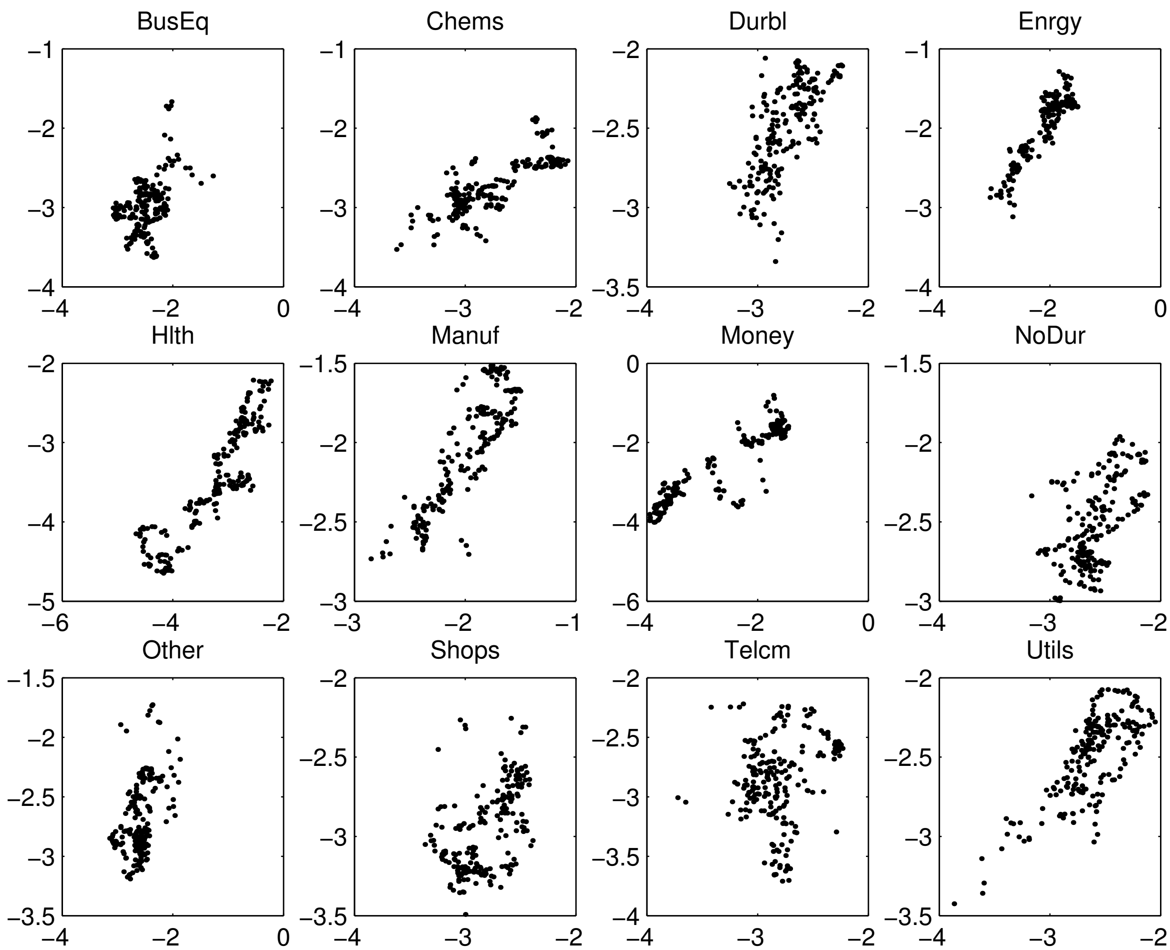

Figure 5: **Scatter-plot of future returns and log market shares (inclusive of human capital)**

Each scatter-plot provides the log market shares relative to overall wealth inclusive of human capital (horizontal axis) and the 4-year cumulative expected return (vertical axis)