CARF Working Paper

CARF-F-069

The Spirit of Capitalism and Asset Pricing: an Empirical Investigation

Qiang Zhang
University of Memphis

June 2006

CARF is presently supported by Bank of Tokyo-Mitsubishi UFJ, Ltd., Dai-ichi Mutual Life Insurance Company, Meiji Yasuda Life Insurance Company, Mizuho Financial Group, Inc., Nippon Life Insurance Company, Nomura Holdings, Inc. and Sumitomo Mitsui Banking Corporation (in alphabetical order). This financial support enables us to issue CARF Working Papers.

The Spirit of Capitalism and Asset Pricing: an Empirical Investigation[1]

Qiang Zhang
Department of Economics
University of Memphis
Memphis, TN 38152

Tel.: (901) 678 4627
Email: qzhang2@memphis.edu

Abstract

We extend and test two models of aggregate asset pricing that feature status-seeking through accumulation of not only financial assets but also human capital. We use weak-identification robust tests to confront these models with U.S. data. Contrary to previous results, we find that the spirit of capitalism hypothesis, modeled as either direct preference for wealth or pursuit of relative wealth status, is rejected in the aggregate data. Therefore, adding status motive alone to an otherwise standard model may not be sufficient to resolve the equity premium puzzle.

JEL: G10, G12

[1] I thank R. Anton Braun, Quentin Chu, John Conlon, Isao Ishida, Yasuyuki Sawada, Mark Van Boening, and the seminar audience at the University of Memphis, Ole Miss, and University of Tokyo for helpful comments. I am especially grateful to Bill T. Smith for helpful discussions and comments. For help with the data, I thank Pankaj Jain and Charles Shi. For technical assistance with Matlab, I thank David Huckaby and Lan Wang.

1. Introduction

It has long been observed that individuals are driven by the pursuit of social status. A particular form of status seeking that has been studied in economics literature is Max Weber's (1958) spirit of capitalism hypothesis. According to Weber, "Man is dominated by the making of money, by acquisition as the ultimate purpose of his life. Economic acquisition is no longer subordinated to man as the means for the satisfaction of his material needs."[2] If wealth seeking in this sense accurately characterizes human behavior, it should affect microeconomic consumption, saving, and portfolio decisions, as well as macroeconomic performances of an economy populated by such wealth-conscious individuals. Three recent papers, Bakshi and Chen (1996, henceforth BC), Smith (2001), and Gong and Zou (2002), have theoretically investigated the asset-pricing implications of this theme. They have demonstrated in various contexts that the spirit of capitalism hypothesis may help resolve the equity premium puzzle. Furthermore, the test results in BC (1996), so far the only empirical evidence on the spirit of capitalism hypothesis in the asset pricing literature, support such an optimistic view.

BC modeled status-seeking as direct preference for *financial* wealth (i.e. the level of financial wealth, in addition to consumption, affects the consumer's utility), though in their and others' theoretical analyses, the pursuit of relative wealth, i.e. individual wealth relative to a social wealth benchmark, has been studied. This raises two questions.

First, just as a larger financial wealth may lead to higher status, a higher level of human capital through better education or training tends to bring higher social recognition as well, even though it may not always lead to a higher income. Indeed, sociologists typically find that the prestige (i.e. status) ranking of an occupation depends substantially more on its average schooling than on its average income. See e.g. Featherman and Stevens (1982). Hence, a status-conscious

[2] In addition to Weber, many others, including Adam Smith, John Keynes, Karl Marx, and Gustav Cassel, have stressed the importance of status-seeking in understanding capital accumulation and other issues. See Zou (1994) for excerpts of their writings on this matter.

individual cannot afford to ignore human capital and focus on accumulating financial wealth alone. In addition, it is now almost common sense that the dominant component of an average household's total wealth is its human capital. Naturally, at national level, human capital accounts for a far larger fraction of total wealth than financial assets. The share of human capital in U.S. national wealth has been estimated to be about 2/3 or even above 90%. See e.g. Jorgenson and Fraumeni (1989) and Lettau and Ludvigson (2004, LL henceforth).

It is therefore both natural and necessary to extend the concept of status-seeking to include the acquisition of human capital, in addition to financial assets, in empirical evaluations of the spirit of capitalism models. Furthermore, independent of the inclusiveness of status measures, which is specific to the spirit of capitalism models, there is also the more general problem of accounting for Roll's (1977) critique in evaluating asset pricing models. According to this critique, a valid test of any asset pricing model that involves the return to total wealth portfolio should include returns to assets that may not be directly observable, such as human capital, housing, consumer durable goods, private equity, and deposits. This also requires us to include these assets in wealth.

Second, is it possible to go beyond the direct preference for wealth and test the perhaps more interesting case of relative-status seeking in the aggregate data? BC (1996, p.145) did not think that it would make sense to do so, and therefore did not pursue it. But to many, status is intrinsically a relative concept.

In this paper, we address these two questions by first extending the concept of status to include human capital and essentially all financial and real assets in household portfolio, and then testing both the direct preference for wealth and the pursuit of relative wealth status in BC's (1996) model and Smith's (2001) model. Our treatment of relative wealth-status seeking in the aggregate data is similar in spirit to Abel's (1990) "catching up with the Joneses" preferences.

A recent strand of literature has proposed novel approaches to incorporating human wealth into empirical analysis of asset pricing models. See e.g. Campbell (1996), Jagannathan and Wang (1996), Vissing-Jørgensen and Attanasio (2003), Palacios-Huerta (2003), and Zhang (2006).[3] These studies show that accounting for human wealth produces substantially different results than when it is ignored. Along the same line, our empirical results are also substantially different from those in BC (1996).[4] We reject both the BC (1996) and the Smith (2001) model, whether status is modeled as direct preference for wealth level or as the pursuit of relative wealth status.

Even if we ignore human wealth, there are still reasons to reconsider BC's (1996) empirical evidence for the following two reasons. First, their consumption-(financial) wealth ratio measure may well be non-stationary, but the econometric techniques that they used require stationarity. Second, their wealth growth measure, the value-weighted real return on stocks listed at the New York Stock Exchange (NYSE), grossly over-estimates both the level and the volatility of wealth growth. See Sections 4.A and 4.B for details.

In the next section, we present a concise review of the asset pricing literature that feature the spirit of capitalism hypothesis. In Section 3, we review BC's (1996) model and Smith's (2001) model before we explain our two status measures. We describe in Section 4.B how we measure wealth-related variables. We then sketch our econometric methods in Section 4.C. In Section 5, we present our empirical results. We conclude our paper in Section 6 by calling for more efforts on empirical studies of implications of status-seeking behavior.

---

[3] Braun and Shioji (2003) extended the Campbell (1996) model to measure equity risk in Japan.

[4] It is important to note that accounting for human capital does not unduly bias our tests towards rejecting the spirit of capitalism models. Doing so has actually led to either non-rejection or more favorable results for all the models investigated by the papers cited in this paragraph.

2. Literature Review

We now offer a short review of the three papers mentioned in the Introduction on the spirit of capitalism and asset pricing. More details on the two models we evaluate in this paper can be found in Section 3. BC (1996) cast their model in the expected utility framework. When status is modeled as direct preference for wealth, the implied equity premium depends on the covariance between stock return and wealth growth, as well as the covariance between stock return and consumption growth – the risk factor in the standard consumption capital asset pricing model (C-CAPM). The first covariance has a weight equal to the status parameter, and the second has a weight equal to the relative risk aversion (RRA) coefficient. Since a portion of the equity premium is now explained by a new risk factor, their model could potentially perform better than the C-CAPM. When status is modeled as wealth relative to a social wealth index, in addition to the two risk factors above, the equity premium also depends on a third covariance between stock return and the growth of social wealth index, with its weight determined by the status parameter.

Smith (2001) extended BC's analysis to the non-expected utility model of Epstein and Zin (1991) and Weil (1990) (EZW henceforth) that separates RRA from the elasticity of intertemporal substitution (EIS) of consumption. The equity premium in Smith's (2001) model depends on the same risk factors (covariances) as in the BC model. However, the weights of these covariances now depend not only on the RRA and the status parameter, but also on the EIS. Such a generalization may further enhance the model's ability to explain asset returns. The spirit of capitalism now polarizes an individual's RRA: If her RRA is larger than 1, her effective RRA increases with her status motive; however, if her RRA is smaller than 1, the opposite happens. In addition, her status motive affects her time preference rate and EIS.

Gong and Zou (2002), on the other hand, maintained the expected utility framework, but introduced direct preference for wealth and capital income taxes into a stochastic growth model. They demonstrated that wealth motive raises the equity premium, reinforcing BC's (1996) results.

BC (1996) found favorable evidence for direct preference for financial wealth using U.S. aggregate data. In particular, they reported that the RRA did not need to be high for their model's stochastic discount factor (SDF) to pass the Hansen and Jagannathan (1991) volatility bound. This contrasts sharply with the very high RRA that the standard C-CAPM requires. Since there is the widely held belief that RRA should be low (see e.g. Lucas (2003, Section IV)), their model seems to have offered an important improvement over the standard model. Smith's (2001) model, on the other hand, has not been empirically examined so far. The SDFs of both the BC model and the Smith (2001) model include wealth growth and the consumption-wealth ratio. In addition, the SDF of Smith's (2001) model includes the return on the representative agent's wealth portfolio. Incorporating human capital into these three terms will simultaneously account for the portion of status induced by human capital as well as Roll's (1977) critique.

3. Models and Status Measures

In BC's model and Smith's (2001) model, individuals are assumed to derive utility from both consumption and status. To incorporate human capital into wealth, denoted by W, we assume $W_t = A_t + H_t$ for the representative agent, where A_t is her non-human wealth and H_t is her human wealth. Since Smith's model nests BC's model as a special case, for the convenience of exposition, we present the discretized version of the former below. The representative agent is assumed to have the following recursive preferences

$$(1-\gamma)U_t = \left\{(1-\beta)\left[C_t\, S_t^b\right]^\theta + \beta\left[E_t(1-\gamma)U_{t+1}\right]^{\theta/(1-\gamma)}\right\}^{(1-\gamma)/\theta}, \qquad (1)$$

where β is the time discount factor, C_t is consumption flow, S_t is status, b captures the strength of status motive, θ governs the EIS for the composite good $C_t S_t^b$, γ is the RRA coefficient for timeless gambles on this composite good, and E_t represents the expectation conditional on information available at time t. S_t is measured relatively as W_t / V_t, where V_t is a predetermined social wealth index. The agent chooses consumption and portfolio weights each period to maximize (1) above subject to the budget constraint

$$W_{t+1} = \left(W_t - C_t\right) R_{t+1}^m . \tag{2}$$

Here R_{t+1}^m is the stochastic return on the representative agent's wealth portfolio from period t to $t+1$. There are $n-1$ financial assets, and one of them is a riskless asset. Human capital, the n^{th} asset, is a risky asset. The budget constraint (2) and the Euler equations in BC (1996) and Smith (2001) still hold after incorporating human capital into wealth, as long as human capital is tradable. In the real world, human capital is, of course, largely non-tradable. However, a shadow value for it can still be calculated and added to financial assets, and R_{t+1}^m can be reinterpreted accordingly. See Epstein and Zin (1991) for such an argument. By combining the Euler equation for equity premium in Smith (2001) with the consumption Euler equation implied by his model, we can show that the Euler equations for asset returns in this model are as follows:

$$E_t\left[\beta^{(1-\gamma)/\theta}\left(\frac{C_{t+1}}{C_t}\right)^{(1-\gamma)(1-1/\theta)}\left(\frac{S_{t+1}}{S_t}\right)^{b(1-\gamma)}\left(1+b\frac{C_{t+1}}{W_{t+1}}\right)^{(1-\gamma)/\theta}\left(R_{t+1}^m\right)^{(1-\gamma)/\theta-1} R_{j,t+1}\right]=1 . \tag{3}$$

Here $R_{j,t+1}$ is the gross return on asset j, $j = 1, 2, \ldots, n-1$. Note that (3) may not hold for the return on human capital because it is not tradable. When $\theta = 1-\gamma$ and $S_t = W_t$ in (3), the Euler equations tested in BC (1996) are recovered:

$$E_t\left[\beta\left(\frac{C_{t+1}}{C_t}\right)^{-\gamma}\left(\frac{W_{t+1}}{W_t}\right)^{-\lambda}\left(1+\frac{\lambda}{\gamma-1}\frac{C_{t+1}}{W_{t+1}}\right)R_{j,t+1}\right]=1, \quad j = 1, 2, \ldots, n-1, \qquad (4)$$

where $\lambda = -b\theta$.

In order for equations (3) and (4) to hold for aggregate data, the social wealth index V_t must be constant across individuals, i.e. they share the same wealth benchmark (BC (1996, p. 139)). Other than this point, little else is known on what V_t should be. However, without modeling V_t, we will be forced to confine S_t to be the level of wealth as in BC (1996). Such a status measure might be interesting in its own right, because it is still consistent with Max Weber's description of the spirit of capitalism we quoted in the Introduction. For this reason, we retain wealth level as *a* measure of status in our empirical work. Doing so will also allow us to compare our results with those in BC (1996). In addition, such a measure of status is, broadly speaking, consistent with the notion of "status goods" that some researchers have used, i.e. goods that reveal the status of an individual who consumes it. In our context, we view the entire wealth stock of an individual as a status good. A recent study by Aït-Sahalia, Parker, and Yogo (2004) explored how accounting for luxury goods in addition to basic consumption can help explain the equity premium. They used the level of luxury goods consumption in their utility function, which has similar flavor to wealth level in equation (1) because luxury goods can be viewed as "status goods."

However, to many researchers, the use of wealth level as a status measure is not ultimately satisfying, because status is often considered a relative concept. This naturally motivates the use of per-capita wealth as V_t. But as pointed out by BC (1996, p. 145), if we use per-capita wealth of year *t* as V_t, $S_t = 1$ holds always, reflecting the fact that the representative agent, being the fictitious individual representing average economic behavior and average status, is always in the middle class. Such a choice of V_t takes status concern out of the aggregate model and is not desirable for our purpose.

In contrast, if we borrow the idea in Abel's (1990) "catching up with the Joneses" model that the *lagged* per-capita consumption is the social standard of living, and assume that consumers use the *lagged* per-capita wealth as the social wealth benchmark, we will still obtain a meaningful measure of relative status.[5] Furthermore, since Weber's assertion on the spirit of capitalism explicitly states that wealth accumulation is not just for an individual's future consumption, but becomes "the ultimate purpose of his life," it is appropriate as well as necessary to put relative well-being in wealth, instead of in consumption. In other words, consumers may not choose to directly catch up with the Joneses' consumption, but may instead catch up with their wealth. In such a circumstance, consumers gauge individual status by comparing current individual wealth with last period's per-capita wealth, i.e. $V_t = W_{t-1}$. As a result, for the representative agent, the relative status $S_t = W_t / V_t = W_t / W_{t-1}$. In the representative agent context, such a choice of social wealth benchmark is actually quite sensible because the only comparison that she can make within the economy is over time. Unlike a real-world individual, she cannot do cross-sectional comparison because she represents the aggregate economy and there is "nobody else" for her to compare herself to within the closed economy. In terms of the utility function (1), such a status measure means that the representative agent derives utility from both consumption and wealth growth.[6]

[5] See Smith and Zhang (2006) for empirical evidence on one version of Abel's (1990) model.

4. Measurement Issues and Econometric Methods

4.A Bakshi and Chen's (1996) Measures of $\{C_t/W_t\}$ and $\{W_t/W_{t-1}\}$

BC (1996) estimated the consumption-wealth ratio by utilizing the following identity that involves consumption growth and wealth growth:

$$\frac{C_t}{W_t} = \frac{C_0}{W_0} \cdot \frac{C_1/C_0}{W_1/W_0} \cdots \frac{C_t/C_{t-1}}{W_t/W_{t-1}}.$$

They used the real return on NYSE stocks to proxy wealth growth, which averages about 8% a year. There are two major problems with such a proxy. First, eq. (2) clearly shows that wealth growth is equal to the product of the return on total wealth portfolio and the fraction of wealth that is not consumed, instead of just the return itself. Second, using such a proxy amounts to ignoring assets whose returns tend to be lower, and less volatile, than stock returns, such as bonds, deposits and housing. Consequently, both the level and the volatility of wealth growth are likely to be substantially over-estimated by BC's (1996) proxy (see the top of p. 12).

On the other hand, the growth of per capita consumption (i.e. the numerators in the identity above) has been about 2% a year in the U.S. Therefore, over a long period the C_t/W_t series estimated by BC's (1996) method may be biased downward, and may therefore be nonstationary. This is indeed the case. See Figure 1 for an illustration. The solid line in this figure is the C_t/W_t series calculated by their method using per person non-durable goods and services expenditure (excluding clothing and shoes because of their durable nature). The trend line for the C_t/W_t series, indicated by the dashed line, has a conspicuous downward slope. An Augmented Dickey-Fuller test of the null hypothesis that this series contains a unit root does not reject at conventional significance levels. See Table 1 for the test result. Consequently, BC's

---

[6] Another potentially interesting measure of V is the median wealth level in the economy. It is, however, not clear how median wealth level across individuals, when wealth includes human capital, real estate, consumer durable goods, and private equity, among other assets, can be obtained.

(1996) empirical results are questionable because the econometric methods that they used all require their SDF to be stationary, and C_t/W_t is a component of their SDF.

4.B Measuring $\{C_t/W_t\}$, $\{W_t/W_{t-1}\}$ and $\{R_t^m\}$

Zhang (2006, Section 1.1) developed a simple approach to accounting for human capital and essentially all non-human financial and real assets in household portfolio in the estimation of the C_t/W_t, W_t/W_{t-1} and R_t^m series using LL's (2004) *cay* values. Though there have been some recent challenges to the usefulness of the *cay* variable in predicting stock returns (e.g. Rudd and Whelan (2006)), the use of *cay* in Zhang's (2006) approach does *not* rest on its predictive power. Here we briefly describe this approach. Let *Y* be real after-tax labor income per person. Denote the logarithm of a variable *X* by *x*. The *cay* variable in LL (2004) is the residual from *their* co-integrating regression of *c* on *a* and *y*

$$cay_t = c_t - 0.269\, a_t - 0.621 y_t . \qquad (5)$$

Here 0.269 is the estimated steady-state share of financial assets in total wealth, and 0.621 is the share of human wealth.[7] The logarithm of non-human wealth per person, a_t, includes essentially all forms of financial and real assets, e.g. bank deposits, bonds, housing, consumer durable goods, and private equity, in addition to stocks. The consumption measure is the non-durable goods and services expenditure (excluding clothing and shoes). These data are quarterly and span from 1959 to 2001. LL (2001, 2004) showed that some theories on human capital return imply that the log of consumption-wealth ratio is

$$c_t - w_t \approx cay_t - \nu\kappa - \nu z_t , \qquad (6)$$

[7] These two estimates do not add up to 1, as LL explained, because they should add up to 1 – *u*, where *u* is the share of consumption flow (e.g. the service flow from durable goods) that is not observable. This fact implies that the true share of human capital in total wealth is 0.621/(0.621 + 0.269) = 0.698.

where v is the steady-state share of human wealth in total wealth, κ is a linearization constant, and z_t is a random stationary term. To obtain C_t/W_t, we need to know the sum of the last two terms in eq. (6). Zhang (2006) showed how an assumption on human capital return can be used to reduce z_t to a constant, z.[8] Further, he used the widely accepted stylized fact that the U.S. economy has been in a steady state for the past several decades to determine that $\exp(-v\kappa - vz) = 0.00697$ for quarterly data. This means that we can use (6) to calculate quarterly consumption wealth ratio as follows

$$\frac{C_t}{W_t} \approx 0.00697 \exp(cay_t) .$$

Next, equipped with C_t/W_t estimates for all t, wealth growth is estimated by using the following identity in Zhang (2006):

$$\frac{W_{t+1}}{W_t} = \frac{C_{t+1}}{C_t} \cdot \frac{C_t/W_t}{C_{t+1}/W_{t+1}} .$$

Finally, eq. (2) implies that for given C_t/W_t and W_{t+1}/W_t, the return on optimal portfolio R_{t+1}^m can be easily solved.

Lettau (2000) noted that when asset returns are independently and identically distributed, optimal consumption is proportional to wealth. Under such a circumstance, the two terms W_{t+1}/W_t and C_t/W_t in (4) do not independently contribute to the volatility of the SDF in BC's (1996) model. Our W_{t+1}/W_t and C_t/W_t measures take this concern into account. If C_t/W_t is constant over t, W_{t+1}/W_t is equal to C_{t+1}/C_t in the last equation, and using such a measure of wealth growth in the SDF does not unduly inflate its volatility. If C_t/W_t is not constant, this

[8] A constant z implies that the ratio of labor income to human capital is approximately constant. z will be time-varying if Y/H is assumed to be equal to the dividend price ratio for stocks. However, it can be shown that such an assumption leads to downward-trending C/W series.

approach produces wealth growth estimates that more or less track consumption growth if the volatility of C_t/W_t is not large.

We present our estimates of C_t/W_t along with the estimates calculated using BC's (1996) method in Figure 1. It is obvious that our C_t/W_t estimates are stationary. In Figure 2, we compare our W_{t+1}/W_t estimates with BC's (1996) proxy for it, the value-weighted real return on NYSE stocks. The difference between the means of the two series is large: 1.0052 for the former, and 1.0199 for the latter. The difference between the two series' volatilities is even larger, as the standard deviation of our W_{t+1}/W_t estimates is only one-tenth of that of NYSE stock returns. Such large difference will surely affect estimation and test results, because in order for the two models to be relevant, the volatilities of their SDFs must be sufficiently high. This in turn requires that the exponents in the SDFs be large in absolute terms, given the small volatilities of correctly measured wealth-related variables. The fact that these exponents also affect SDF volatility implies that the small volatilities of wealth-related variables may not necessarily lead to rejection of the two models under investigation. This point will become clearer when we present the empirical results on Smith's (2001) model in Section 5.B and 5.C.

A major advantage of the approach above is that it gets around the thorny issue of directly measuring human capital stock. We now explore the possibility of employing this approach in a household-level data set to produce household-level C_t/W_t, W_t/W_{t-1}, and R_t^m estimates. Doing so requires us to run the co-integrating regression of c on a and y at household level. This is possible if a data set has detailed and reasonably accurate information on a household's consumption, labor income, and non-human assets over an extended period of time.

However, no single data set has all the information needed. For example, the Current Population Survey has no consumption and asset data. The Panel Study of Income Dynamics contains only food expenditure. Though the Consumer Expenditure Survey (CEX) has more detailed consumption data, it surveys a household for only five quarters. Furthermore, the Bureau of Labor Statistics in their website expressly cautions that the asset data in CEX is not reliable and recommends the asset data from Survey of Consumer Finance (SCF), which is conducted once every three years. Therefore, even if we create synthetic panel data on demographic cohorts by combining CEX and SCF, the number of observations for each cohort will be just seven because regularly and consistently measured CEX consumption data did not start until 1984. This is certainly too short a sample for running a co-integrating regression to generate for each cohort meaningful *cay* values. In addition, even if we ignore quality and use CEX asset data, we would only have about 20 data points for each age cohort, still barely enough to run a meaningful co-integrating regression. As a result, the wealth-related variables measured with such *cay* values will not be accurate. Such inaccuracy will result in unreliable model tests.

We therefore aggregate data in our tests. Furthermore, a model that purports to explain the equity premium should be able to pass a test at the aggregate level, i.e. to explain the aggregate equity premium. It is probably for this reason that most previous studies have used aggregate data to test asset pricing models, including BC (1996).

4.C Econometric Methods

Following Epstein and Zin (1991), we define $\eta = (1-\gamma)/\theta$. In addition, to facilitate the comparison of the strength of status-seeking in the non-expected utility case with that in BC (1996), we define $\lambda = -b\theta$. Lastly, we substitute our measurements of wealth-related variables into (3) and obtain, for the case of $S_{t+1} = W_{t+1}$, the following Euler equations

$$E_t\Bigg[\beta^{\eta}\left(\frac{C_{t+1}}{C_t}\right)^{\eta(\theta-\lambda)-1}\left(\exp(cay_t - cay_{t+1})\right)^{\eta(1-\lambda)-1}\left(1-0.00697\exp(cay_t)\right)^{1-\eta} \left(1-\frac{\lambda}{\theta}\cdot 0.00697\cdot\exp(cay_{t+1})\right)^{\eta} R_{j,t+1} - 1\Bigg] = 0, \qquad j = 1, ..., n-1. \tag{7}$$

The Euler equations in the BC model with direct preference for wealth are obtained when $\eta = 1$. For the relative wealth status version of the model, we use two plausible status measures, $S_{t+1} = W_{t+1}/W_t$ (per-capita wealth of last quarter as the social wealth benchmark) and $S_{t+1} = W_{t+1}/W_{t-3}$ (per-capita wealth of last year as the benchmark). The Euler equations for these two cases are similar to (7) and are not presented to conserve space.

We use generalized method of moments (GMM) to test (7), including the 2-step GMM of Hansen (1982) and the continuous updating GMM estimator (CUE henceforth) of Hansen, Heaton, and Yaron (1996). The size distortion in the model specification test associated with the CUE is smaller than that associated with the 2-step estimator. However, as the reader will see from the next section, not only the 2-step estimator and the CUE both produce results that are quite sensitive to the initial values used in estimation, but also the results show signs of weak identification. For the purpose of understanding empirical results below, it is useful to know that two common symptoms of weak identification are: (1). the model specification test results based on 2-step GMM and CUE usually provide conflicting evidence and; (2). the parameter estimates produced by these two asymptotically equivalent GMM estimators are substantially different. We therefore use Stock and Wright's (2000, SW henceforth) asymptotic theory for CUE to conduct our tests, as their theory is robust to weak identification caused by weak instruments. See Stock, Wright, and Yogo (2002) for a survey on weak identification in the GMM framework.

We now define $\boldsymbol{\mu} = (\beta, \eta, \theta, \lambda)$, and denote the true value of $\boldsymbol{\mu}$ by $\boldsymbol{\mu}_0$. Denote the CUE criterion function by $S_T(\boldsymbol{\mu}) \equiv T\, \overline{\boldsymbol{\varphi}}(\boldsymbol{\mu})' \mathbf{W}_T(\boldsymbol{\mu}) \overline{\boldsymbol{\varphi}}(\boldsymbol{\mu})$, where T is the sample size, and $\overline{\boldsymbol{\varphi}}(\boldsymbol{\mu})$ is the unconditional sampling counterpart to the left-hand side of (7). Two results in SW (2000) are used in our empirical analysis below. First, under appropriate assumptions, $S_T(\boldsymbol{\mu}_0) \xrightarrow{d} \chi^2_{m \times p}$, where m is the number of assets used in a test and p is the number of instruments. Second, under the assumption that we know which subset of parameters are well identified (denote it by

$\boldsymbol{\varphi}$) and which are weakly identified (denote it by $\boldsymbol{\omega}$), $S_T\left(\boldsymbol{\omega}_0, \hat{\boldsymbol{\varphi}}(\boldsymbol{\omega}_0)\right) \xrightarrow{d} \chi^2_{m\times p-q}$, where q is the number of well identified parameters and $\hat{\boldsymbol{\varphi}}(\boldsymbol{\omega}_0)$ is concentrated continuous updating estimate of well-identified parameters for given values of weakly identified parameters $\boldsymbol{\omega}_0$. These two results suggest that we can test a model by finding the set of parameter values that do not lead to large values of S_T relative to the critical values of the two χ^2 distributions aforementioned at a certain significance level. Such a set of parameter values is called either a joint *S* set (for the first χ^2 test) or a concentrated *S* set (for the second) in the next section. An empty *S* set indicates rejection of the model under investigation. In our *S* set analysis below, we use a heteroscedasticity-consistent optimal weighting matrix.

The instruments we use are fairly standard and are listed under Table 2. We also experiment with second lags of these variables to alleviate possible time aggregation bias in the data. We use two assets, the stocks listed on NYSE and the U.S. Treasury bills, in our tests. All the quantities are deflated by the personal consumption expenditure chain-type deflator (with 1996 = 100) provided by the U.S. Commerce Department, as in LL (2004). The sample period is 1959:1 to 2001:4.

5. Empirical Results

In this section, we first report in Tables 2 and 3 the empirical results obtained by using the 2-step GMM and the CUE on the two models under investigation that feature direct preference for wealth. The results produced by SW's (2000) weak-identification robust tests are presented in Tables 4-7 for both direct-preference-for-wealth models and relative wealth status models. To conserve space, we only report the results obtained with first-lagged instruments. Our test results are qualitatively robust to twice-lagged instruments.

5.A Results Based on 2-Step GMM and CUE

For BC's (1996) model, $\boldsymbol{\mu} = (\beta, \gamma, \lambda)$. There are two panels in Table 2, each corresponding to a set of initial parameter values. We find that the CUE estimates are very sensitive to the initial values used. For example, for the first set of initial values (1, 0, 0), the γ estimate from the CUE is 0.001. When the initial values change to (0.95, 0, 0), the γ estimate from the same estimator changes to –0.64. In addition, the estimates of γ and λ are very different across 2-step estimator and CUE for either set of initial values. For the first set of initial values (1, 0, 0), the γ estimate from the 2-step GMM is –26.7 while that from the CUE is 0.001 as just mentioned.[9] For the same set of initial values, the λ estimate produced by the 2-step estimator is 27.8, in striking contrast with the continuous updating estimate of 0.09. In terms of model specification testing, the χ^2 test does not reject the BC model at 10% level when the 2-step GMM is employed. However, when the CUE is used, the χ^2 test rejects the model very strongly: the *p*-value for this test is virtually zero. Such substantial swings of parameter estimates and test results persist when the second set of initial values are used. These large variations are symptoms of weak identification, as explained in Section 4.C.

Table 3 presents the 2-step and CUE results on the Smith (2001) model with direct preference for wealth. Since they share the same features as the results in Table 2, we do not describe them in detail here. Furthermore, Zhang (2006) presented evidence on weak identification in the EZW model when Roll's (1977) critique is accounted for. Since Smith's (2001) model nests that model, it is not surprising that the results in Table 3 also show symptoms of weak identification.

---

[9] It is also troubling that the 2-step γ estimate in the first panel and the continuous updating γ estimate in the second panel have the wrong signs, because from the standpoint of theory, γ should be positive as it captures the aversion to consumption risk in BC's (1996) utility function. Furthermore, $\gamma \geq 1$ is required in order for the transversality condition in their model to hold.

5.B Weak-Identification Robust Tests of Direct Preference for Wealth Models

We now turn to results of *S* set analysis on direct preference for wealth. For results on relative wealth status, see the next subsection. In constructing *S* sets, we use the following ranges and increments for parameters values: $\beta \in$ [0.96, 1.03] at increments of 0.001; $\eta \in [-135, 1]$ at increments of 0.25; $1-\theta \in [0.4, 2.5]$ at increments of 0.152; and $\lambda \in [-0.2, 0.2]$ at increments of 0.01.[10] Our findings are as follows. First, whether we use once- or twice- lagged instruments, all *S* sets for the BC model at 5% significance level are null. See the two rows labeled "BC" in Table 4. This is very strong evidence against BC's model, and therefore, the spirit of capitalism hypothesis modeled as direct preference for wealth. Second, the same cannot be said about Smith's (2001) model because the 95% joint *S* set, and the 95% concentrated *S* set when β is concentrated out, are both non-empty.[11] Although the 95% concentrated *S* set when β, $1-\theta$, and λ are concentrated out is null, it could be due to the possibility that fewer parameters should have been concentrated out.

The non-empty *S* sets for the Smith (2001) model imply reasonable values of RRA and plausible values of EIS and *b*, the spirit parameter. See the top panel of Table 5 for some examples, which are obtained by using a finer increment of 0.015 for $1-\theta$ to inspect the model more closely. In this table, β values for *S* set elements with positive *b* values are all between 0.98 and 0.984. There are multiple incidences of γ values around, or substantially below, 2, which most researchers view as reasonable. Of course, in this model, it is the effective RRA, $1-(1+b)(1-\gamma)$, that eventually matters when it comes to measuring true risk version. But

[10] We allow β to be larger than 1 because many previous empirical research, e.g. Epstein and Zin (1991), have found such values. In our results, β values larger than 1 are all associated with negative values of *b*. The interpretation of β values larger than 1 in the non-expected utility context is difficult, however, as noted in Epstein and Zin (1991), and the difficulty is obvious by inspecting (1). Therefore, we focus on the set of empirical results that feature β values smaller than 1 in Table 5 and Table 7 below.

even for the effective RRA, there are many incidences of values around, or substantially below, 2.[12] The EIS (i.e. the inverse of $1-\theta$) in this model is for the composite good $C_t W_t^b$, not C_t. Therefore, the implied EIS values around 1 in this table are not necessarily at odds with the small estimates in Hall (1988) and others that focused on estimating *consumption* EIS. Moreover, even in the consumption EIS literature, there have been many estimates of consumption EIS larger than 1. The values of b in this table range from 0.15 to 0.42, suggesting that investors derive utility from wealth (in addition to from consumption).

The non-rejection of the Smith (2001) model by the data can be attributed to either the non-expected utility (i.e. the isolation of EIS from RRA) or the direct preference for wealth. The fact that two of three *S* sets for this model in Table 4 are non-empty already suggests that the non-expected utility is a crucial element in this model's success because without it, the model reduces to the BC model, for which the associated *S* sets are all empty, as mentioned earlier. However, it is not obvious if the direct preference for wealth has contributed *independently* to the non-rejection of Smith's (2001) model. To answer this question, and as a more discriminating test of the model, we examine the hypothesis $b=0$ (i.e. no direct preference for wealth), which implies $\lambda=0$. This suggests that we need to look for *S* set elements with zero λ values. We are able to find many of them in the joint *S* set. Most of them correspond to a β value of 0.986, two of them correspond to a β value of 0.987, and seven of them share a β value of 0.985. We report some of them at the lower panel of Table 5. It is clear that they contain reasonable values for all the parameters. Therefore, the model still holds without direct preference for wealth. In this

---

[11] This fact and the results on Smith's model in the next subsection explain Footnote 3 in the present paper.

[12] The combinations reported in this table imply effective RRA's that are smaller than or equal to γ. In the joint *S* set, there are also combinations of parameter values that imply effective RRA larger than γ. These combinations, however, all feature $\beta > 1$ or imply $b < 0$.

sense, the direct preference for wealth is not crucial for the non-rejection of the Smith (2001) model.

The concentrated *S* set when β is treated as the only well-identified parameter does not contain elements with $\lambda = 0$. This is favorable evidence for the direct preference for wealth. However, there is also some ambiguity on whether β is well-identified. We are led to this ambiguity by inspecting the β estimates in the last two panels of Table 3. The variations in the two β estimates are quite large across the last two sets of initial values when CUE is used. In addition, β estimates also swing substantially across two estimation methods when the last set of initial values is used.

5.C Weak-Identification Robust Tests of Relative Wealth Status Models

To give the two models under investigation the best chance, we now test them with relative-status seeking. We present four sets of results on them in Table 6. Two sets of results are based on the assumption that individuals use last quarter's per-capita wealth as the social wealth benchmark. This means that for the representative agent, $S_{t+1} = W_{t+1}/W_t$. The other two sets of results are obtained by assuming that the per-capita wealth a year (four quarters) ago is the relevant benchmark, i.e. $S_{t+1} = W_{t+1}/W_{t-3}$ for the representative agent. We find that BC's (1996) model featuring these two alternative measures of relative wealth status is still rejected at 5% level, as the joint *S* sets and the concentrated *S* sets when β is concentrated out are all null. See the four rows labeled "BC" in Table 6. In contrast, Smith's (2001) model with such relative wealth status measures performs better than BC's (1996) model: now the *S* sets are all non-empty. See the upper half of Table 7 for some elements of the joint *S* sets for this model and the implied γ and effective RRA values. However, now all four *S* sets for this version of Smith's (2001) model include elements with $\lambda = 0$. See the lower portion of Table 7 for examples of these elements. Hence, relative status seeking modeled as wealth growth is also rejected at 5% level.

Since Smith's (2001) model reduces to the EZW non-expected utility model when $\lambda = 0$, the results reported at the lower panels of Table 5 and Table 7 constitute favorable evidence for that model. This finding is consistent with the evidence in Zhang (2006). In that paper, he showed that when Roll's (1977) critique and weak identification are both taken into account, the EZW non-expected utility model's asset pricing implications cannot be rejected, and the historical average equity premium, risk-free rate, and stock return volatility can be simultaneously matched with reasonable parameter values. Since the two models studied here are competing theories of the EZW model, and are rejected by the same econometric methods as used in evaluating the latter, the results of the present paper enhance our understanding on the empirical performances of these three asset pricing models.

6. Conclusions

Extending the notion of status-seeking to include the acquisition of human capital in addition to financial wealth, we have empirically examined two models of asset pricing that feature the spirit of capitalism hypothesis. Status-seeking in our tests is modeled as either direct preference for wealth or the pursuit of relative wealth status. In addition to the standard GMM estimators, we have also employed an econometric procedure developed by SW (2000) that is robust to weak identification of model parameters due to weak instruments.

Our test results are different from the optimistic ones reported in BC (1996) that were based on mis-measured wealth growth, non-stationary consumption-wealth ratio, and the direct preference for financial wealth alone. We unambiguously reject their model: all the confidence sets for this model are null at the 5% significance level. Since the testing technique we use has only ignorable size distortion in the finite sample, it is very difficult to attribute this rejection, as in BC (1996), to the large size distortion in the model specification test associated with the 2-step GMM estimation. We have found favorable evidence for the Smith (2001) model in the sense that the associated confidence sets are non-empty and contain sensible parameter values. However, the hypothesis that there is no status motive cannot be rejected as well in this model.

Therefore, we conclude that the spirit of capitalism *alone* is not adequate for understanding the equity premium puzzle in aggregate data. We, however, caution against interpreting our findings as a call for abandoning status motive altogether in understanding asset pricing and other economic problems. For example, some studies in recent years have attempted to explain not only the average size of equity premium but also its variation over time. Although our findings imply that the spirit of capitalism alone cannot explain the variation of equity premium over time, it is, however, still possible that incorporating status motive into a model with other ingredients, such as some type of market friction, might produce different results from ours.

References

Abel, Andrew (1990): "Asset Prices under Habit Formation and Catching Up with the Joneses," *American Economic Review Papers and Proceedings*, 80, 38-42.

Aït-Sahalia, Yacine, Jonathan Parker, Motohiro Yogo (2004): "Luxury Goods and Equity Premium," *Journal of Finance*, 59, 2959-3004.

Bakshi, Gurdip and Zhiwu Chen (1996): "The Spirit of Capitalism and Stock-Market Prices," *American Economic Review*, 86, 133-157.

Braun, R. Anton, and Etsuro Shioji (2003): "Aggregate Risk in Japanese Equity Markets," University of Tokyo and Yokohama National University Working Paper.

Epstein, Larry and Stanley Zin (1991): "Substitution, Risk Aversion, and the Temporal Behavior of Consumption and Asset Returns: An Empirical Analysis," *Journal of Political Economy*, 99, 263-286.

Featherman, G. and D. Stevens (1982): "A Revised Socioeconomic Index of Occupational Status: Application in Analysis of Sex Differences in Attainment," in R. Hauser et al., Ed., *Social Structure and Behavior*, Academic Press, New York.

Gong, Liutang and Heng-fu Zou (2002): "Direct Preference for Wealth, the Risk Premium Puzzle, Growth, and Policy Effectiveness," *Journal of Economic Dynamics and Control*, 26, 247-270.

Hansen, Lars P. (1982): "Large-Sample Properties of Generalized Method of Moments," *Econometrica*, 50, 1029-1054.

Hansen, Lars P. and Ravi Jagannathan (1991): "Implications of Security Market Data for Models of Dynamic Economies," *Journal of Political Economy*, 99, 225-262.

Hansen, Lars P., John Heaton, and Amir Yaron (1996): "Small Sample Properties of Alternative GMM Estimators," *Journal of Business and Economic Statistics*, 14, 262-280.

Jagannathan, Ravi and Zhengyu Wang (1996): "The Conditional CAPM and the Cross-Section of Expected Returns," *Journal of Finance*, 51, 3-53.

Jorgenson, Dale and Barbara Fraumeni (1989): "The Accumulation of Human and Nonhuman Capital, 1948-1984," in R. Lipsey and H. Tice, eds., *The Measurement of Saving, Investment, and Wealth*, University of Chicago Press.

Lettau, Martin (2000): "Cross-Variable Restrictions in Euler Equations and Risk Premia," *Applied Economics Letters*, 7, 99-101.

Lettau, Martin and Sydney Ludvigson (2001): "Consumption, Aggregate Wealth, and Expected Stock Returns," *Journal of Finance*, 56, 815-849.

Lettau, Martin and Sydney Ludvigson (2004): "Understanding Trend and Cycle in Asset Values: Reevaluating the Wealth Effect on Consumption," *American Economic Review*, 94, 276-299.

Lucas, Jr., Robert E. (2003): "Macroeconomic Priorities," *American Economic Review*, 93, 1-14.

Palacios-Huerta, Ignacio (2003): "The Robustness of Conditional CAPM with Human Capital," *Journal of Financial Econometrics*, 1, 272-289.

Roll, Richard (1977): "A Critique of Asset Pricing Theory's Tests: Part I," *Journal of Financial Economics*, 4, 129-176.

Rudd, Jeremy and Karl Whelan (2006): "Empirical Proxies for the Consumption-Wealth Ratio," *Review of Economic Dynamics*, 9, 34-51.

Smith, William T. (2001): "How Does the Spirit of Capitalism Affect Stock Market Prices?" *Review of Financial Studies*, 14, 1215-1232.

Smith, William T. and Qiang Zhang (2006): "Asset Pricing with Multiplicative Habits and Power-Expo Preferences," Manuscript, University of Memphis.

Stock, James H. and Jonathan H. Wright (2000): "GMM with Weak Identification," *Econometrica*, 68, 1055-1096.

Stock, James H., Jonathan H. Wright, and Motohiro Yogo (2002): "A Survey of Weak Instruments and Weak Identification," *Journal of Business and Economic Statistics*, 20, 518-529.

Vissing-Jørgensen, Annette and Orazio Attanasio (2003): "Stock-Market Participation, Intertemporal Substitution, and Risk Aversion," *American Economic Review Papers and Proceedings*, 93, 383-391.

Weber, Max (1958): *The Protestant Ethic and the Spirit of Capitalism*, Charlkes Scriber's Sons, New York, NY.

Weil, Philippe (1990): "Non-Expected Utility in Macroeconomics," *Quarterly Journal of Economics*, 105, 29-42.

Zhang, Qiang (2006): "Human Capital, Weak Identification, and Asset Pricing," *Journal of Money, Credit, and Banking*, 38, 873-899.

Zou, Heng-fu (1994): "The Spirit of Capitalism and Long-Run Growth," *European Journal of Political Economy*, 10, 279-293.

Table 1

Results of the Augmented Dickey-Fuller Tests

$$\Delta(C_t/W_t) = \alpha_0 + \alpha_1 t + \alpha_2(C_{t-1}/W_{t-1}) + \alpha_3\Delta(C_{t-1}/W_{t-1}) + \alpha_4\Delta(C_{t-2}/W_{t-2}) + u_t$$

α_0	α_1	α_2	α_3	α_4
0.0012	-6.37×10^{-6}	–0.0570	0.1157	–0.1759
(1.81)	(–1.77)	(–2.06)	(1.51)	(–2.29)

Note: The term C_t/W_t in the testing equation above is the consumption-(financial) wealth ratio estimated using BC's (1996) method. Both the Akaike and Shwartz information criteria pick 2 lags for the first difference of C_t/W_t in the test. The *t* statistics are in the parentheses. The 10% MacKinnon critical value for the ADF *t* statistic for $\hat{\alpha}_2$ is –3.143. The ADF ρ statistic is –9.634, with a 10% critical value less than –17.5. When dropping the time trend, the ADF *t* ratio for the α_2 estimate changes to –1.07 and still cannot be rejected at 10% level.

Table 2

Two-Step and Continuous Updating GMM Results on the BC (1996) Model with Direct Preference for Wealth Using Standard Asymptotics

Method	β	γ	λ	χ^2
		Initial Values (1, 0, 0)		
2-step	0.984	-26.67	27.78	15.4
	(0.025)	(6.35)	(4.73)	(0.166)
continuous updating	0.998	0.001	0.09	84.6
	(0.003)	(0.21)	(0.15)	(0.000)
		Initial Values (0.95, 0, 0)		
2-step	0.984	-26.64	27.73	15.4
	(0.025)	(6.35)	(4.73)	(0.166)
continuous updating	0.960	-0.64	-2.39	39.6
	(0.013)	(0.85)	(0.64)	(0.000)

Note: Standard errors are in parentheses, except for the column labeled χ^2 where the *p*-values are reported in parentheses. Instruments used are 1, and first lags of consumption growth, the term premium, the bond default premium, the real dividend yield, the after-tax labor income growth, and the real T-bill rate. Assets priced are T-bill and NYSE stocks.

Table 3

Two-Step and Continuous Updating GMM Results on the Smith (2001) Model with Direct Preference for Wealth Using Standard Asymptotics

Method	β	η	$1-\theta$	λ	χ^2
			Initial Values (1, 1, 0, 0)		
2-step	1.000	5335.3	-0.01	1.01	59.4
	(0.000)	(8772.9)	(0.00)	(0.00)	(0.000)
continuous updating	0.971	1.62	-0.41	-1.08	39.9
	(0.983)	(74.34)	(17.49)	(96.27)	(0.000)
			Initial Values (1, -40, 0, 0)		
2-step	1.072	-25.92	0.99	0.05	15.3
	(0.208)	(9.15)	(0.05)	(0.20)	(0.123)
continuous updating	1.002	-84.91	0.74	0.28	19.3
	(0.184)	(3022.1)	(27.04)	(26.33)	(0.037)
			Initial Values (1, -40, 0.85, 0)		
2-step	1.005	-26.17	0.97	0.03	15.4
	(0.220)	(36.40)	(1.53)	(1.62)	(0.117)
continuous updating	1.479	-245.6	1.00	0.01	10.2
	(0.142)	(76.0)	(0.01)	(0.28)	(0.426)

Note: In this table, $\eta = (1-\gamma)/\theta$, $\lambda = -b\theta$. See also the notes under Table 2 for instruments used in estimation here.

Table 4

The 95% *S* Sets for the Direct Preference for Wealth Models

Model	95% Concentrated *S* Set			
	with β concentrated out			with β, γ, or η concentrated out
BC	Null			Null
Smith	η	$1-\theta$	λ	Null
	[-150, -40]	[0.81, 3.00]	[-0.09, 0.25]	
	95% Joint *S* Set for (β,λ,γ) or ($\beta,\eta,1-\theta,\lambda$)			
BC	Null			
Smith	β	η	$1-\theta$	λ
	[0.969, 1.023]	[-131.25, -25.5]	[0.856, 1.008]	[-0.01, 0.17]

Note: This table reports the range of each parameter in a non-null *S* set. The results reported here are based on using the seven instruments listed under Table 2.

Table 5

Selected Elements in the 95% Joint *S* Set for Smith's (2001) Model with Direct Preference for Wealth

β	η	$1-\theta$	λ	b	γ	Effective RRA
0.980	-30	0.976	-0.01	0.417	1.72	2.02
0.981	-40	0.946	-0.02	0.370	3.16	3.96
0.982	-35	0.961	-0.01	0.256	2.37	2.72
0.983	-35	0.946	-0.01	0.185	2.89	3.24
0.984	-35	0.931	-0.01	0.145	3.42	3.77
0.986	-30	0.976	0	0	1.72	1.72
0.986	-30	0.991	0	0	1.27	1.27
0.986	-35	0.976	0	0	1.84	1.84
0.986	-40	0.976	0	0	1.96	1.96
0.987	-60	1.006	0	0	0.64	0.64

Note: The first four columns report the elements in the 95% joint *S* set for the Smith (2001) model obtained with the seven instruments listed under Table 2. The value of *b*, which captures the strength of the spirit of capitalism, is calculated as $-\lambda/\theta$. The effective RRA is equal to $1-(1+b)(1-\gamma)$.

Table 6

The 95% *S* Sets for Relative Wealth Status Models

Model	Concentrated S set, β Well-Identified, $S_{t+1} = W_{t+1}/W_t$			
BC	Null			
Smith		η	$1-\theta$	λ
		[-135, -14.5]	[0.704, 1.008]	[-0.19, 0.2]
	Concentrated S set, β Well-Identified, $S_{t+1} = W_{t+1}/W_{t-3}$			
BC	Null			
Smith		η	$1-\theta$	λ
		[-132, -11.25]	[0.704, 1.008]	[-0.19, 0.2]
	Joint S Set, $S_{t+1} = W_{t+1}/W_t$			
BC	Null			
Smith	β	η	$1-\theta$	λ
	[0.98, 1.024]	[-100, -28.75]	[0.856, 1.008]	[-0.06, 0.17]
	Joint S Set, $S_{t+1} = W_{t+1}/W_{t-3}$			
BC	Null			
Smith	β	η	$1-\theta$	λ
	[0.983, 1.002]	[-126.5, -29.5]	0.856	[-0.02, 0.17]

Note: See the notes under Table 4.

Table 7

Selected Elements in the 95% Joint *S* Set for Smith's (2001) Model with Relative Wealth Status

β	η	$1-\theta$	λ	b	γ	Effective RRA
			$S_{t+1} = W_{t+1}/W_t$			
0.983	-41.75	0.856	-0.03	0.208	7.012	8.265
0.984	-39.00	0.856	-0.01	0.069	6.616	7.006
0.984	-42.75	0.856	-0.02	0.139	7.156	8.011
0.985	-43.50	0.856	-0.01	0.069	7.264	7.299
0.986	-93.00	1.008	0	0	0.256	0.256
0.986	-92.75	1.008	0	0	0.258	0.258
0.985	-37.75	0.856	0	0	6.436	6.436
0.985	-38.00	0.856	0	0	6.472	6.472
			$S_{t+1} = W_{t+1}/W_{t-3}$			
0.983	-52.75	0.856	-0.02	0.139	8.596	9.651
0.983	-53.00	0.856	-0.02	0.139	8.632	9.692
0.984	-48.25	0.856	-0.01	0.069	7.948	8.431
0.984	-56.00	0.856	-0.01	0.069	9.064	9.624
0.985	-45.25	0.856	0	0	7.516	7.516
0.985	-45.75	0.856	0	0	7.588	7.588
0.985	-46.00	0.856	0	0	7.624	7.624
0.985	-46.25	0.856	0	0	7.660	7.660

Note: See the notes under Table 5.

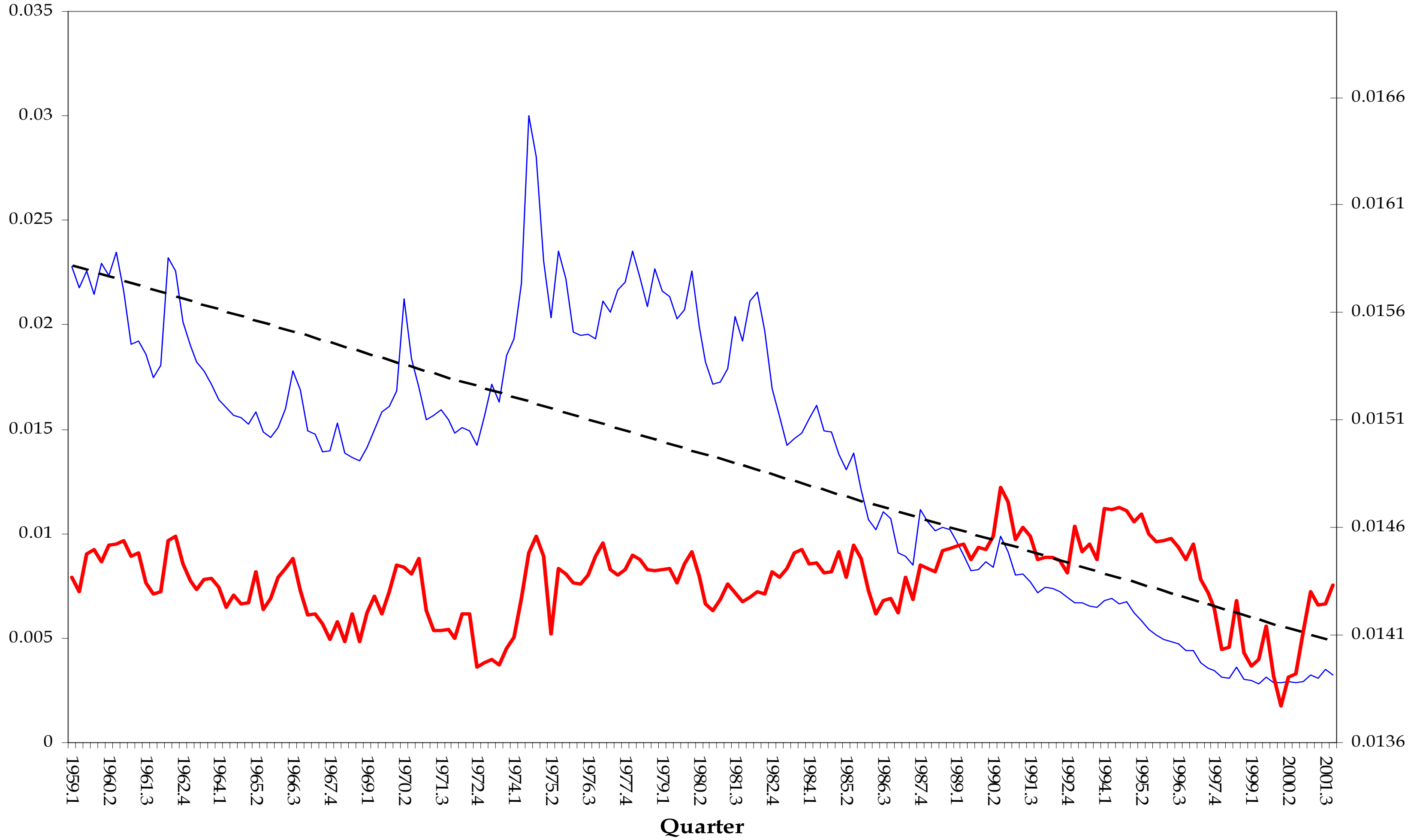

Figure 1: The quarterly consumption-financial wealth ratio computed using BC's (1996) method (fine blue line, left scale), its linear trend (dashed line), and the quarterly consumption-total wealth ratio in the present paper (heavy red line, right scale).

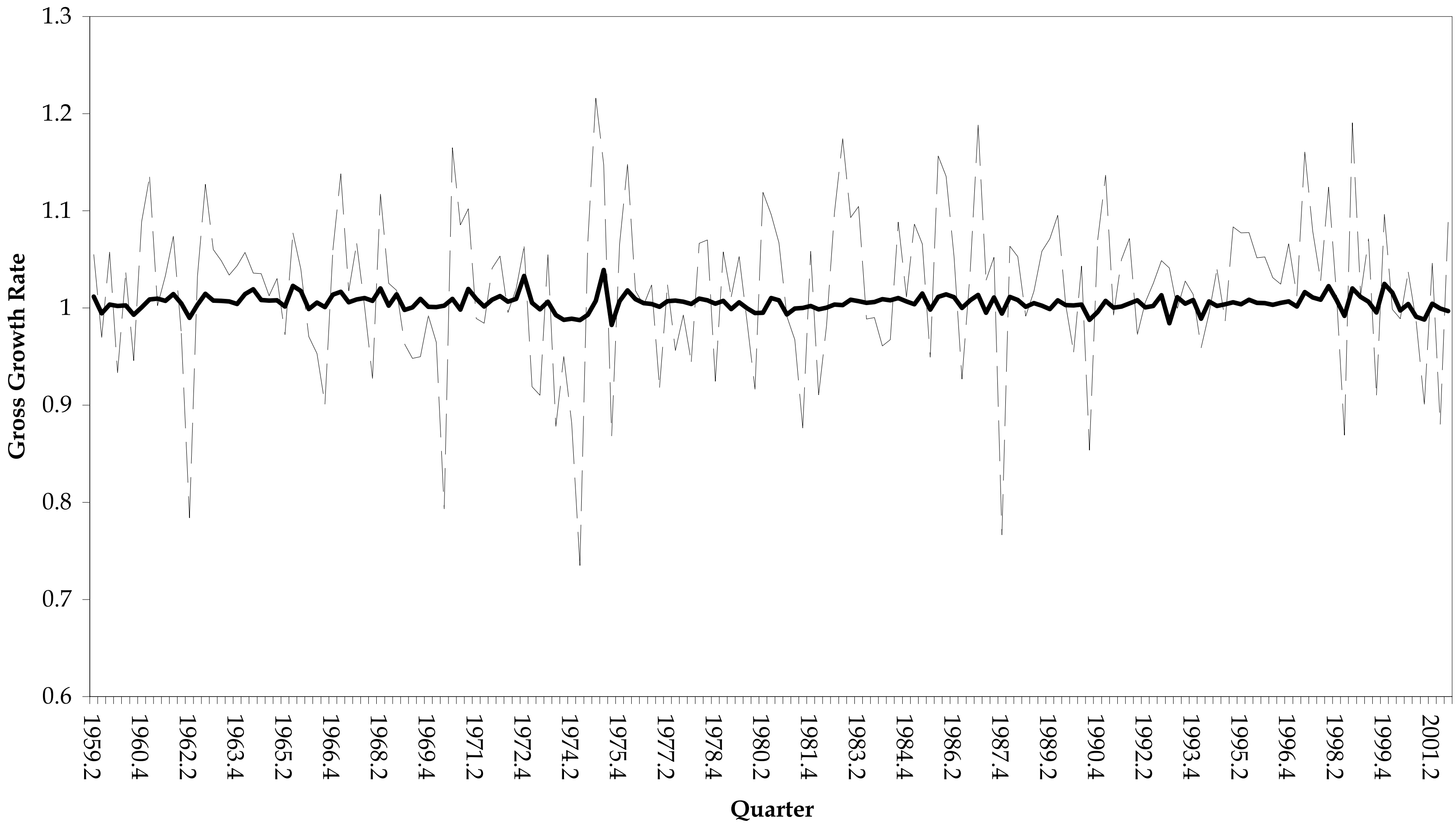

Figure 2: A comparison of quarterly real wealth growth incorporating human wealth, non-stock wealth as well as stocks (solid line) and its proxy, quarterly value-weighted real return on NYSE stocks (dashed line).