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Wealth and the Capitalist Spirit

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Abstract

The wealth distribution in the U.S. is more unequal than either the income or earnings distribution, a fact current models of saving behavior have difficulty explaining. Using Max Weber's (1905) idea that individuals may have a 'capitalist spirit', I construct and simulate a model where individuals accumulate wealth for its own sake rather than as deferred consumption. Including capitalist-spirit preferences in a simple life cycle model, with no other modifications, generates a skewness of wealth consistent with that observed in the U.S. economy. Furthermore, capitalist-spirit preferences provide a way to generate decreasing risk aversion with increases in wealth without resorting to idiosyncratic rates of time preference.

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1 Introduction

In the United States, the wealthiest 1 percent of households owns one third of the wealth of the entire economy, but receives only 15 percent of earnings and less than 10 percent of income, while a significant fraction of the population, almost 10 percent, holds little or no wealth at all (Diaz et al., 1997). Explaining wealth inequality is a challenge for most models of saving behavior that are based on consumption smoothing because they imply a far tighter relationship between earnings and wealth than that observed in U.S. data (Hendricks, 2004; Carroll, 2001). Some of the inequality in wealth we observe is generated by the inequality of wage and capital income. But since wealth is even more concentrated than income or earnings (including capital income), differences in saving behavior must also be a factor in the explanation for the skewness of the wealth distribution. Dynan et al. (2004) find that, based on data from the Panel Study on Income Dynamics and the Survey of Consumer Finances, individuals with higher income have higher saving rates, a fact that cannot be explained by models of saving behavior that assume the wealthy are scaled up versions of the poor. Data on portfolio composition from the Survey of Consumer Finances also indicates that the wealthy hold much riskier portfolios than the rest of the population (Carroll, 2002), which is difficult to reconcile in models with homogenous preferences and a constant coefficient of risk aversion.

Heterogeneous human capital development and the transfer of earning ability across generations contribute to permanent income inequality and thus to much of the wealth inequality we observe (Huggett et al., 2003). However, even models that incorporate education, demographic factors and idiosyncratic uninsurable income shocks are unable to generate wealth inequality that can match the concentration of wealth among a small percentage of the population that characterizes the U.S. wealth distribution (Huggett, 1996). In order to capture the extreme right skewness in the wealth distribution, we need a mechanism to promote saving behavior that differs between high and low permanent income earners (Carroll, 2000). Recent work on understanding the skewness of the wealth distribution has focused on dynastic models in which individuals are part of long lived families and bequests form the predominant intergenerational link (De Nardi, 2004; Fuster, 2000). These models became popular following the controversial evidence that the pure life-cycle component of the aggregate U.S. capital stock has historically been relatively small (approximately 20 percent) and therefore most capital accumulation occurs through intergenerational transfers (Kotlikoff and Summers, 1981). Bequest motives were also proposed as an explanation for the 'saving puzzle': Contrary to the predictions of the stochastic life cycle model, retired individuals, especially wealthier retirees, typically do not de-cumulate their wealth appreciably after retirement and some even save (Dynan et al., 2004). There is evidence that bequest motives do play an important role in wealth accumulation and may explain the extreme accumulation of wealth among a small group of families. But intergenerational transfers of wealth cannot explain why there is no significant difference in the rate of asset de-cumulation between the wealthy elderly with children and those without (Hurd, 1986). Moreover, it is difficult to determine whether bequests are intentional or accidental (Hendricks, 2002) and accidental bequests should have a limited impact on wealth concentration.

Weber (1905) and Smith (1776) before him proposed that individuals have a 'capitalist spirit': An innate desire to be frugal, accumulating wealth throughout their lifetime.[1] The idea that individuals have a direct preference for wealth is most easily interpreted through modification of the utility function, so that utility expresses preferences not only over consumption (and possibly leisure) but also over wealth holdings directly.

In this paper, I propose a quantitative life cycle model that takes its inspiration from the qualitative literature on the capitalist spirit, in which individuals with high permanent income have a stronger incentive for wealth accumulation than individuals with low permanent income. I focus on the cross sectional distribution of wealth for a typical cohort of individuals as the cohort ages. I find that a simple life cycle model with capitalist-spirit preferences generates a distribution of wealth consistent with U.S. data. It is able to replicate much of the concentration of wealth among the income rich, wealth concentration within age groups, and continued asset accumulation after retirement. Individuals with capitalist-spirit preferences also exhibit declining risk aversion with increases in wealth.

I focus on the ability of the life cycle model, augmented with capitalist spirit preferences, to explain four sets of empirical facts: the concentration of wealth compared to income (Castañeda et al., 2003), the unequal distribution of wealth within age groups (Huggett, 1996), the lack of wealth de-cumulation among the elderly, (Hurd, 1986) and the different risk profiles of the portfolios of the wealthy versus the rest of the population (Carroll, 2002). I argue that augmenting a fully specified life cycle model with a direct preference for wealth enables the model to explain these facts better.

In the next section, I review some facts about the U.S. wealth and income distributions; section three discusses the capitalist spirit. Section four sets out the model with capitalist-spirit preferences, section five discusses the calibration and section six presents the simulation results. Section seven lays out the claims regarding risk aversion and section eight concludes with some reflections on what the model gets right and what is needed to make it better able to explain the concentration of wealth among households in the top percentiles while still capturing the behavior of households in the rest of the distribution.

[1] Weber proposed the existence of a 'spirit of capitalism'. He writes "The peculiarity of this philosophy of avarice appears to be the ideal of the honest man of recognized credit, and above all the idea of a duty of the individual toward the increase of his capital, which is *assumed as an end in itself.*" pg. 51 (Weber, 1905) (Italics are mine.) Or "It is thought of so purely as an end in itself, that from the point of view of the happiness of, or utility to, the single individual, it appears entirely transcendental and absolutely irrational." pg. 53 (Weber, 1905) In the literature, a 'direct preference for capital' is synonymous with the 'the capitalist spirit' suggested by Weber.

2 Stylized Facts

The main source of microeconomic data on wealth for the U.S. is the Survey of Consumer Finances (SCF) which collects detailed information every three years about wealth and portfolio composition for a cross-section of households.[2] Table 1 displays the wealth distribution given by 5 waves of the SCF, where the amount of wealth held by individuals in the top percentiles of the wealth distribution is contrasted with the amount held by those in the bottom 50 percentiles (Kennickell, 2003). The most striking aspect of the table is how little wealth the first 5 deciles of the wealth distribution holds and, conversely, how much the top five percentiles hold. Households in the top five percentiles of the wealth distribution hold more than 50 percent of aggregate wealth, while households in the bottom 50 percentiles of the wealth distribution hold less than 5 percent of aggregate wealth. The average of the Gini coefficient for the wealth distribution (0.79) over the last decade confirms this skewness, where values of the Gini coefficient close to 1 signify increasing inequality.

In comparison to these wealth statistics, table 2 depicts the distribution of normal income for four waves of the SCF, 1989, 1992, 1995 and 1998.[3] It is readily observable that income, while fairly unequal, is distributed much more equally than wealth. Households in the top 5 percentiles of the income distribution earn approximately one third of aggregate income. The Gini coefficient for income, which averages 0.54, is also much lower than for the wealth distribution (which averaged 0.79). Although few countries exhibit the extreme concentration of wealth observed in the U.S., even moderately egalitarian countries such as Sweden have more concentrated distributions of wealth than income (De Nardi, 2004) and other countries such as the UK are catching up to the level of inequality in the U.S. (Banks et al., 2000).

The data in these tables demonstrate wealth in the U.S. is much more concentrated than income and that this phenomenon has been persistent over at least the past decade. The fact that income is less concentrated than wealth implies income heterogeneity alone cannot explain the concentration of wealth. Table 3 presents the responses individuals gave as the most important reasons for their family's saving, distributed by type of reason, in the SCF (see Kennickell 2003). The predominant reason individuals report for saving out of income was for liquidity. This response is often interpreted as buffer stock saving (Carroll, 1992), where individuals accumulate wealth to reach a target wealth to income ratio that allows them to buffer the impact of transitory income shocks on their consumption behavior. The second most important reason given for saving was for retirement. Very few individuals (at most 5 percent) indicated that saving for their family, for example for bequest purposes,

[2]The SCF was explicitly designed to measure the balance sheet of households and the distribution of wealth. It over-samples wealthy households by including a representative population sample and a list sample drawn from tax records. It is the most accurate representation available of the upper portion of the U.S. wealth distribution.

[3]Normal income is an empirical measure that approximates permanent income. (Kennickell, 2003)

was important. Although surveys should be treated cautiously, the responses suggest that, among the general population, saving for bequests is less important than saving for liquidity or for retirement and other life cycle purposes, such as education and health care.

3 What is the Capitalist Spirit?

The idea that individuals value wealth for its own sake traces back to Max Weber (1905) who proposed that hard-working, frugal entrepreneurs preferred to save their money, rather than spend it, as an intrinsic good. This impulse to accumulate wealth for its own sake is often referred to as a 'capitalist spirit'. For individuals with capitalist-spirit preferences, acquisition is not only a means for the satisfaction of material needs but also an end in itself. This idea is conceptually similar to 'wealth-as-status', where individuals accumulate wealth to gain prestige, social status and power in society; see Frank (1985) especially, as well as Cole et al. (1992) and Bakshi and Chen (1996).

Zou (1994, 1995) was the first in the modern literature to examine a direct preference for wealth. Following a paper by Kurz (1968), he demonstrates that in a non-stochastic growth model, a direct preference for wealth (or capital) reduces the rate of time preference and so increase capital accumulation because individuals are less impatient, thus potentially explaining the link between saving and growth. Bakshi and Chen (1996) examine the implications of a desire for status, measured in terms of wealth holding either relative to a community wealth level or in absolute terms, for asset pricing. They determine that when investors also care about relative or absolute social status, the marginal propensity to consume and relative risk aversion will depend on social standards with implications for stock price volatility. Smith (1999) develops a formal stochastic growth model incorporating capitalist spirit preferences. He also demonstrates that a direct preference for capital lowers the effective rate of time preference, resulting in a faster accumulation of capital and an acceleration in economic growth, confirming Zou's (1995) result in a stochastic environment. Reiter (2004) develops a general equilibrium model in which individuals have capitalist-spirit preferences and the option of choosing an entrepreneurial venture. He finds that capitalist spirit preferences when combined with entrepreneurial ventures can explain at least some of the extreme concentration of wealth.

Most work that examines the skewness of the wealth distribution considers bequest motives as the likely explanation (De Nardi, 2004; Laitner, 2001). Although capitalist-spirit preferences are conceptually similar to a bequest motive, they differ in several important ways. First, they provide a rationale for all wealthy households to accumulate additional wealth, not only those with an explicit intention to leave their estate to their children. Second, in a model with a bequest motive and no mortality risk, only terminal wealth will appear in the utility function where as in a model with capitalist-spirit preferences wealth appears in the utility function in all periods. Although capitalist-spirit preferences are explicitly formulated to capture a direct preference for wealth throughout the life cycle, they can alternatively be interpreted at the end of life as a bequest motive. An approach that allows households to have a direct preference for wealth, without specifying whether that preference is related to a bequest motive, status, power, or some other motivation, is more flexible and thus better able to match the reasons individuals report for saving (discussed above and in table 3) as well as their behavior.

4 Model with Capitalist Spirit Preferences

I develop a partial equilibrium life cycle model augmented to include uninsurable earnings and a direct preference for wealth. I assume each household consists of one wage earner who begins earning wage income at the start of her economic life and who retires at age T_R. Individuals receive income from labor earnings and returns on their assets and there is one risk free asset.

4.1 Preferences

I assume that households derive utility from consumption and wealth holdings directly, with their utility function given by

$$U(C_t, W_{t+1}) = u(C_t) + v(W_{t+1}) = \left[\frac{C_t^{1-\rho}}{1-\rho} + \frac{(W_t - C_t + \gamma)^{1-\alpha}}{1-\alpha}\right] \tag{1}$$

where end of period wealth, or saving, is defined as $W_{t+1} = W_t - C_t$ so that utility is defined over current consumption and saving, or the wealth left over after current consumption decisions are made. α, ρ and γ are positive constants (discussed below) with the restriction that $\alpha < \rho$. The intraperiod functions, $u(C_t)$ and $v(W_{t+1})$, have a constant relative risk aversion form and are strictly concave and continuously differentiable, so that the utility function, $U(C_t, W_t)$ is also concave (though not strictly so). As usual, ρ is the coefficient of relative risk aversion for consumption while α controls the demand for wealth. The constant relative risk aversion preference structure exhibits prudence (the marginal utility curve is convex) inducing precautionary behavior in the presence of uncertainty. The assumption that $\alpha < \rho$ implies that as the marginal utility of consumption approaches zero, the share of income going to wealth approaches one. By permitting households to value wealth differently from consumption, the marginal utility gained from an extra unit of wealth declines more slowly than the marginal utility gained from an additional unit of consumption. This luxury good property of wealth is consistent with the data that show wealthier individuals are more likely to save additional increments of permanent income and provides a reason for individuals to continue to accumulate wealth that does not exist in otherwise fully specified life cycle models.

The intraperiod utility function describing the household's preferences over wealth includes a positive modified Stone-Geary parameter, γ (Carroll, 2000)[4]. Poor individuals (in terms of income) will not have as strong an incentive to accumulate wealth since the assumption that $\gamma > 0$ implies there is a threshold level of consumption below which wealth accumulation, for capitalist spirit purposes, will be small to negligible. The parameter γ thus generates heterogeneity in the desire to accumulate wealth for capitalist spirit purposes. Under these parameter restrictions capitalist spirit preferences will have a small impact on the behavior of relatively poor households but an increasingly large impact as wealth increases, so that poorer households will behave as ordinary savers–accumulating only what they need for precautionary and retirement purposes, while wealthier households will also be motivated by the capitalist spirit to save.

Although this utility function is non-homothetic across consumption and wealth, it maintains time separability. In contrast to most of the capitalist-spirit literature, in which preferences for consumption and wealth take on a multiplicative form, these additive preferences appear better able to capture the behavior of wealthy households, as they require no restrictions on whether wealth and consumption are compliments or substitutes.[5]

If we interpret the capitalist-spirit motive in the last period of life as a desire to leave a bequest, then for $\alpha \neq \rho$, households will value bequests and their own consumption differently, in contrast to the calibration of bequest motives where they are valued equally, e.g., Cagetti and De Nardi (2006). Carroll (2000) argues, for example, that the marginal utility from bequests should diminish at a slower rate than the marginal utility from consumption.

4.2 Income Process

Households receive wage labor income during their working life. Following Carroll (1997), I assume labor income is decomposed into two multiplicative components: a permanent component and a temporary income shock, ε_{t+1}, as follows

$$\begin{aligned} Y_{i,t+1} &= P_{i,t+1}\varepsilon_{i,t+1} \\ P_{i,t+1} &= G_t P_{i,t} \Psi_{i,t+1} \end{aligned} \tag{2}$$

where $Y_{i,t+1}$ is individual wage income, $P_{i,t+1}$ is the permanent component of income and G_t is the aggregate growth rate of permanent income due to technological progress. This

[4]This parameter, γ, is similar in spirit to a Stone-Geary parameter (which is negative in its original formulation Stone 1954; Geary 1949-50) in the sense that it provides a threshold level for wealth above which the capitalist spirit motive for wealth accumulation will outweigh the consumer's impatience and desire for immediate consumption.

[5]Luo and Young (2003) use a multiplicative version of capitalist-spirit preferences in an otherwise standard model of consumption and saving behavior. They find that the multiplicative version of capitalist-spirit preferences actually reduces the right skewness of the wealth distribution.

formulation abstracts from any age dependence of income, which would, in this specification, be dominated by the aggregate growth rate. $P_{i,t+1}$, is the level of income that would obtain without transitory shocks, rather than the present discounted value of future income streams (Friedman, 1957). $\varepsilon_{i,t+1}$ represents a transitory income shock that is independently and identically distributed, taking on the value of 0 with probability p, where p is very small, and the value of 1 with probability $1-p$.[6] $\Psi_{i,t}$ is an innovation to the permanent component of income and follows an i.i.d. lognormal distribution with mean 1 and standard deviation of σ_Ψ. The log of the permanent component of income, $\ln P_t$, evolves as a random walk with drift. This specification has been widely used in empirical work and therefore appears to fit the data reasonably well (Carroll and Samwick, 1997).[7]

I assume an exogenous retirement age T_R, after which earnings become deterministic

$$Y_{i,t} = G_R P_{i,R-1} \tag{3}$$

where $P_{i,R-1}$ is the household's permanent income in the year prior to retirement and G_R is the replacement rate of permanent income following retirement. The assumption that income can go to zero in each period combined with the assumption that consumption must remain strictly positive (to satisfy the Inada condition, $\lim_{c\to 0} u'(c) = \infty$) implies the consumer will choose not to borrow against future income. Hence this assumption behaves like a liquidity constraint (Deaton, 1991) or endogenous borrowing constraint (see Feigenbaum 2007 for a discussion). The fact that retirement income is based on permanent income in the year prior to retirement means that the consumer knows that his future income will not be zero forever. This will loosen the affect of the endogenous constraint, so that there will be some borrowing, which will be bounded below by the maximum the individual is able to repay so as to meet the end of life constraint, $x_T \geq 0$ (where x_T is cash-on-hand in the last period).

4.3 Decision Problem

There is one wage earner per household who has a finite lifespan with a deterministic horizon from $t = 0$ to T. At the beginning of the first period households solve the following

[6] I ignore other types of transitory shocks, for example negative health shocks that occur after retirement (Huggett and Ventura, 2000).

[7] The fact that the shocks are i.i.d means that the consumer cares only about the total amount of assets she has to consume, not about their origin, i.e., as wealth or income. In the typical problem of this type, we could then normalize by the level of assets plus income (called cash-on-hand by Deaton 1991). However, since the utility function is non-homothetic such a normalization is unavailable.

optimization problem (individual subscripts are dropped here):

$$\begin{aligned} V(X_t, P_t) &= \max_{C_t} E\left(\sum_{t=0}^{T} \beta^t \left[u(C_t, W_{t+1})\right]\right) \\ &= \max_{C_t} u(C_t, W_{t+1}) + \beta E_t[V(X_{t+1}, P_{t+1})] \end{aligned} \tag{4}$$

subject to

$$\begin{aligned} X_{t+1} &= R(W_t - C_t) + Y_{t+1} \\ Y_{t+1} &= P_{t+1}\varepsilon_{t+1} \\ P_{t+1} &= G_t P_t \Psi_{t+1} \end{aligned} \tag{5}$$

where $X_{t+1} = R(W_t - C_t) + Y_{t+1}$ is the dynamic budget constraint, and $X_0 = 0$ and $X_T \geq 0$. I define $W_{t+1} = W_t - C_t$ to be the wealth left over at the end of period t after the consumption decision is taken at the beginning of period t. X_{t+1} is defined following Deaton (1991) to be total liquid assets or cash-on-hand and includes interest earned on the previous period's wealth holding (savings) and current income. Uncertainty arises from uninsurable permanent, Ψ_t, and transitory, ε_t, income shocks. The budget constraint implies that consumers can borrow and save freely at the risk free rate limited by the need to satisfy their intertemporal budget constraints, notably $X_T \geq 0$ must hold. All variables are in real terms. $V(\cdot, \cdot)$ is the value function, β is the discount factor which takes a value between 0 and 1, E_t is the expectations operator conditioned on information available at the beginning of period t, in particular current income is known, Y_t is current income (as defined above), and C_t is current consumption. There is one asset that pays a risk free gross rate of return, $R = 1 + r$, which I assume to be constant.

Optimal behavior is given by the Euler equation

$$C_t^{-\rho} = \beta E_t R[C_{t+1}^{-\rho}] + (W_t - C_t + \gamma)^{-\alpha} \tag{6}$$

The Euler equation in this case has an additional term, $(W_t - C_t + \gamma)^{-\alpha}$, compared to the usual model with utility defined over consumption only. This term represents the marginal utility gained from the wealth that is left over after current consumption decisions are taken. Since individuals receive direct utility from wealth, their marginal benefit from saving an increment of income will be greater than just the benefit they receive from consuming that saving in the future. In other words, consuming ϵ more in period t results in a loss of part of $\beta E_{t+1} R \epsilon_{t+1}$ for future consumption and the additional utility that comes from holding part of ϵ_{t+1} in wealth. This is the mechanism through which capitalist-spirit preferences increase the willingness to delay or forgo consumption, increasing wealth holding at any t. Another way of thinking about this is to consider the perfect certainty case. In the case without income shocks or other uncertainty and without capitalist spirit preferences, the Euler equation is just $C_t^{-\rho} = R\beta C_{t+1}^{-\rho}$ and so consumption growth is well known to be $\frac{C_{t+1}}{C_t} = (R\beta)^{\frac{1}{\rho}}$. In the case with capitalist spirit preferences, there is an additional term: $C_t^{-\rho} - R\beta C_{t+1}^{-\rho} = (W_t - C_t + \gamma)^{-\alpha}$. If $R\beta = 1$, then $C_t^{-\rho} - C_{t+1}^{-\rho} = (W_t - C_t + \gamma)^{-\alpha}$, and the difference between the marginal utility of consumption between periods is equal to the marginal utility of wealth. In general that difference, unlike in the perfect certainty model without capitalist spirit preferences and with $R\beta = 1$, will not be zero (implying constant consumption over time) but will be positive implying that consumption growth will be positive (in this case). The idea is that individuals will have lower current consumption because it will be more valuable to them to save to create additional wealth and higher future consumption, even in the case where $R\beta = 1$ and there is no income uncertainty. If γ is very large, however, that additional term, $(W_t - C_t + \gamma)^{-\alpha}$, will be very small, so that the difference in the marginal utility from consumption between t and $t+1$ will be very small and the desire to substitute current consumption for future consumption and wealth will be much lower. In the limit, as γ tends to infinity, this wealth term will become negligible so that the difference between the marginal utility of consumption in period t and period $t+1$ will tend to zero and consumption will be the same in all periods (for the case with no income uncertainty and $R\beta = 1$).

We can consider differences in behavior for different income draws when γ is large. Given an additional increment of permanent income, lower income consumers will have a very small incentive to save it relative to their incentive to consume it, as their utility gain from holding it as wealth will be insignificant compared to the utility they receive from current consumption. Consider the case for an individual with very low permanent income the last period (and assume no transitory shocks), for her the marginal utility of wealth will be high, but she will consume all of her income with $\bar{C} = \gamma^{\frac{\alpha}{\rho}}$, where $W = 0$, for all $C \leq \bar{C}$. Since $\gamma > 0$ a larger fraction of an extra unit of income will always be consumed, than will be saved, at low income levels. Conversely, for individuals with a high permanent income draw, the assumption that $\alpha < \rho$ means that a larger (and increasing in income) fraction of an additional increment of income will be saved than allocated to current consumption. In other words, at higher levels of income, the marginal utility gained from an additional unit of consumption will be smaller than the marginal utility gained from an additional unit of wealth.

5 Simulation and Calibration

I solve the model numerically using value function iteration. Beginning at the last period, the Euler equation is solved backwards, for the optimal consumption profile and corresponding level of wealth in each period (see Appendix for discussion of solution technique).

Solution of the model yields a set of consumption rules governing choices in each period.

I model individuals who begin earning labor income at age 25 to avoid issues associated with post-secondary education. At the beginning of each period, the household receives labor income Y_t, the permanent component of which is drawn from a log-normal distribution. The mean and standard deviation of the permanent income distribution are calibrated to match U.S. log income levels in approximately the 25th year of life, as measured in the SCF (1998) for households with a head who is between 25 and 35 years of age in the survey year. Thus individuals differ in log labor endowments at birth (in terms of the model, age 25)

$$y_1 \sim LN(\mu, \sigma_1^2)$$

In each year following the first year (age 25), individuals receive an idiosyncratic permanent innovation to labor income and potentially a large transitory shock. Income uncertainty in the model derives from two parameters: p, the probability of a large negative temporary income shock, and σ_Ψ, which controls the uncertainty of permanent shocks. Permanent income also grows according to an aggregate annual growth rate G, which is constant during working life. I assume that individuals retire at age 65. Although what is considered the normal retirement age is changing, individuals who were born before 1943 are eligible to receive Social Security payments in the U.S. at age 65. Individuals who were born between 1944 and 1953 can begin receiving payments at age 66. Thus, I chose age 65 as a normal retirement age. I assume that individuals receive income from (employer contributed) pension plans and social security which will comprise 50 percent of the permanent income (excluding any transitory shock) they receive when they are 64. Once they retire, they will no longer receive permanent or transitory income shocks. I assume individuals will continue to receive this replacement level of income until their 80th year (model year 55) after which they die with certainty.[8] I assume there is no population growth.

Table 4 displays the distribution of permanent income in the model by percentile as well as the Gini coefficient. In the simulations, the permanent income shock is drawn from a log normal distribution with mean 1.0 and standard deviation 0.10. Carroll (1992) finds that each consumer has approximately a 0.65 percent chance of experiencing a near-zero non-capital income event in any given year based on data from the Panel Study of Income Dynamics. Based on this evidence, I set the large transitory shock (effectively a zero income event) to occur with a probability of 0.005. I assume these transitory shocks are fully recovered from after 1 year, which is also consistent with the evidence from PSID data presented in Carroll (1992), where he shows that for wage workers not experiencing a change in marital status, income typically recovers fully from near-zero income events

[8] The assumption of a known death age is made to focus on how capitalist-spirit preferences change the behavior of the wealthy, abstracting from accidental bequests and the additional precautionary saving generated by end-of-life uncertainty.

within three years and mostly recovers within one year.

Table 5 presents the values of the parameters used in the simulation. The preference parameters $(\alpha, \beta, \gamma, \rho)$ are set using a model period of one year. The value of the discount factor, β, is set to an annual value of 0.96 which is common in the literature (Cagetti, 2003) and the gross interest rate, R is set equal to 1.03, which is roughly consistent with the real interest rate over the last 50 years in the U.S. Since the rate of time preference is larger than the real interest rate, individuals will be impatient, and in the absence of uncertainty would prefer to run down their assets. I choose the coefficient of relative risk aversion on consumption, ρ, to be two, which is conservative and consistent with the traditional range estimated in the empirical literature. These parameter choices allow the results of my model to be directly comparable to a baseline life cycle model, for example, Hubbard et al. (1995).

This leaves me with two free parameters to calibrate, γ and α, which are unique to the model. It is difficult to calibrate α and γ as there are few intuitive guides for these values. The capitalist-spirit preference parameter, α, is theoretically restricted to be less than ρ but this leaves a wide range of values between 0 and 2 as candidates. When α is very small relative to ρ, the marginal utility of wealth declines much more slowly than the marginal utility from consumption, which makes the capitalist spirit incentive very strong. In practice, I choose several values of α, consistent with the restrictions laid out above, and then vary γ to match the Gini coefficient on the wealth distribution. The results of experiments for two values of γ and α, given in Table 6, are presented in Table 7.

I simulate the model under the set of parameter values discussed above for cohorts of 20,000 households. In the simulation, all households start with zero asset holdings. Individuals are heterogenous in their receipt of permanent and transitory income shocks so that their optimal consumption profiles differ. Although the transitory income shock will cause households to behave as if they were liquidity constrained, in practice, the assumption of positive retirement income loosens this constraint.

6 General Features of Model Economy: Cross Sectional Distribution of Wealth

Table 7 compares the model results (KS for capitalist spirit) with a life-cycle model (baseline) with no capitalist spirit preferences and empirical data from the 1995 Survey of Consumer Finances (SCF). The baseline life-cycle model corresponds to the case where $\gamma \rightarrow \infty$ in the utility function with capitalist spirit preferences. The first line of table 7 shows the distribution of wealth for the U.S. economy based on the 1995 SCF.

In the experiments, the accumulation modifying parameter, γ, is set in real U.S. dollars. Income ranges between approximately \$10,000 and \$400,000 in the first year of life, thus values of γ are chosen so that the strength of the capitalist spirit motivation will be heterogeneous and specifically so that the relatively poor will not defer consumption in order to accumulate wealth.

In general, comparing the Gini coefficient and the amount of wealth among the top percentiles of the wealth distribution for the baseline model without capitalist spirit preferences to any of the four different parameterizations with capitalist spirit preferences (except for $\gamma \to \infty$ which is effectively the baseline model) we find that the model with capitalist spirit preferences is better able to match the Survey of Consumer Finances data presented in the top row. Comparing the results for different parameterizations, we find that the version of the model with relatively high α and γ parameter provides the closest match. Below I discuss how different combinations of α and γ contribute to wealth inequality.

The accumulation modification parameter, γ, contributes to the skewness in the wealth distribution in the sense that lower values for γ generate a more equal distribution of wealth since they make the income threshold at which the capitalist spirit motivation will have a material effect on consumption behavior lower. Thus more households will, in general, save more than they otherwise would, creating a larger amount of aggregate wealth but a more equal distribution of it. Higher values of γ increase the income threshold so that fewer households' consumption behavior will be materially impacted by the capitalist spirit and aggregate savings concentrated among households with the highest income draws, creating a more unequal distribution of wealth. The relationship between the accumulation modification parameter and the degree of skewness in the wealth distribution, as measured by the Gini coefficient and the top percentiles of the wealth distribution, is non-monotonic, so that increasing γ does not translate one-to-one into additional skewness. For example, as $\gamma \to \infty$, for a given α, preferences collapse to the ordinary utility function over consumption, with no capitalist spirit term. This result is reported for two different values of α in table 7. In practice, for larger values of α, a lower limiting value of γ is needed for the capitalist spirit term in the Euler equation to become insignificant. I found that for $\alpha = 1.7$, a γ of approximately \$10,000,000 was needed for the capitalist spirit term to become insignificant, whereas for the case with $\alpha = 1.0$, a value of γ equal to 10 times that amount was required.

From table 7, in the case with $\alpha = 1$, we see that increasing γ increases wealth inequality. The top one percent of the wealth distribution holds approximately 13 percent of the wealth in the simulated economy for $\gamma = \$500,000$ with a Gini coefficient of 0.68, compared to the case with a smaller value for γ (\$75,000) where the top one percent holds just under 13 percent of the model economy's wealth and the Gini coefficient is 0.66.

The choice of α also contributes to wealth inequality in the simulated economy. The closer α is to the value of ρ, which is 2 in these simulations, the faster the marginal utility of an additional unit of wealth declines (for a given γ). From table 7, when $\alpha = 1.7$, we see that overall inequality as measured by the Gini coefficient is higher than the case where $\alpha = 1.0$, regardless of the choice of γ. This is because for a higher α, the marginal utility from saving an additional unit of income is lower, so less wealth is accumulated by individuals who are not as income rich than is the case with $\alpha = 1$, where the incentive for accumulation is very strong and households above the income threshold will accumulate a lot of wealth, making the distribution more equal. In otherwords, the distinction between the wealthy and the very wealthy will be small for $\alpha = 1$ but much larger for $\alpha = 1.7$. In the case with $\alpha = 1.7$ and $\gamma = \$500,000$, the top percentile of the wealth distribution holds 18 percent of the wealth of the simulated economy and the Gini coefficient is 0.85. This is the closest match to the data, in fact the Gini coefficient is too high, but part of the reason it matches so well is because with a weaker capitalist spirit motivation, there is a wider disparity between the rich and the poor with more of the poor borrowing. In this simulation, the bottom 50 percentiles of the wealth distribution have only 1.7 percent of the simulated economy's wealth which is about half the amount of wealth as is reported for those percentiles in the Survey of Consumer Finances data (see table 1).

Thus there is a balance in the choice of α, for very low values of α (for example, for $\alpha = 0.8$) given the level of γ, the marginal utility of consumption intersects the marginal utility of wealth at a relatively low level of wealth so that households consume only a small amount and prefer to save the rest out of each income draw, yielding a more equal distribution of wealth, but one in which everyone unrealistically consumes very little. Conversely, for relatively high values of α, the capitalist spirit motivation is weaker so that less wealth is accumulated, but there is a more unequal distribution.

Comparing any of the capitalist spirit parameterizations with the baseline life-cycle model with no capitalist spirit term (in line 3 of table 7), the model with capitalist-spirit preferences generates significantly more wealth inequality than the baseline model. The model with capitalist-spirit preferences also provides a better match to the inequality reported by the 1995 Survey of Consumer Finances (on line 1) than the model without such preferences, although it still falls short of the wealth inequality exhibited in the SCF. The model with capitalist spirit preferences also matches the amount of wealth held by the lowest 50 percentiles of the wealth distribution as reported in Table 1 fairly well. The Survey of Consumer Finances reports that individuals in the bottom 50 percentiles of the wealth distribution held on average (averaged over the 5 series from 1989 to 2001) 3.1 percent of the wealth. In the model with capitalist spirit preferences, for $\gamma = \$500,000$ and $\alpha = 1$, the lowest 50 percentiles of the distribution hold about 3.9 percent of the wealth.

Most households start their working life with few or no assets and begin to accumulate as they age. This means that part of the inequality in the cross-sectional wealth distribution comes from combining cohorts who are at different stages in their life cycle but the rest of it must come from within age group differences in behavior and earnings. The standard life cycle model has trouble matching the inequality within age groups observed in the data (Huggett, 1996). In the next section, I consider how well the model with capitalist spirit motivations matches the empirical data relative to the baseline model.

6.1 Distribution of wealth by age

Huggett (1996) points out that not only is wealth skewed cross-sectionally in the data, but that wealth skewness persists within age groups. The inequality in the wealth distribution is not driven solely by the mixing of 22 year old college graduates with no assets and 55 year old soon to be retired workers who have had 30 years of working life to accumulate wealth, but is also driven by the fact that consumers of any age with higher income draws will have higher saving rates. Since I have calibrated a life-cycle model, we can observe the distribution of wealth within age groups. According to standard life cycle theories of saving, young people begin saving initially for precautionary purposes or to reach their target wealth to permanent income ratio (or buffer-stock level of wealth). As they age, they begin to save for retirement, with accumulated savings reaching a peak shortly before retirement. The elderly are then supposed to de-cumulate their wealth smoothly following retirement. Thus in the life cycle model, consumers display peaked wealth profiles where the household reaches its maximum wealth as it heads toward retirement.

In the model with capitalist spirit preferences, the wealth of richer households does not exhibit the standard peaked profile. For these households, savings in old age can in fact be higher than at 40-45 years old (roughly the time frame when wealth accumulation peaks in the baseline life cycle model). In fact, households with a strong capitalist spirit motive for wealth accumulation will continue to accumulate wealth even through retirement and even though in this calibration death is known with certainty (see table 9). This theoretical result receives support from several empirical studies of the saving behavior of the elderly, for example, Brittain (1978), Menchik and David (1983), and Danziger et al. (1983) . Danziger et al. (1983), in particular, show that many of the elderly not only do not run down their wealth during retirement, but spend less on consumption goods and services than the young at all levels of income, and the oldest of the elderly save the most at a given level of income.

Table 8 displays the wealth concentration within age groups, comparing the results for the model with capitalist spirit preferences and the model without those preferences with data from the 1995 Survey of Consumer Finances. The first panel in table 8 shows the life cycle dispersion of wealth when α is 1 and γ is \$500,000.[9] We see that wealth becomes more concentrated within cohorts as the cohorts age, beginning from a moderately unequal initial distribution of permanent income (presented in table 4). For comparison, the baseline life cycle model, without the capitalist spirit term in the utility function, is also shown in the table in panel 2 and statistics from the 1995 Survey of Consumer Finances are in panel 3. Looking at the results for the model with capitalist spirit preferences first (panel 1),

[9] I consider the distributions with $\alpha = 1$ because there is almost no borrowing, so the skewness is not coming from having a significant amount of debt particularly at the early ages.

at age 25, the household has no wealth, and so the distribution of wealth at age 27 looks pretty similar to the distribution of income. By age 45, there is more wealth concentration within age groups compared to the baseline model, without capitalist spirit preferences, where there is very little concentration of wealth within age groups. The baseline model does not exhibit much within age cohort concentration of wealth because the only thing differentiating behavior within age-groups is the receipt of different shocks. For the baseline model, individuals have the same target ratios of wealth to income, regardless of their level of income so that there shouldn't be any variation in saving rates, aside from that caused by the receipt of transitory shocks. For the model with capitalist-spirit preferences, by age 65, the top percentile of the wealth distribution holds a larger fraction of wealth, 8.8 percent, and the Gini coefficient within age groups is much higher at 0.54 than for the baseline model.

Comparing these results to Survey of Consumer Finances data (reported in panel 3), we find that they capture roughly a third of the inequality as measured by the wealth holdings of the top percentile of the wealth distribution and a little more than half the overall within age-group inequality as measured by the Gini coefficient. In the data, by age 65 the top 1 percent of the wealth distribution holds 32 percent of the wealth held by individuals who are 65 years old and the Gini coefficient for that cohort is 0.75. The model with capitalist spirit preferences is not able to capture this extreme within age group inequality, although it does a better job at matching it than a life-cycle model without capitalist spirit preferences. The reason that the capitalist spirit motivation has trouble creating the within age-group wealth inequality in the data, is likely is due to the lack of capital income and intergenerational transfers in this model compared to the data.

Another way to look at how saving behavior differs between the baseline model without capitalist spirit preferences and the model with those preferences is to look at the ratio of wealth to permanent income by percentiles of the wealth distribution in each model. The first columns in table 9 shows the ratio of wealth to permanent income ratio by age generated by the model with capitalist spirit preferences for the parameters $\alpha = 1.0$ and $\gamma = \$500,000$. At the 99th percentile, individuals who are 65 years old have accumulated approximately 29 times their permanent income. These are the individuals who received one of the highest income draws in the first period and who have saved most of their income. At age 75, the wealth to permanent income ratio continues to increase to 55 for individuals in the top percentile of the distribution. Comparing these results with the baseline model (the next two columns of table 9), without capitalist spirit preferences, in the highest percentile of the wealth distribution, 65 year old individuals have accumulated approximately 7 times their initial permanent income level. During retirement, households without capitalist spirit preferences run down their assets, so that by age 75 they have only twice their initial permanent income left to consume. The last two columns of table

9 display the same statistics based on data from the 1995 Survey of Consumer Finances. In the data, these ratios are even higher, particularly for individuals who are 75 years old. There are likely several reasons for the huge ratio (roughly 9,500) of wealth to income held by the top percentile of the distribution for 75 year-olds. First, the data sample is likely not representative of the population since the sample of wealthy 75 year-olds is very small. Second, the data includes capital income and intergenerational transfers and probably reflects the cashing out of capital gains from retirement savings.

6.2 How Does the Model Compare?

The standard model for understanding saving and consumption behavior is the precautionary saving model in either a life cycle or dynastic formulation (Carroll, 1997; Cagetti, 2003; Gourinchas and Parker, 2002). This framework models two of the most important reasons for saving: to finance retirement consumption and to protect current consumption from unexpected income shocks. Aiyagari (1994) (in a general equilibrium model) and Carroll (1992) (in a partial equilibrium framework), for example, are able to explain the saving behavior of much of the population when they include uninsurable labor income uncertainty, but generate considerably less wealth concentration than observed empirically. Further refinements to the simple life cycle model which add unpredictable future medical expenses, social security benefits, uncertainty about the timing of death and realistic demographic characteristics, are able to generate a skewness of the wealth distribution consistent with the data for approximately the first 60 to 80 percentiles. It cannot account for the remainder of the wealth distribution, however, and in particular the creation of large estates.

I report statistics based on 1995 Survey of Consumer Finances data and the simulation results of four influential studies in table 10 to compare with the results presented in this paper. Each of these studies reports distributional statistics for wealth and/or earnings, including a Gini coefficient measure of inequality. The study that best approximates the U.S. wealth distribution is De Nardi (2004). Using a mixed dynastic framework, she replicates some of the right skewness of the wealth distribution as a result of introducing social insurance with borrowing and a parental bequest motive. Approximately 19 percent of the households in her model economy (with a parental bequest motive) have negative or zero wealth, while in U.S. economy, approximately 6 to 15 percent of households have negative or zero wealth and she is not able to generate the concentration of wealth among the households who fall into the top 5 to 10 percentiles of the wealth distribution although she gets very close to matching the overall Gini coefficient. The canonical models simulated in Aiyagari (1994) and Castañeda et al. (2003) in particular perform poorly in explaining wealth concentration. Huggett (1996) adds social security and demographic parameters to a life cycle model, enabling his model to replicate some of the wealth distribution, although the concentration of wealth is generated by the fact that income poor individuals receive social security payments and therefore save very little, many carrying debt for the majority of their lives.

Comparing these simulation results with the results for model with capitalist-spirit preferences reported on the last line, the model with capitalist spirit preferences does a better job of matching the data than the models in the current literature. But, if we compare the results to the SCF data on line 1 of the table, the model with capitalist spirit preferences still under-predicts the share of wealth held by the top percentiles of the wealth distribution. In order to more closely match the entire cross-section of the wealth distribution, we need to model retirement more realistically and introduce uncertainty regarding medical expenses and death, as well profits from business ventures or capital gains from stock holdings. But even with these limitations, a simple modification of the life cycle model to include a direct preference for wealth gets relatively close to matching the empirical wealth concentration.

7 Response of the Wealthy to Risk

A utility function defined over consumption and wealth has implications for how households respond to risk as their wealth grows. The curvature of the utility function, in general, controls the consumer's attitude toward risk, while the degree of precaution is determined from the convexity of the marginal utility function. The utility function with capitalist-spirit preferences has two separate curvature parameters, the parameter associated with the intraperiod utility function over consumption and the parameter associated with the intraperiod utility function over wealth.

One way we can determine the differences in risk attitudes between consumers with capitalist spirit preferences and those without such preferences is to simulate risk aversion numerically for different levels of permanent income along the solved optimal path for consumption. Following Carroll and Kimball (1996), I use an empirical measure of relative risk aversion based on the curvature of the value function, which separates factors contributing to the change in the risk behavior as income grows. Intuitively, a convex combination of the elasticity of the marginal utility functions determines the degree of risk aversion. The Bellman equation for this problem in the case with no uncertainty, writing wealth as W and income as P, is

$$V_t(W_t, P_t) = u(C_t, W_t) + \beta V_{t+1}(W_{t+1}, P_{t+1}) \tag{7}$$

Differentiating the Bellman equation twice with respect to current wealth gives:

$$V^{ww}(W_t, P_t) = u^{ww}(C_t, W_t) C^{w}(W_t, P_t).$$

where $C^w(W, P)$ is the marginal propensity to consume, and consumption is a function of wealth and income. Dropping time subscripts for sake of clarity, this can be expressed this as

$$\frac{V^{ww}(W,P)}{V^{w}(W,P)} = \frac{u^{ww}(C,W)}{u^{w}(C,W)} C^{w}(W,P) \tag{8}$$

and multiplying through by negative wealth gives us

$$\frac{-V^{ww}(W,P)}{V^{w}(W,P)} W = -\frac{u^{ww}(C,W)}{u^{w}(C,W)} C(W,P) * \frac{WC^{w}(W,P)}{C(W,P)}. \tag{9}$$

which can be written as

$$\frac{-V^{ww}(W,P)}{V^{w}(W,P)} W = -\frac{u^{ww}(C,W)}{u^{w}(C,W)} C(W,P) * \phi. \tag{10}$$

The first term on the right hand side is the usual Arrow Pratt coefficient of relative risk aversion (for one good): $-\frac{u^{ww}(C,W)}{u^{w}(C,W)}C(W,P)$. This term asymptotes to α as income (and therefore wealth) approaches ∞ but is equal to 1 when income is very low. The second term, $\frac{WC^{w}(W,P)}{C(W,P)}$, expresses the marginal propensity to consume out of increases in wealth or the elasticity of the marginal utility function. We can call this the consumer's 'risk factor' ϕ, as it demonstrates intuitively the way in which individuals' risk attitude changes as their wealth rises. As wealth rises, the marginal propensity to consume out of the increase in wealth falls lowering the consumption covariance with a given financial investment. This is captured by the 'risk factor' defined above.

Table 11 shows this empirical 'risk factor' for households at different values of permanent income in the model with capitalist spirit preferences versus the baseline model. The parameter values used for this calculation are $\alpha = 1.0$ and $\gamma = \$500,000$. In the baseline model, as permanent income rises, the marginal propensity to consume out of increases in income rises quickly and asymptotes at 1. For the model with capitalist-spirit preferences, as permanent income rises, the marginal propensity to consume increases at a slower rate and asymptotes at approximately 0.8.

Figure 1 displays the information contained in table 11 graphically. The dotted curve represents the risk factor, ϕ, of the individual without capitalist spirit preferences (the baseline consumer) while the bottom smooth curve represents the risk factor of the consumer with capitalist spirit preferences. From this figure, the marginal propensity to consume out of wealth (measured as the marginal propensity to consume times the ratio of wealth to consumption) for the baseline consumers increases quickly and asymptotes to 1.0, whereas for capitalist spirit consumers it increases at a much slower rate and asymptotes to 0.8, so that the curve depicting the risk attitude consumer with capitalist spirit preferences always lies below that of the consumer with baseline preferences.[10]

[10]The bumpiness at the low end of wealth holdings ($x - axis$) of the risk factor for the model with capitalist spirit preferences is due to the fact that in the capitalist spirit model this risk factor (and the

Figure 1 about here

When the preference for risk is increasing in the level of wealth, the proportion of wealth invested in a risky asset should increase because the risk premium required to do so is lower. So the lower risk aversion of capitalist-spirit consumers should result in more equity holdings in their portfolios relative to the portfolios of consumers in the baseline model.[11] Alternatively, lower risk aversion under capitalist spirit preferences, may explain why wealthy entrepreneurs do not appear to diversify their earnings but instead invest the majority of their portfolio in their own company even though they draw wage income from their company as well (Carroll, 2002).

The model with capitalist-spirit preferences thus provides a means for risk attitudes to differ across individuals based on their wealth and income, without assuming heterogeneous discount rates. Individuals with high income draws will display lower risk aversion than those with low draws and should hold portfolios with riskier profiles than the relatively poor. Moreover, risk aversion in a model with this type of capitalist spirit preferences is no longer tied to the intertemporal elasticity of substitution as it is in the baseline model. In the model presented here, there is no second asset to test the prediction about portfolio holdings, so in order to further investigate the implication of capitalist spirit preferences for risk aversion and relative portfolio composition, we would need to examine the case with a risky and a risk free asset as well as determine the theoretical properties of this utility function. These exercises are left for a future paper.

8 Conclusion

I demonstrate that including a direct, additively separable, preference for wealth or a 'capitalist spirit' in the utility function provides a mechanism for high income households to continue accumulating assets even when they have reached their buffer stock targets and saved sufficiently for retirement. In this way, the model with capitalist-spirit preferences can explain several features of the data that life cycle models without this modification have difficulty explaining. In particular, it can explain most of the concentration of wealth, the increasing concentration of wealth as individuals age, the absence of retiree de-cumulation and increasing risk tolerance with wealth.

Moreover, capitalist-spirit preferences provide an explanation for disproportional wealth concentration (relative to income) without relying on bequest motives. Although including intergenerational transfers in models of saving behavior has been the standard response for

marginal propensity to consume) is also a function of permanent income. In order to use a two-dimensional graph, permanent income is held constant and wealth holding is permitted to vary. The result of this expository simplification is the flat part and the initial bump in the risk factor graph.

[11] See Ait-Sahalia et al. (2004) for a similar implication when individuals can choose to consume basic or luxury goods.

explaining the right skewness of the wealth distribution, the empirical evidence for bequests is mixed at best. For example, according to altruistic bequest theory, children with low permanent income should receive more transfer income from their parents than children with high permanent income. Yet empirical studies demonstrate either the opposite or that wealth is shared equally among children. The advantage of capitalist-spirit preferences is that they provide a parsimonious means for capturing the desire to accumulate wealth regardless of life status, e.g., for childless families as well as those with children, that is also able to account for the fact that there are several motivations for bequests such as altruism and egoism, as well as accidental bequests. Bequest motives may be active across some subset of the wealthy population but a model with capitalist-spirit preferences can capture these motives too, as capitalist-spirit preferences effectively act as a bequest motive in the last period of life.

The model with capitalist-spirit preferences is able to generate more than two thirds of the concentration of wealth without the assumption of a particularly skewed permanent income distribution or the inclusion of profits from capital. Moreover, the choice of parameter values is conservative: Households experience moderate growth of income and receive permanent shocks which can affect their permanent income positively by at most 10 percent in one period. In reality, consumers face an uncertain lifespan, the possibility of large medical expenses after retirement, and income profiles differ significantly across education levels. In addition, income from profits is undoubtedly a very important explanatory factor for large estates. The possibility of achieving a very high return on a relatively modest investment, for example, like Bill Gates' return on his investment in Microsoft, must also play a role in the skewness of the wealth distribution.

This paper is the first to present additive capitalist-spirit preferences in a fully developed life cycle model. This simple augmented life cycle model does not replicate all of the skewness of the empirical wealth distribution. In order to explain the creation of the massive estates observed in the data, the model needs to incorporate other factors such as capital earnings especially from entrepreneurial ventures. These ideas are left for a future paper.

9 Appendix

9.1 Tables and Figures

Table 1: Percent of Wealth held by percentiles of the wealth distribution.

Percentile	**1989**	**1992**	**1995**	**1998**	**2001**
Top 1%	30.3	30.2	34.6	33.9	32.7
Top 5%	54.4	54.6	55.9	57.2	57.7
Top 10%	67.4	67.2	67.8	68.6	69.8
Top 50%	97.3	96.9	96.4	97.0	97.2
Bottom 50%	2.7	3.3	3.6	3.0	2.8
Gini	0.78	0.78	0.78	0.79	0.80

Note: Survey of Consumer Finances (SCF) data from reported years. Wealth refers to net worth calculated from data on assets and debt reported in the SCF. From Kennickell (2003), table 15 and Kennickell (2006), table 4.

Table 2: Percent of Income held by percentiles of the income distribution

Percentile	**SCF 1989**	**SCF 1992**	**SCF 1995**	**SCF 1998**
Top 1%	16.9	18.6	14.4	16.5
Top 5%	31.7	34.5	28.5	31.0
Top 10%	42.3	45.2	39.2	40.8
Top 20%	57.2	59.9	54.5	56.1
Gini	0.54	0.57	0.52	0.53

Note: The percent of income reported here is normal income reported in the Survey of Consumer Finances. Normal Income is the empirical equivalent of permanent income. Statistics from 1989 and 1992 SCF are from Quadrini (1999), statistics from the 1995 and 1998 SCF are the author's calculation using survey weights.

Table 3: Main Reasons for Saving

	1992	**1995**	**1998**	**2001**
Retirement	19.4	23.7	33.0	32.1
Liquidity	33.9	33.0	29.8	31.2
Education	9.1	10.8	11.0	10.9
Housing	4.0	5.1	4.4	4.2
For Family	2.6	2.7	4.1	5.1
Purchases	9.7	12.8	9.7	9.5
Investments	7.6	4.2	2.0	1.0
Do not Save	12.0	6.8	4.9	4.9

Note: This table is from Kennickell (2003) and reports Survey of Consumer Finances survey responses for various years.

Table 4: Description of Permanent Income Distribution in Simulations

Age	**1 %**	**5%**	**10%**	**20%**	**40%**	**Gini**
25	6.2	19.9	31.5	48.3	71.0	0.43

Note: Calibration assumptions for individual income draws in the first period. This distribution is calibrated to match SCF data for normal income.

Table 5: Fixed Parameters

Parameter	**Description**	**Value**
β	discount factor	0.96
ρ	coefficient of risk aversion	2.0
σ_Ψ	SD of permanent income shock	0.1
σ_y	SD of initial log income distribution	0.83
R	gross risk free interest rate	1.03
T	life length	55 yrs
T_R	retirement begins	40 (= 65 yo in real yrs)
p	probability of unemployment	0.005
G	growth rate of permanent income (level)	1.03
G_R	replacement rate of retirement income	50 percent

Note: Fixed calibration assumptions used in all of the simulations, except where noted.

Table 6: Calibrated Capitalist-Spirit Parameters

Parameter	**Description**	**Value**
α	coeff of risk aversion on $W_t - C_t$	1.0; 1.7
γ	accumulation modifying parameter	75,000; 500,000

Note: Values of capitalist-spirit parameters for all simulations.

Table 7: Cross Sectional Distribution of Wealth for Population

Experiment	α	γ	1%	5%	10%	20%	Gini
SCF 1995, all ages	-	-	34.6	55.9	67.8	80.9	0.79
Baseline model	-	-	5.5	19.2	31.8	51.1	0.45
KS model	1.0	75,000	12.8	34.2	49.5	68.3	0.66
KS model	1.0	500,000	13.3	35.8	51.7	70.7	0.68
KS model	1.0	$\gamma \to \infty$	4.2	15.1	32.1	53.0	0.44
KS model	1.7	75,000	15.3	39.9	56.7	76.1	0.75
KS model	1.7	500,000	18.1	45.6	63.9	84.0	0.85
KS model	1.7	$\gamma \to \infty$	5.6	21.1	34.8	54.7	0.45

Note: The baseline model refers to the model without a direct preference for wealth (capitalist spirit) or where $\gamma \to \infty$. KS refers to model with capitalist-spirit preferences, SCF refers to the Survey of Consumer Finances.

Table 8: Wealth holdings by Age Group

	Age	1%	5%	20%	Gini
Panel 1	**27**	6.5	20.5	49.2	0.44
$\alpha = 1.0$	**45**	7.9	24.5	56.0	0.54
$\gamma = \$500,000$	**65**	8.2	54.7	56.2	0.54
	80	8.5	25.5	57.1	0.54
Panel 2	**27**	1.2	5.8	22.0	0.05
Baseline Model	**45**	1.9	7.9	26.8	0.12
	65	2.6	10.2	31.6	0.20
	80	3.2	11.7	34.2	0.23
Panel 3	**27**	26.1	46.5	81.0	0.86
Survey of Consumer Finances 1995	**45**	20.7	40.2	68.9	0.67
	65	31.7	52.2	78.4	0.75
	80	50.5	61.0	76.1	0.76

Note: Percentage of wealth held by selected percentiles of the wealth distribution in the simulated model with capitalist-spirit preferences, 'Capitalist Spirit Model'. Parameters values for the model with capitalist-spirit preferences are shown in the first panel. The second panel shows results from a simulated life-cycle model without capitalist spirit preferences. The third panel shows data from the 1995 Survey of Consumer Finances (SCF). Representative population weights were used to calculate the statistics for the wealth distribution from the SCF and wealth is defined as net worth (assets less debts).

Table 9: Wealth to Permanent Income Level by Age in Model

Percentile	KS Model		Baseline Model		SCF 1995	
	Age 65	**Age 75**	**Age 65**	**Age 75**	**Age 65**	**Age 75**
Top 1%	28.7	54.8	7.2	2.1	29.6	9,562.1
Top 5%	23.7	43.9	6.9	2.0	19.0	27.4
Top 10%	21.5	39.0	5.5	1.1	18.2	17.7

Note: The ratios of wealth to permanent income for selected percentiles of the wealth distribution are shown for the model with capitalist-spirit preferences (KS), the baseline model without capitalist spirit preferences and data from the 1995 Survey of Consumer Finances. Retirement in the simulated results occurs at age 65 and the parameter values for the KS model are $\alpha = 1$ and $\gamma = \$500,000$. The statistics from the Survey of Consumer Finances data are calculated with population weights.

Table 10: Comparison of Recent Studies of the Wealth Distribution

Study	**Model**	**Series**	**Top**	**Top**	**Bottom**	**Gini**
			1%	5%	40%	Coeff
Average of 5 SCF waves		Wealth	32.6	56.0	n/a	0.79
Diaz et al. (1997))	Dynastic	Earnings	6.8	7.5	32.5	0.10
		Wealth	3.2	13.1	14.9	0.38
Castañeda et al (2003)	Dynastic	Earnings	2.0	10.1	20.6	0.30
		Wealth	1.7	7.9	32.0	0.13
Huggett (1996)	Life Cycle	Earnings	13.6	22.6	9.8	0.42
		Wealth	11.1	33.8	0.0	0.74
De Nardi (2004)	Life Cycle w/ Bequests	Earnings	n/a	n/a	n/a	n/a
		Wealth	14.0	37.0	0.0	0.74
Francis (2008)	Life Cycle w/ Cap Spirit	Earnings	6.2	19.9	14.2	0.43
		Wealth	15.3	39.9	1.6	0.75

Note: The first line shows the average of five waves of the Survey of Consumer Finances data for 1989, 1992, 1995, 1998, and 2001. Simulation results taken from cited articles and compared to results from table 8. The results from Diaz et al. (1997) are based on the model in Aiyagari (1994) with baseline parameters.

Table 11: Risk Factor Comparison at Different Levels of Permanent Income

Percentile	**KS Model**		**Baseline Model**	
	Income	ϕ	**Income**	ϕ
10th	$ 7,720	0.31	$ 7,720	0.69
50th	$ 21,784	0.49	$ 21,784	0.85
75th	$ 38,160	0.57	$ 38,160	0.90
90th	$ 62,676	0.70	$ 62,676	0.96
95th	$ 85,584	0.75	$ 85,584	0.99
99th	$ 344,242	0.79	$ 344,242	1.0

Note: Comparison of risk coefficients at selected percentiles of the wealth distribution for both the model with capitalist-spirit preferences (KS) and the baseline model. Income refers to level of permanent income. The 'risk factor' ϕ, is equal to the marginal propensity to consume times the ratio of wealth to consumption. It is described further in Section 7.

9.2 Numerical Solution

To solve the model, I apply the method proposed by Deaton (1991) and elaborated by Carroll (2002).[12] The technique involves iteration on the Euler equation to find the optimal consumption profile given the initial level of assets and permanent income. The method works directly from the Euler equation, where the value function must be satisfied by the solution in every period, to compute the optimal policy function through backward iteration from last period consumption. I constrain the roots of the Euler equation at any level of cash on hand, x_t, to be positive (i.e., I choose the positive root). The transitory shocks introduced into the model, in general, should prevent borrowing, so that consumption is positive and always at least ϵ less than x_t. In practice, since I assume that retirement income is deterministic and not subject to transitory shocks, the desire to never borrow caused by the transitory shocks will be weakened and some borrowing will occur. To deal with any kinks in the consumption function generated by the restriction that consumers must satisfy their intertemporal budget constraint, I use discretized grids (explained below) which are finer for lower levels of cash-on-hand and income.

I begin by determining the consumption rule in the last period of life. Since the consumer might choose to die holding assets, last period's consumption is not simply the remaining assets, as in the typical finite horizon life cycle problem. Instead, in the last period, T, optimal consumption is determined by solving: $c_T^{-\rho} = (x_T - c_T + \gamma)^{-\alpha}$, where $x_T = Rs_T + y_T$ or cash-on-hand. When x_T is small, the consumer will want to die with debt. To restrict the consumer from violating his budget constraint, consumption in the last period, c_T, will be $c_T = \min[c_T^*, x_T]$, where c^* is optimal consumption.

There are several steps involved in solving this problem. These are:

1. Discretize the state variables: create an exogenous grid of points for the state variables, cash-on-hand and permanent income, X_t, P_t. In order to make the grid finer for lower values of cash-on-hand and permanent income where the curvature of the consumption function is likely to be greater, I take logs of the grid points, so that there are more points in the lower region of the grids. In practice, I used 51 point grids with almost half the points below 2. The grids are relatively small because I must solve the problem with separate grids for cash-on-hand and income, thus there are 51X51 (or 2,601) combinations of cash-on-hand and income to generate a consumption rule for.

2. Beginning with the last period, solve (numerically) the consumer's problem backwards to find the optimal profiles for consumption and wealth.

3. Given the solved policy function for the grid points, do linear interpolation between grid points to generate a smooth policy function. In practice the consumption func-

[12] This is sometimes called a projection method. See Adda and Cooper (2003)

tions begin to converge after about 25 periods (depending on the parameter values).

4. Simulate consumption profiles. Generate a sequence of 20,000 income draws over 55 years, based on the mean and standard deviation of the initial income distribution. For each income profile, which is subject to different permanent and transitory income shocks each period, simulate optimal consumption profiles for the pre and post retirement periods.

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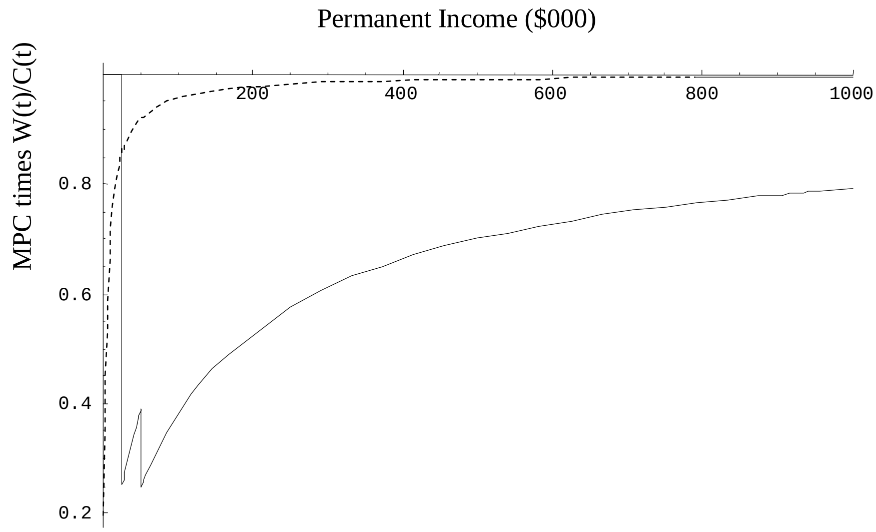
Figure 1: Comparative Risk Behavior in Baseline and Capitalist Spirit Model.



Note: The dotted line is without capitalist-spirit preferences, the solid line is with capitalist-spirit preferences. Permanent income levels are reported in the thousands of dollars.