The Effects of Retirement on Consumption

The objective of this paper is to begin a theoretical catalog of the different ways one could expect consumption before and after retirement to be different. When doing this, it is important to separate the differences between how age would affect consumption preferences and how being retired, independent of age, would affect such preferences. The Life Cycle Income Hypothesis and the Household Production model are found to generate opposite hypotheses regarding the expected differences between pre- and post-retirement expenditure.

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Introduction

This paper is a theoretical exploration of the ways in which one could reasonably expect household expenditures to change due to retirement from the labor force. Understanding these changes is important for determining a financially sound retirement plan, and therefore important to health and economic well being in retirement.

Recent literature has consistently shown that baby-boomers are not saving enough to maintain current levels of consumption into their retirement years (Yuh, Montalto & Hanna, 1998; Bernheim, 1996; Moore & Mitchell, 1998). Whether this apparent "under-saving" is due primarily to uninformed financial planning or personal preference is unclear. In other words, are boomers under-saving because they don't understand how much they need to retire, because they are choosing to live with less consumption in retirement, because they expect to save more in the future, or some combination of the three? This paper will shed light on this question by using economic theory to generate hypotheses about what one would expect would happen to a households expenditures in retirement.

Tables 1 and 2 use Consumer Expenditure data to show how the expenditures of United States' Households change as they age. Table 1 shows the expenditure patterns of the 1932-1942 birth cohort changed from 1987 (when they were between 45 and 54 years old) to 1997 (when they were between 55 and 64). Table 2 shows the changes in the same time period for the 1922-1932 birth cohort. Since the 1987 and 1997 Consumer Expenditure Survey samples are different, some of these changes will be due to household size changes and any systematic differences in the expenditure patterns of people who have a greater chance of surviving to old age. Nevertheless, one can see that that households headed by older Americans tend to spend less on virtually every expenditure category except health care. This is an empirical phenomenon supported in previous literature.

Table 1
Consumption Pattern of the 1932-1942 Birth Cohort by Age of Reference Person (1987-1997)

Item	45-54 Years Old (1987)	55-64 Years Old (1997)
Food at home	3,678	3,139
Food away from home	2,799	1,946
Housing	12,509	11,090
Utilities, fuels and public services	2,895	2,654
Housekeeping supplies	616	523
Apparel and services	2,720	1,045
Transportation	8,711	6,708
Health care	1,757	2,187
Entertainment	2,057	1,900

Note. Data: Consumer Expenditure Survey (Expenditures for both years in 1997 Dollars)

Table 2

Consumption Pattern of the 1922-1932 Birth Cohort by Age of Reference Person (1987-1997)

Item	55-64 Years Old (1987)	65-74 Years Old (1997)
Food at home	3,234	2,600
Food away from home	2,208	1,466
Housing	10,206	8,876
Utilities, fuels and public services	2,661	2,321
Housekeeping supplies	552	449
Apparel and services	1,949	1,302
Transportation	6,999	4,605
Health care	1,936	2,900
Entertainment	1,592	1300

Note. Data: Consumer Expenditure Survey (Expenditures for both years in 1997 Dollars)

Review of Literature

There has been an abundance of empirical work examining expenditure changes in retirement. In their study of expenditure patterns of 3,599 retirees during the years 1972-1973, and 1986-1987, Nieswiadomy and Rubin (1995) proposed that with increased life expectancy and better health, older retirees would purchase more leisure activities, and the marginal propensity to consume leisure related services would increase. Results indicated substantial increases in the preferences of retirees for leisure activities over time. The propensity for retirees to purchase leisure doubled. In addition, they found that the retired spent more out-of-pocket for health care. Health care expenditures was positively correlated with age, as the older retirees greatly increased the amount of money spent on their health care. Expenditure shares for food, cash gifts, and apparel declined for both groups, while alcohol and entertainment purchases increased.

Hitschler (1993) compared the spending habits of older consumers in 1980 and 1990. Consumer units (or "households") were separated into two groups, those aged 65-74 were the "younger group" while those aged 75 and older were the "older group." They found that the "younger group" had higher total expenditures than did the "older group" for both years, with the exception of health care.

The question of retirement's effect on consumption is a difficult one to investigate for several reasons. First, it is difficult to investigate the question empirically because actual retirement expenditures can be confounded by poor financial planning. It is clear that retirees consume at a lower rate than non-retirees do. It is not clear that this lower rate of consumption was planned beforehand. This makes empirical analysis of the effects of retirement on consumption difficult at best and impossible at worst. Second, a retiree's saving desires and his/her consumption desires are not synonymous. Desired retirement wealth can include desired bequests. Since the debate surrounding the existence of a bequest motive among retirees has yet to be resolved, using household savings to make inferences about consumption in retirement is not appropriate.

Theoretical Framework

This theoretical exploration into how consumption changes in retirement will be explicitly split into two paradigms – the effects of being retired on consumption, and the effect of *age* on consumption. This division works from a financial planning perspective as well: there are two basic phenomena for which the prospective retirees need to plan for. First, you will be retired, i.e. no longer working, and that can influence your attitudes towards consumption, independent of how old you are. Second, you will be getting older, and this fact will also change your consumption habits/preferences, independent of being a retiree. Therefore, each behavioral model outlined here will be used to yield insight into the effects of being retired on consumption and the effects of getting older on consumption separately.

Hanna, Fan, and Chang (1995) use simulation do illustrate a comprehensive picture of age's effects on consumption, with one major limitation: they do not incorporate leisure into the utility function. By leaving leisure out of the equation, their simulations fail to address how the amount of leisure in a specific period of time could affect the decision about how many goods and services to consume in that period. Furthermore, we could expect that how one views free time, it's usefulness, and it's productivity, could change with age. Therefore, incorporating

leisure into the models discussed provides a richer picture into the relationship between retirement and desired consumption.

Consumption Models

Biological Models

Biological models can, to some extent, inform our understanding of consumption in retirement and old age. In general, consumption depends upon various factors like financial resources available, social position, physical and/or biological state and psychological effects.

A study by Lee and Novielli (1996) showed that the elderly tend to consume at lower caloric levels than the non-elderly. This low caloric intake of the elderly population was more due to their inability to go to grocery stores and make food for themselves, rather than a shortfall in monetary resources. The social, physical and psychological conditions often adversely affected food consumption due to loss of appetite, inability to buy and cook food and medical conditions (Roe, 1992). Several studies show that insufficient food consumption, for whatever reasons, has created immense health risk amongst the elderly population. Consumption amongst the elderly significantly changes when they have a partner and/or through socialization than in isolation (Walker & Beauchene, 1991).

Another study showed that homebound retirees and the aged suffering from physical/mental disabilities and unable to shop, cook and eat consume less than their able-bodied counterparts (Lee & Novielli, 1996). Again, a study in the recent past has shown that 1.5 million elderly Americans experienced at least one circumstance of hunger or food insecurity (one or more days without food) due to lack of money in the 6 months prior to the study (Burt, 1993).

Most of the recent studies conclude that with age people need no less food but a balanced diet with all the nutrient value to avoid loosing weight, ill health, medical condition and for maintenance of good health. Consumption towards medical expenses not covered by the usual health insurance tends to increase in old age thereby having significant effect on items and patterns of consumption.

Static Models

We can use static, one-period models of economic choice to yield hypotheses regarding whether preferences toward consumption versus leisure change with age and with retirement. Few studies have dealt with the effect of age of head of household with changes in consumption, and no studies to the author's knowledge estimate precisely the effect age has on preferences directly. An exception is Zeldes (1989), who used age to derive testable implications for the behavior of consumption in the presence of borrowing constraints. This study yielded no specific results with respect to age effects, however.

Thinking about the effects of retirement on consumption in a static framework seems at first futile. However, there is some value in thinking about the effect of retirement in this manner. How does not working effect our consumption? In a static framework, this is akin to asking what happens to consumption if we constrain the household to zero hours of work. Under this framework, retirement would be exogenous.

If the zero hours of work constraint is not binding, i.e. if the marginal substitution between consumption and leisure is less than or equal to the wage rate, then unconstrained desired hours of work are zero, and there is no effect on consumption. If the household is constrained by the retirement condition, (i.e., without the constraint, the consumer would choose to work), then the effect of this constraint is less consumption than otherwise. This is a fairly straightforward point, but it highlights the problem of examining data on consumption by age to examine how preferences change. While the beginning of this section shows how we might expect preferences to change, viewing retirement as a constraint can demonstrate how consumption decisions may have very little to do with preferences. There are many retirees who became that way voluntarily but for whom it is currently a constraint – "un-retiring" is not feasible, and their consumption may be affected by such a constraint.

Life Cycle Model

Static models can be very useful in understanding how preferences might be different in retirement than during the work years, particularly in our understanding of how preferences for leisure might change with age. However, a model that takes the well being of the individual over the entire life cycle as the objective can yield further insight into the effects of retirement on consumption. These further insights will come not so much by understanding how preferences change, but by showing us how decisions about consumption at different points in time might fit into a whole plan.

Using a life cycle context, one views the consumer standing in the present with various choices about when to spend their money. One can think of those various time periods as different "goods," where the relative prices of the goods are defined to be the real interest rate between periods. Given interest rates and prices, the consumer's goal is to allocate their resources (time and money) optimally by choosing amounts of consumption in each time period.

As stated previously, Hanna, Fan and Chang (1995) do an excellent job of cataloging the effects that age might have on an optimal consumption plan in a life-cycle context. In general three things happen to your desired consumption at a certain point in time as that point gets further into the future (i.e., as you age). First, the price of consumption in the future is generally cheaper than consumption now because of positive real interest rates. If you can earn interest over and above the rate of inflation, than resources now can buy more consumption if they were saved and invested. This means that if preferences about when to consume were the same in all time periods (i.e., controlling for the effects of age we found in the previous section), we would expect consumption to go up as you age. Second, consumption farther in the future has less value, because you are less likely to survive to enjoy it. Consumption farther into the future has less intrinsic value because there is a chance that you will not survive to future years. This means that we would expect consumption to go down as you age, as households consume more of their resources in periods they are more likely to be alive.[4]

The simulations run by Hanna, Fan and Chang showed that, in general, the first phenomenon above tended to dominate the second at earlier ages, while in the later years, the second tended to dominate the first. Therefore, in nearly all the simulations run by Hanna, Fan and Chang, consumption eventually starts to decrease. However, in some of these simulations, it doesn't begin to decrease until well into old age, depending on the real interest rate that is assumed (the higher the assumption about real interest, the later in life consumption will begin to decrease).

Third, the more tolerance you have for risk, the more likely a household will be to plan for equal levels of consumption over time. This third effect tends to "dampen" the second effect. The more averse to risk the household is, the less willing the household is to decrease consumption during periods it isn't likely to survive. With high-risk aversion, one would expect households to plan to consume nearly as much in old age as at young ages.

What Hanna, Fan and Chang do not take into account in their simulations is the effect that leisure time has on optimal consumption. This issue wasn't specifically addressed formally in the literature until MaCurdy (1981). MaCurdy argues that the individual's objective is not so much optimal consumption as it is satisfaction maximization. Since it reasonable to assume that time spent not working (leisure) effects the consumer's satisfaction in ways time spent working does not, then Hanna, Fan and Chang's descriptions of optimal consumption only hold if the amount of leisure per period is held constant over the life cycle.

If an individual plans to retire, how would this effect the optimal consumption path? With reasonable assumptions about real rates of return and risk aversion, we would expect individuals to generate a relatively "smooth" or constant stream of satisfaction (consisting of both consumption *and* leisure) over the life course, the same way relatively smooth streams of consumption were generated in the Hanna, Fan and Chang simulations. This implies that consumption in retirement would be lower than consumption before retirement. To generate smooth satisfaction when leisure is relatively high during retirement and relatively low before it, the consumer must counteract the imbalance in leisure with relatively low consumption in retirement and relatively high consumption before it.

The Life Cycle model has contributed to our understanding of the effect of consumption in the following way. As one ages, optimal consumption should rise, and then fall at very late ages. For risk averse households, these rises and falls are fairly small. Therefore, there isn't much evidence either way for what a rational retirement planner would do to plan for changes in consumption as they age. Retirement, on the other hand, should cause consumption to go down, because the rational consumer will plan for less consumption in times of abundant leisure, so as to generate smooth levels of satisfaction over time. All told, it appears that the life cycle model is leading us to deduce that retirement will decrease consumption.

Household Production Model

The Household Production Model (Becker, 1965) can be particularly useful at looking at the effects of both age and the retirement decision itself on consumption. Under the household production model, Households receive utility from "commodities" or "Z-goods." These commodities require both time and consumption as inputs. For example, a particular Z good might be a family meal, which requires as inputs the groceries, electricity, use of a stove, and the time and effort required in order to prepare it. The usefulness of the household production model lies in its guiding principle that time is required to enjoy different goods and services.

Therefore, to understand the effects of age on consumption, one needs not only to consider how the utility function U(Z) changes, like we did in the static model section. One also needs to understand how the production function – the way in which leisure and goods generate the Z commodities – changes as we age. So there are two questions that we must answer in order to understand the effects of age on consumption. First, do preferences switch from "goods intensive commodities" – Z commodities which require more goods then time – as we age? If this were true, then we would expect consumption to go up as we age. Second, what happens to a person's efficiency with respect to turning goods and time into Z commodities? Let's go back to the "meal" example. We might expect that as one gets older, it would take more time and effort to prepare a meal. Furthermore, we might expect the goods required to prepare it do remain more or less constant. This implies that the production function (and the marginal product of time, in particular) has decreased. If this is true, then we would expect the individual to respond by putting more goods into the production process and less time, to re-equate the marginal product of consumption and time (assuming consumption and time exhibit diminishing marginal returns in the production process). Therefore, if for most Z commodities, the effect of age on the production process were to decrease the productivity of time relative to goods (a reasonable assumption), then the result would be to increase consumption as one ages.

How would consumption change at retirement according to the Household Production model? With more time in retirement, the household would presumably have more time to invest in the production of every conceivable commodity. Assuming diminishing marginal returns to that time in the production of commodities, this would mean that the marginal productivity of time would decrease. To re-equate the marginal productivities of goods and time for each commodity, one would need to respond with more consumption. In other words, if you have time, you need goods to go with it.

Implications

With respect to retirement's effects on consumption, the Life Cycle model seems to be in direct conflict with the Household Production model. The Household Production model says consumption in retirement should go up, Life Cycle model says household production should go down. Future research needs to closely examine how these two alternative hypotheses come together in the actual behavior of retired persons.

One major limitation of this inquiry is that the interaction of age and retirement has been ignored. For example, your planned consumption might be systematically different for early retirees and later retirees. In other words, the effects of being retired on consumption might depend on how old you are at retirement. This phenomenon might not have been captured in any of the above analysis.

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Endnotes

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[4] Hanna, Fan and Chang state in their paper "Certainty is assumed in the analyses presented in this paper." However, they have included a discount rate of preferences equal to survival probabilities, which are an attempt to "mimic" the effect of survival risk on optimal consumption.