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Status Seeking Behavior and the Life Cycle Hypothesis

Ranajoy Chaudhury

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Ranajoy Chaudhury*

Centre for Studies in Social Sciences

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Abstract

In this paper, we study the effects of status consciousness on life cycle profiles of consumption and wealth and see how it differs from the results of standard macroeconomic theories which is without incorporating status. Also, we examine whether the overall wealth of the economy with status seeking behavior is higher or lower than an economy without it. For this, we consider a general equilibrium overlapping generations model and calibrate it to the features of U.S economy. We find that incorporating status seeking behavior, the overall wealth of the economy is reduced by 6.8 per cent and savings rate is reduced by 4.4 per cent.

Keywords: status seeking; life cycle profile; wealth accumulation;

JEL: E03; E21;

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1. Introduction

The concept of status seeking behavior has received an overwhelming attention in the last couple of decades. Its origin, however, can be found in the works of Smith (1776) and Veblen (1899) and sometime later emphasized by Duesenberry(1949). The basic idea of status seeking bahavior is that an individual attains utility not only from his or her consumption but also from his or her's consumption relative to the average. Thus, individuals engage in purchasing status goods to increase utility via enjoying a relatively higher consumption basket of status goods. What are status goods is also a question we need to address and reasearchers have offered various definitions of status goods. We will briefly discuss this in this paper. There is an enormous volume of literature on status seeking behavior.[1]. The main finding of all these studies is that the status seeking behavior is strongly prevalent in our society. Its impact on savings, growth and inequality has also been studied extensively. The purpose of this paper is to examine the effects of status consciousness on some standard theories of consumption and wealth accumulation, in a macroeconomic setting. We abstact from issues of growth and inequality. Primarily, we look at the life cycle profiles of consumption and wealth

[1]For a literature review on this, see Chaudhury and Santra (2015), Kahneman and Kreuger (2006), and Heffetz and Frank (2008).

and the overall impact on savings and wealth. To our knowledge, this is the first attempt to calibrate a status seeking macroeconomic model with the features of the U.S. economy and quantify its effect on macroeconomic aggregates of savings and wealth.

From basic macroeconomic theories of ealth and consumption, we know that the age-wealth life cycle profile depicts a hump-shaped curve. On the consumption side, agents want to smooth consumption over time. So, when they are young, and their income is low, they borrow. They save during their middle ages and dis-save during retired time. In this paper, we examine how these profiles are affected if one incorporates status seeking behavior in the utility function. For this, we consider a general equilibrium overlapping generations model, where agents differ only by age as is standard in such kind of models. This allows us to look at the life cycle consumption and wealth profile of individuals'. We calibrate both, a (baseline) model without status, and the status seeking model. We then compare the life cycle profiles under the two models and also the savings and wealth aggregates. There are two versions of status seeking model that we consider, one is with homothetic preferences and the other with non-homothetic preferences. The reason for considering two types of preferences is that they induce completely different types of behavior. In the context of an additional consumption good in

the utility function, that is status goods consumption in addition to non-status goods consumption, non-homotheticity plays a very important role for obvious reasons (See Ait-Sahalia, Parker & Yogo (2004), who offer a solution to the equity premuim puzzle by considering both basic and luxury goods in their model).

The main result of this paper is that the savings rate and aggregate wealth is lower in the economy with status consciousness as compared to a model without status. The life cycle profiles of consumption and wealth also display different behavior from the baseline model, that leads to lower asset accumulation in the status seeking model. The hump-shaped asset profile is still observed. These results reiterate the already established results on the importance of incorporating status seeking behavior in economic analysis.

The structure of the paper is as follows. Section 2 lays out the theoretical model. Section 3 discusses the data, identification of status goods, and life cycle profiles. Section 4 draws a comparison between the baseline and the status model and Section 5 concludes.

2. Model

The model that we consider is an otherwise standard overlapping generations (OLG) model where agents differ only by age. Agents live for N periods. Age(period)

is denoted by $t \in \{1, 2, ..., N\}$. The first period of an individual starts at age 20 and the agent lives till age 79. We abstract from population growth, early death or bequests in this model. Population growth or early death are not important factors in the current study but bequests might have an impact as it is a strong motive for savings (De Nardi 1994). If bequests are included in the model, it is expected to dampen the consumption profile, but that is something which is left for future study. Also, as is standard in the literature in dealing with these type of models, we do not consider borrowing. Borrowing is an important instrument for agents to smooth consumption over time, but by excluding borrowing from the model, we can still get the basic insights from the model outcomes.

Agents' consumption basket consists of non-status goods (basic goods)[2] and status goods. Agents derive utility from consumption of basic goods, C and consumption of status goods, X relative to the status goods consumption of the reference group, $\overline{X}$. Some discussion on reference group is appropriate here. The purpose of having a reference group is that an individual compares his or her own consumption to that of some particular group. Say, for instance, this particular group that we call reference group is the people living in the neighborhood. To

[2]Non-status goods and basic goods are used interchangeably throughout the paper. They mean the same thing.

be more precise, in a microeconomic setting reference group may be considered as the geographical region and/or race where the agent lives. (See Charles, Hurst & Roussanov (2009), where they consider both race and geographical region in defining reference group). In the macroeconomic model that we consider, that is the OLG framework or in other words, there is a representative agent (for each age) framework, reference group for representative agent (of each age) may be considered as the average of the status goods consumption of all agents of the same age within the economy. The only source of heterogeneity in OLG model is age and hence we cannot consider reference groups based on geographical region or race classification without introducing additional degrees of heterogeneity.

2.1. Agent's Optimization Problem

An agent's optimization problem in the status seeking model can be laid out in the recursive form as

$$\begin{aligned} V_t(a, r, w, l, \overline{X}) &= \max_{C,X,a^{'}} U(C, \frac{X}{\overline{X}}) + \beta V_{t+1}(a^{'}, r, w, l,^{'} \overline{X}^{'}) \\ s.t. \quad a^{'} &= (1+r)a + wl - C - X \end{aligned}$$

where a' denotes next period's (primes denote next period's values) assets, w is the wage rate, l is the labor supply in efficiency units of labor (exogenously given), β is the discount factor and r is the interest rate. $\overline{X}$ is the average consumption of status goods of the reference group (which is the entire economy for that particular age of people in the economy). Except for assets, all the other variables in the arguments for value functions are exogenously given to the agent. r and w are endogenously determined in a general equilibrium model and the agents take it as given. Although there are two types of goods in the economy, we do not consider separate production processes.[3] Thus, we take the price of both basic goods and status goods to be one. We do not consider price effects.

From the first order conditions, one can get the intratemporal allocation equation

$$U_C(C, \frac{X}{\overline{X}}) = U_X(C, \frac{X}{\overline{X}})$$

The Euler equations for intertemporal allocations are given by

[3]It is a standard practice to allocate output produced between consumption and investment of physical capital which is starkly different from reality. In the same spirit, dividing consumption between status and non-status goods can be thought of as dividing output between consumption and investment in physical capital. On the other hand, if we were to consider two production processes, each for different type of good, prices would not be equal.

$$U_C(C, \frac{X}{\overline{X}}) = \beta(1+r)U_C(C', \frac{X'}{\overline{X'}})$$

$$U_X(C, \frac{X}{\overline{X}}) = \beta(1+r)U_X(C', \frac{X'}{\overline{X'}})$$

The baseline model is just the above model without the status seeking good, that is

$$\begin{aligned} V_t(a, w, r, l) &= \max_{C, a'} U(C) + \beta V_{t+1}(a', w, r, l') \\ s.t.\ a' &= (1+r)a + wl - C \end{aligned}$$

2.2. Production Function

The technology for output production is given by $f(k, l)$, where k is the per capita capital stock and l is the per capita labor supply. Output produced can either be consumed (as status or basic goods) or invested in physical capital. For the numerical exercises, we consider a Cobb-Douglas production function. Physical capital depreciates at the rate δ.

2.3. Equilibrium

Definition 1. *An equilibrium in this economy is given by a constant distribution of population,* ν*, an interest rate* r*, a wage rate* w*, functions,* $c^*(z), x^*(z), a^{'*}(z)$ *for all state variables* Z*, the per capita labor supply* l*, such that the following conditions hold over the state variables:*

(i) Given factor prices, $c^*(z), x^*(z), a^{'*}(z)$ *solve the above described maximization problem with state variables* Z*.*

(ii) The price of each factor is equal to its marginal product

$$r = \frac{\partial f}{\partial k}, w = \frac{\partial f}{\partial l}$$

(iii) All markets clear

$$\begin{aligned} k &= \sum a^* \nu; \quad C = \sum c^* \nu; \quad X = \sum x^* \nu; \\ l &= 1; \\ f(k) &= c + x + \delta k \end{aligned}$$

3. Data

The data that we use for the analysis is the Panel Study of Income Dynamics(PSID). The PSID is a survey of U.S. households (selected randomly) on wealth, income, consumption and various other types of variables. The survey is conducted by the Institute for Social Research at the University of Michigan. We use the 2011 wave[4] for our analysis.

3.1. Wealth and Income Profiles

There are two measures of wealth in the PSID. One is including home equity and the other without home equity. Some other components of wealth which are included in both definitions are rental real estate, farms or businesses, automobiles, stocks, IRAs, bank accounts, corporate bonds. Income includes only labor income. We work with weighted data and to get the age-wealth and age-income profiles, we take the average wealth and income for each age. Using age polynomials which gave the best model fit , wealth and income profiles are smoothed. Figures 1 and 2 display the wealth (including home equity) and income profiles. Wealth reaches peak level at age 70 and falls thereafter. At around age 55, income reaches its

[4]Latest wave available as of May 2015.

highest level and then falls thereafter.

Using the proportion of agents of each age in the population, and the income of agent of each age, we find per capita earnings We then find efficiency units of labor by dividing income of the agent of each age by per capita earnings. The agents' efficiency units of labor times the time spent working is the agents' labor supply, l. We assume that each worker inelastically supplies one unit of labor. Figure 3 gives the efficiency units profile. At age 52, agents' productivity reaches the peak and falls thereafter.

3.2. Status Goods

In our model, we not only have basic goods but also status goods. There is no unanimity in the literature as to what are status goods or how to identify status goods. Luxury goods have a strong resemblance with status goods, but the distinction is very subtle and hard to capture. Charles, Hurst and Roussanov (2009) define visible goods as status goods. Glazer and Conrad (1996) use charitable donations as status goods. Bloch , Rao and Desai (2004) consider wedding celebrations in rural India as status goods. Chao and Schor (1998) use women's cosmetics as status goods. We use the definition of status goods as in Chaudhury and Santra(2015), that is, identify status and non-status goods based on consumption pattern of

individuals. Chaudhury and Santra (2015) divide the population into 4 spending groups so that variation in consumption within each group is minimized, which means that differences in variance across items (within a group) reflects differences in status. Within each group, each item is ranked based on variance. The idea is that status goods will have a high variance and basic goods will have a low variance. Based on their findings, we take food at home, food delivered at home, utilities, gas, clothing and car insurance as basic goods and take the rest as status goods. After grouping the status and non-status goods, we use PSID 2011 data to depict the profile for those goods. The profiles are smoothed using age polynomials. Figure 4 gives the profiles. The consumption levels of both types of goods reach their peak levels around age 45. The consumption of status goods is quite less than that of non-status goods across almost all ages except at the beginning when they are almost the same. The ratio of these two types of goods seems to be quite stable after the initial periods (10 years).

3.3. Population Profile

We get the population measure from the Current Population Survey(CPS) constructed from U.S. census data. In our model, we take a population measure of 1 for agents from age 20 to age 79. In CPS, the population percentage of each

age group between age 20 and 79 is given with 5 year intervals. We normalize the measure to 1. Figure 5 shows the distribution of population across age.

4. Results

We perform several numercial exercises to evaluate the effects of status consciousness on consumption and wealth. We consider a closed economy where the equilibrium interest rate is determined by the equality of assets(capital) demanded by firms and assets supplied by households. We then compare the baseline model with the status seeking model and see the insights arising out of the numerical exercises. However, as a prelude to that, let us first specify the preferences over status and non-status goods and also how we construct $\overline{X}$.

4.1. Preferences and Calibration

We use a variant (we incorporate status and use both homothetic and non-homothetic versions) of the preferences used by Ait-Sahalia, Parker and Yogo (2004). The preferences for the consumer is given by

$$U(C, \frac{X}{\overline{X}}) = \frac{C^{1-\gamma}}{1-\gamma} + \frac{(X/\overline{X})^{1-\lambda}}{1-\lambda}$$

with $\gamma, \lambda > 0$. Note that if $\overline{X}$ is increased, consumption of X has to be increased as well to make the consumer not worse off. For the baseline model, $U(C) = \frac{C^{1-\gamma}}{1-\gamma}$, and γ is set to 1.5. For all the simulations, the discount factor and depreciation rate is chosen such that the capital output ratio is around 4, to match that of U.S. Share of capital in the production function is fixed at 0.36.

4.2. Construction of Target Status Level

Each period the agent has to choose optimal consumption of status and non-status goods based on resource constraint and target status level. An OLG model is essentially a representative agent model for each age of the agent. We have the constructed productivity for agent of each age. The steady state wage rate is determined by the marginal product of labor. And to get the target status level, we look at the ratio of status goods consumption to total consumption (denoted by Rstatus in figures 6 and 11), and multiply it by income which is productivity times the wage rate (recall that an agent inelastically supplies one unit of labor each period).[5] The target level of status for each period is depicted

[5] Although an agent does not work after retirement (theoretically), say from age 65 onwards, we still see in data that labor income is low but positive (on average) for people aged above 65. Since in our model labor income is wage times productivity times labor supply, we do not assume labor supply is equal to 0, so that income is not 0 in the last few periods and thus is consistent with what we see in data.

in Figure 6. As expected, it is closely related with the productivity profile, since the magnitude of status goods consumption depends on income. The ratio of status goods consumption to total consumption is more or less steady across all time periods and hence the target level of status is less hump shaped or flatter than the productivity profile. This is the $\overline{X}$ in the utility function.

4.3. Baseline vs. Status Seeking Behavior

Table 1 displays the results. In Status1 model, we consider homothetic preferences and set $\gamma = \lambda = 1.5$. For the baseline model, the discount rate and depreciation rate that supports capital-output ratio (K/Y) of around 4.10 is 0.99 and 0.03 respectively. We do not change the discount rate and depreciation rate for every simulation, namely Status1 and Status2. When comparing the baseline model with status seeking model, two comparisons needs to be made. One at the aggregate level as displayed in Table 1 and the other involving the life cycle profiles. At the aggregate level there is not much difference between the models with and without status (comparison of baseline to Status1), when homothetic preferences are used. This result is not surprising, since the preferences are assumed to be homothetic. In the presence of such preferences, the only differences from the baseline model are (i) split between status and non-status goods consumption

and (ii) life cycle profiles. Figures 7-10 show the comparison. Note that the simulated asset profile reaches the peak at age 65 as compared to age 70 in the data. The simulated asset profiles have the familiar hump-shape as observed in the data. There are a couple of things to observe even before we start comparing the two models. First, since income is very low at the early stages of the life cycle, savings is zero (refer to Figure 9) at the early stages of work life. Second, consumption is steadily increasing over the life cycle, instead of remaining more or less constant as implied by life cycle hypothesis. This is because there is no borrowing in this model. Thus, we see that the agent making zero savings at the early stages, after that, positive savings till around age 50 and then starts dis-saving. Now, turning to the model comparisons, the first thing to note is that the key to different (simulated) profiles is the target status value ($\overline{X}$) across time periods (Figure 6). Had there been no $\overline{X}$ in the model, the split between status and non-status goods consumption would be equal and the profiles between baseline and Status1 would be identical. But, having no $\overline{X}$ in the model is of course not the objective, because that will not give us the answers that we seek in this paper. Since $\overline{X}$ follows a (dampened) hump-shaped profile, it means that agents have to consume higher levels of status goods (to be as close as possible to $\overline{X}$) around the middle of life cycle when $\overline{X}$ levels are very high. This implies that the agent will save and

acculumate assets before the high levels of $\overline{X}$ are reached. This is typically what is reflected in the asset profiles in Figure 7. Also, the dis-savings are much more (compared to the baseline) when higher levels of $\overline{X}$ are encountered. Around the end of the life cycle, $\overline{X}$ is much lower and also dis-savings have been much higher in periods before that and hence we see less capital accumulation compared to the baseline in the last 25 periods. Similar reasoning explains the total consumption profile, savings and the split between status and non-status goods consumption in Figures 8-10.

Table 1					
Economy	Wealth	K/Y	Savings	Wage Rate	Interest Rate
Baseline	9.01	4.08	12.25%	1.41	5.82%
Status1(Homothetic)	9.06	4.10	12.30%	1.42	5.78%
Status2(Non-homothetic)	8.40	3.90	11.71%	1.38	6.23%

In Status2 economy, we consider non-homothetic preferences and set $\gamma = 1.5$ and $\lambda = 2.0$. It can be shown that if $\gamma < \lambda$, then X is a luxury good in the sense that as expenditures goes to ∞, share of expenditure on X is 1 and share of expenditure on C is 0.[6] Also note that since $\lambda > \gamma$, the agents smooths consumption more over status goods than non-status goods. This can be seen

[6] Although the context in different, and no target status variable is present in their model, Ait-Sahalia, Parker and Yogo (2004) show these properties. This can readily be extended to the current context.

easily by looking at figures 10 and 15. It is important to note here that since the agent does not choose $\overline{X}$, agent chooses X, such that the ratio $X/\overline{X}$ is more or less the same every period, which means that when $\overline{X}$ is low, the agent will keep X low as well. Figure 12 compares the asset profiles between baseline and Status2 economy. Asset accumulation is less in Status 2 economy in all periods except for the first 20 periods. The lower asset accumlation can be explained by the need to maintain stable $X/\overline{X}$ or the need to keep up with the Joneses. In the last few periods, the target status value is relatively low and agents dissaves relatively less in the last few periods as compared to baseline (See Figures 13-14). This also explains the big divergence between the status and non-status goods in the last few periods in Figure 15. Overall, because of the above explained life cycle profiles of asset accumulation, the overall assets and savings rate in the economy is lower in the case of Status2 economy than the baseline (see Table 1).

To summarize, we compared the baseline model with a status seeking model, with homothetic preferences and non-homothetic preferences. We found that at the aggregate level, there is not much difference between the baseline model and the status seeking model (with homothetic preferences). However, when non-homothetic preferences are considered, we find that the aggregate wealth and savings rate of the economy with status seeking model is reduced by 6.8 per cent

and 4.4 per cent respectively (as compared to the baseline). Specifically, the life cycle profiles differ more when non-homothetic preferences are considered. The life cycle asset accumulation is lower for most of the periods in the status seeking model with non-homothetic preferences.

5. Conclusion

This paper is an attempt to study the life cycle profiles and examine its impact on aggregate savings and wealth by calibrating a baseline and status seeking model. The motivation for this study is primarily the concern that incorporating status seeking behavior might have negative impact on aggregate savings and wealth and hence is an area for policy makers to pay attention to (See Chaudhury and Santra (2015) for a detailed discussion on policy implications).

Our results indicate that status seeking behavior indeed leads to lower aggregate wealth in the economy, and also the life cycle profiles are different than the ones without incorporating status.

This paper can be extended in many ways. One is to include borrowing. Another is to include bequests. One of the key components of the model is the target level of status. In our model, it is exogenously given, it would be interesting to

see how this impacts the model when it is endogenously determined every period. That is, incorporating how consumption of status goods of agents determines target level of status.

In general, the status seeking behavior poses a challenge for most of the standard consumption theories. One of them is precautionary savings. Will agents save at the same rate (in the presence of uncertain income) with and without status seeking behavior? What about borrowing constraints? Will the borrowing constraint be binding every period (as far in time as possible), so that agents can purchase more of status goods? These are some interesting questions that we seek to answer in future work.

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6. Appendix - Computation of Equilibrium

There is no borrrowing in this model. We take an asset grid with values between 0 and $15 * maxincome$. There are 1000 points on the grid.

The decision rules across periods are found by solving the model backwards as is standard in an overlapping generations model. That is, we start with the terminal period value function where all assets are consumed. Then move to next period and choose optimal assets and split between status and non-status goods. This way the model is solved till the first period.

We search for an interest rate where the aggregate supply given by asset holdings is very close to the aggregate demand for capital by firms. We specify the

nominal interest rate range of 0 to 2. $r\_min = 0$ and $r\_max = 2$. We start with a value of $rtemp = (r\_min + r\_max)/2$. If for $rtemp$, $k\_s - k\_d > 0$ then $r\_max = r\_temp$,else $r\_min = r\_temp$ and the same procedure is repeated until $k\_s = k\_d$.

7. Figures

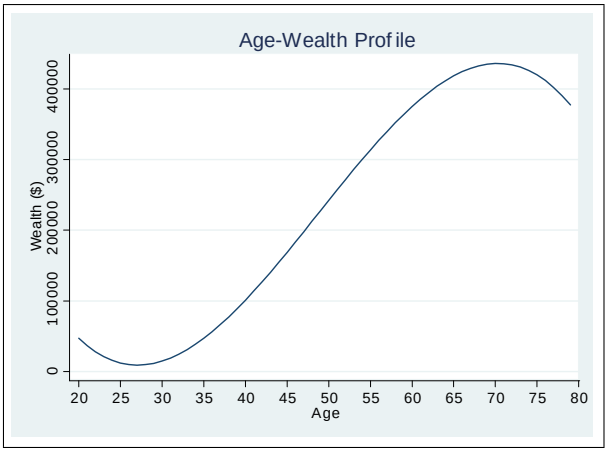

Figure 1

Figure 2

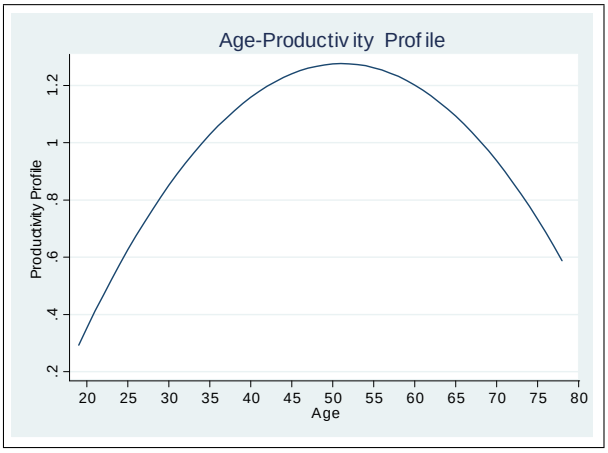

Figure 3

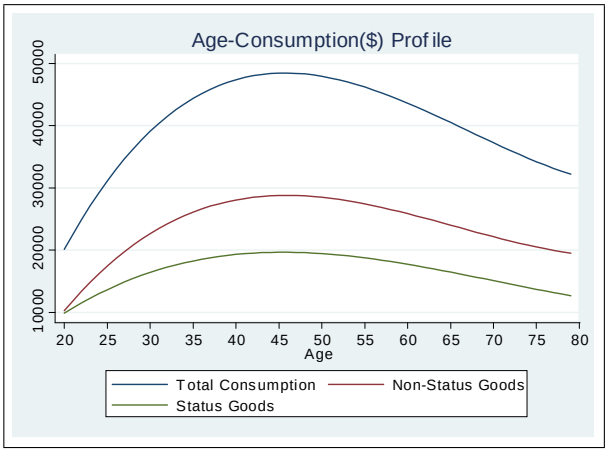

Figure 4

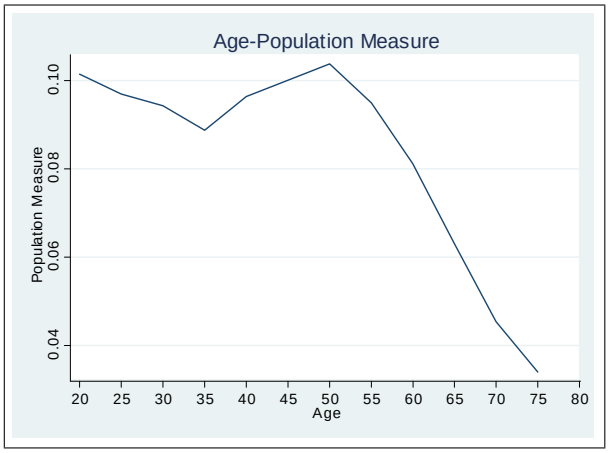

Figure 5

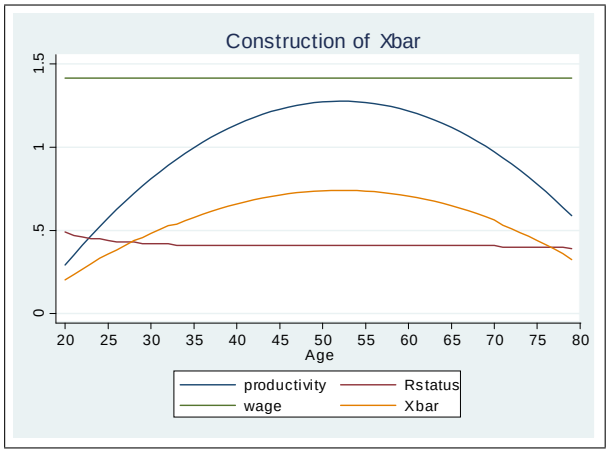

Figure 6

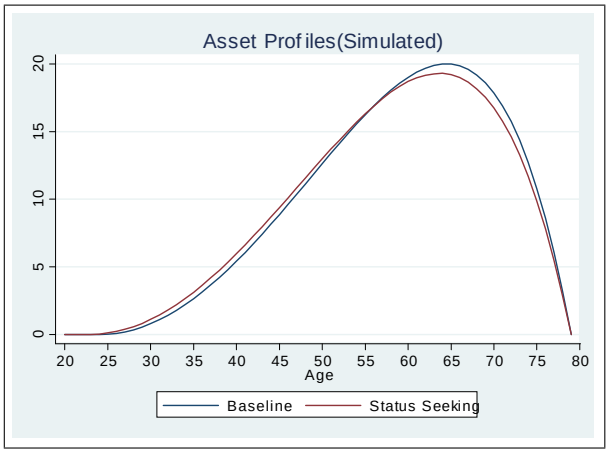

Figure 7

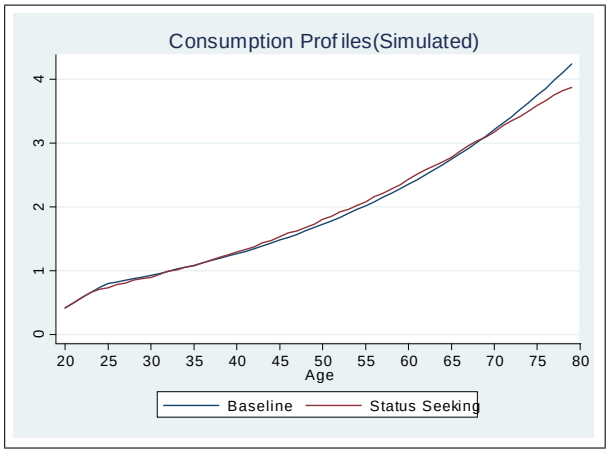

Figure 8

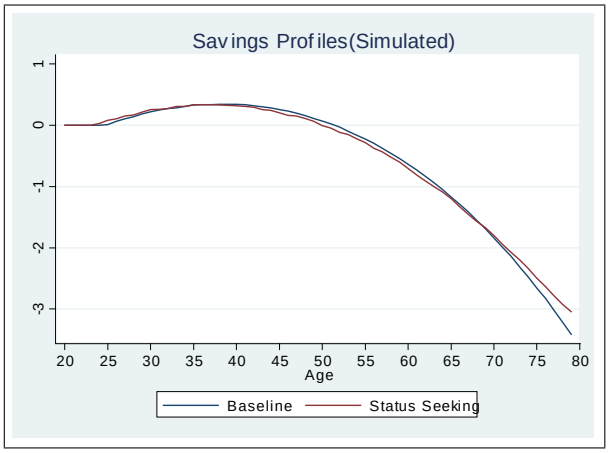

Figure 9

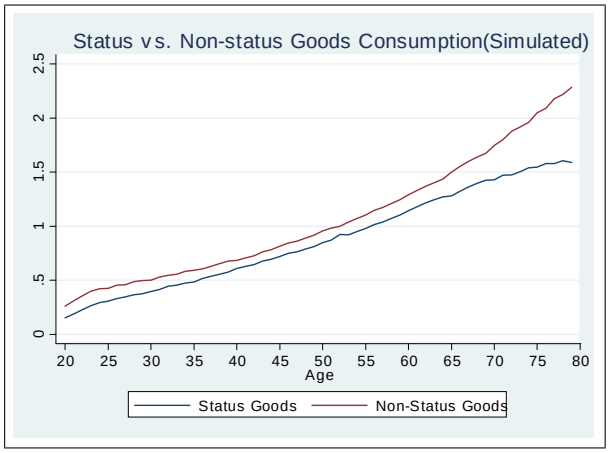

Figure 10

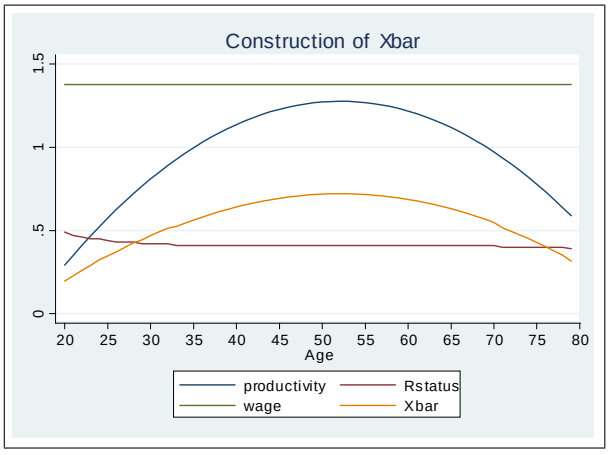

Figure 11

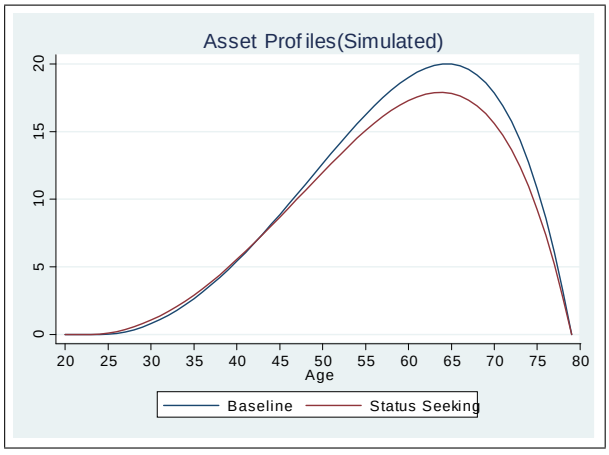

Figure 12

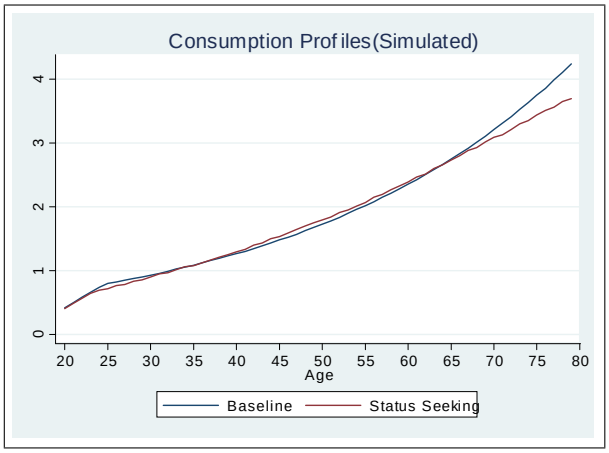

Figure 13

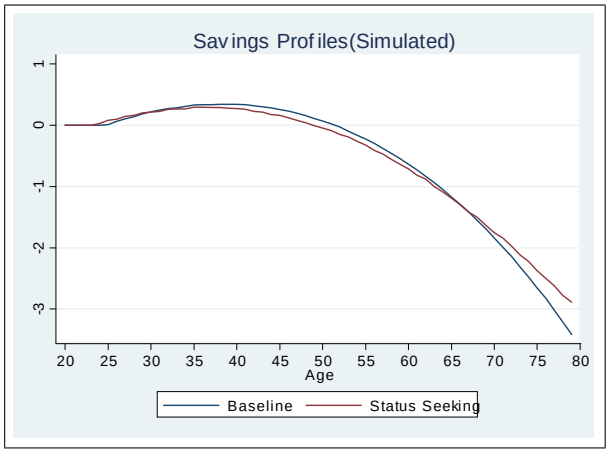

Figure 14

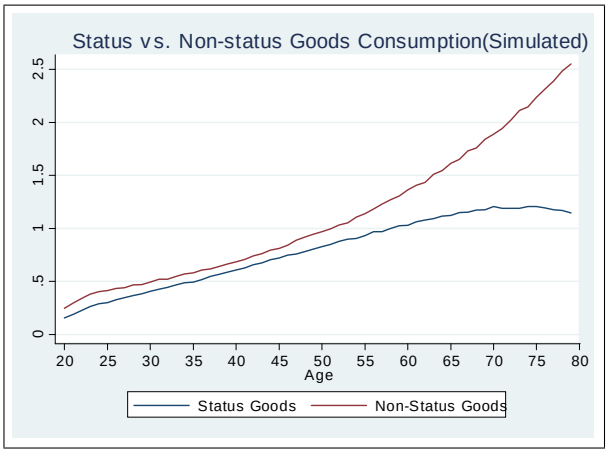

Figure 15