# Using a Life-Cycle Model to Predict Induced Entry Effects of a $1 for $2 Benefit Offset in the SSDI Program

Hugo Benitez-Silva, SUNY-Stony Brook
Moshe Buchinsky, UCLA
John Rust, University of Maryland

# Introduction

- There have been various policy changes that have been considered by the Social Security Administration (SSA).
- One proposal for a change in the Social Security Disability Insurance (SSDI) program is “$1 for $2 benefit offset”.

- Under the current law SSDI recipients who return to work during a 9 month ``trial work period'' (TWP)+ three-month grace period (TMGP), face no loss of benefits.
- Continued work that yield earnings higher than the *substantial gainful activity* (SGA) ceiling will result in termination from the roles.

- The $1 for $2 offset may increase labor supply of some SSDI recipients.
- Not clear whether or not it would result in significant cost savings from permanent *induced exit* from SSDI.
- It might even generate an increase in costs.
- It might even decrease the number of beneficiaries who exit SSDI after the TWP.

- The biggest concern to policy makers is the possibility that the $1 for $2 offset would result in significant *induced entry.*

- Studies by the SSA and the Congressional Budget Office (CBO) provide very different forecasts of the magnitude of the induced entry effect.
- The CBO: The $1 for $2 offset would result in an increase of 75,000 SSDI beneficiaries over a ten-year period.
- The SSA: it would increase SSDI roles by 400,000 over the same time period.
- There are correspondingly large differences in the estimated costs:
- The CBO predicts net costs  increase of $410 million over five years.
- The SSA predicts costs increase of $5.1 billion.

# Our method

- We use a prototype of an empirical life-cycle model that is quite rich and can be used to provide detailed predictions of the behavioral responses to a wide range of hypothetical changes in Social Security policies.
- Here we use a calibrated version of the life cycle model to examine the behavioral responses to the proposed $1 for $2 benefit offset plan.

- The idea of $1 for $2 offset is extremely popular with disability advocates. They claim that the threat of loss of benefits due to earnings in excess of the SGA after the TWP is the primary reason that SSDI beneficiaries do not return to work.
- In 1999 President Clinton signed a Federal law mandating that the SSA undertake a *demonstration project* to estimate the magnitude of labor supply responses and the level of induced entry under the $1 for $2 offset.

- It turns out that it is difficult to measure induced entry via controlled experiments.
- A panel of consultants chosen by SSA that:
- “The classical experimental designs considered have very serious defects and should not be used to study induced entry”.
- “Valuable information on the impact of induced entry may be acquired at relatively modest cost through the use of dynamic modeling of individual behavior and through responses to a hypothetical survey, such as the NSHA survey currently planned”.

- We employ here a DP version of the classical life-cycle model that incorporates a realistic treatment of the Social Security rules, particularly with regard to the SSDI program.
- We have calibrated the model so that the simulated behavior resembles the behaviors observed in the HRS and other aggregate data sets.

# Main Results

- Under the *status quo* approximately 9.5% of the SSDI recipients eventually return to work (via the TWP).
- Under the $1 for $2 offset 48.9% of the SSDI recipients eventually return to work.
- Nearly all of the DI beneficiaries who return to work do so only on a part-time basis and for a relatively short duration.
- The average number of years worked while receiving SSDI benefits is about 2.9 years. The mean earnings of those who return to work is $9,096, whereas the SGA for this cohort is $6,000 annually.

# Main Results-2

- 75% of those on DI roles will eventually experience some partial recovery. 50% will fully recover.
- Under the $1 for $2 offset, nearly all of the fully recovered beneficiaries have incentive to return to work, whereas only 18% of them have sufficient incentive to do so under the status quo.

# Main Results-3

- we assume that SSA can make a credible commitment not to increase the audit rates (CDR's).
- If individuals continue to have the same beliefs as under the current system: The fraction of DI recipients who return to work falls from 48.9% to 36.8%.

- Independent evidence that the $1 for $2 benefit offset provides a strong work incentive is provided in Muller (1992).
- Followed 59,000 SSDI beneficiaries who were first entitled to benefits between age 55 and 64.
- 11% of them returned to work at some point after their initial entitlement.
- Of these, 71% returned to work after age 62 and 47% returned to work after age 65.
- This is of significant importance, because SSDI beneficiaries can convert from DI to OA benefits at age 62, which has a substantially higher disregard level.

- The life-cycle model's predictions are similar.
- Under the status quo 9.5% of DI beneficiaries return to work, all of whom first return to work after age 62.
- 44% do some work even after age 65.
- The response is much larger and at earlier ages under the $1 for $2 offset rule, because individuals can take advantage of the tax incentives as soon as they are able to work.

- The life-cycle model predicts that the $1 for $2 offset will have small induced entry effect.
- The number of SSDI applications increases by only 2.2%, while SSDI roles increase by 3.2%.
- 5.9% increase in the total number of person-years spent on SSDI.

- The $1 for $2 offset will increase the net cost of the SSDI program.
- But, it also provides a clear benefit to a subset of SSDI recipients: annual consumption increases by an average of 2.2% over their full life times, and by 6.9% between the ages of 45 and 65.
- Nevertheless, due to the relatively high marginal tax rate of 50% and the increasing disutility of effort at older ages, the *ex ante* increase in welfare for a younger person is small.
- The main welfare gains occur *ex post,* for people who have already entered SSDI and who have experienced a full or partial recovery.

# Evaluating the Effects of the $1 for $2 Offset

- Under the current policy, a SSDI beneficiary who desires to return to work can take advantage of a 9 month *trial work period* in which there is no offsetting reduction in benefits.
- Beyond the TWP SSDI benefits are completely terminated if they earn more than the SGA threshold ($800 per month in 2003).
- The $1 for $2 offset proposal would allow any SSDI beneficiary who returns to work to remain on the roles.
- Their DI benefits would be reduced by $1 for every $2 earned in excess of the SGA threshold.
- The intention of the new proposal was to provide a tax incentive that would encourage SSDI beneficiaries to leave the roles and return to work.

- There is a concern that the $1 for $2 offset would lead to net increase in the cost of the DI program as a result of *induced entry*.
- The U.S. Congress mandated that the SSA undertake studies to predict the net effect of the $1 for $2 offset proposal.
- The 1999 *Ticket to Work Act and Work Incentives Improvement Act* authorized the SSA to carry out *demonstration projects*, that is, a large scale controlled experiments with human subjects, in order to evaluate the impact of the $1 for $2 offset.

- Demonstration projects suffer from a number of disadvantages.
- They are extremely costly and time-consuming.
- Since the induced entry effect can be small, analyses by the Office of Research, Evaluation, and Statistics (ORES) at the SSA suggest that a huge demonstration project would be necessary to obtain reliable estimates.
- Even a large scale experiment may not accurately estimate the ultimate impacts because of *informational* and *social interaction effects,* which are hard to control for in an experimental setting.

- To control for these effects a panel of advisors to the SSA have considered a *county design*. All individuals in entire counties are assigned to either the treatment or the control groups.
- However, there are likely to be unobserved state and county level factors that also affect application decisions and that will not be controlled.
- A recent report by Tuma (2001): “There is no disagreement, however, that the sampled numbers of counties would need to be large, that their populations would be very large, and that the cost of a demonstration study of induced entry could be huge”.
- Also, in general, it would also be of interest to study the incentive effects of other effective tax rates on benefits.

- Moffitt (2003) states: “While randomized field trials in the area of welfare reform have been professionally conducted and well-run, and have yielded much valuable and credible information, their usefulness has been limited by a number of weaknesses, some of which are inherent in the method and some of which result from constraints imposed by the political process. The conclusion is that randomized field trials have an important but limited role to play in future welfare reform evaluations, and that it is essential that they be supplemented by non-experimental research”.
- He also concludes that experiments: “should be supplemented by non-experimental analyses of entry effects where it appears possible that those effects are significant”.

# The Life-cycle Model

- There is no single life-cycle model, but rather a class of models that differ in the details about labor supply, consumption, savings, uncertainty, social insurance institutions, etc.
- Some economists (e.g. Bernheim, Skinner and Weinberg (2001)) argued that the life-cycle model cannot account for observed levels of *under-saving*, and consequently low wealth accumulation by a significant fraction of Americans.
- We argue that this conclusion is erroneous because it is based on an oversimplified formulation of the life-cycle model.

- Current versions of life-cycle model a lot more realistic and account for many more aspects of the individual’s decision process (e.g. Rust and Phelan (1997)).
- The advent of fast computers and improved algorithms now allows us to solve increasingly realistic versions of the life-cycle model numerically.
- Computer simulations of these models show that the life-cycle model is sufficiently rich to be able to provide insightful explanations for a wide variety of previously puzzling aspects of savings, labor supply, pension, and SSA application.

- A prime example is the *age 65 retirement puzzle*. Previous oversimplified life-cycle models were unable to explain the peaks in retirements at ages 62 and 65, because they failed to accurately model the Social Security rules.
- The peak at age 62 is largely due to a significant number of low income, liquidity constrained, individuals who would have liked to retire earlier than 62 but are unable to borrow against their future Social Security benefits.
- The peak at age 65 is largely due to health insurance constraints, that is, individuals who have health insurance policies through their employer but who would be unable to purchase fairly priced retiree health insurance if they were to quit working before 65.

- We generally follow Rust and Phelan (1997) with several substantial improvements.
- The parameters of the life-cycle model include parameters that determine individuals' preferences for consumption and leisure, and parameters that characterize their beliefs about their uncertain future health, mortality, and earnings.
- Other parameters are imposed from the outside, under rationality assumption:
- ages of early and normal retirement;
- bend points in the function relating AIME to the PIA;
- actuarial reduction factors for payment of Social Security benefits at the early retirement age, and so forth.

- Rust and Phelan ignored the SSDI program, and assume that income equals consumption.
- Our model includes consumption/savings decision in addition to the labor/leisure decision.
- The model includes an integrated treatment of the SSDI and the Old Age and Survivor's Insurance programs of Social Security (OASDI).
- In the future we will include Medicare/Medicaid, private health insurance, and Unemployment Insurance components of the SSA.
- We will also have more realistic treatment of the family that includes: income from spouses, asset/business income, and other sources of unearned income.

- The unknown parameters of this successor model will be estimated using the most recent available panel data from the six waves of the Health and Retirement Survey (HRS) over the period 1992 to present.
- We illustrate some comparisons of the behavior predicted by a calibrated version of the model with actual behavior observed in the HRS, other micro data, and aggregate program statistics from the SSA and other agencies.

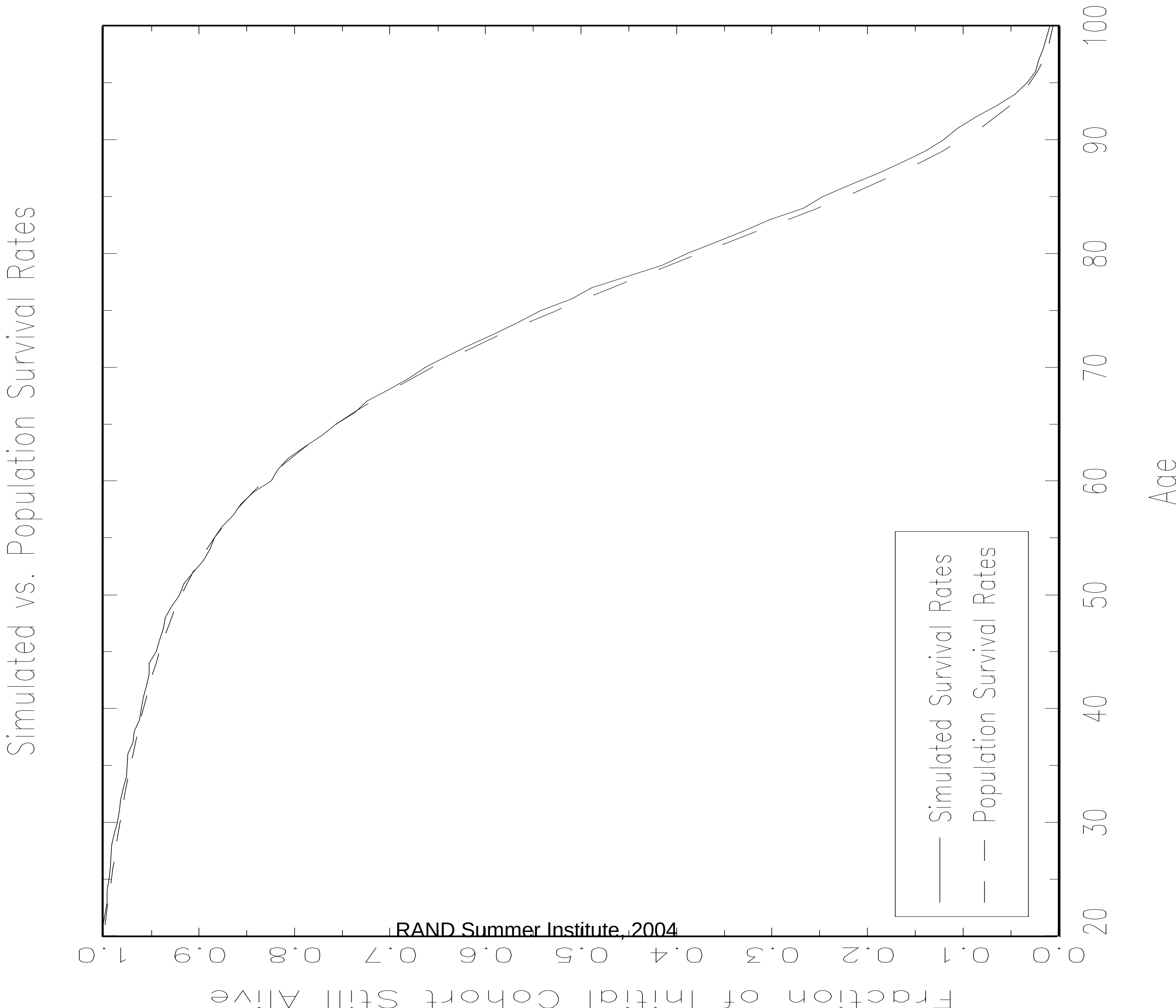
# The Model

- Time horizon: 20 to death.
- In each period the individual makes decisions about consumption, saving, whether or not to work, and if so, whether to work full- or part-time, and whether or not to file an application for disability benefits.
- If the person is over age 62, whether to apply for Old Age benefits.
- An individual conditions his/her decisions on current information, which includes age, wealth, and health status.
- The individual faces uncertainty about future health status, mortality, and earnings.

- The model has three health states:
- (1) excellent/good health;
- (2) fair/poor health; and
- (3) ``disabled''.
- States (1) and (3) are persistent, while the poor health state represents a *transitional state.*

- Initially we assume that the transition probabilities do not depend on age.
- The probability of dying does depend on age, as well as on the person's health status.
- Using the HRS/AHEAD we estimated age and health-dependent survival probabilities (Figure 1).

# Figure 1


Simulated vs. Population Survival Rates
Simulated Survival Rates
Population Survival Rates
Age
20
30
40
50
60
70
80
90
100
Fraction of Initial Cohort Still Alive
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0

- Individuals maximize the expected discounted stream of future utility.
- Per period utility function

$$u\left(c,l,h,t\right)$$

where $c$ is consumption, $l$ is leisure, $h$ is health, and $t$ is age.

- The utility of leisure (disutility of work) is an increasing function of age and is higher for individuals who are in worse health.
- The worse a person's health is, the lower their overall level of utility.
- We also allow for a bequest motive.

# Application for SSDI

- Any person is eligible to apply for SSDI benefits provided they are younger than the *normal retirement age.*
- If they are over the normal retirement age, the only option is Old Age benefits.
- Prior to the normal retirement age any person has the option of applying for either SSDI or Old Age benefits, if he/she is over the *early retirement age*

# Application for SSDI

- We do not model any appeal if application for SSDI is denied.
- We simply assume that a denied applicant can reapply an unlimited number of times.

# Getting of the DI Roles

- When a person reaches the NRA he/she is automatically transferred to the OA program.
- Individuals can return to work on a full- or part-time basis, and consequently will be terminated from the SSDI roles after the 9 month TWP.
- Small probability that an individual will be involuntarily terminated as a result from random audits (CDR’s).
- We allow this probability of termination to depend on health status.
- When calibrated the probability of termination due to a CDR is 3 times higher after engaging in a TWP
- In practice only about 10% of DI recipients take advantage of the TWP.

# Agent's Decisions

- Agents make three decisions at the start of each period

$$\left( l_t, c_t, ssd_t \right)$$

$$l_t = 1, \text{ Not working at all}$$

$$l_t = .543, \text{ Working full-time}$$

$$l_t = .817, \text{ Working pat-time}$$

# Agent's Decisions

- For *Social Security Decision*:

$$ssd_t = 1, \text{ Apply for OA benefits.}$$
$$ssd_t = 2, \text{ Apply for DI benefits.}$$
$$ssd_t = 0, \text{ Not apply for benefits.}$$

# State Vector

- The state vector is:

$$\left(t, w_t, ss_t, aw_t\right)$$

$w_t = \text{ Net wealth}$

# Social Security State

- Takes on ten values:

$$ss_t = 0, \text{ Not entitled to benefits}$$

$$ss_t = 62,\ldots,70, \text{ Entitled to benefits}$$

$$\text{at ages } 62,\ldots,70, \text{ respectively}$$

# Average Index Earnings (AIE)

- In order to carry the entire history of earnings we approximate the AIE in a Markovian fashion.
- Log annual earnings (for full-time worker):

$$\log\left(y_t\right) = \alpha_1 + \alpha_2 \log\left(aw_t\right) + \alpha_3 t + \alpha_4 t^2 + \eta_t$$

- Then

$$aw_{t+1} = \frac{t}{t+1} aw_t + \frac{1}{t} y_t .$$

# Other features Accounted for

- Actuarial reductions in old age benefits claimed prior to the NRA, and for the *delayed retirement credit* for benefits claimed after the NRA.
- Taxation of benefits. Individuals whose combined income exceeds a given threshold pay Federal income taxes on a portion of their Social Security benefits, as well as the 15.75% Social Security payroll tax.

# The individual's utility

If $ssd = 2$:

$$u_t\left(c, l, ssd, h, age\right) = \frac{c^\gamma - 1}{\gamma} + \phi\left(age, h, aw\right)\log\left(l\right) - 2h - K.$$

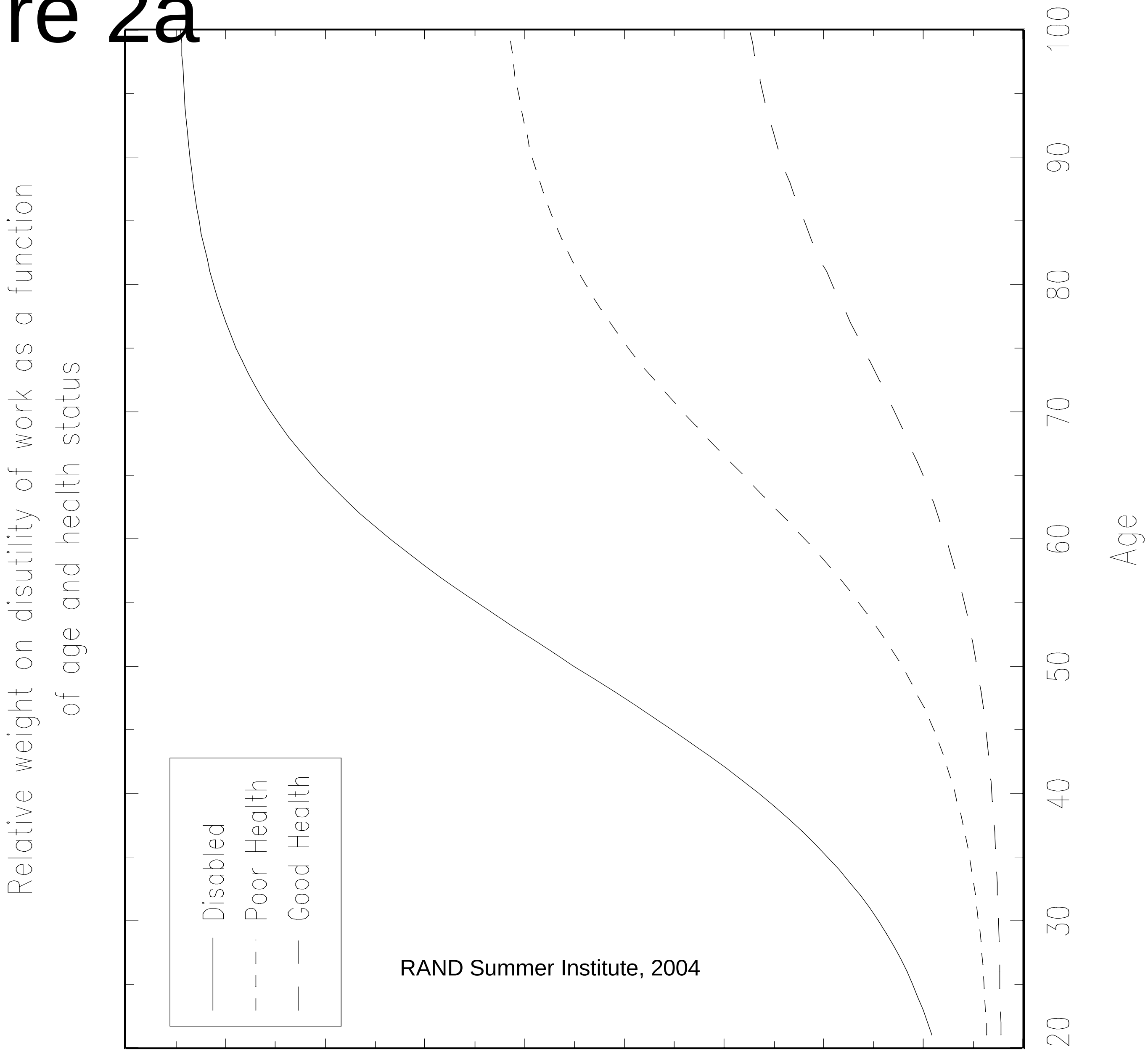
Otherwise:

$$u_t\left(c, l, ssd, h, age\right) = \frac{c^\gamma - 1}{\gamma} + \phi\left(age, h, aw\right)\log\left(l\right) - 2h.$$

$\phi\left(age, h, aw\right)$ is the relative disutility of work.

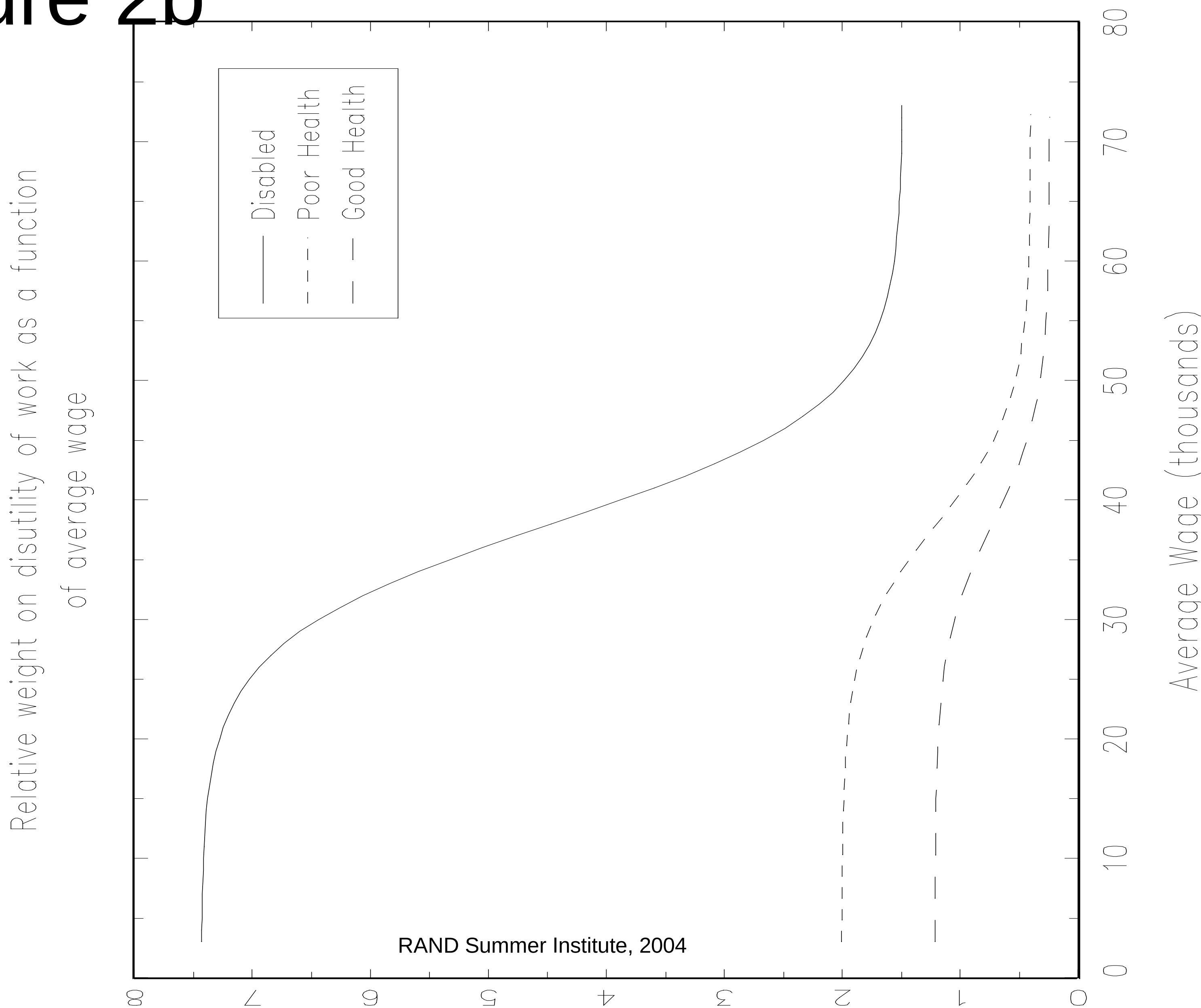
- The parameter $K$ represents the *stigma,* or *hassle,* costs of applying for DI.
- While $K$ can be a function of observed and unobserved heterogeneity, here we just set $K = .001$.
- Figure 2 shows the $\phi$ function use in our solution.

# Figure 2a



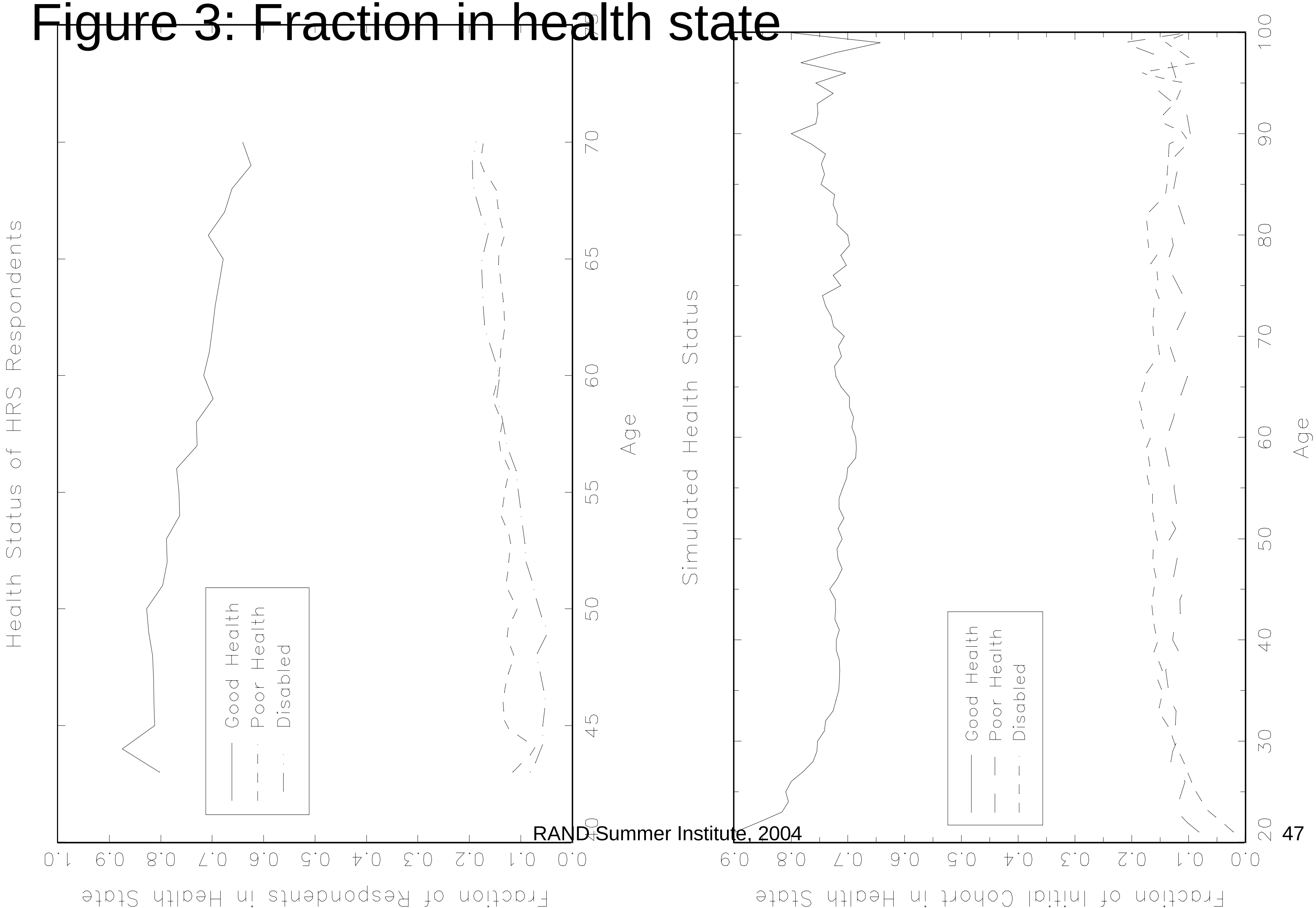
Relative weight on disutility of work as a function
of age and health status
Age
20
30
40
50
60
70
80
90
100
Disabled
Poor Health
Good Health

# Figure 2b


Disabled
Poor Health
Good Health
Relative weight on disutility of work as a function
of average wage
Average Wage (thousands)
0
10
20
30
40
50
60
70
80
0
1
2
3
4
5
6
7
8

# Simulations-Health status

## Figure 3: Fraction in health state

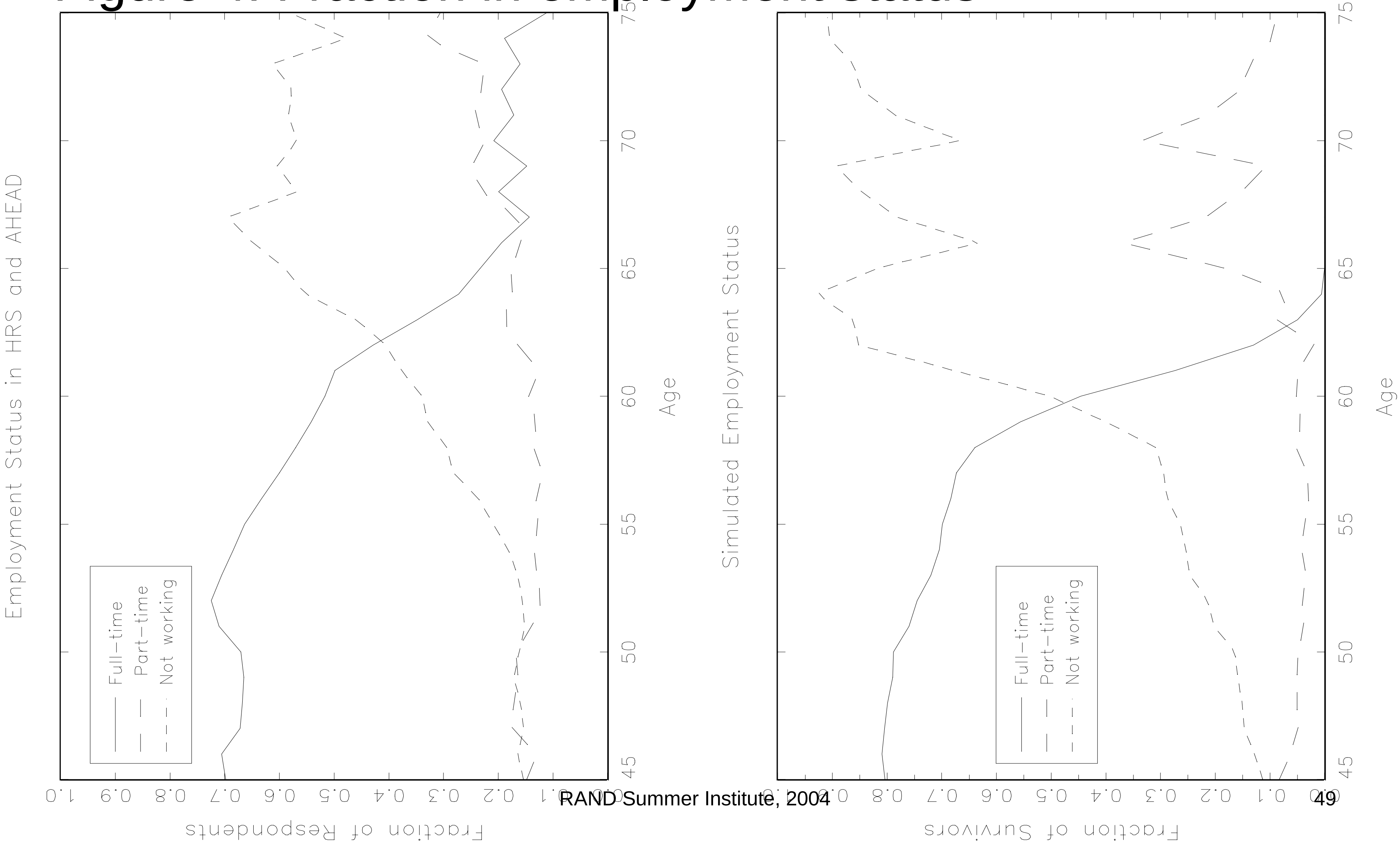


# Figure 3

- The fraction of people with good health decline a little more rapidly in the HRS.
- The fraction in poor health and disabled increase more rapidly with age in the HRS.
- This suggests that the assumption of age-invariant health transition probabilities should be relaxed.

# Simulations-Health status

## Figure 4: Fraction in employment status

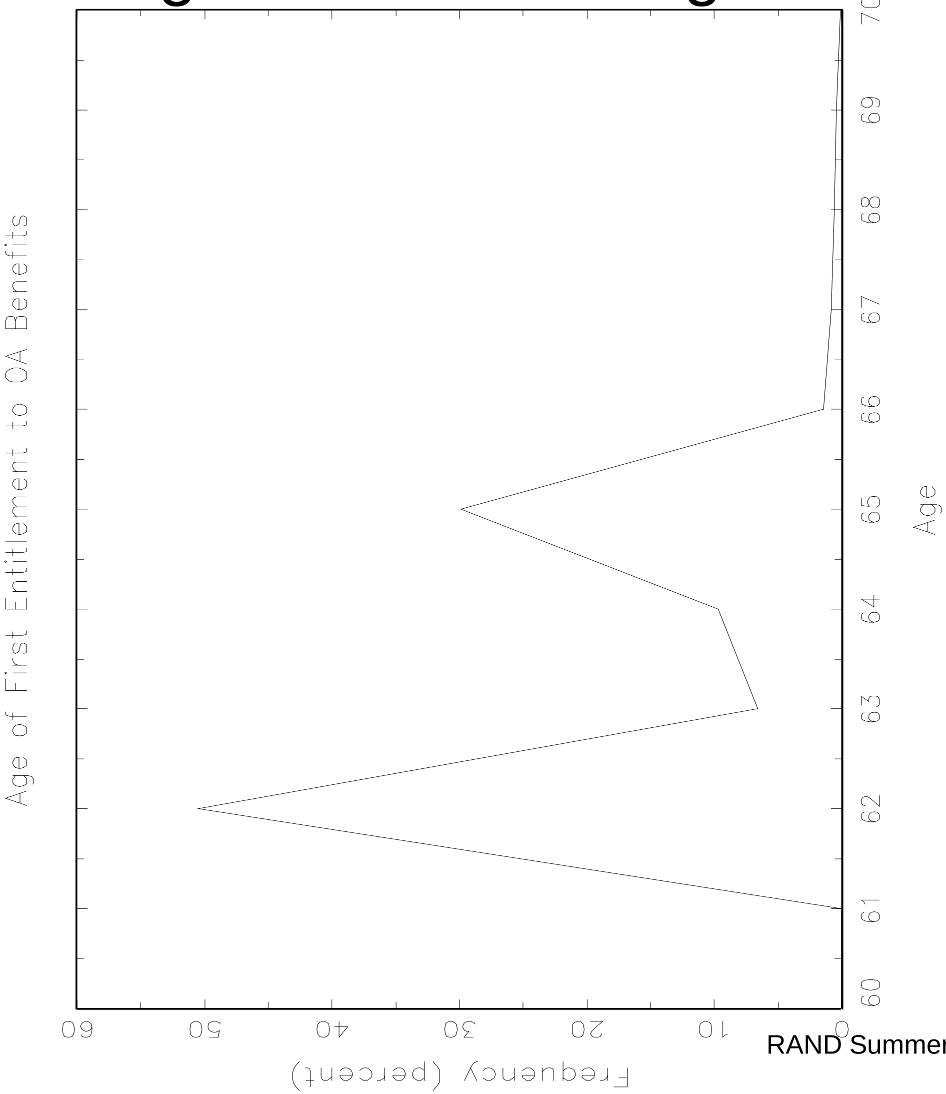


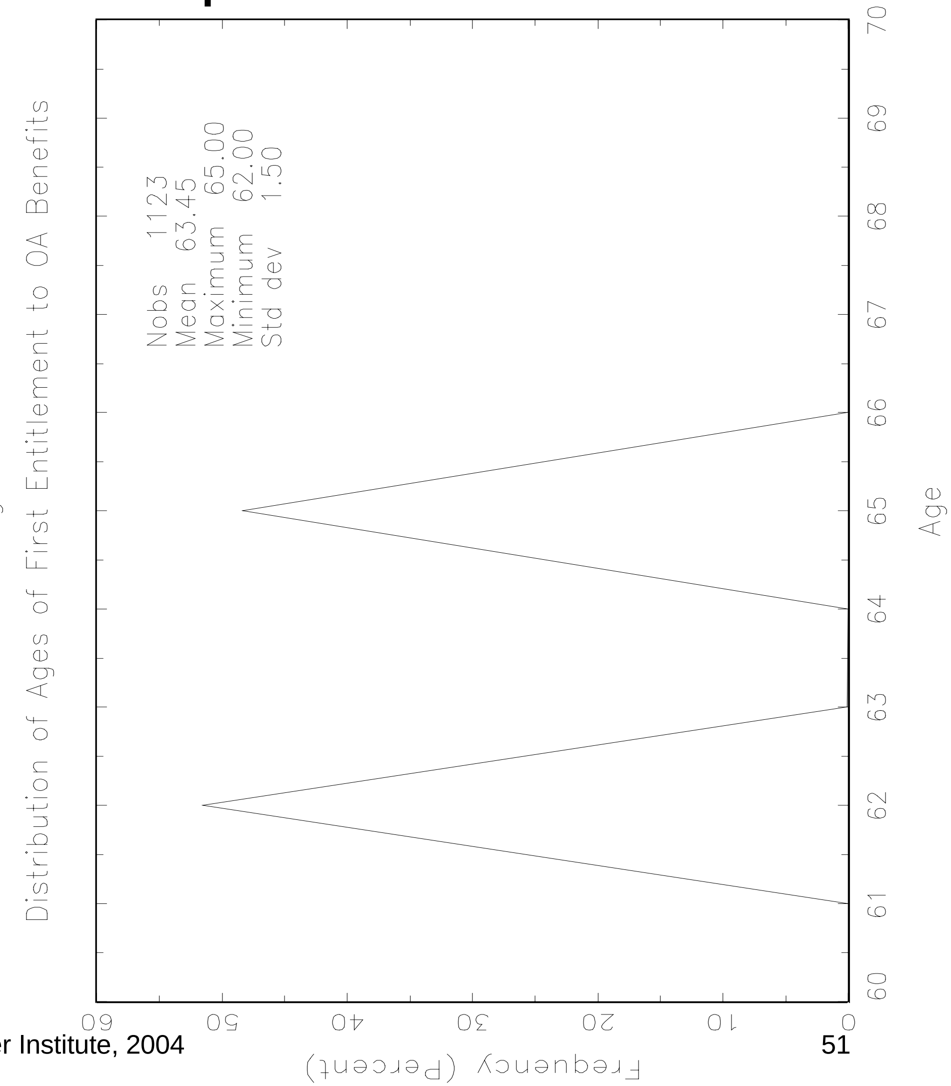
# Figure 4

- Clear decline in labor force participation starting at about age 54.
- Significant increase in part-time work after the age 60.
- The DP model exhibits similar, but more exaggerated pattern. The pronounced peaks in part-time work at ages 65 and 70 (when the earnings test tax falls from 50% to 33% and 0%) are absent in the HRS data.
- Another discrepancy: The life-cycle model over-predicts the fraction of full-time workers between 45 and 60, and under-predicts this fraction at later ages.
- Many of these discrepancies can be reconciled in future versions of the life-cycle model by adding more heterogeneity with respect to how rapidly the disutility of work increases with age.

# Simulations-OA Benefits

## Figure 5: Dist. Of age at first receipt



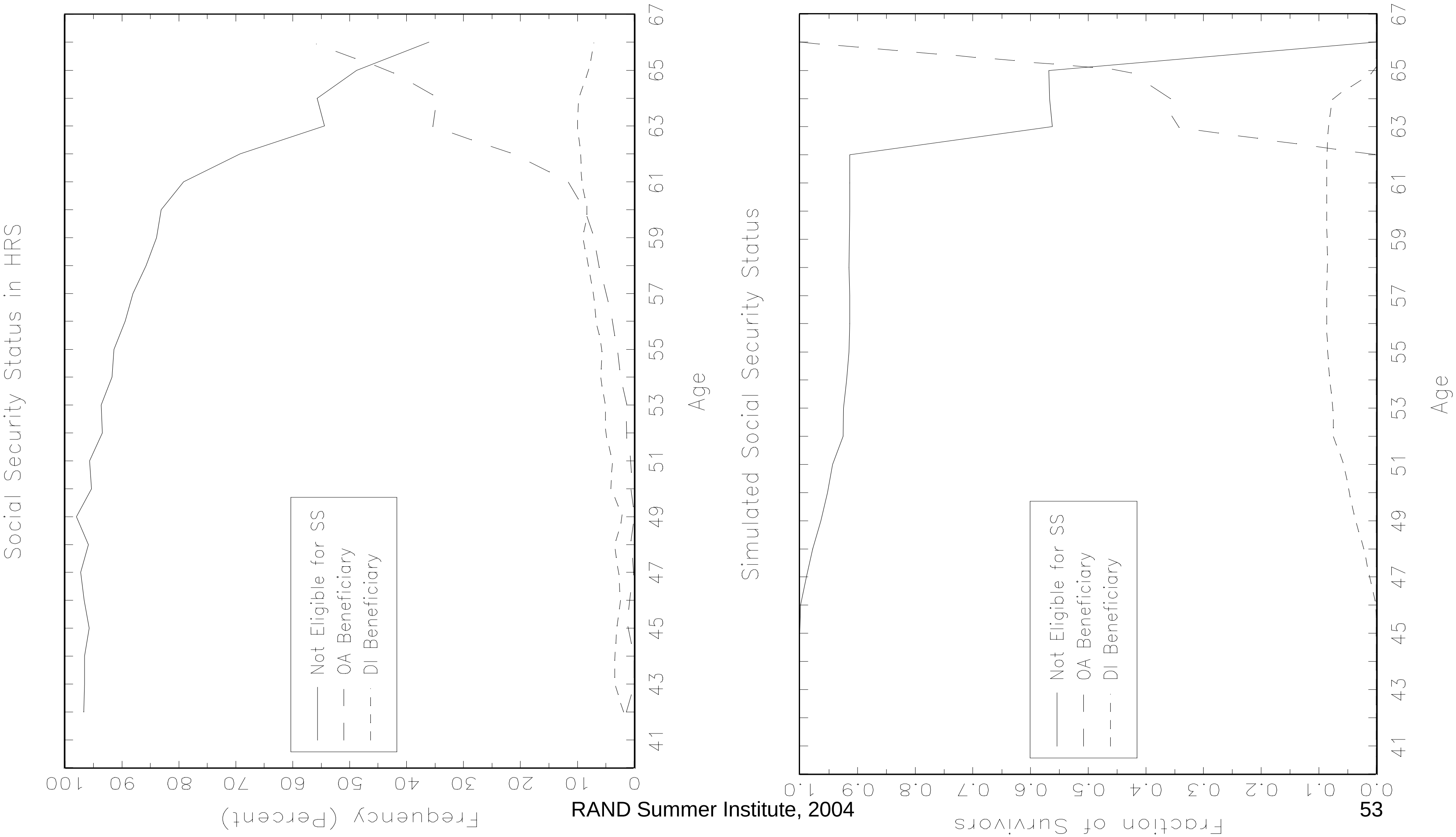



# Figure 5

- Left panel: 1999 Annual Statistical Supplement to the *Social Security Bulletin.*
- *The model captures the main features of the data.*
- *The model does not capture the small fraction of individuals who claim benefits at ages 63 and 64.*
- *Reason: Need more heterogeneity.*

# Simulations-SSA Status

## Figure 6

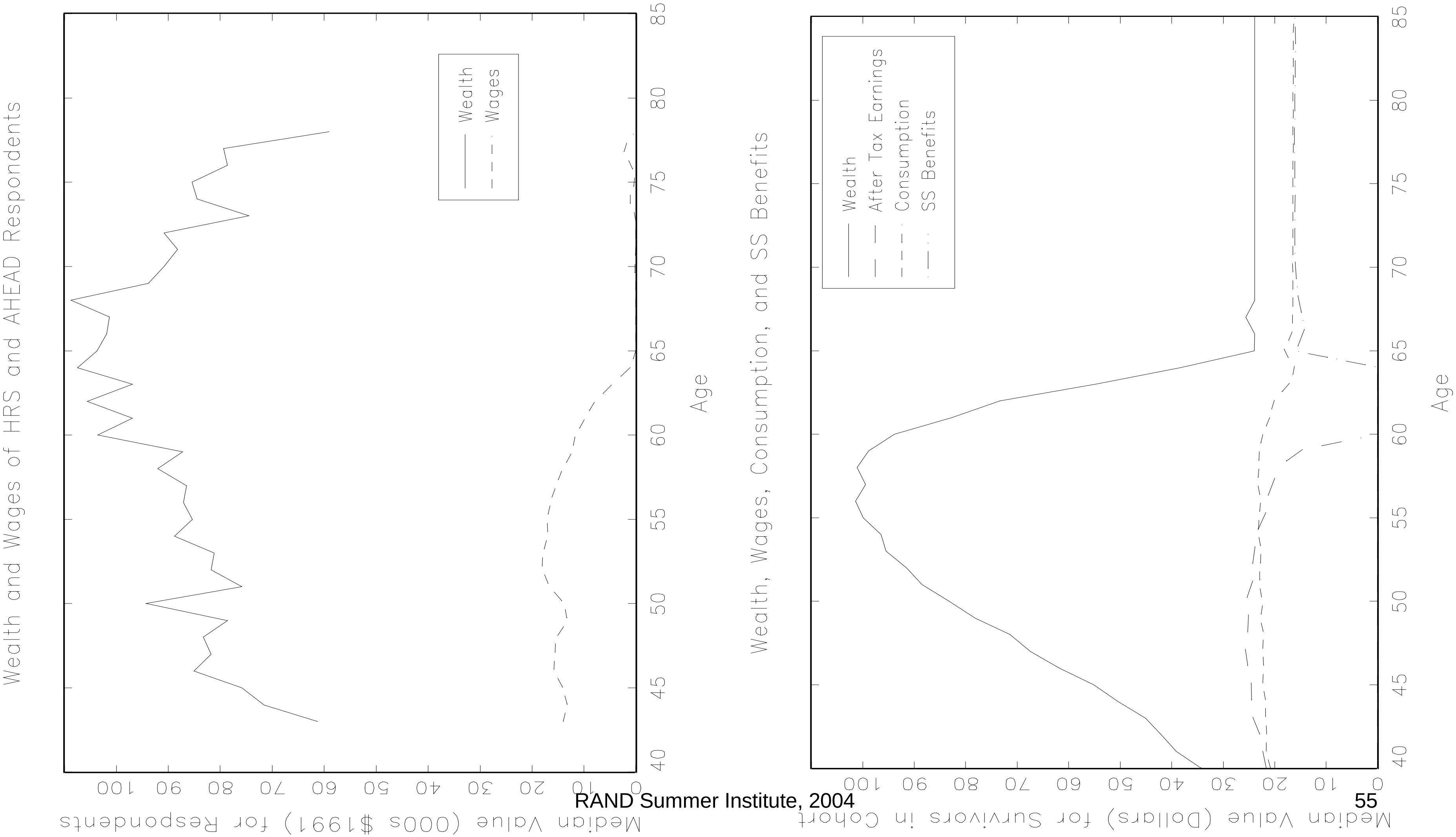


# Figure 6

- Categories: Not receiving, Receiving SSDI, Receiving OA.
- Model does a good job, except for entry into SSDI.

# Simulations-Wealth and Wage

## Figure 7: Median value of wealth and wage



# Figure 7

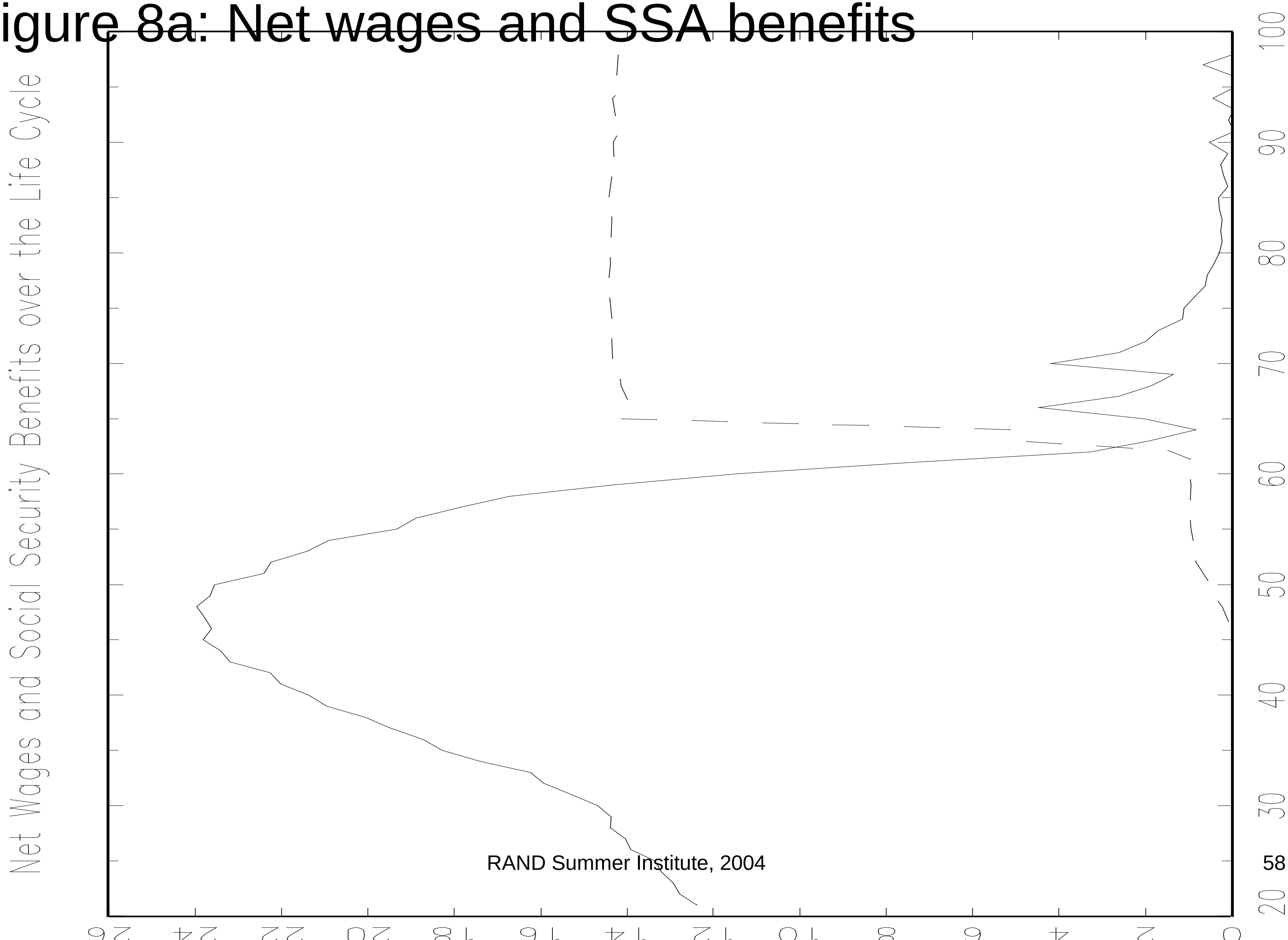
- Similar picture from both panels.
- The maximum level of wealth accumulation is about the same in the data and the simulations
- But, the life-cycle model predicts a more peaked trajectory for wealth.
- The actual distribution of wealth is more skewed in the HRS.
- We need to incorporate other sources of income: spousal income, inheritances, etc.
- Also, need to account for other risks, e.g. involuntary unemployment and uninsured medical costs.

# Summary

- Overall, the simulation results provide a reasonable approximation to the data. Contrary to the claims by Bernheim and others, the individuals followed by the HRS adequately prepared for retirement.
- If anything, they have a higher level of wealth accumulation after retirement age than is predicted to be optimal by the life-cycle model.
- Our conclusions are similar to Engen, Gale and Uccello (1999).

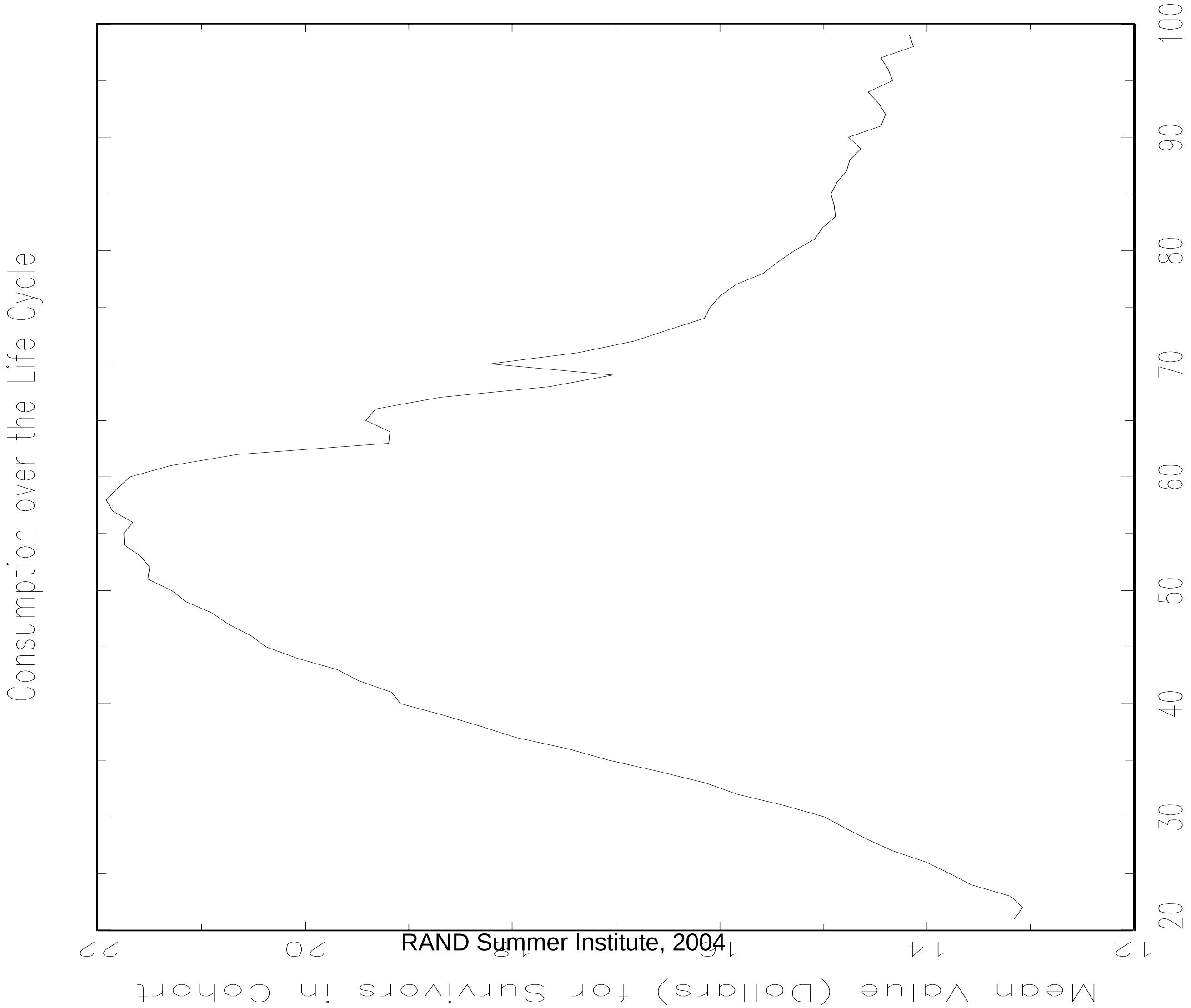
# Simulations

## Figure 8a: Net wages and SSA benefits



# Simulations

## Figure 8: Consumption

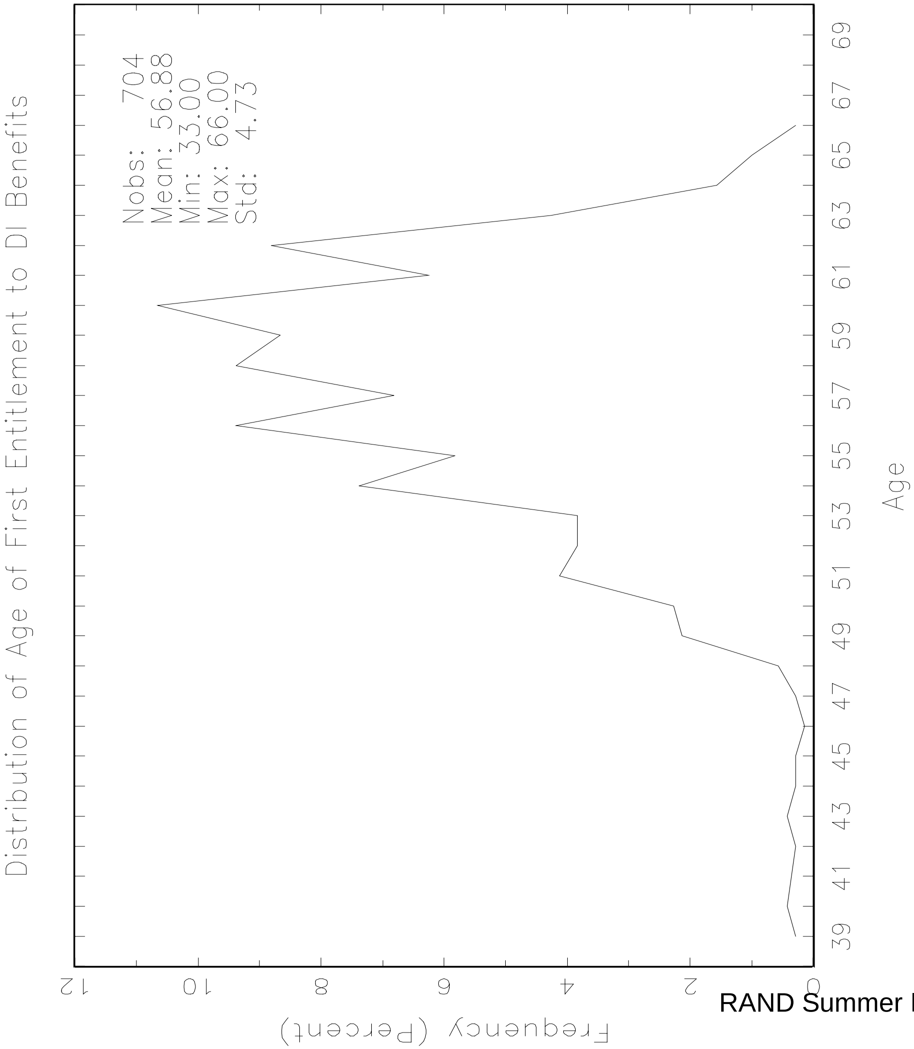


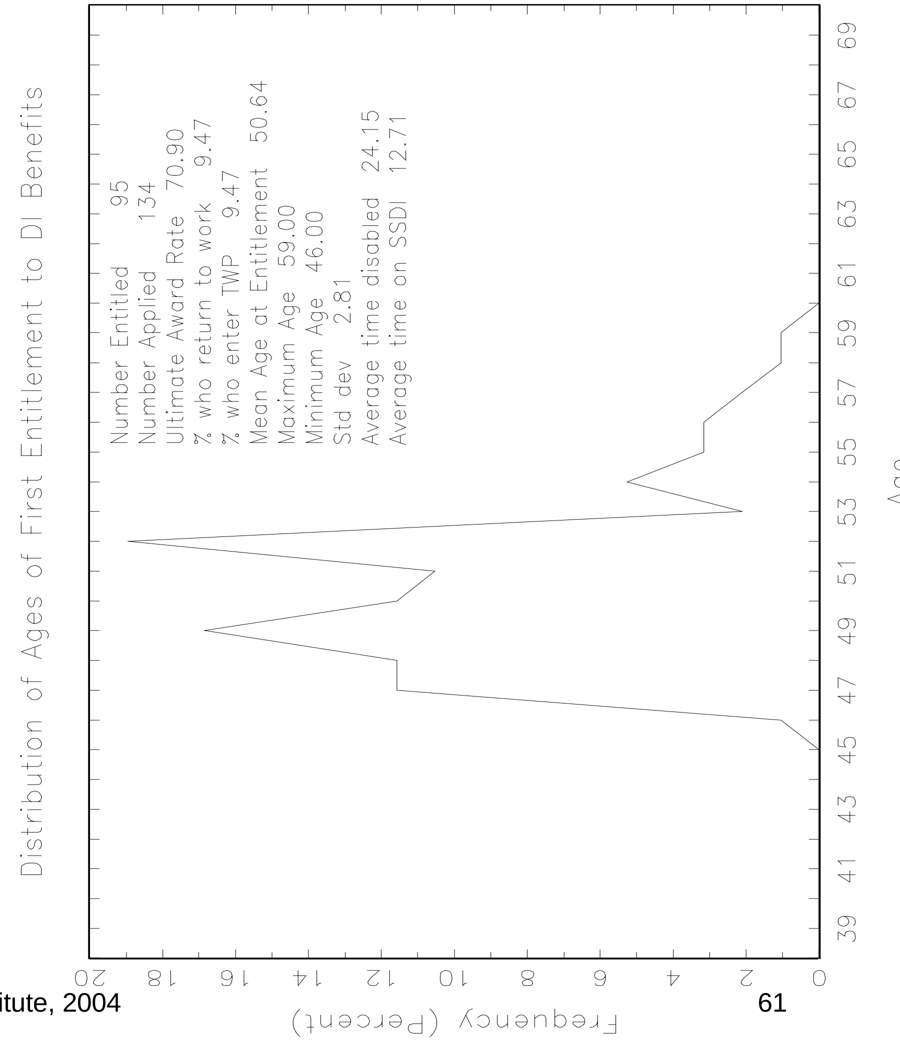
# Figure 8

- The life-cycle model predicts that as individuals enter retirement, they make significant reductions in their consumption spending.
- Mean consumption spending declines from a peak of $22,000 per year at age 60 to about $19,000 per year at age 65.
- Also, individuals start to retire in their 50s, but SSA benefits don't begin until ages 62 and 65.
- Figure 8 show the life-cycle model predicts what Bernheim claims it cannot predict.

# Simulations

## Figure 9: Age of first DI receipts



# Figure 9

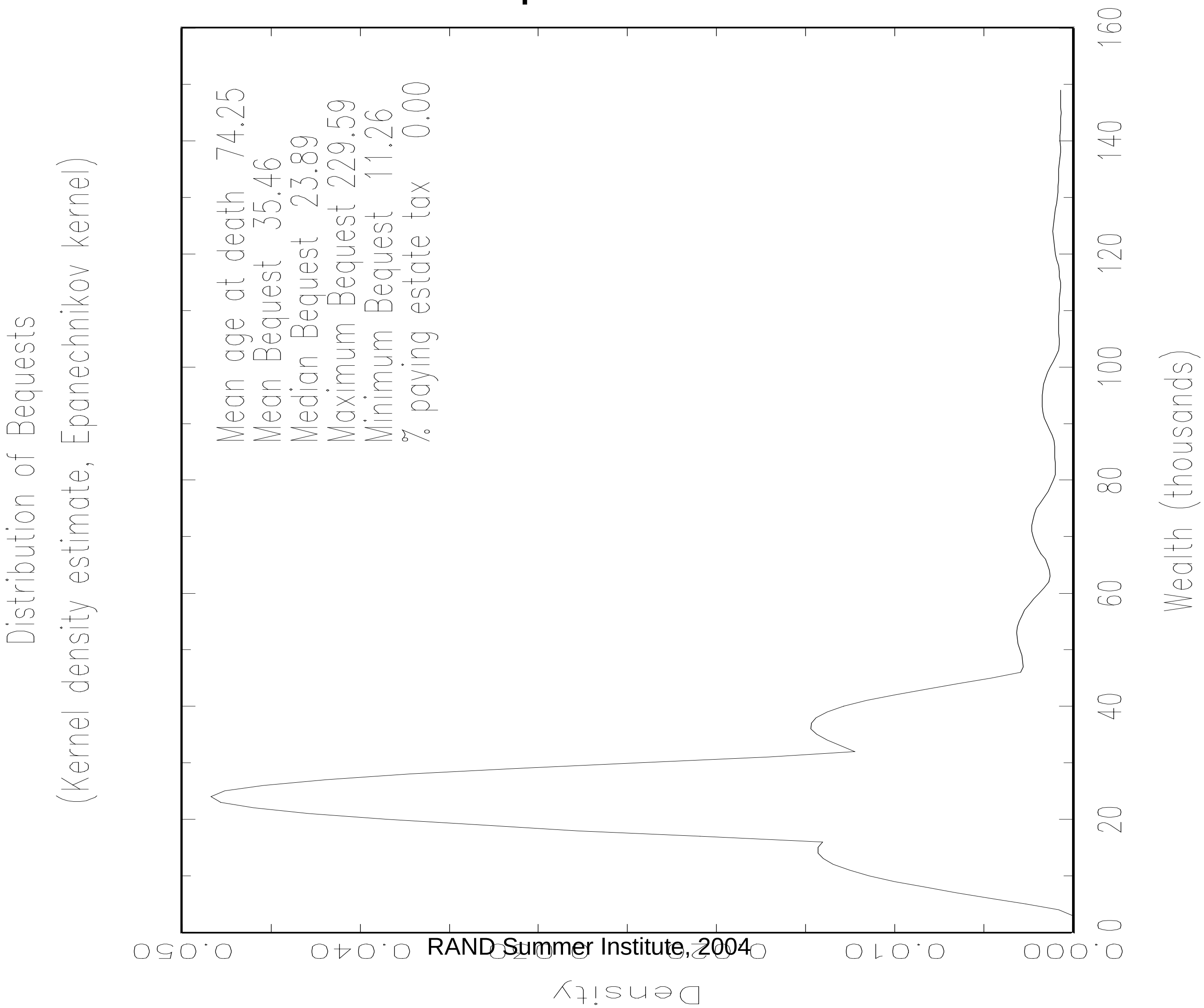
- The simulations are qualitatively similar to the actual distribution, except that the life-cycle model under-predicts the mean age of first receipt of DI benefits.
- Two key aspects of individuals' preferences and beliefs affect individuals' decisions to apply for SSDI, and to return to work under the TWP.
- Perceived stigma of being on SSDI
- The individual's beliefs about the chances that they will be a subject to and CDR.
- In our simulation the stigma effect is fairly small (K=.001).

# Figure 9 (Cont'd)

- The results indicate that 50% of the individuals on DI recover from their disability.
- Why only 11% of DI awardees take advantage of the TWP period?
- Muller (1992, 2000) indicates that people believe that being engaged in TWP will lead to greater risk of leaving the roles via a CDR.

# Implications

## Figure 10a: Distribution of Bequests

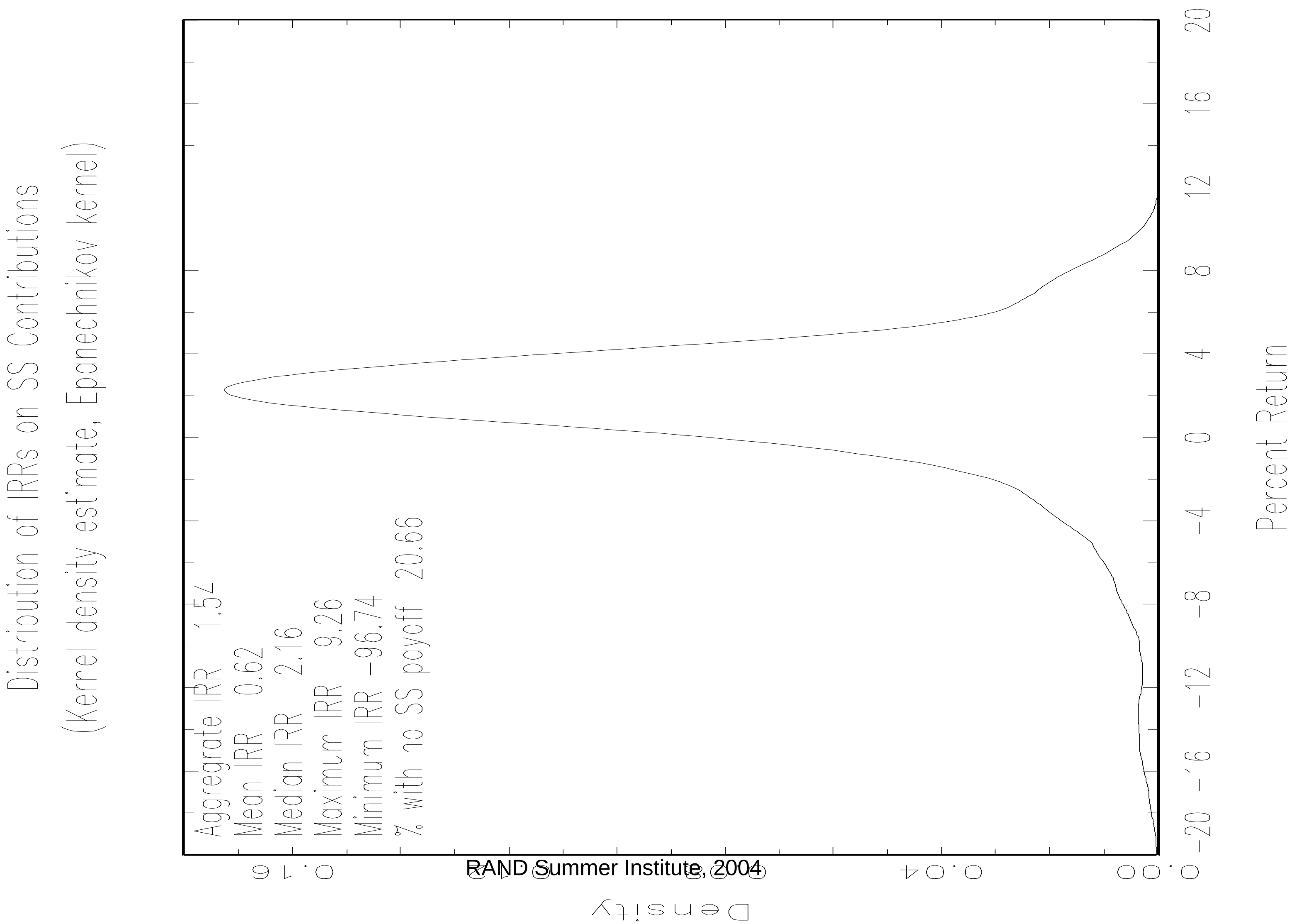


# Figure 10a

- The distribution of bequests is highly skewed, none exceeded the $600,000 exemption level from Federal estate taxes.
- Hurd and Smith (2001) work indicates that our simulation results are quite reasonable.

# Implications

## Figure 10b: Internal rate of return



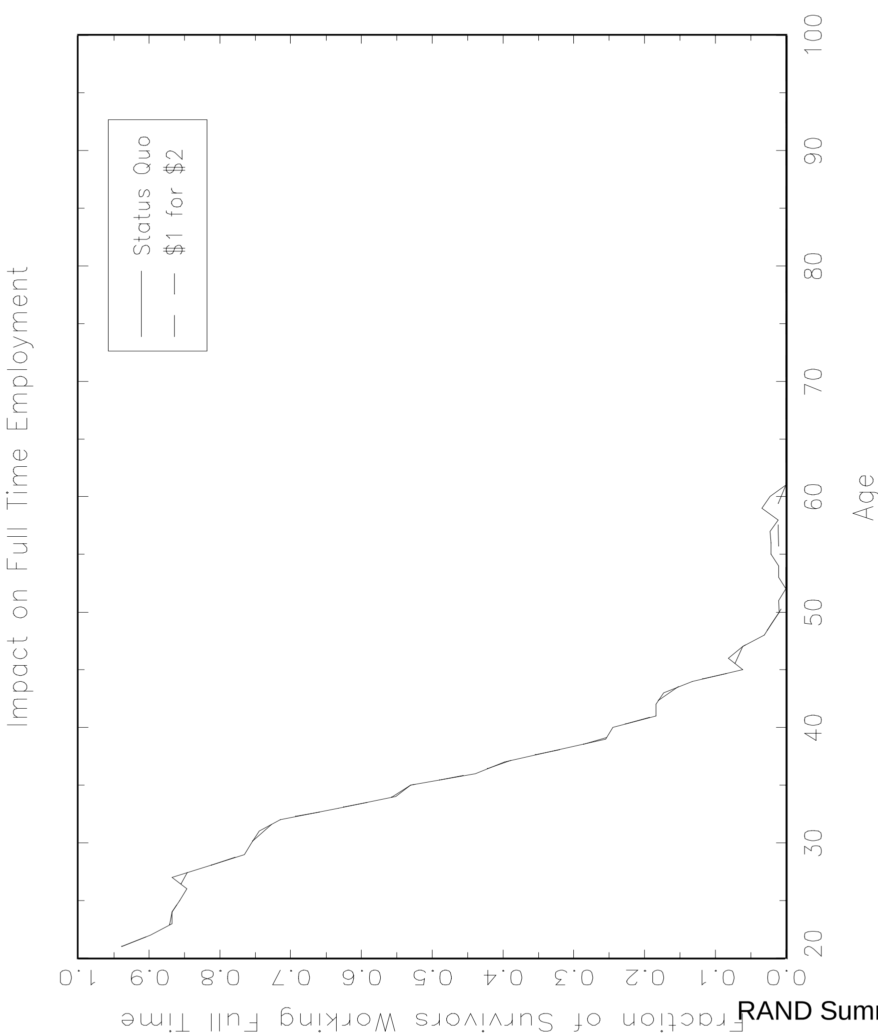
# Figure 10b

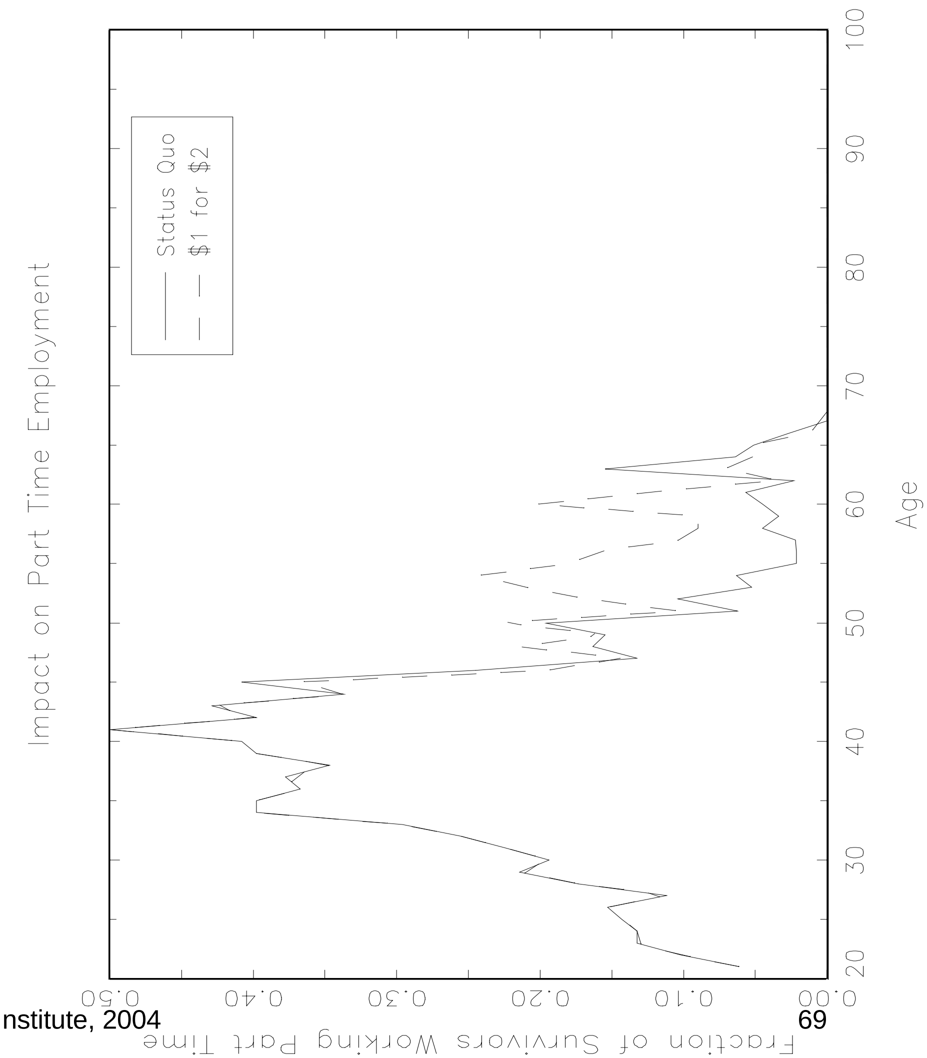
- We computed the interest rate which equates the discounted value of Social Security taxes (including the employer share) to the present value of Social Security benefits (including disability benefits).
- Consistent with other studies (e.g. Geanakoplos, Mitchell, and Zeldes 1999): The average internal rate of return on Social Security is only 2%.

## The Impact of the $1 for $2 Offset

- The life-cycle model provides us with an opportunity to conduct a very special type of *controlled experiment*.
- We simulate a population of 1,123 individuals starting at age 20 under the *status quo*.
- Re-solve and re-simulate the model under the $1 for $2 offset alternative.
- Save all the *random seeds* that are used to generate stochastic trajectories for health, mortality, wages, etc.
- Use the individuals under the status quo as *experimental controls.*
- Apply the same seed numbers to another simulated population of 1,123 individuals who are given the $1 for $2 benefit offset “treatment”.
- The only differences in the outcomes for the two groups are changes in the endogenous variables, which reflect the behavioral responses to the $1 for $2 treatment.

# Figure 11: Labor supply effects



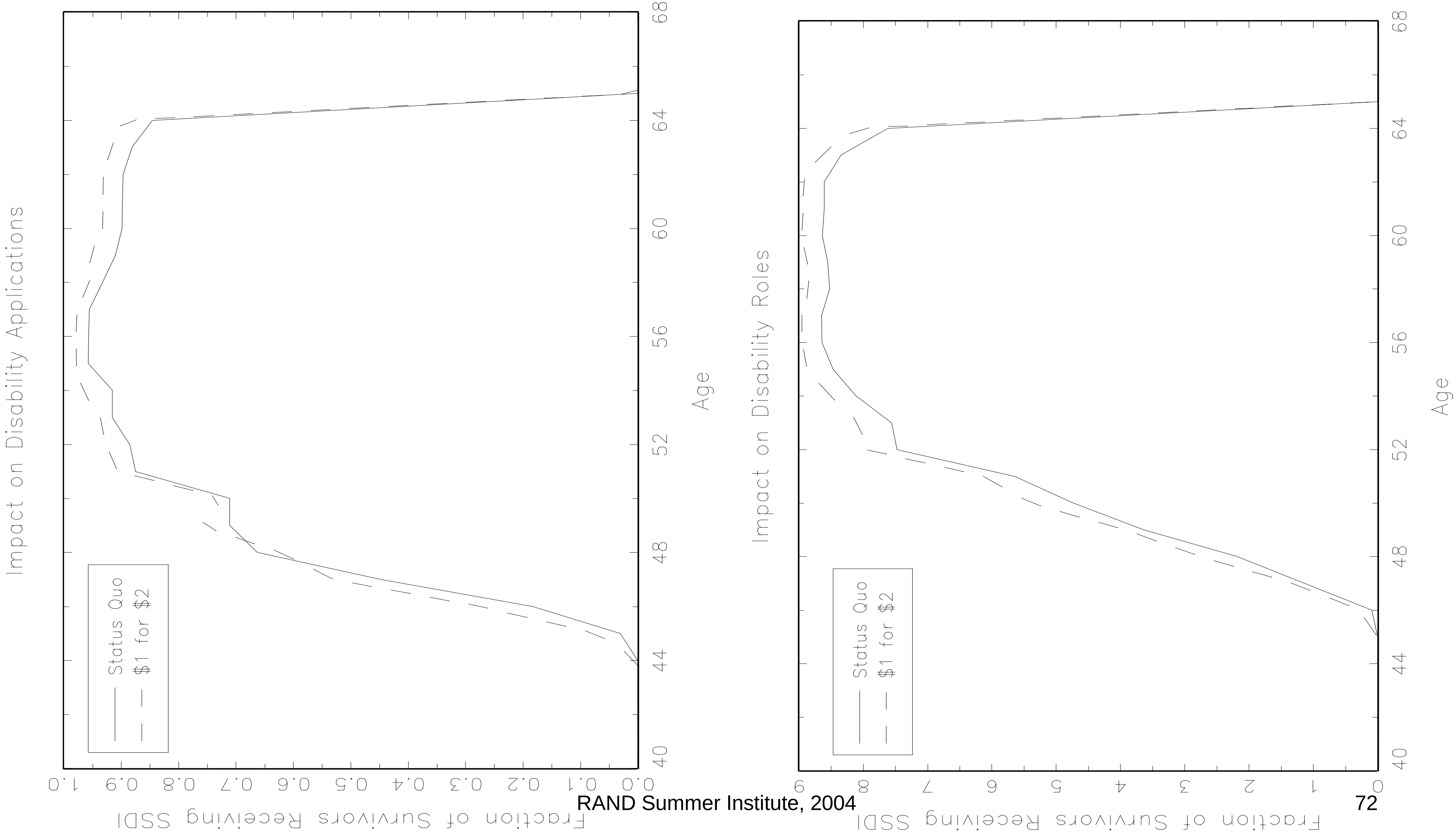
# Figure 11: Labor supply effects (cont'd)

- Very little effect on full-time work: a slight reduction in the number of individuals engaging in full-time work between age 51 and 60.
- At age 55 2.1% work full-time under the status quo, only 1.0% work full-time under the $1 for $2 offset.

# Figure 11: Labor supply effects (cont'd)

- Significant impact of on part-time work, concentrated between the ages of 50 and 61, when the can take advantage of the $1 for $2 offset provision.
- There is some part-time work at ages 45 and 46, reflecting the fact that a small number of individuals were induced to begin their application for DI earlier than they did under the status quo.
- There are particularly large peaks in part-time work at ages 54 and 60, when over 20% of the sample are working part-time.
- Under the status quo: a peak of part-time work at age 63, reflecting the opportunistic use of the TWP option. They do it at 63 because after age 62 DI recipients have a fall back option of early retirement.
- Overall, 9.5% return to work under the status quo, and 48.9% under the $1 for $2 offset.
- Furthermore, under the $1 for $2 offset they work an average of 2.9 years, while under the status quo they work only 1 year.

# Figure 12: Induced Entry Effect



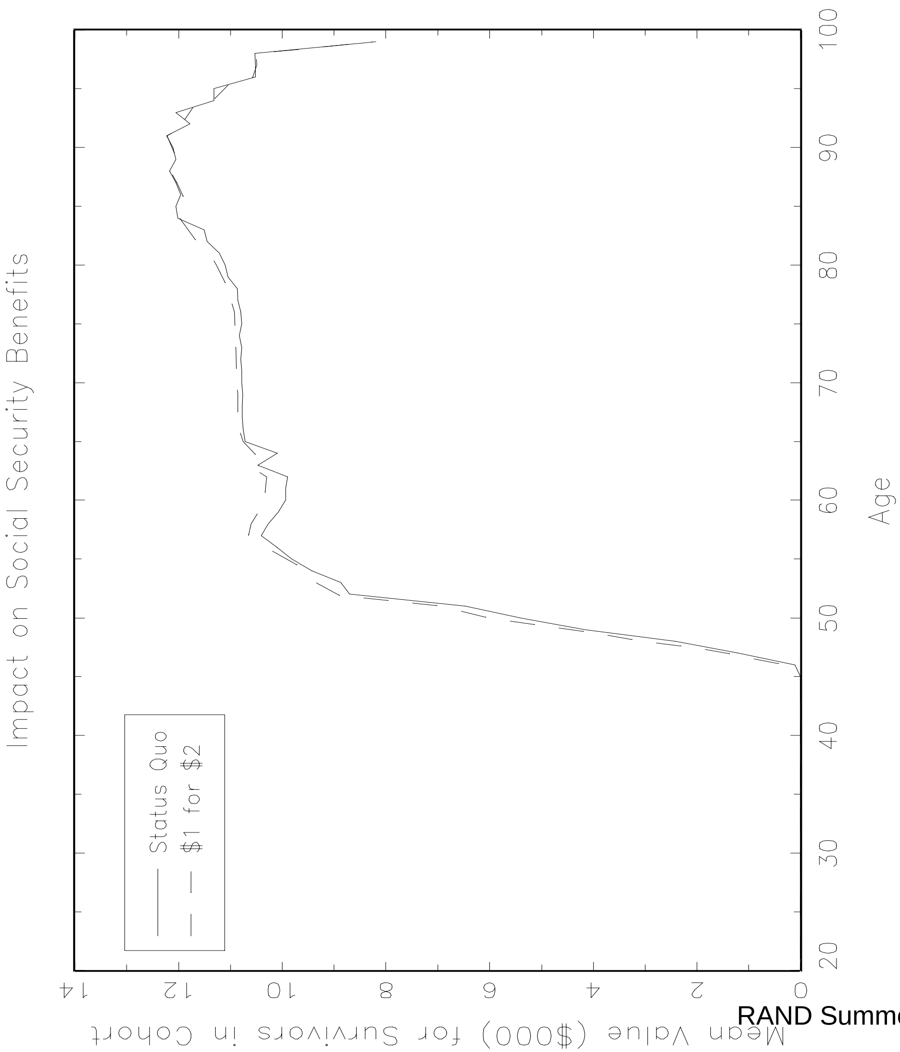
## Figure 12 (Cont'd)

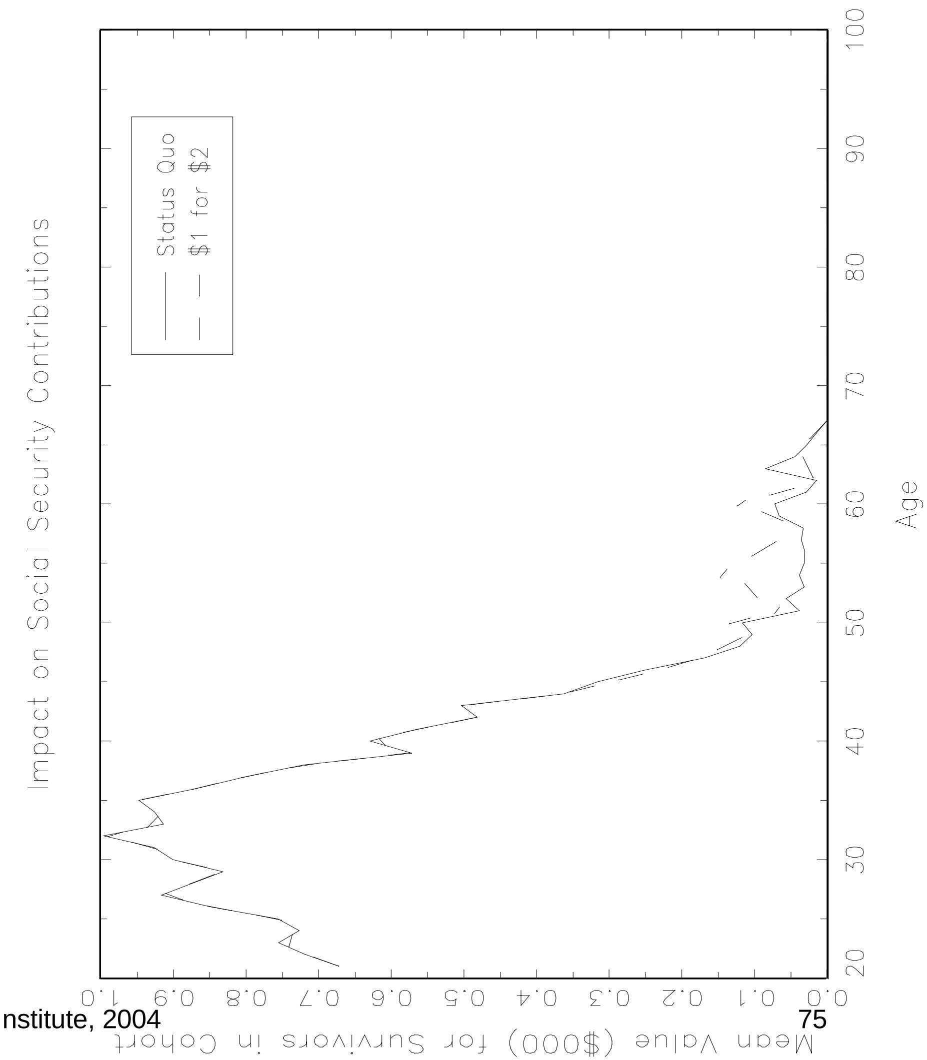
- Only a modest induced entry effect here.
- Overall, 134 individuals applied for SSDI and 95 were ultimately awarded SSDI benefits under the status quo simulation
- 137 individuals applied and 98 were ultimately awarded SSDI benefits under the $1 for $2 offset.
- The net gain in expected discounted utility due to the $1 for $2 offset is not large enough to induce people to apply for benefits.
- Under the $1 for $2 offset the ultimate award rate is 71.5%, only slightly higher than 70.9%, under the status quo. That is, there is very small *induced persistence* effect.

# Figure 12 (Cont'd)

- SSDI roles increase by 3.1% in our simulations, somewhat larger than the 2.2% increase in applications for SSDI.
- The reason: mean duration on the DI program increases by .3 years, from 12.7 years under the status quo to 13.0.
- The increase in mean durations is due to a .3 reduction in the mean age of first receipt of DI benefits.
- The combined effects of induced entry and the increase in mean duration on the program result in an increase of 5.9% in *person-years* spent on SSDI roles.

# Figure 13: SSA Contributions and Benefits



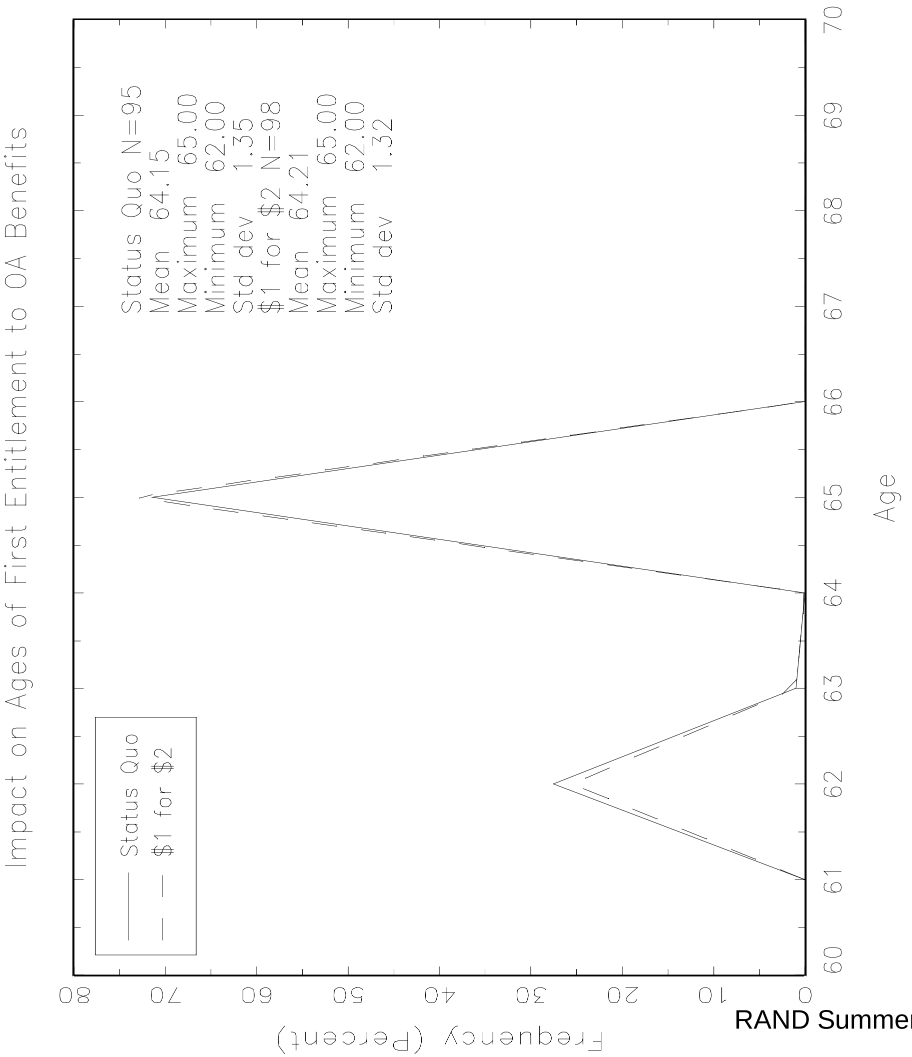
## Figure 13 (Cont'd)

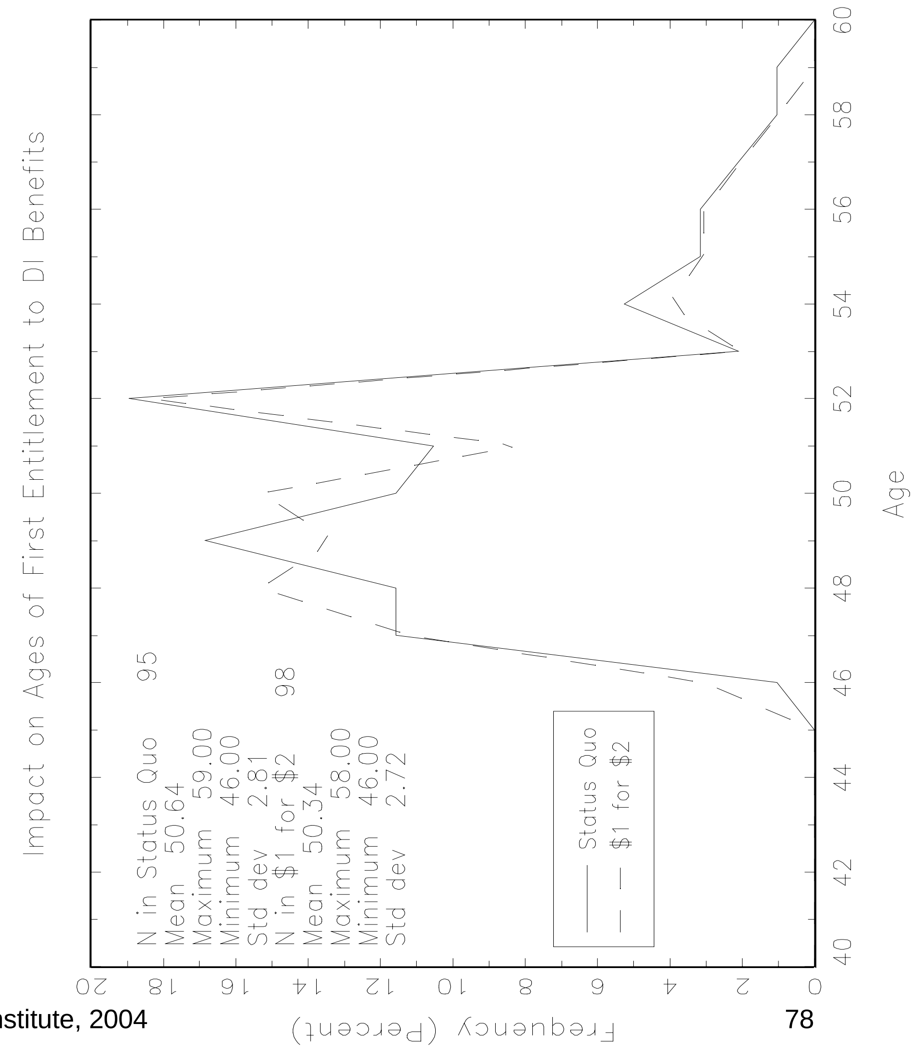
- A priori the effect of the $1 for $2 on net benefit payments is unclear.
- Recipients are on the roles for longer, but they receive reduced benefits when working, and they make Social Security contributions on their wage earnings.
- The results is DI benefit payments are slightly higher. Especially between the ages of 50 and 60 DI benefits are 4.3% higher under the $1 for $2 offset.

# Figure 13 (Cont’d)

- The higher level of part-time work between the ages of 50 and 60 results in higher Social Security contributions.
- Under the $1 for $2 offset individuals get higher earnings.
- This leads to a lasting increase in Social Security benefits at retirement.

# Figure 14: Distribution of 1st Receipt of DI and OA Benefits



## Figure 14: (Cont'd)

- A slight downward shift in the ages of first receipt of DI, from 50.6 years under the status to 50.3 years under the $1 for $2 offset.
- Hardly any effect on the ages of first receipt of OA benefits.
- Very small increase in claims for OA benefits at age 65 relative to age 62.

# Table 1

- Table 1 summarizes the fiscal implications of the $1 for $2 offset for the sub-population of SSDI recipients in the simulation cohort.

**Table 1: Summary of the Budgetary Impacts of the $1 for $2 Offset**

| Item | Status Quo | $1 for $2 Offset | % Change |
|---|---|---|---|
| Number of DI applicants | 134 | 137 | +2.2% |
| Number of DI recipients | 95 | 98 | +3.2% |
| Person-years spent on DI | 1273 | 1348 | +5.9% |
| Number of DI recipients who returned to work | 9 | 48 | +533% |
| Mean Years of Part Time Work on DI | 1 | 2.9 | +290% |
| Mean Years of Full Time Work on DI | 0 | 0 | 0% |
| Present value of Federal Tax Payments ($000) | $1938.92 | $ 1872.75 | -3.4% |
| Present value of Social Security contributions ($000) | $3,003.26 | $3,129.84 | +4.2% |
| Present value of Social Security benefits ($000) | $10,940.08 | $11,474.07 | +4.9% |
| Net Present value of Cost of SSDI beneficiaries ($000) | $ 5,997.90 | $6,471.48 | +7.9% |
| Present value of pre-tax wage earnings ($000) | $24,219.80 | $25,240.65 | +9.3% |
| Present value of consumption ($000) | $ 33,116.34 | $ 34,684.56 | +4.6% |

## Table 1 (Cont'd)

- The present value of benefits paid under the $1 for $2 offset increases by 4.9% from $10.9 million to $11.5 million.
- On a per beneficiary basis, the is only 1.6%, from $115,159 to $117,082.
- Hence, the majority of the aggregate increase in payments is due to the induced entry effect.

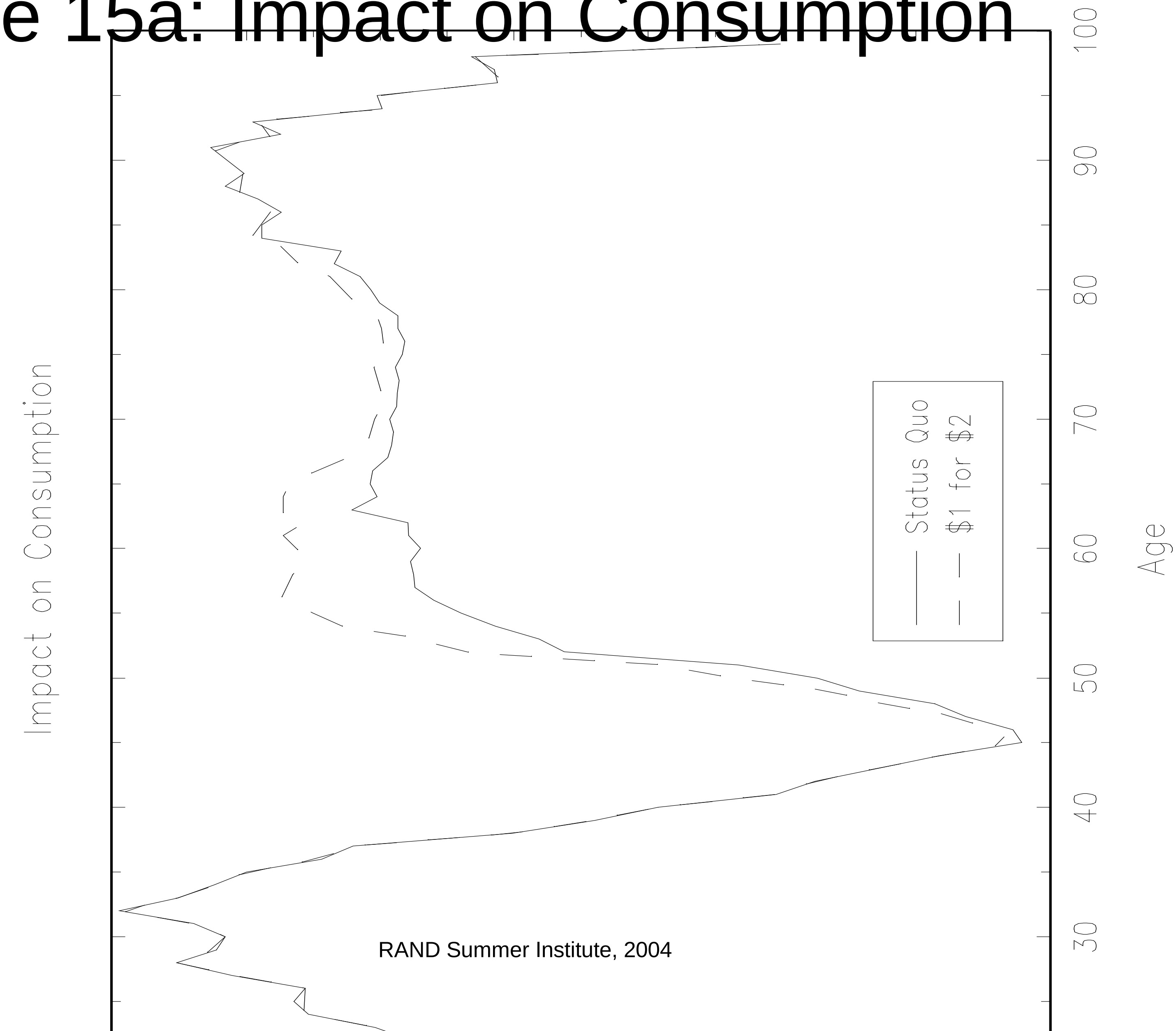
# Table 1 (Cont'd)

- The PV of Federal tax payments is slightly lower under the $1 for $2 offset, because part-time earnings of many DI recipients qualify them for tax rebates under EITC.
- The net present value of the net cost increase by 7.9% under the $1 for $2 offset, from $6.0 million to $6.5 million.
- On a per beneficiary basis, discounted costs rise by 4.6%, from $63,147 to $66,041 per beneficiary.

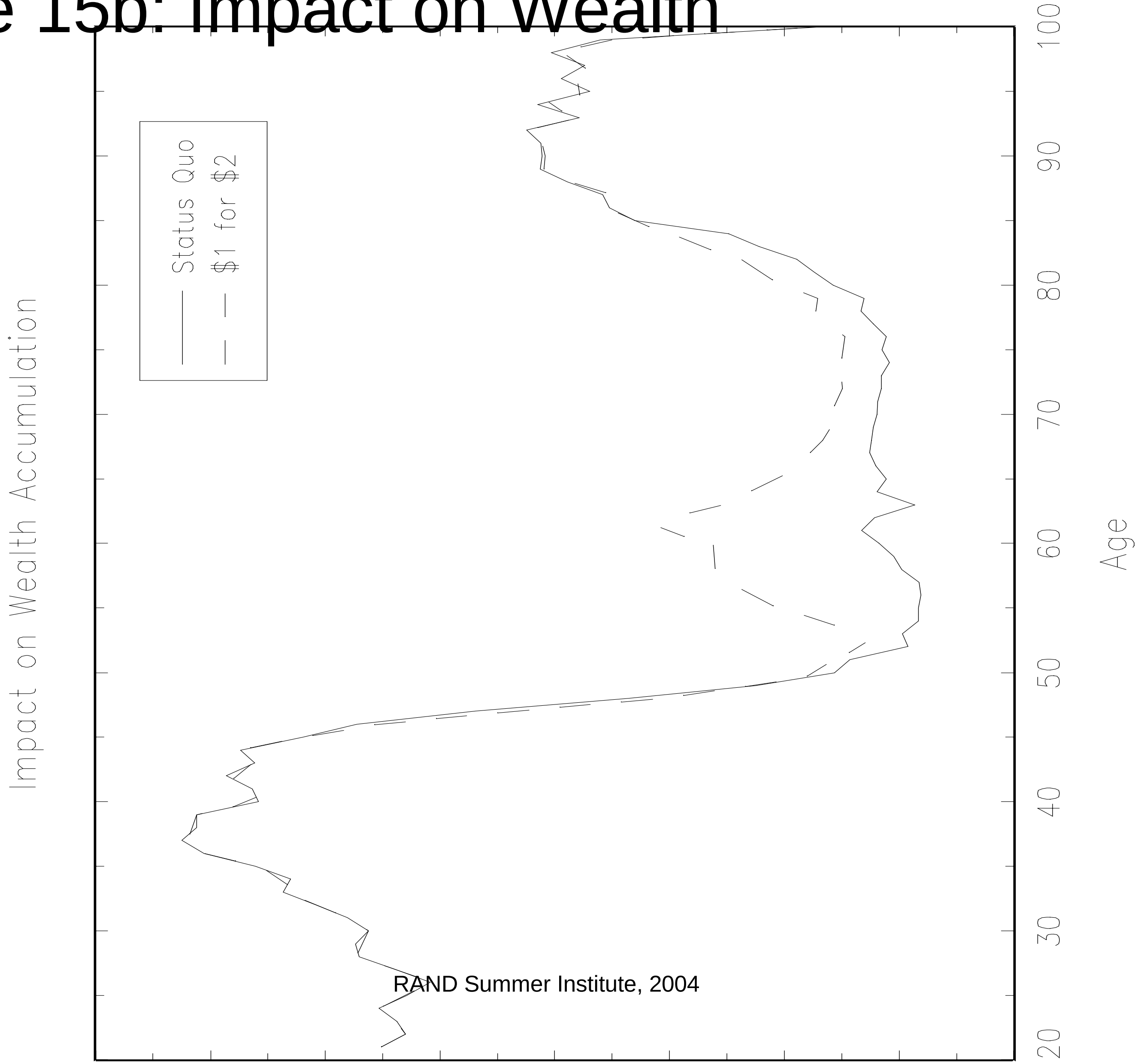
# Table 1 (Cont'd)

- Implementation of the $1 for $2 offset policy would result in modest increase in DI applications, awards, roles, and net expected discounted costs.
- However, the $1 for $2 offset provides the most needy SSDI recipients with clear welfare improvement.
- The PV of pre-tax wage earnings increase by 9.3%.
- The PV of consumption increase by 4.6%.

# Figure 15a: Impact on Consumption



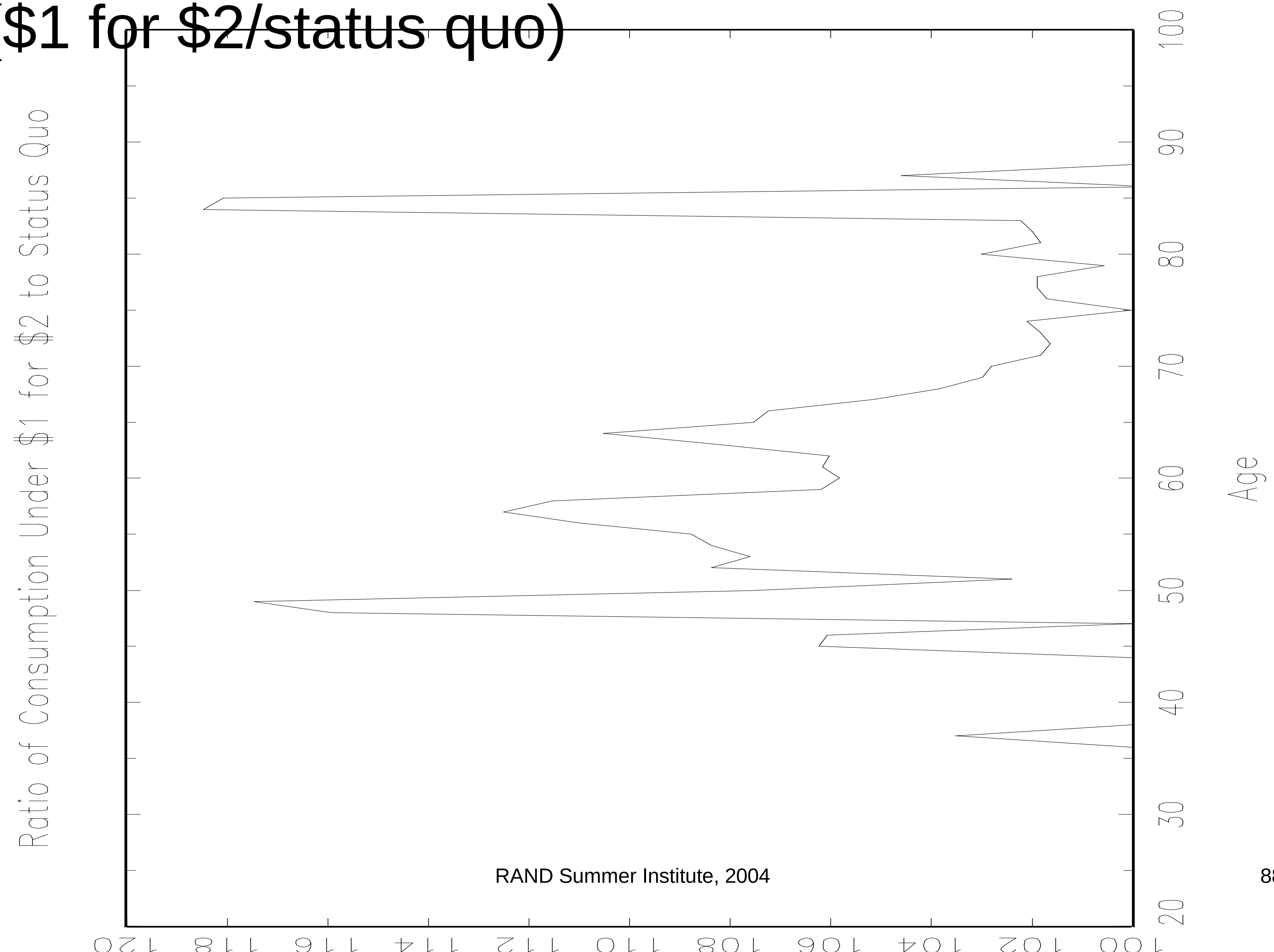
# Figure 15b: Impact on Wealth



# Table 15: (Cont'd)

- The mean consumption is higher under the $1 for $2 offset at every age.
- Similarly, the net worth is also higher under the $1 for $2 offset at all ages. No increase in consumption and net worth prior to age 45.
- The biggest increases occur between the ages of 55 and 70.

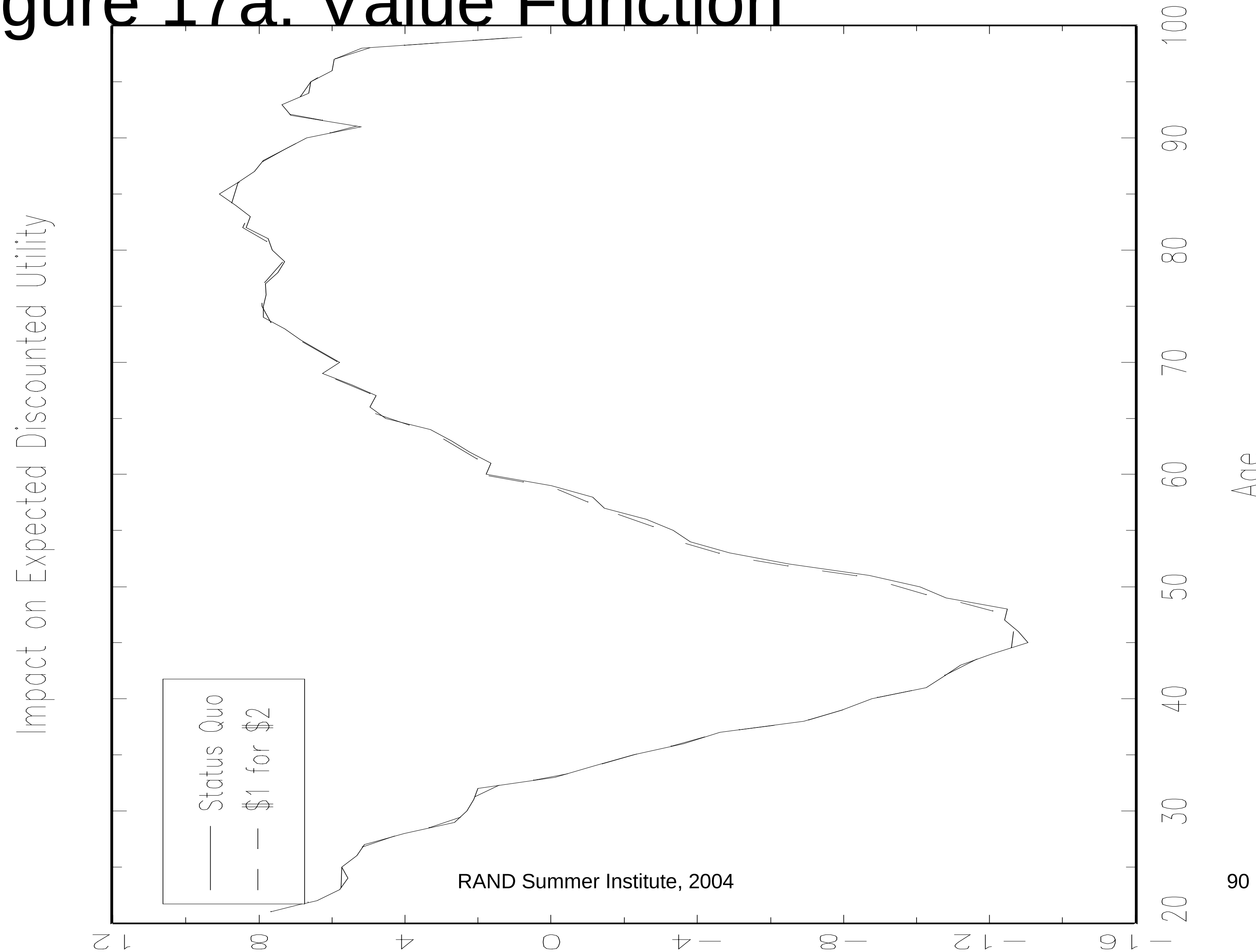
# Figure 16: Consumption Ratio ($1 for $2/status quo)



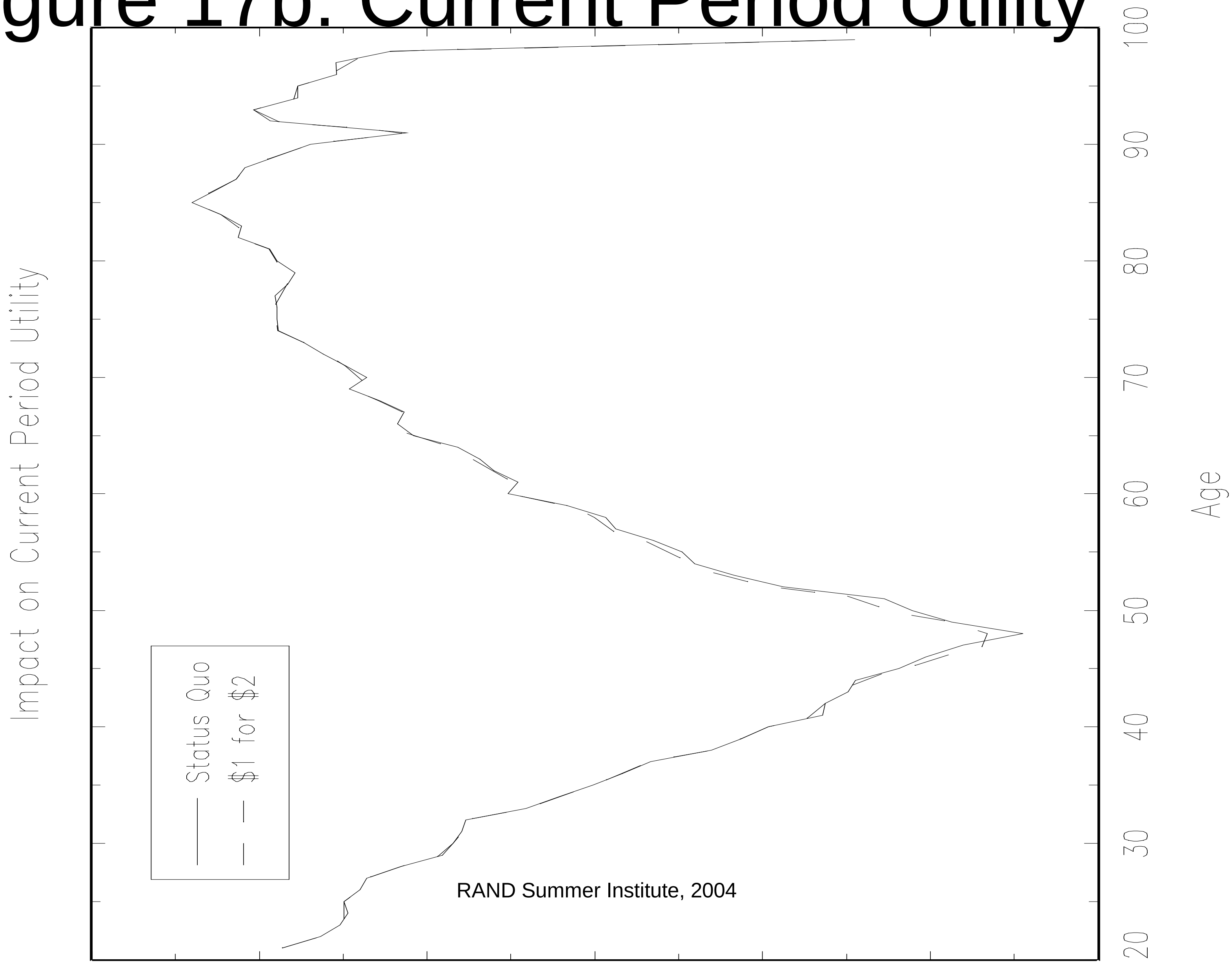
## Figure 16: (Cont'd)

- There are particular ages at which there are fairly big increases in consumption.
- Around age 45 consumption increase by more than 18%.
- Over the entire life-cycle, consumption increases by an average of 2.2% per year, and by 6.9% per year between ages 45 and 65.

# Figure 17a: Value Function



# Figure 17b: Current Period Utility



# Figure 17: (Cont'd)

- The simulations show that the $1 for $2 offset provide an attractive work option for nearly 50% of SSDI beneficiaries.
- They receive a combination of wage earnings and reduced SSDI benefits, rather than relying exclusively on a relatively small SSDI benefits.

# Figure 17: (Cont'd)

- Both *V* and *u* initially decline with age until about age 45, then increase until leveling off around age 70.
- Welfare is only slightly higher under the $1 for $2 offset than under the status quo.
- The increase in utility and welfare is barely visible. Why?

# Figure 17: (Cont'd)

- Our welfare calculations account for the disutility of work effort. Thus, the rise in consumption came at a cost of forgone leisure by individuals who decided to return to work. The individuals are better off doing so, in an *ex ante* sense, but disutility of work effort almost counterbalanced the increased utility from higher consumption.

# Figure 17: (Cont'd)

- The combination of the high tax rates (50%), higher disutility of work at older ages, and the relatively low earnings prospects for DI beneficiaries implies that, on average, the $1 for $2 offset is not a great deal.
- The utilities in Figure 17 are averages of utilities of 50% of the population of DI beneficiaries who never experienced a recovery from disability and 50% who did.

# Conclusions and Discussion

- The $1 for $2 option is clear very valuable for DI beneficiaries who have recovered from their disabilities.
- For younger person who has not yet become disabled or considered applying to the DI program, the ex-ante increase in welfare is negligible.
- The welfare gain is mostly for those who are already on DI and who have completely recovered from their disability.

# Conclusions and Discussion (Cont’d)

- The analysis of welfare changes is the key to understanding why the induced entry effect is not very large in our model.
- The *ex ante* gains facing a prospective SSDI applicant are not large when one factors in:
- (1) the chance that after incurring the hassle of submitting an application it would ultimately be rejected;
- (2) the chance that once on the program the person would experience a medical recovery that would allow him/her to work; and
- (3) the high effective 50% surtax on the benefits for SSDI beneficiaries who do return to work.