

Lectures Notes on Welfare and Social Security Reforms

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1 Welfare Reform

1.1 Some Institutional Details

Welfare programs are programs that transfer cash and consumption goods to the poor and destitute. [In medieval Europe the Church took responsibility for the poor.] The milestones in the U.S. welfare programs are:

- In 1935, the federal government established Aid to Families with Dependent Children (**AFDC**) program and Supplemental Security Income (SSI) program under Social Security Act;
- In 1960s under President Johnson “War on Poverty”, Medicaid was established to provide medical assistance to poor families, which is now the largest assistance program in dollar terms;
- On August 22, 1996, President Clinton signed the Personal Responsibility and Work Opportunity Reconciliation Act (**PRWORA**), which changed the name of the assistance program from AFDC to **TANF** (Temporary Assistance for Needy Families). PRWORA and subsequent state legislations changes on welfare constitutes what we meant by welfare reforms.

The major welfare programs include the following:

1. AFDC and TANF: cash program, a *combination of federal and state programs*; states administer AFDC, set the benefit levels and have discretion over rules; federal contribution to the programs varies from 1/2 to 3/4 depending on the per capita income of the state. There are huge state variation in the level of benefits, for example, Alaska’s benefits are seven times higher than Mississippi. From 1970 to 1996, total expenditure increased from \$19 billion (in 1996 dollars) to \$22 billion, and total number of beneficiaries increased from 7.4 million to 12.6 million [average benefits per family declined almost by half] It is a means-tested program, that is, the benefits are reduced as income rises [this implies that the effective marginal income tax rate could be as high as 100 percent] TANF replaced AFDC from 1997. Two major differences from AFDC: first, matching grants are replaced by block grants, a fixed amount of money; second, TANF focused on moving individuals from welfare to work, the use of TANF funds

has to be consistent with federal priorities of strong work requirements, time limits to receiving assistance, a reduction in welfare dependency and the encouragement of two-parent families. [A useful website is the Department of Health and Human Services, Administration for Children and Families at <http://www.acf.dhhs.gov>]

2. EITC [earned income tax credit] supplements the income of low-income families with children by an amount which depends on their income and number of children. Basically if an eligible family's income is below certain level, the government gives it a negative income tax (tax credit) that could be as high as 40%. The rate varies across states and income. After \$28,495, one receives no credit for extra dollars earned. [The total expenditure on EITC grew from \$1.25 billion in 1975 to \$25 billion in 1996]
3. Food Stamps: This is a federal program enacted in 1975 with uniform benefit levels. The benefit level depends on income (adjusted, and housing expenditures are deductible). Food stamp benefits are limited to working-age adults without In 1996, the average monthly benefits were \$73.30 per person and \$175 per household.

In 1996, food stamp benefits are limited to working-age adults without children; no more than three months in a thirty-six month period if they have not worked twenty hours a week, completed a job training program or participated in a workfare program.

4. Medicaid:
 - Enacted in 1966, provides medical assistance to the poor; medical care to disabled, and nursing home care to the aged.
 - It is a federal-state matching program: The federal portion is about 50-83% (depending on the state's per capita income);
 - The states have considerable discretion in determining eligibility and coverage;
 - Recently covers about 36 million low-income individuals, including 18 million children;
 - Historically, families receiving benefits under AFDC were eligible for medicaid. Hence eligibility for medicaid is based on a threshold test: those with income above the threshold (essentially the cutoff level of AFDC) are not eligible. This creates a welfare lock: because many employers do not provide medical benefits

to low income workers, many of those on welfare find themselves in a dilemma: even if they would like to work, they lose eligibility for medicaid benefits if they accept a job. This is particularly important for those with children requiring medical attention.

- A new program, called Children's Health Insurance Program (CHIP) is created to deal with this issue.

An interesting question is why welfare reform commands so much attention recently. There are a couple of factors:

1. It was felt that welfare had created a dependency and there was wide agreement that welfare system has to be reconstructed to help those on welfare get off welfare and be productive in the labor force. Clinton "End welfare as we know it" "A hand up, not a hand out", "making work pay".
2. A misperception: The federal deficit reached record during Bush administration. There was a widespread impression that welfare was largely responsible. [In fact, in 1996 total welfare expenditures account for less than 10% of total federal expenditures, and excluding Medicaid they were only 4%]
3. After the passage of PRWORA, the federal government turned a large surplus, and the welfare rolls declined dramatically. [These two phenomena are correlated, but welfare roll decline did not contribute to the federal surplus at all.]

1.2 Welfare Reform Bill of 1996

Its official name is Personal Responsibility and Work Opportunity Reconciliation Act of 1996. [PRWORA]

Two main changes:

1. It replaced the AFDC system in which the federal government paid a fraction of the state expenditure with a block grants of TANF (Temporary Assistance to Needy Families);
2. It imposed a number of stringent requirements designed to encourage movement from welfare to workfare.

The three most important features of 1996 welfare reform bill are:

- **Block granting:** The federal government gives each state a block grant (which is a fixed amount) in exchange for the state's promise to continue spending on welfare support at least 75% of the amount that they had spent previously on welfare;
- **Time Limits:** Federal rules stipulate that federal TANF funds may not be received by a family which includes an adult who has received sixty months of TANF funds previously;
 - A state may exempt up to 20% of its caseloads from the five year limit based on hardship;
 - States can choose to support all families beyond five years if they choose;
 - Many states adopted a shorter two-year welfare eligibility;
 - The hope is that these time limits would not only push people off the welfare rolls, but also that they would discourage people from joining in the first place.
- **Workfare:** Adults had to engage in some form of work after a maximum of two years of TANF benefits, and to participate, unless the state opted out, in community services after two months (20 hours minimum in 1997-1998, and 30 hours after 2000). This work requirement does not apply to single parents of children under age 6 who can not obtain child care.

1.3 Incentive Effects of the Welfare System (Moffitt 1992)

To be added later.

1.4 Workfare versus Welfare: Besley and Coate (1992)

This is an applied theory paper which addressed the following question: How does work requirements in poverty-alleviation programs provide incentives? Two arguments are provided:

- **Screening argument:** Workfare will direct poverty-alleviation support toward the truly needy. [For this argument to work, we need to have a model with unobservable types of earning abilities.]

- Deterrent Argument: Work requirement will encourage poverty-reducing investments. [For this argument to work, we need to have a model in which the earnings ability can be changed by incurring some investment.]

THE MODEL

- The government is concerned to ensure that each individual gets a minimum income level z , at minimum fiscal cost;
- n individual. The income generating ability, a is either a_L or a_H with $a_L < a_H$. Thinking of a as individual's wage rates; suppose that in the population a fraction γ of the individuals is of type a_L ;
- Worker's utility function over income y and work l is given by

$$y - h(l)$$

where $h' > 0, h'' > 0$.

- A Poverty-alleviation Program (PAP) is a pair of benefits packages $\{b_i, c_i\}, i = L, H$ where
 - b_i is a cash transfer for individuals with ability i ;
 - c_i is the time of the public sector work requirement.
- The public sector work requirement is assumed to be non-productive.
- The government's problem is

$$\begin{aligned} & \min n [\gamma b_L + (1 - \gamma) b_H] \\ \text{s.t.} \quad & y_H \geq z \\ & y_L \geq z, \end{aligned}$$

where y_i is the income of an individual with type a_i combining the transfer and the income from the labor market.

PRELIMINARY ANALYSIS

- An individual of type a_i chooses which benefit package to claim and the amount of labor to put in the private labor market. Denote $\hat{l}(a_i)$ as the solution to

$$h'(\hat{l}(a_i)) = a_i,$$

the amount of labor supplied in the private labor market is

$$l(c; a_i) = \begin{cases} \hat{l}(a_i) - c & \text{if } c \leq \hat{l}(a_i) \\ 0 & \text{otherwise.} \end{cases}$$

That is, the labor supply in the labor market is independent of b , due to the separable utility function (hence there is no income effect).

- Private sector earning is then

$$y(c, a_i) = \begin{cases} a_i [\hat{l}(a_i) - c] & \text{if } c \leq \hat{l}(a_i) \\ 0 & \text{otherwise.} \end{cases}$$

- To make the problem interesting, assume that

$$y(0, a_H) > z > y(0, a_L).$$

That is, without government intervention, only type L group is poor.

- The indirect utility level for type i worker when accepting pair (b, c) is given by

$$v(b, c, a_i) = b + y(c, a_i) - h(\hat{l}(a_i)).$$

Note that $v(b, c, a_i)$ is increasing in b , decreasing in c , and increasing in a_i .

BENCHMARK CASE: OBSERVABLE AND EXOGENOUS ABILITY

If ability is unobservable, then the government's problem is

$$\begin{aligned} & \min_{\{b_L, c_L, b_H, c_H\} \in \mathbb{R}_+^4} n [\gamma b_L + (1 - \gamma) b_H] \\ \text{s.t.} \quad & v(b_H, c_H, a_H) \geq v(0, 0, a_H) \\ & v(b_L, c_L, a_L) \geq v(0, 0, a_L) \\ & b_L + y(c_L, a_L) \geq z \end{aligned}$$

Note that we have only the individual rationality constraints, no incentive compatibility constraints are needed because we assume that abilities are observable.

Claim: The optimal solution is given by

$$\begin{aligned} b_H &= 0, c_H = 0 \\ c_L &= 0, b_L = z - y(0, a_L). \end{aligned}$$

The proof is very simple and omitted. Hence if income generating abilities are observable and exogenous, then the cost minimizing PAP is a welfare program (i.e. imposes no work requirement)].

CASE II: UNOBSERVABLE AND EXOGENOUS ABILITIES, UNOBSERVABLE PRIVATE SECTOR EARNINGS

Suppose that the government can not observe the private sector earnings. In this case, the individuals can masquerade and continue to work as much as they like in the private sector. The government's problem is

$$\begin{aligned} \min n [\gamma b_L + (1 - \gamma) b_H] \\ \text{s.t. } \quad v(b_H, c_H, a_H) &\geq v(b_L, c_L, a_H) & (1) \\ v(b_L, c_L, a_L) &\geq v(b_H, c_H, a_L) & (2) \\ b_L + y(c_L, a_L) &\geq z & (3) \end{aligned}$$

Discussions:

1. If the policy maker can not impose work requirements, i.e. if c_H and c_L are restricted to be zero, then the only IC PAP is $b_L = b_H$ because of the monotonicity of $v(\cdot)$ in its arguments.
2. The work requirement can be used to screen workers of different types because high ability workers have a higher opportunity cost of satisfying the work requirement. For example, in Figure 1, the PAP pairs $\{(b_L, c_L), (0, 0)\}$ is an incentive compatible benefits package.

CLAIM: If both ability and private market incomes are unobservable, then one of the following PAP is cost-minimizing:

- **(Welfare)** Impose no work requirement and offer both groups transfers of $z - y(0, a_L)$;

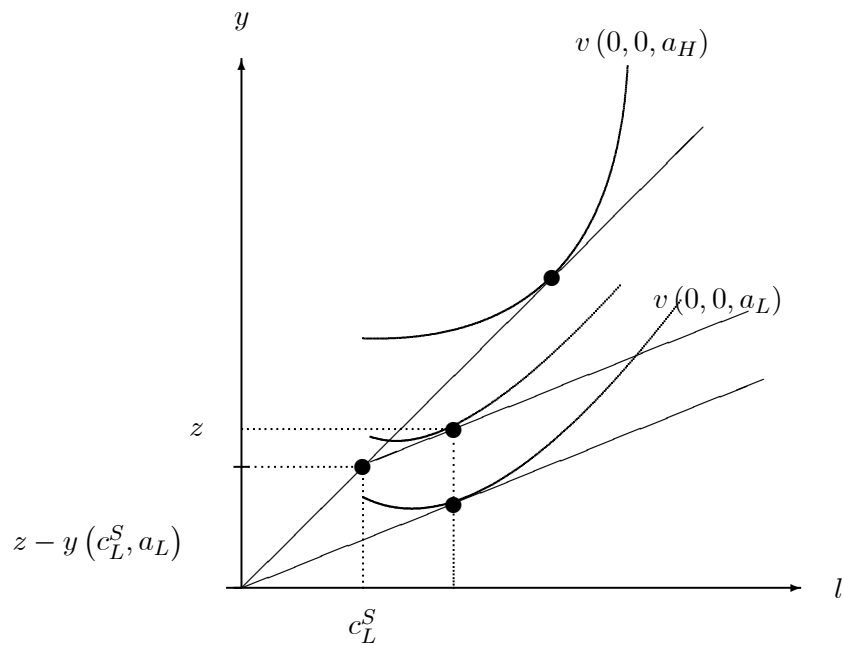


Figure 2: Optimal Workfare Packages

- **(Workfare)** Offer self-categorized a_H individuals no benefits and no work requirement; and offer self-categorized a_L individuals a transfer of $z - y(c_L^S, a_L)$ in exchange for work requirement of c_L^S , where c_L^S is the unique solution to

$$v(0, 0, a_H) = v(z - y(c_L^S, a_H), c_L^S, a_H).$$

[See Figure 2 for the illustration]

- Moreover, the workfare solution is optimal if and only if

$$(1 - \gamma) a_H > a_L.$$

The authors also consider the case where the private sector earnings are observable, and come up with similar characterization of the minimum cost PAP.

THE DETERRENT ARGUMENT: OBSERVABLE AND ENDOGENOUS EARNINGS ABILITIES.

Suppose that individuals can ex ante make efforts to change their earning ability type.

- Assume that the probability an individual is of type a_H is given by $\pi(e)$, where $\pi(\cdot)$ is an increasing and strictly concave function;
- The government first chooses a PAP, then individuals make their effort choices.
- Individuals maximize

$$\pi(e)v(b_H, c_H, a_H) + [1 - \pi(e)]v(b_L, c_L, a_L) - e.$$

The first order condition is

$$\pi'(e^*)[v(b_H, c_H, a_H) - v(b_L, c_L, a_L)] = 1$$

Denote $\Delta(b_L, c_L, b_H, c_H) \equiv v(b_H, c_H, a_H) - v(b_L, c_L, a_L)$. We hence have

$$e^* = e^*(\Delta(b_L, c_L, b_H, c_H)).$$

That is, the incentives to exert effort is provided by Δ . If $\Delta = 0$, then $e^* = 0$.

- The expected cost of a PAP is now

$$n\{[1 - \pi(e^*(\Delta))]b_L + \pi(e^*(\Delta))b_H\}.$$

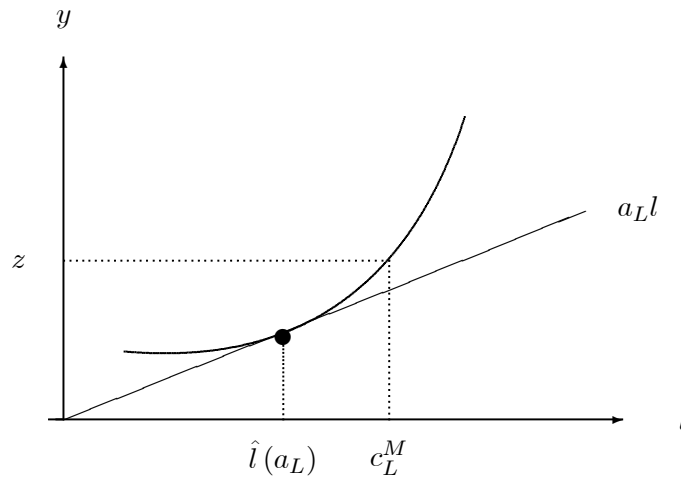
- Define the maximal work requirement c_L^M by

$$v(z - y(c_L^M, a_L), c_L^M, a_L) = v(0, 0, a_L).$$

That is, c_L^M is the work requirement which, if coupled with a transfer sufficient to get the poor to the poverty line z , would make them just indifferent between status quo and participating in the program. [See Figure 3 for the determination of c_L^M]

CLAIM: Suppose that abilities are observable, but depends partly on effort. Then the cost minimizing PAP either:

1. imposes no work requirement and offers low ability individual a transfer of $z - y(0, a_L)$;
or
2. imposes work requirement c_L^M on a_L and offers them a transfer of z .

Figure 3: Determination of c_L^M

1.5 A Proposal for Welfare Reform (Keane 1995)

Keane (1995) proposes a novel idea for welfare reform: *All* single mothers who work at least part time receive a \$23 per week work subsidy, which is taxed away at a 7% rate as earned income increases. He showed by simulations that such *universal* work subsidy can save costs, make more people work and make women better off.

How can a universal work subsidy save money while also increasing the utility of single mothers? This can be illustrated in Figure 4.

In Figure 4, Line ABC is a typical budget constraint created by the AFDC and food stamp programs. Line EDC is what the budget constraint might look like without any programs (the usual linear budget constraint assumed in the labor supply literature). Thus the distances AE and BD are the benefit amounts at 0 and 20 hours. At 40 hours (at C), benefits go to zero. The introduction of the work subsidy for any single mother who works at least part time in the market shifts the budget constraint to ABB'C'. The distance B'B is the amount of the subsidy for part-time work. Since the subsidy is taxed away with earnings, the subsidy amount for full-time work C'C is smaller than B'B.

As shown in Figure 4, the introduction of the work subsidy will cause women, who were choosing nonwork and full benefits under the original AFDC and Food Stamps program, to shift to part-time work, and move to a higher indifference curve. The work subsidy saves money on these switchers because the combination of subsidy and welfare benefits paid to

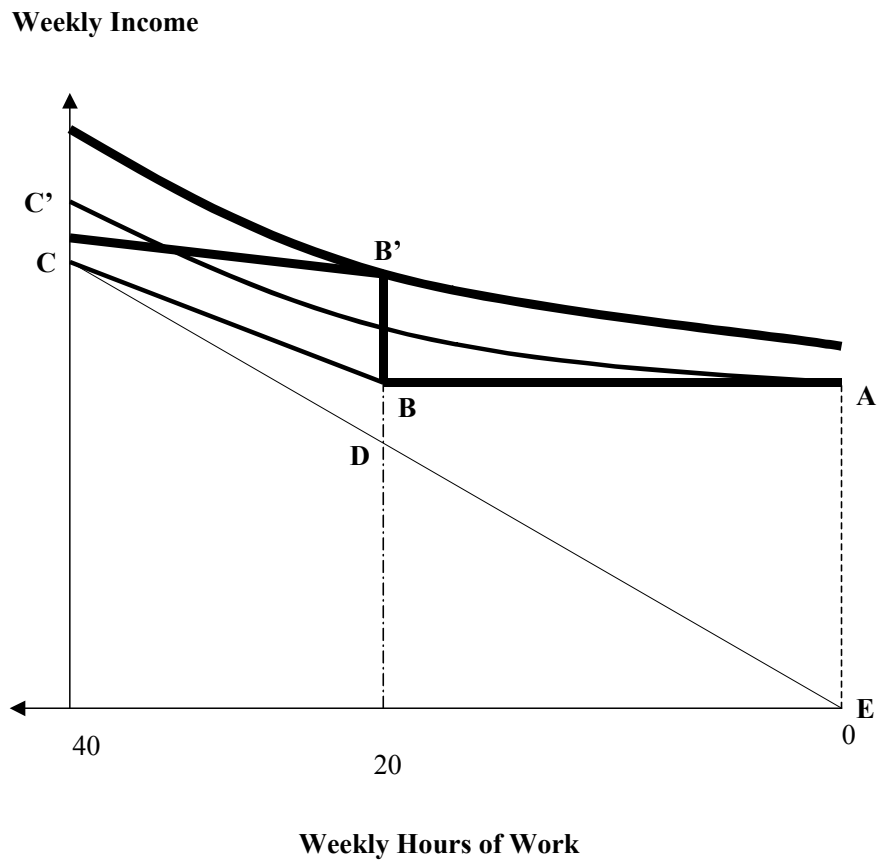


Figure 4: How a Universal Subsidy Can Affect the Decisions to Work.

her if she works part-time, $B'D$, is smaller than the benefits she was receiving when she did not work, AE .

Of course, the work subsidy is costly because some women who would have worked in the market anyway now receive a subsidy for doing so. This effect causes costs to increase. The net cost implication of such a work subsidy policy depends on the proportion of women who will switch from no-work to part-time work. It turns out that there is a large fraction of single mothers on this margin. So the cost saving effect from the switchers more or less cancels out the cost increasing effect of the workers, will slight cost saving.

It is cost effective to target the subsidy to encourage part-time market work because AFDC and food stamps benefits for a typical single mother drop by roughly two-thirds if she goes from nonwork to part-time work (that is, BD is about $1/3$ of AE). Therefore, of the possible savings that accrue to the government from getting welfare recipients to work, most can be achieved by getting them to work just part-time. What is the difference between this work subsidy proposal and the EITC? EITC is more expensive because these tax credit payments are proportional to earned income, which means that they are roughly twice as great for full-time as for part-time work.

1.6 Is Time-limited Welfare Compassionate? (Fang and Silverman 2001)

Proponents of the recent welfare reform often argued for the new eligibility restrictions in the name of compassion for the poor. Prominent law and opinion makers emphasized the value of welfare time limits and other restriction to *recipients*, rather than to taxpayers or to society at large. They, like Dole, claimed that while perhaps “tough,” time limits and other welfare eligibility restrictions were truly more compassionate than the previous rules. By encouraging the poor to enter the workforce, the restrictions would not just be good for taxpayers, the reforms would be good for the poor themselves.

The question is: how might time limits on welfare eligibility and work requirements benefit the welfare eligible? It is a fundamental property of standard economic decision problems that adding constraints to an agent’s choice set cannot make her better off. Compassionate time limits are therefore precluded by the standard framework. This truism motivates our departure from the standard setup: We allow agents to have *present-biased* preferences, and thus introduce the potential for both problems of self control and utility gains from restricting choice sets.

THE MODEL

- Discrete time, finite horizon model with periods $t = 1, \dots, T$.
- In each period, an agent chooses one and only one of the following options:
 - **Welfare.** Welfare benefit is m and it represents cash assistance and the monetary value of in-kind aid such as food stamps, housing subsidies and medical insurance. The time limit on welfare eligibility is denoted by $L > 0$.
 - **Work.** We assume that if an agent works her wage depends only on the cumulative number of periods she has ever worked, denoted by τ . The wage experience profile is denoted by $w(\tau)$.
ASSUMPTION: There exists $0 < \tau^* < T$ such that $w(\tau) < m$ if $\tau < \tau^*$, and $w(\tau) \geq m$ if $\tau \geq \tau^*$.
 - **Home.** The third choice is for an agent to stay home without work or welfare. We assume that by staying home an agent can generate endowment income e , which, without loss of generality, is normalized to zero.
- We adopt a simple, and now familiar formulation of agents' potentially time-inconsistent preferences – (β, δ) -preferences (Phelps and Pollak, 1968, Laibson, 1994):

Definition 1 (β, δ) -preferences are preferences that can be represented by:

$$\text{For all } t, U^t(u_t, \dots, u_T) \equiv \delta^t u_t + \beta \sum_{s=t+1}^T \delta^s u_s, \text{ where } \beta \in (0, 1], \delta \in (0, 1]. \quad (4)$$

We characterize the behavior of agents with time inconsistent agents with and without time limits. Some examples are as follows:

Example 1 (Lack of Commitment Outcome) Let $\beta = 1/2$, $\delta = 1$. The wage profile is:

$$\begin{array}{c|ccc} \tau & 0 & 1 & 2 \\ \hline w & -2 & -8 & 18.5 \end{array}.$$

In this example, the agent will be on welfare in all three periods in the absence of time limits. If a time limit of one period is imposed, then the agent will work in all three periods.

Example 2 (Now or Never Outcome) Let $\beta = 1/2, \delta = 1$. The wage profile is:

τ	0	1	2
w	-2	5.6	3

In this example, the agent will work from date 1 in the absence of time limits. If a time limit of 1 period is applied, then the agent will be on welfare on period 1, and start working from period 2.

2 Social Security Reform

2.1 Institutional Background

2.1.1 Basics of Social Security

The source of information is:

1. Joseph Stiglitz: Economics of the Public Sector, Third Edition, Chapter 14: Social Insurance;
2. Richard C. Leone and Greg Anrig, Jr. (Editors): Social Security Reform, The Century Foundation Press 1999;
3. Daniel Shaviro: Making Sense of Social Security Reform, University of Chicago Press 2000.

Social security, also known as Old-Age, Survivors and Disability Insurance (OASDI), is part of the social insurance programs in the U.S. and it was enacted in 1935. It is intended to provide a basic standard of living to the aged, the disabled and their survivors. Workers contribute financially to the system during their careers and earn entitlement to family benefits upon retirement, disability, or death.

The other social insurance programs are: medicare, which provided medical care for the aged; unemployment insurance (also enacted in 1935) provides income to individuals during short-term spells of unemployment.

The U.S. Social Security System. The U.S. Social Security System is organized as a *modified pay-as-you-go basis*. What does it mean? In a pure pay-as-you-go system, the payroll taxes of those working today pay for the benefits received by the elderly today. The

U.S. system is called a modified pay-as-you-go system because revenues and expenditures are not required to balance out each year, instead it is required to be balanced over a *seventy-five-year horizon*. The balance between receipts and expenditures is added to, or subtracted from the social security trust fund.

In contrast, a private pension is a *fully funded system*, that is, each age group's pension is supported by its own contribution.

How are Social Security Financed? Social Security is financed by an ear-marked payroll tax that is paid partly by employees and partly by their employers. [The payroll taxes consist of two components: the social security tax and the medicare tax.] As of 2002, the combined social security tax rate is 12.4% on the first \$84,900, with the employee and the employer both paying 6.2%. [But of course, it does not matter whether it is your left or right hand that pays the bill.] The combined medicare tax rate is 2.9% with no income limit. The social security tax rate and the maximum tax base have increased dramatically since social security was enacted:

year	1937	1967	1974	1981
ss rate (combined)	2%	8.8%	11.7%	13.3%
ss max income	\$3000	\$6600	\$13,200	\$29,700

Also the social security tax is paid purely on an individual, not a household, basis. Thus married couple who both work pays more social security taxes.

What is the Nature of Social Security Program? It is very important to note that the Social Security is not just a pension program, it is also a redistribution program. It is true that the benefits an individual receives are linked to his/her contributions by a complicated formula, and the more an individual contributes, the more he/she gets back - just as in the case of private insurance. But in private insurance, an individual who spends \$10,000 to buy an annuity policy would approximately get about ten times more the benefit of someone who spends \$1000. In social security this is not the case: poorer individuals (or those who have made smaller contributions) get back proportionately more; and married couples in which only one individual worked get back proportionately more than do couples in which both worked and earned similar income. [Unfortunately, the redistributive nature of the social security program is never made clear to the American citizens.]

How are Benefit Levels Determined? The determination of the social security retirement benefits can be summarized as follows: "Take the PIA on your AIME, adjust for your

retirement age and spousal benefits, and then just index it by CPI.” [if you know that it means]. Now I explain:

To Qualify: To qualify for social security benefits, you must have worked during at least forty quarters.

Average Indexed Monthly Earnings (AIME). AIME is your average monthly wage for the best thirty-five years in your career. However, only covered earnings (or those subject to social security tax under then-applicable annual ceilings) are counted. Covered earnings from before you reached age 60 are indexed for both real and inflationary wage growth until you turn 60. Years other than your top thirty-five are ignored for benefit purposes, and they are commonly called “dropout years”.

Primary Insurance Amount (PIA). PIA is the basic monthly payment that social security will offer you (indexed for inflation) if you retire at age 65, and that is adjusted for early or late retirement. Hence, subject to these adjustments, it is the bottom line - the actual dollar amount on the check you get each month from social security. How is PIA determined from AIME? PIA is computed from AIME via a three-bracket, declining-rate formula. You get 90 percent of your AIME up to a low dollar amount, 32 percent of your AIME from that point to an indeterminate amount, and then 15 percent for remaining covered earnings. The dollar amounts in the above rate brackets depend on your year of birth so they can be indexed to wage growth (which prevents the first two brackets from gradually disappearing over time). For example, for workers who were born in 1937 and thus will reach age 65 in 2002, the 90 percent reimbursement rate applies to annualized AIME (AIME multiplied by 12) from 0 to \$6,060, the 32 percent rate from \$6,060 to \$36,516 and the 15 percent rate above \$36,516. From the PIA formula, you can see the distributional effects of the social security.

Retirement Age: Under current (year 2002) rules, you get 100 percent of the PIA each month if you begin receiving benefits at age 65 (the “normal” retirement age). One has the option of retiring at age 62 and getting only 80 percent of the PIA from then on, or at age 67 or 70 and getting somewhat more than 100 percent. These benefits adjustments for early or late retirement are said to be roughly actuarially fair, in the sense of not greatly biasing the average participant’s choice between the alternatives. After 2002, the normal retirement age will slowly increase until it reaches 67 in the year 2025.

Spousal Benefits: Social security also provides spousal benefits, including but not limited to survivorship benefits. Once you reach age 65, you are entitled to 50 percent of your retired spouse's PIA (on top of his or her benefits) while he or she is alive, increasing to 100 percent after the spouse dies. However, you can not receive both spousal benefits and your own benefits, rather, you get whichever is higher and the other is lost. Minor dependent children of retirees also receive certain survivors' benefits.

Dealing with Part-time Earnings. Between the ages of 62 and 70, if you elected to start receiving social security benefits but have earnings for the year in excess of a dollar ceiling, your benefits for the year are reduced. In 2002, for example, beneficiaries between ages 62 and 65 will lose 50 cents of social security benefits for every dollar of earnings above a threshold amount (around \$11,000); those between 65 and 70 will lose 33.3 cents of benefits for every dollar of earnings above \$30,000.

Income Taxation of Benefits. Under a maddeningly complex set of rules, Social Security benefits are excluded for income tax purposes by individuals with modified adjusted gross income below \$25,000 (\$32,000 for married couples). Above that point, the benefits are 50 percent includable, and the resulting income tax revenues officially attributed to the social security trust fund. The inclusion percentage rises to 85 percent for individuals with modified adjusted gross incomes above \$34,000 (\$44,000 for married couples), with the extra revenues from the increase in inclusion percentage being officially attributed to Medicare.

To summary: From the above quite complicated rules relating contribution to benefits, the social security system has a major drawback: *lack of transparency*. It seems to be an untold secret of Washington politicians that social security is redistributive (presumably for political reasons). Lack of transparency may contribute to the difficulties in reforming social security, as myths and reality get confused together.

2.1.2 The Often-mentioned Reasons for Social Security Reform

1. **Fiscal Imbalance:** without changes, the social security trust fund may be depleted in the 2030s.. The Social Security Trustees' projections about the Trust Funds are based on assumptions about demographic and economic trends over the next seventy-five years. The Trustees make three sets of predictions based on optimistic, intermediate, and pessimistic assumptions about future conditions. The fiscal conditions for Social Security are dramatically different depending upon which assumptions are used. Under the intermediate

assumptions, the Trust Funds would be fully spent in 2032. [The projections vary year by year, you can check the Annual Social Security Trustees Report for updates.]

Why is this happening now? It is because of the modified pay-as-you-go nature of the U.S. social security system. The financial viability of such a system depends on (1). the ratio of the number of workers to the number of retirees; (2). the rate of increase of productivity. In the U.S. the ratio of covered workers to OASDI beneficiaries has decreased dramatically from more than 16 to 1 in 1950 to slightly more than 3 to 1 today, and it is anticipated to further decrease to 2 to 1: the reasons are, earlier retirement ages, increase longevity, and slower population growth. Productivity growth in the US. has slowed down by more than a half since 1973.

2. Adverse Effect on Savings: The provision of social security reduces individuals' need to save for retirement. There is concern that this leads to lower aggregate savings, hence lower investment and growth in productivity. Martin Feldstein in his paper "Social Security, Induced Retirement and Aggregate Capital Accumulation" (JPE 1974, 905-926) claims that social security may have led to a reduction in private savings in the U.S. of as much as 60 percent, others have argued that the effects are much smaller and the system may indeed have encouraged saving.

Even though the theoretical case is not clear, empirically the U.S. national saving rate has been declining for the past 35 years, and some suspect that social security may be responsible for the low rate of personal saving in the U.S. (even though the evidence is very scarce).

3. Adverse Effect on Labor Supply: Social security has an effect on labor supply: it induces individuals to retire earlier than they otherwise would. In 1950, 83.4 percent of men aged 55 to 65 were employed; by 1990, only 67.8 percent of men in this age group were working. Today most men and women retire before age 65 and almost 60 percent receive social security benefits at age 62, when reduced benefits for early retirement first become available. The large decline in labor force participation of those over 65 has occurred at exactly the same time that there has been a large increase in social security benefits per recipient (between 1968 and 1976, real benefits were increased by 39 percent).

However, the decline of labor force participation of older workers is also related to the employer-provided pension plans. In most private pension plans, the value of a worker's pension declines substantially if he or she continues to work past age 65, and often past age

55.

4. Low (Perceived) Rate of Return: Now we often hear that social security needs reform because it provides a rate of return lower than that obtained in private retirement accounts. The complaint was not heard in the past because then benefits far exceeded contributions. This complaint is not quite accurate: the return of the social security trust fund should be contrasted with a security with comparable risk properties (and it does favorably well). The return is substantially lower than obtained on the stock market when it is having a boom (as from 1995-2000), but the stock market has a much higher risk.

Moreover, the criticism is also misplaced. The U.S. has a pay-as-you-go system, and in such a system, the long run return (in equilibrium) is related to the rate of growth of the economy, which will be typically lower than the rate of return on capital. [Consider an OLG model. Suppose that there is no productivity and population growth. Then each old will get exactly the same as their contribution, a return of “zero”. Of course, the rate of return to capital in such a stationary equilibrium is not zero.] The low rate of return is not the result of a failure to invest well, rather it is simply the result of having a pay-as-you-go system.

5. Inequities: We mentioned earlier that in the U.S. social security system, those who make similar contributions get back on average different amounts. That is, their expected paybacks differ because of differences in family status. To some, these differences are viewed as inequitable: why should someone simply get more because he or she chooses to get married?

2.1.3 What are the Proposals of Social Security Reform?

The reforms that have been proposed can be categorized into three kinds:

A. REDUCING EXPENDITURE.

- 1. Adjustments of Benefit Formula:** The formula for determining benefits could be adjusted in ways which would slightly reduce expenditures and might even enhance efficiency and equity. For example, currently benefits are based on the highest 35 years of contributions. Individuals who work longer, but whose income in those later working years is not among their best, receive no increase in benefits in return for their additional contributions. The benefit formula could be adjusted to have a less discouragement to work in later years.

2. **Adjusting the Normal Retirement Age:** The 1983 reforms increased the normal retirement age at a gradual pace, to 67 by the year 2022. The argument for increasing the retirement age is that better overall health has led to increase longevity (which is a reason for the system's financial problem); and on average individuals should be able to work longer. [To take care of individuals with poor health, the disability insurance coverage will expand.]
3. **Adjustment of the Cost of Living Index:** Recall that PIA is indexed by the rate of inflation as measured by the consumer price index (CPI). There is widespread agreement that CPI overstates increases in the cost of living.
4. **Means Testing Benefits:** Social security is a redistributionary program, but it does not look at the overall well-being of the recipient, but only on his/her social security wage income. A billionaire who worked little during his life - and so had low wages - would receive back far more than his social security contributions, an amount identical to that received by an unskilled worker with the same history. *Opposition to means testing is very strong, because it would make explicit the redistribution role of social security.* Social security advocates worry that in the long run, this will undermine support for the program.

B. INCREASING REVENUES.

1. **Taxing the Social Security Payments:** Some propose that security benefits a retiree receives beyond what he or she contributed to the system as a worker would be taxed as ordinary income. Other retirement plans, such as some IRAs, already are taxed in this matter.
2. **Extending Social Security Coverage:** Currently, about 3.7 million state and local government employees are excluded from the program. Subjecting government workers to social security payroll taxes would bring more revenues into the system.

C. STRUCTURAL REFORMS.

1. **Investing Trust Funds in Equities:** The equity premium (about 4%) in the long run implies that the financial position of social security would be improved if a fraction of the social security trust fund were invested in a broad base of equities. Three

objections: first, risk; second, the cost of government borrowing will be higher because currently, social security trust fund invests solely in government debt); third, the resulting government ownership of equities would affect the private equities market.

2. **Privatization:** Since the current system is pay-as-you-go, privatization requires funding the unfunded liability which currently is about 9 trillion dollars. [Chile, which as a privatized social security system used the funds from privatization of its copper mines to fund the unfunded liability.] If one raises tax to fund the unfunded liability, then the problem of the current social security would disappear as well without privatization.

2.2 Social Security Privatization

2.2.1 A Privatization Plan (Mitchell and Zeldes 1996)

Mitchell and Zeldes (1996) attempted to provide a more detailed privatization plan that consists of two key steps:

1. Allocate all *future* contributions to a two-pillar arrangement. The first pillar would entail a small *demogrant*, or minimum pension for retirees who contributed to the system over a full lifetime of work. The second pillar would be a *fully funded, individual, defined-contribution account*, financed by payroll taxes, held in financial institutions, and directed by participants;
2. Compensate current system participants for loss of promised benefits by giving them specially issued government “*recognition*” bonds worth no more than the value of their accrued benefits minus the present value of the demogrant.

Under this system retirement consumption would be supported by the demogrant in the form of an indexed annuity, funds from individual social security retirement account, and other privately accumulated funds.

Note that recognition bonds above is basically the unfunded liability. Who would fund the recognition bonds? This is an unaddressed question in Mitchell and Zeldes (1996).

Mitchell and Zeldes (1996) then compares (heuristically) the current system and the privatization plan assuming that both systems are solvent in the following aspects: risk and

insurance; redistribution; household behavior (portfolio choices, saving and work); macro economics implications (national savings rate, rate of return, and administrative costs.

2.2.2 Evaluating the Social Security Privatization Plan (Geanakopulos, Mitchell and Zeldes 1998)

Reference: GMZ's paper: "Would a Privatized Social Security System Really Pay a Higher Rate of Return?"

The goal of the paper is to challenge the following popular argument: (a) projected return to social security are low relative to expected returns on stocks and bonds, and therefore (b) everyone would receive higher returns and be better off if we moved to a privatized system where individuals could directly invest their contributions in stocks and bonds.

They first draw a clear distinction of three terms:

1. **Privatization:** Replacing the currently mostly unfunded defined-benefit social security system with a defined-contribution system of *individual accounts held in individual workers' names*.
2. **Diversification:** Investing funds (either from the personal account or from the social security trust fund) into a broad range of assets, including U.S. equity, private bonds, foreign securities, in addition to the government bonds now used exclusively by the social security trust fund. [The current focus os on diversifying into stocks.]
3. **Prefunding:** Reducing the sum of the system's implicit and explicit debt (or unfunded liability).

The distinction of these three terms is important: it makes clear that privatization could be done without diversification by simply establishing individual accounts that hold exclusive government bonds. The Mitchell and Zeldes privatization plan outline above deals with the prefunding issue by issuing "recognition bonds" guaranteed by the U.S. government to be paid back by future tax receipts.

GMZ examine the claim that a privatized, diversified social security system could deliver higher returns without any additional prefunding?

I. Are Projected Rates of Return on Social Security lower than those on U.S. Capital Market?

Historically the rate of return from the stock market (as proxied by S&P 500) is 9.4 percent annually, and the rate of return on intermediate term government bonds was 2.3 percent. However, the rates of return under social security is cohort-specific and depend on a host of variables such as mortality, population growth and real wage growth (or the productivity growth). The early cohorts under social security received very high internal rates of return in real terms: over 35 percent per annum for workers born in 1876, 12 percent for cohort born in 1900. Then the IRRs fell over time for subsequent cohorts, dropping down to 1.5 percent for those in 1998.

As we argued before, the projected social security returns are low not because of waste of inefficiency, rather it is a consequence of the system being a modified pay-as-you-go system. In a pay-as-you-go system, the rate of return of social security is determined by population and productivity growth. The liability of the social security system currently is the result of the fact that early generations received a large positive net transfer from social security since the present value across all cohorts (from beginning of the system forward for the infinite future) of the net transfers received must sum to zero.

II. Are low social security returns a valid reason to support privatization?

In supporting privatization, one argument is the following: if projected returns on social security are significantly lower than those offered in the U.S. capital markets, doesn't it immediately follow that we would all be better off if were allowed to invest social security contributions directly in private securities? GMZ argue such claim (1) ignores the transition costs (ie. how do we eliminate the implicit social security debt); (2) does not account for changes in risk born by participants. Regarding the first point, they argue that if the current implicit liability of the social security system is funded by raising taxes, then the rate of return on a privatized system, net of new taxes needed to pay the appropriate interests on the recognition bond debt, would be identical to the low rate of return on the current system. Regarding the second point, it is clear that the equity market has a higher risk, so the question is whether the higher return from equity can more than compensate for its higher risk. They went through the neutralization reasoning for diversified workers, and argue that the real economic benefits to privatization comes from the diversification that would be made available to households that cannot participate on their own in diversified capital markets. They tried to calibrate this latter benefit, and "conjectured" that the number of truly constrained households is probably not that large, and hence privatization

and diversification would have a much smaller effect on returns than reformers typically claim.

2.3 The Effects of Investing Social Security Fund in Equity Market: Abel AER 2001

THE IDEA

When social security invests part of the trust fund in equity, one may argue that this is simply a rearrangement of paper assets without any real allocation consequences (which is simply an application of the Ricardian Equivalence proposition in public finance and the Modigliani-Miller theorem in corporate finance). The argument is that private investors will react to any rearrangement of the social security system's portfolio in a way that completely neutralizes the effects of the portfolio change. For example, if the social security system sells a dollar of bonds and purchases a dollar of equity, private investors would buy a dollar of bonds and sell a dollar of equity. There would be no effect on asset prices or on the integrated portfolio of the private sector and the social security system. However, this argument, like the Ricardian Equivalence Theorem, holds only under a set of assumptions: it requires that all consumers participate in the markets for both bonds and equity, and their holdings of these assets are at *interior optima*. If, for some reason, not every consumer participates in the equity market before social security's change of portfolio, it is possible that real consequences result. Abel presents a simple model of why not everyone participates in equity market based on transactions costs, and then in such a framework investigates (and calibrates) the equilibrium consequences of investing on equity market by the social security on the aggregate capital. [You may think of other reasons of non-participation in the stock market and it would be interesting to investigate such alternative explanations.]

THE MODEL

- OLG model, each consumer lives for two periods;
- Each consumer is endowed with $n > 0$ units of labor when young and labor supply is inelastic; consumers do not work when old. In the population, n is distributed according to CDF $G(\cdot)$, and normalize the aggregate labor units to 1.

$$N \equiv \int_0^{\infty} ndG(n) = 1.$$

- The representative firm's production function is

$$Y_i = AK_i^\alpha (KN_i)^{1-\alpha}, \alpha \in (0, 1)$$

where K_i is firm i 's capital stock, N_i is the labor used by firm i and K is the aggregate capital stock.

- The marginal product of capital is

$$\frac{\partial Y_i}{\partial K_i} = \alpha A \left(\frac{K_i}{N_i} \right)^{\alpha-1} K^{1-\alpha}$$

and the marginal product of labor is

$$\frac{\partial Y_i}{\partial N_i} = (1 - \alpha) A \left(\frac{K_i}{N_i} \right)^\alpha K^{1-\alpha}$$

In equilibrium, $K_i/N_i = K$, hence the gross rate of return on capital and labor are respectively

$$\begin{aligned} R &= \alpha A \\ w &= (1 - \alpha) AK. \end{aligned}$$

- A young consumer endowed with n units of labor earns labor income wn when young, pays social security tax T , which is modelled by Abel as a fully-funded defined contribution: the social security system invests $\theta_b \geq 0$ in riskless bond, and $\theta_k \geq 0$ in risky equity on behalf of each young consumer. When the consumer becomes old, he will receive from the social security a benefit of

$$\theta_b r + \theta_k R$$

where r is the gross rate of return on riskless bond and R is the gross rate on risky capital.

- With whatever income that is left after consumption and social security tax, each young consumer also decides how much to save and how to allocate this saving between riskless bonds and risky capital, subject to a borrowing constraint that prevents young consumers from borrowing to finance consumption.

- **Transaction Costs:** There are no transaction costs associated with investing in riskless bonds, but there is a fixed cost of participating in the stock market. The resource cost of participating is $F_1 \geq 0$ and the utility cost of participating in the stock market is $F_2 \geq 0$.
- Finally the utility function is

$$U = \ln(c - \delta F_2) + \beta E \ln x$$

where $\delta \in \{0, 1\}$ denotes whether the consumer invests in equity or not.

INDIVIDUAL CONSUMERS' DECISION PROBLEM

Omitting the details, Abel showed that consumers can be categorized into three groups based on their investment behavior:

1. The first group, which consists of those with high n , will save some of their disposable income and participate in the stock market. This group is called group H .
2. The second group, which consists of those with intermediate levels of n , will save some of their disposable income but do not participate in the stock market. This group is called group M ;
3. The third group, which consists of those with low levels of n , will consume all of their disposable income and do not participate in the stock market. This group is called group L .

INVESTING SOCIAL SECURITY IN THE STOCK MARKET

Now we consider a *marginal* increase of the investment of social security in the stock market. Such a marginal change will have two effects on the aggregate capital stock:

1. The first effect is the reduction in aggregate saving resulting from the increased consumption of middle-income consumers, who did not participate in the stock market. For these consumers, the social security invests on their behalf in the equity market, allowing them to capture the equity premium (the equity premium arises in this model also because of transactions costs) while not incurring the transactions cost of participating in the equity market. The income effect increased the consumption of group M consumers and reduces aggregate saving;

2. The second effect is the increase in aggregate saving that arises when some group H consumers endogenously switch to not investing in equity market. Those group H consumers who marginally invest in the equity market find that the social security has bought the equity they wanted in their portfolio, and hence substitute their original equity holdings into bond, and save the transaction costs along the way. The marginal propensity to save for these switchers increases the aggregate saving.

Abel then calibrates the net effects, and find the following: if the social security system increases its holding of risky capital by one dollar per capita and reduces its holding of riskless bonds by one dollar per capita, the aggregate holding of risky capital will *fall* by more than 57 cents per capita.