AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

CEPR

Publ 63

CENTER FOR ECONOMIC POLICY RESEARCH

GIANNINI FOUNDATION OF
AGRICULTURAL ECONOMICS
LIBRARY
WITHDRAWN
NOV 11 1986

STANFORD UNIVERSITY * CEPR * PUBLICATION SERIES

This work is distributed as a Policy Paper by the

CENTER FOR ECONOMIC POLICY RESEARCH

100 Encina Commons
Stanford University
Stanford, California 94305
(415) 329-1211

September 1985

CEPR Publication No. 63

PERSONAL SECURITY ACCOUNTS: A PROPOSAL FOR FUNDAMENTAL SOCIAL SECURITY REFORM

by

Michael J. Boskin*

Laurence J. Kotlikoff**
and
John B. Shoven*

*Stanford University

**Boston University

We thank Martin Feldstein, James Tobin and Social Security's Office of the Actuary for helpful comments. Douglas Puffert provided excellent research assistance.

PERSONAL SECURITY ACCOUNTS:

A PROPOSAL FOR FUNDAMENTAL SOCIAL SECURITY REFORM

ABSTRACT

This paper presents a comprehensive Social Security reform proposal, Personal Security Accounts (PSAs), designed to reduce five problems associated with the current system. These are financial solvency, equity, efficiency, uncertainty, and lack of information. Our scheme for modernizing Social Security involves: (1) providing, on a progressive basis, credits for taxes, (2) sharing credits equally between spouses, (3) appropriately allocating credits to the "purchase" (in an accounting sense) of PSA's four insurance policies, (4) using actuarial formulae to determine the size of policies "purchased" with PSA credits, (5) adjusting annually their choice of the marginal PSA discount rate to insure long term financial solvency, and (6) providing annual PSA reports detailing taxes paid and benefits received.

By sharing earnings PSAs eliminate redistribution from single individuals and two-earner couples to one-earner or primarily one-earner couples. By allocating credits to specific needs PSA improves Social Security's provision of Social Insurance. By sending annual reports PSAs reduce information problems. Annual reports also reduce work disincentives by clarifying exactly the additional benefits workers can expect in return for their additional taxes. Finally, by adjusting the marginal discount rate and by guaranteeing PSA benefits the government restores security to the country's major source of retirement finances.

In the course of describing the advantages of the PSA proposal the paper presents some new evidence on the extent of inter- and intragenerational redistribution generated by the current system.

I. Introduction

After Defense, Social Security is the largest program in the federal budget. For more than half of working age households, Social Security taxes exceed personal income taxes. Further, for most elderly households, the future payments they will receive from Social Security constitute their most valuable asset, with the possible exception of their house. Social Security is not only large; it is effective. It has provided substantial income security to the elderly, kept many elderly out of extreme poverty and has transferred hundreds of billions of dollars from younger, wealthier generations to the older, poorer generations. For cohorts of elderly in the 1950s, 60s, 70s, and even 1980s, it has offered a relatively high, if declining, rate of return on tax contributions.

The success of Social Security has diverted attention from a number of significant shortcomings in its design. These problems fall into four categories. They are (1) financial solvency, (2) equity, (3) efficiency, and (4) uncertainty and lack of information.

It is well known that the Social Security System is not funded; its financial assets at any point in time amount to only a trivial fraction of the future payment obligations of the system. The true funding source to meet these future obligations is the taxes or contributions of future workers. The system is in perpetual bankruptcy if these future tax receipts are ignored. However, Social Security is not strictly a pay-as-you-go plan. Such a plan would simply pay to beneficiaries the money which was collected each period from payroll taxes. Social Security does not have the inherent flexibility of such a plan. Instead, it more closely resembles an unfunded defined benefit pension plan, where the benefit formula is not explicitly adjusted to changes in the

cash flow of the system. A major problem with an unfunded defined benefit plan is that it is very susceptible to financial crises. If the benefits are slightly more generous than the taxes collected for a period of time, the system quickly runs into a liquidity problem. The financial position of Social Security depends to a much greater extent on short run business cycles and on long run productivity changes and demographic developments than would a true pay-as-you-go system. This, along with the difficulty in forecasting both demographic and economic developments, explains the repetitive financial crises of Social Security.[1]

The Social Security system is not equitable in that it offers very different rates of return to households in similar circumstances. Some of the distinctions seem quite arbitrary and yet can cause benefits to differ by tens of thousands of dollars. For example, a divorcee who did not work while married is not entitled to any benefits based on the former spouse's Social Security if the marriage lasted less than ten years. However, if married for more than ten years, the divorcee may be entitled to benefits worth $100,000 or more. To us, this seems inequitable, inappropriate, and probably unintentional social engineering. There are other cases. Two earner married couples often receive a much lower rate of return on contributions than one earner families, and single people, on average, do worse than either. Large families benefit from certain aspects of the insurance programs without paying more than smaller families. Those covered participants with short working careers or short careers in jobs covered by Social Security earn a higher rate of return than those with longer careers. In general, the system seems highly inequitable and capricious in its treatment of a vast number of American households.

The uneven treatment and the complicated procedures involved in accurately determining or even roughly assessing one's future benefits leads to the third problem, economic inefficiency arising from the system. The link between contributions and payouts is sufficiently weak that most workers may view their benefits as unrelated at the margin to their tax contributions. This means that the nearly 15 percent contribution rate for Social Security (including the hospital part of Medicare) must be added to the marginal tax rate of the personal income tax in order to compute the total marginal tax rate on earnings. Given that the economic waste due to distortionary taxation rises with the square of the marginal tax rate, it is easy to see that the Social Security payroll tax could be doubling the distortionary costs of the tax system. These extra distortions are unnecessary. If the link between taxes and benefits were made quite tight, then, from the individual's perspective, Social Security contributions would be viewed not as taxes, but primarily as a form of deferred compensation similar to pension contributions, albeit yielding a potentially lower than market return. Social Security contributions would, to a very large extent, be a use of income rather than a tax and would not have the sizeable disincentive affects of the latter.

The complicated benefit formulae just mentioned brings us to our final category of problems with Social Security: uncertainty and lack of information. The typical worker is given no concrete information regarding insurance coverage by Social Security. It takes an extreme effort to determine what a survivor's benefits would be in case of death of a spouse, or what is a reasonable expectation of one's future retirement annuity. Even at the time of retirement, there are numerous stories of different offices of Social Security coming up

with different benefit amounts for the same individual. There is a similar lack of information regarding the disability insurance part of the Social Security program. Most workers have no idea about whether they qualify for disability insurance, let alone how much they would receive should they become disabled. The point is that people face a situation of great uncertainty and lack of information and therefore make uninformed and probably inefficient decisions regarding private insurance coverage and saving.

The revisions of the Social Security system, such as those which occurred in 1983, have been prompted by the system's recurring financial crises. The outcomes have been to change the contribution rates or the benefit formulae or to tax part of the benefits, but the fundamental design of the system has been neither changed nor studied. It is our belief that what is needed to address the four problem areas we have identified is structural reform of the system rather than tampering with tax or benefit schedules.

The Personal Security Accounts (PSA) proposal incorporates many reform ideas that have been previously advanced by members of Congress and government commissions. Chief among these is "earnings sharing," which was recommended by the 1979 Social Security Advisory Council and by the five members of the National Commission on Social Security Reform (Greenspan Commission) selected by the Democratic leadership. In addition, there are several features of the PSA plan that reflect principles of and practices in private saving and insurance markets. These include actuarial benefit calculations, a tight and clear link between contributions made to and benefits received from Social Security, the individual ownership and portability of Personal Security accounts, and annual PSA reports.

Our goal in proposing a reform in the structure of Social Security is not to alter the goals of the system, but rather to meet those goals more effectively and efficiently. In our PSA proposal we recognize the need for mandatory public provision of social insurance; private insurance markets are hampered by severe problems of adverse selection making their pricing far from actuarially fair, and they fail to offer inflation protected life annuities. We, therefore, retain the five insurance functions of Social Security (old age, disability, spousal survivor, child survivor, and old age hospital insurance). We also recognize the desirability of a progressive social security system; the existing Social Security system is redistributive in that it offers a better rate of return to low income participants than to high income ones. This kind of redistribution, which is clearly intentional, could not be accomplished by private insurers. Our proposed reform retains redistribution from high to low income households. In fact it makes it much more explicit and also eliminates the capricious redistribution from low to high income households that now occurs.

A discussion of Social Security reform must discuss the extent to which past policy constrains current options. We have had an unfunded system for nearly fifty years and have accumulated an unfunded liability of several trillion dollars. While the merits of having a funded system can be discussed in theory, switching to a funded system at this point would cause an enormous intergenerational transfer. One generation would be asked to pay for two retirements, their own retirement and that of the retired elderly at the time of the switch. Since this is undesirable from our perspective and likely to be politically infeasible, we accept the continuing unfunded nature of the plan.

We also believe that the system cannot be changed for the currently retired or for those who are near retirement. Therefore, we propose that at the initiation of the PSA reform only those under 45 be enrolled in the new plan; those 45 and older at the plan's initiation would remain under the current Social Security system.

The basic idea of our reform is to tighten the link between contributions and benefits and to offer households an insurance package more customized to their needs. Despite the continued unfunded nature of the plan and its progressivity, the new system would mimic private insurance in many more respects than does the current system. Each individual would have a Personal Security Account. Contributions credited to these accounts will be "spent" (in an accounting sense) for the five types of insurance policies mentioned above in proportions which depend on the age structure of the family. The progressivity of the PSA system results from grossing up credited contributions for those with low incomes and grossing down credited contributions for those with high incomes. The rate of return implicit in the annual "purchase" (in an accounting sense) of additional insurance policies will vary from year to year according to the overall financial circumstances of the system. In this way the system will have the increased flexibility necessary to avoid periodic financial crises. However, previous rates of return used in calculating benefits received for previous contributions are fixed and guaranteed. The system will be more equitable in that rates of return would not systematically differ for one and two earner couples and for single individuals and married couples. The efficiency advantage of our plan stems directly from the tighter link between pay-ins and insurance coverage; i.e., calling the payments contributions rather

than taxes becomes more appropriate. And finally, the uncertainty regarding one's coverage and accrued benefits will be eliminated by sending each participant an annual statement detailing taxes paid, credits received, and insurance benefits "purchased" with the credits.

In the next section, we describe the proposal in detail. Section III analyzes problems of inequity and inefficiency under the current system, pointing out how these problems would be resolved with PSAs. In Section IV we summarize the advantages of the PSA alternative.

II. The Personal Security Account System

The PSA proposal changes Social Security's determination of old age, survivor, and disability benefits. It also modifies OASDI taxation. The proposal does not deal with the health insurance component of Social Security, although reforms similar to those proposed for OASDI seem feasible. The PSA system is designed to adjust the generosity of Social Security automatically to changes in financial projections, but these adjustments are made at the margin, i.e., they affect the accumulation of additional Social Security benefits, but do not alter benefits that were accumulated in the past. These features, as well as the provisions for the transition to PSAs, are discussed here. The main issue with respect to the transition is the establishment of initial PSA accounts for those under age 45; those 45 and older at the initiation of PSAs will not become PSA participants, rather they will continue receiving benefits under the current Social Security System.[2] While we attempt to be as specific as possible in laying out the PSA plan, it should be clear

that we are describing a generic alternative to the current structure of Social Security, i.e., many of the specifics of this scheme could be modified somewhat without altering the basic advantages of PSAs. Our description of PSAs begins with an illustration of the determination of PSA credits and benefits.

A. Benefit determination under PSAs - An Illustration

The provision of benefits under PSAs may easily be understood by considering the example of John and Sally Doe who are ages 41 and 35 in the year 1999. John and Sally have a daughter Josey. All dollar figures in the example are in 1986 dollars and are purely hypothetical in the sense that they may be substantially greater or smaller than those that would actually arise under the PSA plan. In the year 1999 John pays $2000 and Sally pays $1000 in Social Security taxes. Their combined tax payment of $3000 is less than the average tax payment for married couples, so they receive 3600 PSA credits.[3] This illustrates that:

- The PSA system maintains progressivity under Social Security by providing poorer (richer) families with PSA credits that are larger (smaller) than actual family tax contributions.

The 3600 PSA credits are divided equally between John and Sally, and 1800 credits worth of insurance benefits are provided to John, and 1800 credits worth of insurance benefits are provided to Sally. Hence:

- The PSA system involves complete earnings sharing in its determination of benefits.

The Social Security System "spends" John's 1800 credits on the following 4 insurance policies. These policies are additions to those "purchased" for John

in previous years based on previous accumulations of PSA credits. The four policies are: 1) an additional old age annuity, 2) an additional disability annuity, 3) an additional old age spousal survivor annuity payable to Sally if John dies, and 4) an additional child survivor annuity payable to Josey if John dies. Four corresponding additional insurance policies are "purchased" for Sally with her 1800 credits. If John and Sally were childless, Social Security would "spend" none of their credits on child survivor annuities. If John were single with no children all his PSA credits would be spent on an additional old age annuity, and an additional disability annuity. In sum:

- Each of Social Security OASDI's 4 major types of insurance are provided by PSAs. Social Security tailors its "purchase" of these policies to the specific needs of each family.

The allocation of John's 1800 credits to the four additional insurance policies is determined exclusively by Social Security in light of John's family composition; i.e.,

- Like the current Social Security System, the PSA System entails forced saving and forced purchase of disability, survivor, and old age health insurance.

John's 1800 PSA credits are "spent" by Social Security in the following way: 1200 credits are "spent" on an additional old age annuity, 270 credits are "spent" on an additional disability annuity, 200 are "spent" on an additional spousal survivor annuity, and 130 are "spent" on an additional child survivor annuity. This allocation is purely hypothetical. The Social Security

Administration would establish a simple formula for allocating credits amoung the insurance policies that would take into account the composition of the family and the age of the participant. Thus Social Security would allocate relatively more credits to the purchase of disability insurance for younger participants than for older participants, since the need for disability insurance is obviously much greater for a worker age 30 than for one age 60.

B. Actuarial Benefit Calculations

The amount of each annuity "purchased" with the PSA credits is based on an actuarial calculation that equates the present expected value of each annuity's payments to the amount of credits spent on that annuity. The rate of return used by Social Security in 1999 in these actuarial calculations is identical for all policies and all PSA participants. Thus, apart from PSAs' explicitly progressive provision of PSA credits,

- All PSA participants receive identical rates of return on their PSA credited contributions.[4]

Actuarial Benefit Formulae

<u>The Old Age Annuity</u>. This annuity is available starting at age 62 independent of the recipient's labor earnings. For a participant age a in year t the additional old age annuity, A(a,t), "purchased" with PSA age a, year t credits, C(a,t), is determined by formula (1):

$$(1) \qquad C(a,t) = A(a,t) \sum_{i=62}^{100} \frac{P_{i,a}}{(1+r_t)^{(i-a)}}$$

where $P_{i,a}$ is the probability the PSA participant will survive to age i given that he or she is currently age a. In (1) A(a,t) and C(a,t) are both measured in dollars of constant purchasing power, i.e.,

- PSA annuities are fully indexed for inflation.

The term r_t is the guaranteed real rate of return paid on all PSA credits in year t. We describe below Social Security's annual determination of this rate of return. The total indexed old age annuity received by PSA participants starting at age 62 is the sum of the annuities, the A(a,t)s, "purchased" at each age.

Spousal Survivor Annuity. Surviving spouses age 62 and over are eligible to receive the sum of all spousal survivor annuities purchased in any year by any deceased spouse. The actuarial formula determining the purchase of additional spousal survivor annuities in exchange for additional PSA credits is presented in the appendix.

Child Survivor Annuity. This annuity is the sum of all child survivor annuities that are still in effect and that were purchased by any decedent parents on behalf of the child. The annuity is paid to surviving children prior to the child's attaining age 18. Unlike the spousal survivor annuity, the child survivor annuities are five year term insurance policies providing an annuity to a surviving child based on the natural parent's death within five years of the time PSA credits are spent on this form of insurance. The five year term policy assures an adequate level of child survivor protection in the case parents die when the child is quite young. They also assure continued insurance protection (for 5 years) in case a parent or parents become unemployed and suffer a drop in their accumulation of PSA credits. The actuarial formula determining these 5 year term child survivor annuities is presented in the appendix.

Disability Annuity. Like the child survivor annuity, PSA disability annuities are designed as five year term policies, providing benefits in exchange for PSA credits if the insured participant becomes disabled within five years of the purchase of the policy and is under age 62 at the time of the onset of the disability. Each year's expenditure of PSA credits on disability insurance will provide additional five year term disability annuities to the participant. In the event of disability, the disabled participant will collect the sum of the annuities purchased in the current year and the proceeding four years. PSA disability insurance will provide annual payments to disabled workers prior to their attaining age 62. In addition, this insurance policy will have a PSA credit surrender value at age 62 that will be spent on an additional old age annuity. This feature will insure that workers who become disabled when quite young will receive adequate old age income after age 62 despite their having accumulated a relatively small old age annuity prior to age 62. Since the age 62 cash surrender value is designed to protect the young disabled, its size relative to the disability annuity will be a decreasing function of the participant's age. The actuarial formula determining this annuity is presented in the appendix.

C. Personal Security Accounts - Annual Reports

Tables 1 and 2 present a hypothetical PSA report for John Doe in 1999 with the dollar amounts expressed in 1986 dollars (the actual 1999 PSA report would have dollar amounts expressed in 1999 dollars). The first table indicates John Doe's past and current tax payments and accumulation of total PSA credits as well as the allocation of these credits to the 4 insurance policies. The second

table shows the annuities that are purchased with John Doe's PSA credits, and indicates the extent to which these purchased annuities are payable; recall that child survivor and disability annuities purchased more than five years in the past are no longer payable, since these are five year term policies.

Consider Table 1; since John does not marry Sally until he is age 36, and Josey is born when John is 38, no credits are allocated to spousal survivor insurance and to child survivor insurance until John reaches the respective ages 36 and 38. In the first year that John begins working -- when he is age 21 -- Social Security allocates a disproportionately large share of his credits to the purchase of an initial disability annuity. This adjusts for the fact that if John becomes disabled after 1 year he will only receive the disability annuity purchased at age 21, while if he becomes disabled at, for example, age 30 John will receive the sum of the 5 disability annuities purchased at ages 25, 26, 27, 28, and 29. A similarily disproportionately large share of PSA credits is allocated to the purchase of child survivor benefits in the first year that Josey appears since the child survivor policies are also 5 year term policies.

The annuities indicated in Table 2 are purely hypothetical, i.e., they do not reflect an actual actuarial calculation based on the PSA credits of Table 1. The point of the Table is to illustrate simply PSA reporting. As mentioned, the age 65 disability credit surrender amounts finance additional old age annuities for those who become disabled prior to age 65.

D. Individual Ownership and Portability of PSAs

Like John, Sally owns her own PSA account. If John and Sally become divorced, they keep their PSA accounts and, assuming they or subsequent new

spouses pay Social Security taxes, they continue to accumulate PSA credits and PSA insurance annuities. For example, in the case of Old Age annuities the additional annuities purchased when young simply add to those purchased when divorced in determining the total Old Age annuity. While a divorcee spends none of her additionally accumulated PSA credits on survivor insurance for his or her former spouse, the former spouse is still eligible to collect an old age survivor annuity based on purchases of such annuities by the former spouse during their years of marriage. If the divorced couple has children from their marriage, each former spouse is required to buy child survivor benefits for each of their children. Hence:

- PSA accounts are individually owned and are completely portable, but the PSA system requires divorced parents to continue to purchase survivor insurance for children of previous marriages.

E. Taxation and Accrual of PSA Credits

Social Security tax collection would be changed slightly from current practice by taxing combined earnings of spouses at scheduled rates, rather than taxing each spouse separately. For married couples under age 62, the proposal establishes a covered earnings ceiling on the couple's combined earnings and collects taxes on earnings up to this ceiling. For single heads of households a 30 percent lower earnings ceiling is established. These changes are appropriate since single individuals typically have smaller insurance needs than married couples. Relative to the current system only high income, single-earner couples will experience tax increases. The proposal leaves unchanged the time path of scheduled Social Security tax rates.

Under the fully phased-in PSA System, Social Security taxation and the accrual of PSA credits and benefits ceases once a participant reaches age 62. In the case of married couples, younger spouses are taxed as single individuals once the older spouse reaches age 62. Assuming these younger spouses are still working, they will continue to accrue PSA credits and purchase benefits that enter into their own Personal Security Accounts. The earnings of spouses over age 62 will be taken into account in the progressive provision of PSA credits in exchange for Social Security taxes.

F. Social Security Financing and Choice of Annual Guaranteed Rates of Return

The PSA proposal involves no significant change in the time path of aggregate Social Security taxes or aggregate benefits. Under PSAs Social Security would continue to be self financing with benefits paid to older retired generations financed by taxes on young and middle age workers. Unlike the current system, however, the PSA System has provisions that would avoid short term funding crises such as those of 1977 and 1983 and that would automatically eliminate long run deficits.

The choice of the term r_t, the guaranteed rate of return to be used in calculating each year's purchase of additional annuities, appearing in equation (1) and the equations in the appendix will be choosen each year by an independent Board of Actuaries to insure long-run balance between benefits and taxes and the preservation through time of a significant trust fund equal to at least three years of benefit payments. The significant trust fund will insulate the system from short run fluctuations in tax receipts due to recessions, and the annual rate of return will be automatically adjusted to

maintain balance in present value between tax receipts and benefit payments over the succeeding 75 years. Hence, as demographic or economic projections change, the annual rate of return will be adjusted downward in the case of projected 75 year deficits and upward in the case of projected 75 year surpluses. Since the government will guarantee the payment of all purchased annuities, the Board of Actuaries will use conservative projections in determining the annual rate of return. It is important to note that changes in the annual rate of return only affect the purchase of additional benefits and leave unchanged PSA policies purchased in the past, i.e.:

- The choice of each year's rate of return will only affect the calculation of the purchase of retirement, survivor, and disability annuities in that year; annuities purchased in previous years based on previous rates of return will never be altered.

G. The Transition to PSAS

In order to minimize disruptions for those retired, those soon to retire, and those who are disabled,

- All Americans 45 years and older and those currently receiving Social Security disability payments are exempt from the PSA System and will continue to pay taxes and receive benefits as mandated under current law.

For Americans under age 45 at the time of the introduction of PSAs benefits will be determined based on their PSA credits.

1. Determination of Initial PSA Credits.

At the start up of the PSA system all PSA participants will receive an initial allocation of PSA annuities. These annuities will be calculated by treating each initial PSA participant (those under 45) as if he or she had always been enrolled in the PSA system; i.e., Social Security will use information on past tax contributions, past marital status, and past birth of children to determine the PSA credits that would have been earned and the PSA annuities that would have been purchased in each year in the participant's past.

While we realize that this counterfactual historical simulation will require somewhat more information than is currently available to Social Security, particularly marital and birth of children histories, we feel such information could easily be obtained from PSA participants. Random auditing of this information plus penalties for fraudulent statements should minimize problems of cheating in the provision of this information. In simulating PSA histories we propose that the Board of Actuaries use a 3 percent real rate of return for each past year's annual PSA rate of return.[5]

Treatment of Couples with One PSA Nonparticipant. During the transition to complete PSA participation there will be couples in which one spouse participates in PSAs and the other does not; i.e., in these cases one spouse is younger than 45 and one spouse is 45 or older at the time of the initiation of PSAs (this includes participants and nonparticipants who subsequently marry). In these cases Social Security will calculate PSA credits and annuities for the participant pretending that his or her spouse is also a

participant. For the nonparticipant Social Security will calculate Social Security benefits based on current law pretending, where relevant, that the PSA participant is a nonparticipant.

2. Taxation during the Transition

At the initiation of PSAs all couples, including nonparticipants, would be taxed based on the PSA method of taxation, which has a higher taxable earnings ceilings for couples. For high earning PSA nonparticipants who are single this will mean a small reduction in taxes relative to the current system, and for certain high earning couples this may mean a small increase in taxes. But, as described below, such a change would reduce some of the current system's more egregious inequities.

H. Other Features of Personal Security Accounts

1. Initial Age of PSA Participation

PSA's initial age of participation is 18. Participants married to nonparticipants under age 18 will receive PSA credits and annuities in the same manner as described above for the case of older participant-nonparticipant couples.

2. Universal Coverage

All Americans under 45 at the initiation of PSAs will be enrolled in the program. The method, described above, of allocating initial PSA annuities avoids the problem of giving excessively large returns to many new enrollees. Such a problem would arise if the current Social Security system immediately instituted universal coverage.

3. Elimination of Earnings Testing and Income Taxation of PSA Benefits

Under the PSA system PSA benefits would not be subject to an earnings test, nor would PSA benefits be subject to income taxation.

III. Problems of Inequity and Inefficiency Under the Current System and Their Resolution Under PSA

A. Equity Issues

Under the current Social Security system a variety of benefits beyond the worker's basic retirement annuity are available to qualifying dependents with no requirement that the worker contribute additional amounts to pay for these benefits. These "marginally free" benefits include dependent benefits for current and former spouses, survivor benefits for current and former spouses, and survivor benefits for children. Since these marginally free extra benefits are not earnings tested, many of the recipients of these transfers are quite well-to-do middle and upper income households. Those who pay for these transfers are single workers with no dependents and low, middle, and upper income two earner couples that qualify for either no or quite small dependent benefits. These workers are taxed the same as those with qualifying dependents, but their families receive little or none of the system's marginally free benefits.

The amount of lifetime marginally free benefits can be very sizeable relative to the worker's lifetime tax payments. Table 3 presents projections of lifetime OASI benefits and taxes for different middle income households under current law.[6] The households are married couples in three cohorts in

which the husband's share of total household labor earnings ranges from 50 to 100 percent. The calculations take 1985 total household labor earnings of $25,000 as a benchmark. The three cohorts are the cohort born in 1930, the cohort born in 1960, and the cohort that will be born in 2005. In the calculations total household labor earnings prior to 1985 equal $25,000 deflated by a wage growth factor reflecting growth in average wages between the year in question and 1985. Total household earnings in future years equal $25,000 times a growth rate factor reflecting the growth in real wages projected by the Social Security actuaries in their intermediate 1985 projection and the projected age profile of earnings. Lifetime benefits and taxes, including income taxation of Social Security benefits, are calculated as present expected values as of age 25 using male and female mortality probabilities. Lifetime benefits include retirement and spousal survivor benefits, but do not include child survivor benefits, disability benefits, or health insurance benefits. Lifetime social security taxes exclude disability and health insurance taxes. All dollar figures are expressed in 1985 dollars. A three percent real interest rate is used in forming present values.

The table points out two well known types of redistribution in the current system. First there is an intergenerational redistribution. Earlier cohorts are projected to fare much better under Social Security than later cohorts. Thus, for the 1930 one earner couple the present expected value of benefits exceeds the present expected value of taxes by $7,722; this difference is -$48,036 for the middle income, one earner couple born in 2005. These intergenerational transfers are associated with the unfunded financing of Social Security as well as projected changes in the age structure of the population.

Most observers believe as do we, that this intergenerational redistribution, while probably not fully intended, cannot and should not be changed radically or rapidly for political and other reasons.

The second type of redistribution, intragenerational redistribution, is another story. As mentioned, redistribution between one and two earner couples arises because dependent and survivor benefits are available to non-working spouses with no additional tax contributions required from the working spouse. The redistribution between such couples is substantial, and it is projected to continue indefinitely.

Compare for the 1960 cohort the current system's treatment of one-earner couples and two-earner couples in which both spouses are equal earners. The difference, in expected present value, of lifetime benefits less lifetime taxes for these two couples is $15,309 [-24,899 - (-40,208)], which represents over three fifths of the couple's 1985 earnings. This redistribution occurs for older cohorts and is projected to continue into the indefinite future; for the 2005 cohort the difference in treatment of one and two earner couples represents $28,713.

Measured as a fraction of age 25 annual earnings the redistribution from two-earner to one-earner couples is even larger for lower income and higher income households (Table 4). For couples born in 1960 with $15,000 in earnings in 1985 the difference in treatment between one-earner and two-(equal) earner couples is almost a year's earnings. For couples with $50,000 in 1985 earnings, the difference in treatment is over a year's earnings. The progressivity of the benefit schedule provides larger dependent as well as retirement benefits per dollar contributed for lower income couples; hence, the inequality between one-

and two-earner couples measured as a fraction of earnings is greater for lower income than for middle income households. In the case of higher income households, the ceiling on taxable earnings limits the amount of taxes that a single high earner couple pays, although, over a range, it does not limit the amount of taxes paid by the high income two earner couple. Thus, a single earner couple with $50,000 of 1985 earnings is projected to pay $138,302 in present value in Social Security taxes, while a two earner couple in which each spouse earns $25,000 is projected to pay $201,956 in present value in taxes.

An issue not addressed in Tables 3 and 4 is the redistribution between two earner couples in which both spouses always work and two earner couples in which one spouse works sporadically. The table is also deficient in that it takes account neither of child survivor benefits nor of disability benefits and taxes.

Table 4 also demonstrates the unequal treatment between single individuals and one earner married couples as well as between single individuals and married couples in which one spouse accounts for most of the household's total earnings. Take the case of a two earner couple with $15,000 of earnings, $10,000 of which is earned by the husband. The present value transfer is -$6,565 per spouse. For a single male earning $7,500 the present value transfer is -$11,565, or $5,000 less than the per spouse transfer of -$6,565. Another element of redistribution from single to married couples not included in these calculations is the provision of survivor benefits to children.

In addition to transfers from single and two earner couples to one earner or close to one earner couples, the Social Security system also systematically transfers from men to women. In Table 4 the $25,000 male earner who never

marries is projected to lose $25,845 from participating in Social Security. The coresponding female who never marries loses only $14,604. This difference is due to the greater longevity of females.

Equity and PSAs

The PSA proposal eliminates the redistribution from singles and two-earner couples to one-earner or primarily one-earner couples. It does so while still maintaining progressivity in Social Security. Under a PSA system, benefits are tightly tied to tax payments. Households do not receive additional benefits unless they receive additional PSA credits, and households making identical tax payments (per spouse in the case of couples) receive identical credits (per spouse); i.e., the progressive formula relating taxes to credits would be based on taxes paid, in the case of single individuals, and taxes paid per spouse in the case of couples.

Since it appears politically infeasible to use gender-specific mortality probabilities in calculating PSA insurance policies, the PSA plan like the current system, would systematically redistribute from men to women. This redistribution would not, however, be connected to the choice of labor supply of married women; i.e., wives in one earner couples and wives in two earner couples, in which each couple has identical total earnings, receive identical PSA credits.

The earnings-sharing feature of PSAs insures that nonworking spouses who become divorced receive, during their marriage, PSA credits equal to those received by their working spouses. Hence, such divorcees leave their marriages with Social Security benefits, regardless of the length of their marriage.

Abstracting from changes with time in the PSA discount rate, the actuarial discounting feature of PSAs insures that workers who start contributing earlier in life, non-college graduates, receive as good a return on the PSA credits they earn when young as they do on credits they earn when old; i.e., those who start working at early ages are not penalized relative to those starting work at a later age as is true under the current system.

Another equalizing feature of PSAs is that it eliminates those work disincentives facing spouses who will collect as dependents under the current system. At present wives and husbands with low earnings potential who can collect dependent benefits on their spouses' account receive nothing in return for their own tax payments to Social Security. Hence, they face a greater work disincentive due to Social Security than do their working spouses. By basing the determination of PSA credits on total taxes paid, no matter which spouse pays these taxes, as additional dollar of taxes paid by either spouse provides the same additional benefits to the household.

In addition to discouraging the labor supply of second earner spouses, the current system may be needlessly discouraging labor effort of primary earners. The next section addresses the strong possibility that Social Security tax payers do not understand the connection between their tax payments and future Social Security benefits and view Social Security taxes as providing no additional benefits at the margin.

B. Social Security and Economic Efficiency: The Issue of Labor Supply Disincentives

The combined employer-employee Social Security payroll tax rate is currently over 14 percent. Recent estimates suggest that the average marginal

income tax rate is roughly 27 percent (Barro and Sahaskul, 1983). If marginal OASDI and HI payroll taxes provided no marginal Social Security benefits or were incorrectly perceived to provide no marginal benefits, the effective marginal federal government taxation of labor supply would average roughly 41 percent. Since the efficiency costs of distortionary taxation rise as roughly the square of the tax rate, the Social Security payroll tax may be more than doubling the deadweight loss of labor income taxation.

Auerbach and Kotlikoff (1985) use a simulation model to study the efficiency costs of running an unlinked rather than a linked Social Security system. In an unlinked system, benefits are unrelated (at the margin) to tax contributions, while in a linked system every dollar of taxes paid increases benefits at the margin by less than a dollar, a dollar, or more than a dollar, depending on the design of the benefit schedule.

Calculations based on Auerbach and Kotlikoff's model suggest very sizable potential efficiency gains from having a linked rather than an unlinked Social Security system. Their results are illustrative and should not be viewed as providing concrete estimates for the U.S. However, if American workers systematically underestimate actual marginal linkage, the results suggest that the efficiency of the U.S. fiscal structure could be greatly enhanced by providing, at a minimum, better information to workers about the marginal return on their payroll tax dollars, and at a maximum, by substantially increasing the extent of the marginal linkage. Assuming workers incorrectly believe that they receive nothing at the margin in return for Social Security taxes, then the model suggests that the efficiency gains from annual reporting of marginal benefit accrual could be as large as 1 percent of GNP on an annual basis, i.e.,

the possible efficiency gain is equivalent to a 1 percent larger level of GNP this year and every year in the future. This potential efficiency gain is quite substantial relative to other potential efficiency improvements that have been reported in the literature [e.g., Ballard, Fullerton, Shoven and Walley, 1985, Auerbach and Kotlikoff, (1983)].

Actual marginal benefit-tax linkage under the current system can be quite significant for certain workers (Blinder, Gordon, Wise, 1980), but it appears doubtful that many Americans accurately understand the linkage. Indeed, casual conversation between the authors of this proposal and colleagues who are not students of Social Security suggest that most U.S. economists have no understanding of the extent of marginal linkage.

Efficiency and PSAs

An important objective of the PSA plan is making perfectly clear the extent of benefit-tax linkage. The PSA proposal includes annual reports that detail exactly what additional benefits workers receive in exchange for their additional taxes. For certain workers, such as spouses who would collect as dependents under the current system and, therefore, receive nothing in exchange for their Social Security tax contributions, the PSA proposal significantly lowers the tax on labor effort; under the PSA plan additional Social Security tax contributions imply additional PSA credits regardless of which spouse pays the taxes. For other workers, who now mistakenly believe that they receive no marginal benefits in exchange for marginal taxes, the PSA reports would indicate precisely the additional benefits purchased with their additional tax contributions. Finally, for older workers the elimination of

the earnings test under PSAs will eliminate the significant work disincentive confronting the aged under the current system.

IV. Summary

The personal security accounts proposal addresses certain long standing inequities, inefficiencies, and informational problems within Social Security. While it calls for a major restructuring of Social Security for younger and future generations, the proposal preserves the most important features of the present system; it strengthens rather than weakens the government's role and responsibility in running Social Security, and it retains Social Security's four major types of benefits: old age annuities, spousal survivor annuities, child survivor annuities, and disability annuities. The proposal also maintains the progressive nature of Social Security and leaves unchanged Social Security's "pay as you go" financing.

While firm in our basic support of Social Security, we believe that the current Social Security system has serious flaws that cannot be redressed with minor modifications. These design defects appear to generate major inequities, significant work disincentives, and considerable uncertainty about the receipt of benefits. If Social Security were a minor feature in America's economic life modernizing Social Security's design would be of small importance. Such is not the case.

Our scheme for modernizing Social Security involves: (1) providing, on a progressive basis, credits for taxes, (2) sharing credits equally between spouses, (3) appropriately allocating credits to the "purchase" of PSA's four

insurance policies, (4) using actuarial formulae to determine the size of policies "purchased" with PSA credits, and (5) providing annual PSA reports detailing taxes paid and benefits received.

By sharing earnings PSAs eliminate redistribution from single individuals and two-earner couples to one-earner or primarily one-earner couples. By allocating credits to specific needs PSA improves Social Security's provision of Social Insurance. By sending annual reports PSAs reduce potential work disincentives of workers by clarifying exactly the additional benefits that can expect in return for their additional taxes, and by guaranteeing PSA benefits the government restores security to the country's major source of retirement finances.

Table 1

Sample Personal Security Account: Annual Report for John Doe

JOHN DOE
1999 PERSONAL SECURITY ACCOUNT

Social Security #123-45-6789 Current Age 41
Spouse - Sally Doe #1 Child - Josey Doe

PSA CREDITS

Age	Total	Old Age	Disability	Spousal Surv	#1 Child Surv
21	500	250	250	0	0
22	550	440	110	.	.
23	600	480	120	.	.
.	.	.	.	.	.
.	.	.	.		
.	.	.	.	.	.
35	1000	800	200	.	.
36	800	500	180	1.0	.
37	900	575	200	125	.
38	900	300	180	115	3.5
39	1500	870	300	180	150
40	1800	1200	270	200	130

Tax Payments

Age	Amount Paid by John Doe	Amount Paid by John Doe's Spouse
21	480	0
22	535	0
.		
.		
.		
40	1200	600

Table 2

1999 PERSONAL SECURITY ACCOUNT
JOHN DOE #123-45-6789

PSA ANNUITIES

		Disability Annuities				Child Survivor	
Age	Old Age	Purchased	Payable	Credit Surrender Value	Spousal Survivor	Purchased	Payable
21	230	3500					
22	256	1200					
23	241	1250					
.	.	.					
.	.	.					
.	.	.					
35	290	1575					
36	263	1350	1350	15000	300		
37	275	1400	1400	20000	325		
38	187	1200	1200	24000	310	3700	3700
39	362	2000	2000	35000	450	1800	1800
40	450	1850	1850	33500	500	1500	1500

Total Old Age Annuity	10,145
Total Payable Disability Annuity	7,823
Total Age 62 Dis. Credit Surrender Value	127,000
Total Spousal Survivor Annuity	1,885
Total Payable Child Survivor Annuity	7,742

Table 3

Inter- and Intragenerational Inequity

Middle Income Households with $25,000 of Earnings in 1985

(all figures discounted to year cohort was 25)

Cohort	Husband's Share of Total Earnings 100%	67%	50%
1930 COHORT (AGE 25 IN 1955)			
PV Benefits	50,231	44,779	41,591
PV Taxes	42,509	48,817	48,570
PV Transfer	7,722	-4,038	-6,979
1960 COHORT (AGE 25 in 1985)			
PV Benefits	78,257	65,906	60,770
PV Taxes	103,157	101,699	100,978
PV Transfer	-24,899	-35,792	-40,208
2005 COHORT (AGE 25 IN 2030)			
PV Benefits	149,971	126,414	116,915
PV Taxes	198,009	195,102	193,666
PV Transfer	-48,036	-68,688	-76,751

All figures are present expected values measured in 1985 dollars discounted to the year each cohort was age 25. A 3 percent real interest rate was assumed in forming these present values. Earnings prior to and after 1985 equal, respectively, $25,000 times a year specific factor reflecting historic and projected growth in real wages.

Table 4

Intragenerational Inequity

Present Value Transfer 1960 Cohort (Age 25 in 1985)

	Couple				Single	
Total 1985 Earnings	Husband's Share of Total Earnings 100%	67%	50%	1985 Earnings	Male	Female
$10,000	5,283	-1,203	-2,762	$5,000	-4,331	2,756
$15,000	-2,605	-13,129	-15,812	$7,500	-11,565	-3,140
$25,000	-24,899	-35,792	-40,208	$12,500	-25,815	-14,604
$50,000	-61,459	-115,877	-120,263	$25,000	-66,090	-47,385
$80,000	-64,779	-159,607	-192,073	$40,000	-99,694	-86,112

FOOTNOTES

1. See Boskin (1986) for a detailed discussion of Social Security's long term finances.

2. While we prefer age 45 as the critical age for initial PSA eligibility, the PSA plan could certainly be implemented with a younger or older initial eligibility age.

3. In determining the relationship between Social Security taxes and PSA credits, Social Security could clearly be much either more or less progressive than is currently the case, and can also be integrated with any desired change in program size.

4. Rates of return would differ by sex and race if unisex and unirace mortality probabilities are used in the actuarial calculations.

5. A 3 percent real return appears to represent a much higher after tax real rate of return than the average annual risk free real return received by investors in the postwar period.

6. These calculations are similar to those of Pellechio and Goodfellow (1983).

7. This includes 2.9 percent for HI.

REFERENCES

Auerbach, Alan J. and Laurence J. Kotlikoff, "Simulating Alternative Social Security Responses to the Demographic Transition," National Tax Journal, June 1985.

_____ and Laurence J. Kotlikoff, "Social Security and the Economics of the Demographic Transition," in Retirement and Economic Behavior, Henry J. Aaron and Gary Burtless, eds., Brookings Institution, 1984.

_____ and Laurence J. Kotlikoff, "Life Insurance of the Elderly: Adequacy and Determinants," forthcoming in Brookings volume on the Economics of the Elderly, The Brookings Institution, 1986.

_____ and Laurence J. Kotlikoff, "The Efficiency Gains from Social Security Benefit-Tax Linkage," NBER Working Paper No. 1645, June 1985.

Ballard, Charles l., Don Fullerton, John B. Shoven, and John Whalley, A General Equilibrium Model for Tax Policy Evaluation, NBER vol., The University of Chicago Press: Chicago, 1985.

Barro, R.J. and Chaipat Sahasakul, "Measuring the Average Marginal Tax Rate from the Individual Income Tax," Journal of Business 56(4), 1983, pp. 419-52.

Blinder, Alan S., Roger H. Gordon, and Donald E. Wise, "Reconsidering the Work Disincentive Effects of Social Security," National Tax Journal 33(4) December 1980.

Boskin, Michael, Social Security, Towards a Solution, forthcoming, 1986.

_____, Laurence J. Kotlikoff, and John B. Shoven, "Personal Securities Accounts: A Proposal for Fundamental Social Security Reform," presented to the National Commission on Social Security Reform, August 20, 1982.

Burkhauser, Richard, "Earnings Sharing: Incremental and Fundamental REform," in ed: Richard Burkhauser and Karen Holden, A Challenge to Social Security, NY: Academic Press, 1982.

Gordon, Roger H., "Social Security and Labor Supply Incentives," NBER Working Paper No. 989, September 1982.

_____ and Alan S. Blinder, "Market Wages, Reservation Wages, and Retirement Decisions," Journal of Public Economics 14(2), October 1980, pp. 277-308.

Holden, Karen, "Supplemental OASI Benefits to Homemakers," in A Challenge to Social Security, ed: Richard Burkhauser and Karen Holden, NY: Academic Press, 1982.

Johnson, Jon, Richard Wertheimer, and Sheila Zedlewski, "The Dynamic Simulation of Income Model," Volume 1, Urban Institute Working Paper, November 1983.

Kotlikoff, Laurence J., Avia Spivak, and Lawrence H. Summers, "The Adequacy of Savings," The American Economic Review, December 1982.

_____, "Social Security, Time for Reform," Federal Tax Reform: Myth or Reality, Institute for Contemporary Studies, San Francisco, CA, September 1978.

_____, "The Social Security and Welfare System -- What We Have, Want, and Can Afford," in The U.S. Economy in the 1980s, Institute for Contemporary Studies, San Francisco, CA, 1980.

_____, "Reforming Social Security for the Young - A Framework for Concensus," in Controlling the Cost of Social Security, Colin D. Campbell ed., an American Enterprise Institute Book, 1984.

Munnell, Alicia and Stiglin, L., "Women and a Two-Tier Social Security System," in A Challenge to Social Security, ed: Richard Burkhauser and Karen Holden, NY: Academic Press, 1982.

Pellechio, Anthony J. and Gordon P. Goodfellow, "Individual Gains and Losses from Social Security Before and After the 1983 Social Security Amendments," mimeo, June 1983.

President's Commission on Pension Policy, Coming of Age: Toward a National Retirement Income Policy, Washington, DC: Government Printing Office, February 26, 1981.

Report of the National Commission on Social Security Reform, Washington, DC: Government Printing Office, January 1983.

Social Security Financing and Benefits: Reports of the 1979 Advisory Council on Social Security, Washington, DC: Government Priunting Office, December 1979.

United States Senate, Special Committee on Aging, "Women and Social Security: Adapting to a New Era," Washington, DC: Government Printing Office, 1975.

United States Department of Health, Education and Welfare, Social Security and the Changing Roles of Men and Women, Washington, DC: Feburary 1979.

CENTER FOR ECONOMIC POLICY RESEARCH
100 Encina Commons
Stanford University
Stanford, California 94305

CEPR Publication Series

1. Paul A. David, "Microelectronics and the Macroeconomic Outlook," Two Papers for the OECD Working Party on Information, Computer and Communications Policy, April 1982.

2. Timothy F. Bresnahan, "The Impact of Proposed Emissions Rollbacks on the Automobile Industry," April 1982.

3. Ronald I. McKinnon, "A Program for International Monetary Stability," January 1983.

4. Timothy F. Bresnahan, "Automobile Price Indexes by Continent of Origin," November 1982.

5. Ronald I. McKinnon, "Why U.S. Monetary Policy Should Be Internationalized," April 1983.

6. Robert M. Coen and Bert G. Hickman, "Tax Policy, Federal Deficits and U.S. Growth in the 1980's," April 1983.

7. Ronald I. McKinnon, "Dollar Overvaluation Against the Yen and Mark in 1983: How to Coordinate Central Bank Policies," May 1983.

8. Lawrence J. Lau, "The Measurement of Productivity: A Lecture in Memory of Professor Ta-Chung Liu," July 1983.

9. Bert G. Hickman, "Growth, Inflation and Unemployment in the United States," August 1983.

10. Michael J. Boskin, Kenneth Cone and Sule Ozler, "The Federal Budget and Deposit Insurance," November 1983.

11. Michael J. Boskin and Bradford L. Barham, "Measurement and Conceptual Issues in Federal Budget Treatment of Loans and Loan Guarantees," revised December 1984.

12. Claudio R. Frischtak, "Choice of Technology and Economic Growth: A Reassessment," December 1983.

13. M. Elisabeth Paté-Cornell, "Probabilistic Assessment of Warning Systems: Signals and Response," January 1984.

14. Bruce D. Spencer, "Avoiding Bias in Estimates of the Effect of Data Error on Allocations of Public Funds," April 1984.

15. Carson E. Agnew and Richard G. Gould, "Frequency Coordination and Spectrum Economics," Revised March 1984.

CEPR Publication Series (con't)

16. Timothy F. Bresnahan and Peter C. Reiss, "Dealer and Manufacturer Margins," CEPR Technical Report, February 1984.

17. B. Douglas Bernheim, "Dissaving After Retirement: Testing the Pure Life Cycle Hypothesis," CEPR Technical Report, revised March 1984.

18. Bruce D. Spencer, "Sensitivity of Benefit-Cost Analysis of Data Quality," CEPR Technical Report, May 1984.

19. I.P.L. P'ng, "Liability, Litigation, and Incentives to Take Care," CEPR Technical Report, revised May 1984.

20. M. Elisabeth Paté-Cornell and Timothy S. O'Grady, "Reduction of Fire Risks in Oil Refineries: Costs and Benefits of Camera Monitoring," CEPR Technical Report, January 1984.

21. Ben S. Bernanke and James L. Powell, "The Cyclical Behavior of Industrial Labor Markets: A Comparison of the Pre-War and Post-War Eras," revised May 1984.

22. Yoram Weiss, "The Effect of Labor Unions on Investment in Training: A Dynamic Model," CEPR Technical Report, December 1983.

23. Paul A. David, "The Reaper and the Robot (The Diffusion of Microelectronics-Based Process Innovations in Historical Perspective)," revised May 1984. (Same as TIP Working Paper No. 1)

24. Paul A. David and Trond E. Olsen, "Anticipated Automation: A Rational Expectations Model of Technological Diffusion," revised April 1984. (Same as TIP Working Paper No. 2)

25. Josep M Vegara-Carrio, "Software Technological Change: An Economic Approach," May 1983. (Same as TIP Working Paper No. 3)

26. Michael J. Boskin, Marc S. Robinson, Terrance O'Reilly and Praveen Kumar, "New Estimates of the Value of Federal Mineral Rights and Land," revised August 1984.

27. B. Douglas Bernheim, "Life Cycle Annuity Valuation." August, 1984.

28. Arthur T. Denzau, William H. Riker and Kenneth A. Shepsle, "Strategic Behavior in the Theory of Legislatures," CEPR Technical Report, revised June 1984.

29. John E. Chubb, "The Political Economy of Federalism," June 1984.

30. Mathew D. McCubbins and Thomas Schwartz, "The Politics of Derusticication: Court-Ordered Redistricting and Its Policy Effects," July 1984.

CEPR Publication Series (con't)

31. Melvin J. Hinich, "Policy Formation in a Representative Democracy," CEPR Technical Report, revised June 1984.

32. John Mendeloff, "OSHA and Regulatory Theory," June 1984.

33. Timothy F. Bresnahan and Dennis A. Yao, "The Nonpecuniary Costs of Automobile Emissions Standards," CEPR Technical Report, June 1984.

34. Norman Frohlich, Joe Oppenheimer and Cheryl Eavey, "Tests of Rawls' Distributive Justice: An Experimental First Cut," June 1984.

35. John Ferejohn and Roger Noll, "Promises, Promises: Campaign Contributions and the Reputation for Services," CEPR Technical Report, August 1984.

36. Linda Cohen and Roger Noll, "The Electoral Connection to Intertemporal Policy Evaluation by a Legislator," CEPR Technical Report, September 1984.

37. Thomas E. MaCurdy and John Pencavel, "Testing Between Competing Models of Wage and Employment Determination in Unionized Markets," CEPR Technical Report, September 1984.

38. Ben S. Bernanke, "Employment, Hours, and Earning in the Depression: An Analysis of Eight Manufacturing Industries," CEPR Technical Report, revised October 1984.

39. Masahiko Aoki, "The Japanese Firm in Transition," CEPR Technical Report, January 1985.

40. Bruce D. Spencer and Lincoln E. Moses, "Needed Data Quality for an Ambiguous Decision Problem," CEPR Technical Report, January 1985.

41. Michael J. Boskin and Marc S. Robinson, "Energy Taxes and Optimal Tax Theory," revised December 1984.

42. Alan S. Manne, "On the Formulation and Solution of Economic Equilibrium Models," CEPR Technical Report, November 1984.

43. W. Brian Arthur, "Competing Technologies and Lock-In by Historical Small Events: The Dynamics of Allocation Under Increasing Returns," November 1983, revised January 1985. (Same as TIP Working Paper No. 4.)

44. Paul A. David, "Clio and the Economics of Qwerty," December 1984. (Same as TIP Working Paper No. 5.)

45. A. Mitchell Polinsky, "Fixed Price Versus Spot Price Contracts: A Study in Risk Allocation," February 1985.

CEPR Publication Series (con't)

46. Paul A. David, "New Technology Diffusion, Public Policy, and Industrial Competitiveness," revised April 1985. (Same as TIP Working Paper No. 7)

47. Michael J. Boskin and Laurence J. Kotlikoff, "Public Debt and U.S. Saving: A New Test of the Neutrality Hypothesis," May 1985.

48. Partha Dasgupta and Paul A. David, "Information Disclosure and the Economics of Science and Technology," April 1985. (Same as TIP Working Paper No. 8)

49. Paul A. David and Paul L. Stoneman, "Adoption Subsidies vs Information Provision as Instruments of Technology Policy," April 1985. (Same as TIP Working Paper No. 6)

50. Robert M. Coen and Bert G. Hickman, "Social Security and Macroeconomic Activity in 1985-2010: A Forecast with the Hickman-Coen Annual Growth Model," June 1985.

51. Partha Dasgupta and Eric Maskin, "The Economics of R & D Portfolios," April 1985. (Same as TIP Working Paper No. 9)

52. Michael J. Boskin, "Theoretical and Empirical Issues in the Measurement, Evaluation, and Interpretation of Post-War U.S. Saving," July 1985.

53. Masahiko Aoki, "Learning By Doing Vs. The Bounded-Rational Control: An Approach to U.S.-Japan Comparison of Industrial Organization," July 1985.

54. James L. Sweeney and Michael J. Boskin, "Analyzing Impacts of Potential Tax Policy changes on U.S. Oil Security," July 1985.

55. Ronald I. McKinnon, "The Dollar Exchange Rate as a Leading Indicator for American Monetary Policy," August 1985.

56. Ronald I. McKinnon, "Protectionism and the Misaligned Dollar: The Case for Monetary Coordination," October 1985.

57. Tom Lyon, "Trinational Energy Policy Workshop Notes," November 1985.

58. Michael J. Boskin, Laurence J. Kotlikoff and Michael Knetter, "Changes in the Age Distribution of Income in the United States 1968-1984," October 1985.

59. Michael J. Boskin, "Retirement Income Support from the Private Sector," November, 1985.

60. John B. Shoven and Toshiaki Tachibanaki, "The Taxation of Income from Capital in Japan," September 1985.

61. Charles L. Ballard and John B. Shoven, "The Value-Added Tax: The Efficiency Cost of Achieving Progressivity by Using Exemptions," October 1985.

62. Michael J. Boskin, Marc S. Robinson, and John M. Roberts, "New Estimates of Federal Government Tangible Capital and Net Investment," November 1985.

63. Michael J. Boskin, Laurence J. Kotlikoff, and John B. Shoven, "Personal Security Accounts: A Proposal for Fundamental Social Security Reform," September 1985.