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Social Security and the American Family

ABSTRACT

This paper presents the results of a computer simulation of the expected present value of benefits, taxes, and transfers, rates of return, and marginal linkage of benefits and taxes for persons of different income levels and family status. A number of important issues associated with the "deal" and incentives projected to be offered by the current social security system for different family situations are treated: married versus single persons, number of earners in the family and the division of earnings between them, and the special situation of widows and divorcees. The results show tremendous variation for different family situations and often dwarf amounts at stake for most families in the recent debates over income tax reform.

We pay particular attention to items such as marriage penalties and subsidies, incentives to postpone divorce and low marginal linkage of expected benefits to incremental taxes paid by women, whether as second earners in a family, divorcees or widows.

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1. Introduction

Expected Social Security retirement benefits are the largest single "asset" available to most Americans. Social Security is also the source of the largest tax burden for a majority of American workers. Because the program is so large and complex, it is important to understand the investment deal it offers persons and families in different situations, as well as the aggregate financial and economic implications of the program and any changes in it. Expected benefits depend on a variety of factors, such as one's marital status, age, sex, age-earnings profile, length of career, number of children, other income sources in retirement, etc.

The purpose of this paper is to discuss a number of important issues associated with the "deal" and incentives projected to be offered by the current social security system, especially with respect to its treatment of the family. By treatment of the family, we mean the expected benefits, taxes, rates of return and marginal benefits per incremental dollar of taxes paid for persons in different family situations: married versus single, number of earners in the family and the division of earnings between them, the special situation of widows and divorcees, etc.

While a number of authors have commented on various features of the Social Security system affecting people in these different situations<sup>1</sup>, we believe it is worthwhile to refocus attention on

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1. See, for example, essays in Burkhauser and Holden (1982) and the discussion in Boskin, Kotlikoff, Puffert and Shoven (1986).

these specific issues in light of a number of important factors. Among these are the substantial changes introduced by the 1983 Social Security Amendments, the changing actuarial projections used as the intermediate assumptions in the last few years, the dramatic changes in life expectancies, and the rapid change of the structure of American families toward more episodes of divorce, more single person households, and more common and lengthier widowhood than several decades ago, to name a few.

We begin by pointing out that Social Security offers very different ex ante "deals" and marginal returns for incremental taxes paid to persons of different income, family status, age, sex, and income. While this may or may not be desirable, the extent of the differences is not widely appreciated. In particular, the fact that a very substantial fraction of some subgroups in the population receive back virtually nothing for incremental taxes paid and therefore, social security may rightly be perceived primarily as a tax, and not a savings scheme, is among the most important of these problems.

Among the features which treat persons of different family status differently in Social Security are the following:

1. The progressivity of the benefit formula;
2. Survivors' benefits;
3. Spousal benefits;
4. Rules governing eligibility of divorced persons;
5. The ceiling on Social Security taxable earnings;
6. The taxation of one-half of benefits over a certain income level for persons receiving benefits;
7. Child survivors' benefits;
8. The person's age cohort reflecting the maturity of the system, and therefore, their entire tax history.

Each of these factors interact with the important non-Social Security features of differential life expectancies for different groups, most importantly for the issues discussed here, for males and females, and the differential wage level trajectories typical of males and females in the labor force.

There is a substantial variation in the typical Social Security benefits of female new beneficiaries depending upon whether they receive the spouse benefit, their own worker benefit, or in the case of widows, survivor benefits. Of new female beneficiaries in 1982, 64% were part of married couples and 24% were widows. For the former, the most common benefit was the spouse benefit; for the latter, the survivor benefit. About two-fifths of women who were ever married receive benefits based on their own earnings history.

As can be seen from this list of features of Social Security and other factors which affect the deal and the marginal linkage of benefits and taxes, the situation is rather complex. In order to clarify these issues, this paper is organized as follows.

Section 2 presents a cursory literature review and a description of our data and methodology.

Section 3 presents some comparisons among households with different earnings splits and different levels of earnings. We examine a single-earner couple and examples of two-earner couples where the earnings split is two-thirds and one-third between the husband and wife or fifty-fifty between the husband and wife. We present the expected present value of taxes paid, benefits received, and transfers, and therefore, the expected internal rate of return on taxes paid for three total family earnings level indexed to 1985: \$10,000, \$30,000 and \$50,000. These are projected for the cohort of persons born in

1945.<sup>2</sup> Our primary purpose here is not to discuss the intergenerational issues, but rather the intragenerational issues of differential treatment of persons in different family status. The differences often amount to more than the value of a typical family house.

Also presented in Section 3 is a discussion of the second-earners' range of zero-marginal return, i.e., for different levels of husbands' earnings, how much must the wife earn before she begins to receive any incremental return for the Social Security taxes she pays? We also discuss single males versus single females, and singles versus couples. The presence of spousal and survivors' benefits clearly changes the deal offered to couples versus singles.

Section 4 analyzes the marriage penalty or subsidy, i.e., how a man and a woman fare under Social Security if they marry relative to how they fare if they stay single. The amounts involved are substantial, exceeding the much more hotly debated marriage penalty in the personal income tax.

Section 5 discusses the situation for widows and divorcees. We present similar information on the present value of benefits, taxes, transfers, and rates of return, including those in which the widow worked or did not work prior to the assumed date of death of the husband. We also present the various situations defining the range of earnings widows would make without receiving any incremental Social

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2. Boskin, Kotlikoff, Puffert and Shoven (1986) presents details for other cohorts.

Security benefits, or for non-working wives, who start work at two-thirds of their husbands' wage upon widowhood, the age after which they would receive no incremental Social Security benefits despite payment of substantial taxes. Analogous results are presented for divorcees. For the latter, a tremendous incentive exists to postpone divorce until after ten years of marriage. The financial stake can exceed \$50,000.

Section 6 discusses the issue of the marginal linkage of benefits and taxes in more detail. The relation of the expected present value of benefits received for an incremental dollar of taxes paid varies substantially by family status and earnings level.

Section 7 discusses some parallel stories for the cohort born in 1975, given the actuarial projections of the Social Security Administration, ignoring any potential long-term financial solvency problems of the system, and accounting for the major changes relative to the 1945 cohort (i.e., a much larger fraction of women will be assumed to have worked for the bulk of their life by the time they retire).

Section 8 offers a brief conclusion and summary of the results.

## 2. The Present Study in Perspective

Several studies have attempted to estimate the "deal" different households receive or can expect to receive in the future from the Social Security retirement program. It is well known that the early cohorts of retirees had very large rates of return on their taxes and that future retirees, especially wealthy ones, will not fare well relative to rates of return available on private assets.<sup>3</sup>

The primary contribution of this study is to update the results to the post-1983 Amendments situation (of the studies cited only Pellechio and Goodfellow (1983), Boskin (1986), and Boskin, Kotlikoff, Puffert and Shoven (1986) do so), allow for recent changes in the actuarial assumptions to the changing economic and demographic factors, present a wider range of cases, examine the marginal linkage between taxes paid and benefits received, and focus in particular on the situation of women in these updated cases, supplementing the important work in the Burkhauser and Holden volume.

We use a computer simulation to convert assumptions about households' wages, expected mortality, and economy-wide growth in real wages into expected present values of Social Security taxes, benefits, net transfers, and internal rates of return. We also examine the marginal linkage between incremental taxes paid and expected present value of incremental benefits received.<sup>4</sup>

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3. A sample of such studies include Boskin, Avrin, and Cone (1983); Hurd and Shoven (1985); Boskin (1986); Pellechio and Goodfellow (1983); Flowers (1977); Ricardo-Campbell (1977); and several studies in the book by Burkhauser and Holden (1982), of particular importance because it focuses on the role of women in the Social Security system as it existed at the time the essays were written and under various alternatives. See also Boskin, Kotlikoff, Puffert and Shoven (1986), and the survey by L. Thompson (1983).

4. Obviously, in order to conduct these analyses various assumptions have to be made. We consider various aspects of households, i.e., marital status, birth cohort, the amount of total earnings and its division between wife and husband. We calculate expected taxes and benefits using mortality probabilities computed separately for males and females, and separate mortality tables when different cohorts are used. The tables used are those prepared for the intermediate assumptions in the 1983 Annual Social Security Administration Trustees Report.

All earnings levels reported in tables below correspond directly to 25 year olds in 1985. We assume that wages for males increase 1% per

### 3. Comparisons Among Households (1945 Cohort)

Social Security -- both when it was introduced and every time it was expanded -- has been a major vehicle for transferring resources from the younger, richer working generation to the older, poorer retired generation. But these transfers do not occur uniformly across different types of families. Tables 1 and 3 show how the expected present value of benefits, taxes, and transfers for single men and women of different income levels and for married couples vary with different levels and composition of income. In Table 1, we note, moving from single-earner households to an identical earnings stream split between the couple reduces the expected present value of benefits and the expected present value of transfers substantially for all three earnings levels considered. The "deal" as measured by the internal rate of return on expected taxes paid worsens as we move toward a more equal division of the earnings, and obviously, as we move for any type of household to

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year of age, and for females one-half percent per year of age, until age 50. Thus, for the 1945 cohort, male wages in 1985 will be about 16 percent higher than earnings levels listed, since the males will be 40 rather than 25, and female wages will be nearly 8 percent higher (for the same reason). Earnings levels also vary annually with economy-wide wage growth. We use the Social Security Administration's intermediate wage growth assumption (roughly 1 1/2% per year).

We estimate the expected taxation of one-half of future benefits to the extent that that portion of one's benefits plus other adjusted gross income exceeds the non-indexed threshold levels of \$25,000 for singles and \$32,000 for couples. We use the tax law in existence when this paper was written. The results would vary somewhat given the reduction in marginal tax rates in the tax law which is about to be phased in.

For further details, see Boskin, Kotlikoff, Puffert and Shoven (1986).

higher earnings levels. For example, a couple with \$30,000 (at the 1985 wage index) in which the husband was the sole earner would receive a 2.3% internal rate of return on \$136,498 taxes paid, and therefore, suffer a \$27,370 loss discounting benefits and taxes at a 3% real rate of return. The corresponding numbers for a two-third/one-third and one-half/one-half split of income, adding to \$30,000, are 1.75% and 1.45% for the rate of return and transfers of -\$48,715 and -\$54,199. Thus, for the same earnings levels, we see the pattern repeated. Not only does the rate of return vary by family type and earnings level but there is a substantial interaction between the two. For example, for single-earner households, the rate of return received by a \$50,000 earning household is about one-half that for the \$10,000 household (1.95% versus 3.74%), whereas for the household with the equal division of earnings the comparable numbers are 0.61% versus 3.81%, a five-fold rather a two-fold ratio. Clearly, the interaction of the spouse benefit and the incremental taxes paid as the spouse earns a greater amount of taxable income worsens the deal substantially.

Table 2 reports the range of zero-incremental returns for the 1945 cohort for the second-earner. For the same three earnings levels for the primary earner, we report the minimum earnings level per year to receive any incremental return from Social Security taxes paid by the second earner (rather than just collecting the spouse's benefit and "losing" all Social Security taxes paid). Note that this calculation understates the minimum earnings level necessary for second earners with intermittent work histories because it is assumed that this 1985 earnings level will continue each year until retirement.<sup>5</sup> For those

who step out of the work force for some considerable length of time, the numbers would be much larger. As an example, consider the primary earner who is earning \$30,000 per year. If the spouse goes to work, he or she would have to earn almost \$10,000 per year before receiving any incremental return. In short, the first \$9,600 per year of earnings upon which over \$1,000 of taxes would be paid (by the employee and employer) would result in no incremental return to the Social Security benefits for the couple. This is another way to view the difference between the different earnings splits of families.

In short, there is a substantial tax on married women's labor force participation via the spouse's benefit. Until the married woman's own earnings history (if any) is sufficient to produce benefits beyond the spouse's benefit, the entire Social Security payroll tax is a pure tax, with no corresponding presumption of future incremental Social Security benefits. Since the Social Security payroll tax for retirement, survivors and disability exceeds 11% and is expected to rise, this is a substantial extra tax bite at the margin (we take the usual presumption that the employee bears both the employer and the employee component of the tax to be a reasonable first approximation). Under the new income tax reforms, this raises marginal tax rates about 70% and 40% for those in the 15% and 28% brackets, respectively.

Table 3 presents a comparison among single-earner couples, single

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5. The retirement benefit of the spouse is based on an average indexed monthly earning which would include a substantial number of years of coverage.

males, and single females at various earnings levels. The story is much the same as that reported above for single-earner versus two-earner couples, although singles, especially single males fare especially poorly. The reason why single-earner couples do so well reflects the extra benefits due to the joint survivor nature of Social Security benefits for the same taxes paid. Different life expectancies are responsible for the male and female differences among singles. The single-earner couple collects the spouse benefit while both are alive, and survivor benefits are received by a surviving spouse if the single-earner died first. Clearly, in the case of singles, there are by definition no survivors to receive such benefits. Hence, the expected present value of taxes paid is quite similar at each earnings level for each of the three types of households, the expected present value of benefits differs enormously.

For example, at the \$30,000 level the expected present value of taxes is about \$136,000 for single males and single-earner couples and only a few thousand dollars less for single females.<sup>6</sup> However, the expected present value of benefits ranges from \$52,000 for single males to \$109,000 for the single-earner couple.

In brief summary, these tables reveal enormous differences in the expected present value of benefits and rates of returns on taxes paid to different family types at each earnings level and the important

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6. The difference is due to assumptions concerning how earnings rise with age and mortality probabilities.

interaction of family type and earnings level in determining the "deal" various families get from Social Security. While these data are interesting and instructive, we need to probe more deeply into the situation facing widowed and divorced persons. This is especially true because of the likelihood that they will be receiving benefits which are quite low, that they may well be the group in the population most likely to be poor in old age,<sup>7</sup> and because changing family conditions and life expectancies in the U.S. render the treatment of widows and divorced persons increasingly important in an evaluation of the adequacy and cost-effectiveness of Social Security benefits.

#### 4. Marriage and Children

Social Security creates important incentives and provides various subsidies or penalties to family creation and dissolution. For example, there is a huge financial stake in staying married for ten years for those contemplating divorce after a few years of marriage (detailed more fully in Section 5). Likewise, Social Security provides some auxiliary benefits for children, e.g., child survivor benefits. But because of the evolution of the system, these same children will in the future most likely pay much more in taxes than they will receive in benefits. Finally, because Social Security provides spousal survivor benefits, one-half of benefits are taxable under the progressive individual income tax, and a spouse's benefit, a single male and a single female

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7. See Boskin and Shoven (1986).

contemplating marriage may face a marriage penalty or subsidy.

Table 4 presents calculations of this marriage subsidy or penalty for various combinations of the (newly married) husband's and wife's earnings levels assuming that both spouses continue working on the same earnings path. One very important Social Security subsidy is demonstrated in the entries in the table with zero for the Wife's Earnings and the column marked Wife Stops Working. In each of these situations, the couple gets a subsidy given by the spouse's benefit, and avoids the tax payments. The subsidy exceeds \$50,000 in virtually every case. Thus, these couples do much better under Social Security married than as singles. While the wife stopping ~~to~~ work upon marriage is an extreme case, we present these numbers to indicate the value of that "option" to the married couple over its lifetime. For those couples when both spouses continue to work and the wife's earnings are sufficient to generate her own worker's benefits, the table also demonstrates that higher income taxes paid on a portion of Social Security benefits more than offsets the extra value of the survivor's benefit based on the husband's (possibly high) earnings. This penalty can amount to \$9,000 or \$10,000 when discounted at 3%, considerably more when discounted at lower rates. This sum is modest relative to the subsidies to the non-working spouses.

That is not the end of the story, however. Most of those singles who marry will have children, and they in turn, will probably pay considerably more in taxes than they receive back in benefits. While this is unlikely to be of major concern in marriage or fertility decisions, it is interesting to note the expected change in family finances, including the impact from the children's taxes and benefits. Such hypothetical scenarios are presented in Table 5. For several

combinations of parents' earnings and children's expected earnings, we see that the "bad deal" the children get offsets the subsidy to nonworking spouses and substantially increases the marriage penalty for working spouses. The table presumes that our hypothetical singles are from the 1945 cohort, marry and (for simplicity) have two children, one male, one female in 1975. We assume that the children have one earner with the same relative earnings as their father.<sup>8</sup> Since each future couple has two sets of parents, we attribute one-half of the deal to each child in this couple.

Social Security provides various incentives and redistributions because of its many rules and features, such as the spouse benefit, the survivor benefit, taxation of individuals (as opposed to families), etc. In some cases, as documented above, the redistribution is large relative to the disputes over features of the personal income tax. Some of the marriage subsidies are much larger than the annual small marriage penalty in the income tax. The marriage penalties, and poor deal for children, in combination, also can be many times the marriage penalty in the income tax. Whether the marginal incentives are sufficient to change behavior, such as labor force participation and family formation and dissolution is less obvious. Clearly, some of the incentives, such as staying married a tenth year if contemplating divorce after nine years of marriage, are likely to be so strong as to affect behavior noticeably. The spouse benefit rendering the payroll tax a pure tax with no incremental return, undoubtedly reduces the labor supply of

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8. Note, that this means the negative transfers are the smallest for any of the family patterns.

married women. Other incentives exist, but may only affect behavior slightly, if at all.

#### 5. Widowhood and Divorce

Tables 6 and 7 present comparable information to that presented above for archetypical situations for widowed and divorced women. While comparable information could be generated for widowers and divorced men, they are, at least historically, of somewhat less interest given the much higher male labor force participation rates than that for females. The projected treatment of widows born in 1945 at various earnings levels and discounted to constant 1985 dollars reveals some interesting facts. Our archetypical situation contemplates a widow who loses her husband when they are both age 50. The expected present value of benefits include survivor benefits where applicable and retired worker benefits where applicable. The present value of taxes, of course, includes taxes paid by the husband before his death. As can be seen by comparing Tables 6 and 1, widows who lose their husbands at relatively early ages get a much poorer internal rate of return than persons in couples of comparable earnings levels. We assume that in the case of the single earner being the husband that the widow does not go back to work. Widows who lose their husbands at age 50 almost certainly would not earn enough to receive retired worker benefits in excess of their survivor benefits. Hence, Table 6 substantially overstates their rate of return because it excludes any taxes paid beyond age 50 if the widow goes back to work prior to retirement. We also ignore the possibility of remarriage for the purpose of this calculation.

The rates of return for widows in the middle and upper earnings

range are quite low, even negative for those who were working and will continue to work after their husbands' deaths. To take the example of the one-half/one-half earnings split, discounted at a real 3% rate and adding up taxes paid at the same rate, the widow who is from a couple where each of the earners earned \$25,000 adjusted for inflation and productivity growth as of 1985, would lose \$144,000 because she and her deceased husband paid in taxes of \$204,000 and received back slightly less than \$61,000 in expected present value of benefits. The internal rate of return is approximately minus one-half of one percent. Only in the case of single-earner low-income households do widows receive a rate of return comparable to our assumed 3% real discount rate.

In comparing similar columns and rows from Table 6 with those in Table 3, several important facts must be noted. First, the widows get a much worse "deal".<sup>9</sup> Next, Table 3 is completely ex ante, i.e., everything is in expected value terms. Table 6 is somewhat ex post, since we have presumed that the widow and her husband have both survived to age 50 and use mortality probabilities of 1 at age 50 for the husband and the life table mortality probabilities beyond age 60 for the surviving wife. For single-earner couples, widows may begin work but will not be able to work enough to increase her benefits beyond the spousal survivor benefit. The fact that she will pay substantial taxes with no return in benefits will make her worse off than the table actually suggests. The same is true for the two-third/one-third earnings split, i.e., continuing to work at the same presumed earnings

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9. Note, however, Table 1 includes the case of early widowhood weighted by its probability.

level, the widow will get more as a survivor than as a retired worker, and hence gets nothing for incremental taxes paid for the remainder of her work life. In the case where each of the spouses was earning half the income, the widow will get more as a retired worker if she continues to work at the same earnings level than as a survivor.

Again, for the 1945 cohort, we present the range of zero incremental benefits for widows and divorced women. These are presented for three presumed (1985 indexed) husbands' earnings levels: \$10,000, \$30,000, and \$50,000. The data are presented in two ways: First, the minimum earnings level necessary to receive an incremental return and, second the latest age at which widowhood could occur to receive an incremental return if the widow first begins work at two-thirds of the husband's wage rate (slightly higher than the average ratio of female to male wages). Thus, in the first panel we note that for a husband's earning level of \$10,000, a woman who is widowed at age 50 would need to earn \$7,500 in 1985 indexed earnings per year for the remainder of her work life to receive any incremental return whatsoever. All taxes paid under \$7,500 (indexed) would result in zero incremental return. The analogous numbers for widows of husbands earning \$30,000 a year and \$50,000 a year are indeed large: \$21,000 and \$22,000 respectively. Thus, a widow who returns to work full-time for the remainder of her work life and earns up to \$20,000, responsible for joint employee and employer payroll taxes for retirement of well over \$2,000 a year would be receiving no incremental return.

Another way to look at the problem is to ask what is the latest age at which widowhood could occur (and the widow who begins work at two-thirds of her husband's wage, subject to the wage growth conditions

discussed) to receive an incremental return. For the three earnings level, these ages are 39, 41, and 45. Thus, only those who are widowed quite young in their life, do not remarry and go back to work earning two-thirds of their husband's wages over their remaining work life will receive any incremental return. The rate of return will still be quite modest, because the contributions by and on behalf of her husband will generate no return as she will switch from survivor benefits to retired worker benefits.

The table also presents analogous information for divorced women. Recall that women who are married for less than ten years do not "vest" in the husband's earnings records. Correspondingly, any given earnings history may generate more than one divorced person's benefit if there were two or more marriages that lasted ten years or more, apparently a growing phenomenon in the United States. Women do not lose from remarriage, as they can get benefits based on a former spouse's earnings history. The corresponding earnings levels for women married for more than 10 years, and hence entitled to the spouse benefit based on their ex-husband's entire earnings history, to receive any incremental benefits at all are \$2,900, \$9,600 and \$10,000, considerably less than the case for widows.<sup>10</sup>

Correspondingly, the latest age at which divorce could occur (assuming no remarriage) and the divorced worker go to work at two-thirds of the husband's earnings rate and receive any incremental benefits are 51, 49, and 54 respectively. Of course, if the woman's

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10. They need only achieve a retired worker benefit equal to one-half that of their husband to switch from a spouse benefit to their own retirement benefit.

earnings record is considerably smaller than two-thirds of the projected earnings of the divorced husband, these ages would be considerably younger. Recall that many divorced spouses receive no benefits whatsoever from their spouses earnings history because the marriage lasted less than the required time. These persons, of course, receive incremental benefits as soon as they go to work.

These data reveal several interesting facts. First, there is an enormous incentive to postpone divorce until the 10 year "vesting" period is completed. For example, in a one-earner couple with the husband earning \$30,000 indexed to 1985, a divorce after nine years of marriage would cost the divorcee about \$35,000-\$40,000 discounted to 1985! This is more than the median net financial assets of U.S. households.

The treatment of widows and divorcees in an era when life expectancies are growing, especially more rapidly for women than men conditional on reaching traditional retirement ages; divorce and remarriage have become much more prevalent; and the enormous variation in the treatment of different individuals whose condition may differ marginally in terms of when their widowhood or divorce occurred, suggest that continued pressure will be placed upon Social Security to reform the nature of its taxation and benefit payments to families and individuals.

#### 6. The Marginal Linkage Between Benefits and Taxes

We have presented several types of information above for various types of households, including widows and divorcees, traditional one-earner and two-earner couples, single males and single females. Most of

that information concerns the expected present value of total taxes paid, expected present value of total benefits received, and therefore, the lifetime transfer, as well as the internal rate of return, on expected taxes paid. We have discussed some issues of marginal linkage, such as the age at which or the earnings at which a person would start to earn their retired worker benefits and begin to receive an incremental return on their taxes, switching over from spousal, survivor or divorced person's retirement benefit.

It is instructive to note the discounted expected marginal benefit for marginal taxes paid (we assume the extra taxes are spread over the lifetime in proportion to earnings). We present this information in Table 8 to give some idea of the marginal linkage for archetypical couples and singles to complement the information presented for divorcees and widows. For each of our archetypical earnings level, the table considers for male or female the discounted expected extra benefits paid for a dollar of extra taxes spread over the lifetime. These data are for the cohort born in 1960, who have recently entered the labor force, and are discounted to 1985 dollars with a 3% real discount rate. Four cases of family status are presented: one-earner couple, two-earner couple where each is presumed to earn one-half of the earnings, single males, and single females. Some remarkable facts emerge.

In no case is the marginal linkage as high as one. Nobody gets back an incremental dollar for the incremental tax paid. The figures presented in Table 8 range from a marginal linkage as low as 12 cents on the dollar for a female in a high wage two-earner couple and 15 cents on the dollar for a single male of middle income to 73 cents on the dollar for a low income male in a one-earner couple. Note that for some of

the entries in the table, the particular case involved is at the maximum tax, hence, there can be no additional taxes considered as part of this experiment. Note also that in a one-earner couple, the female receives back nothing for an incremental dollar of taxes paid. The female would have to earn a substantial amount of earnings to generate expected Social Security benefits in excess of the spouse's benefit the couple receives independent of any earnings she may produce. For two-earner couples, the discounted expected incremental benefit per incremental tax paid differs for males and females. The extra linkage to male taxes for a couple involve the joint survivor annuity nature of Social Security benefits in the single-earner case and the survivors benefits for the wife in the two-earner case.

The reduced linkage for two-earner wives occurs because she collects survivors benefits rather than retired worker benefits after her husband dies.

There are many reasons why we might be interested in marginal linkage in addition to or instead of total returns. First, to the extent that the complicated system eventually becomes understood,<sup>11</sup> it is the marginal linkage that determines the extent to which Social Security's payroll tax will be thought of as a tax rather than forced saving. To the extent that it is thought of as a tax, it will substantially increase the effective marginal tax rate on labor earnings, worsening the labor market distortion caused by higher

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11. This may be more reflective of a person getting close to retirement, attempting to gather information and calculate what their benefits will be under different stages of retirement and continued earnings levels than for the general population.

marginal tax rates. Finally, equity may be thought of as equal treatment of people at the margin, as well as on average. We make no claim for this, but identical treatment of people at the margin can lead to vastly different treatment of people on average as well as vice versa. We merely present the numbers for additional information.

#### 7. Evolution of the System

Tables 9, 10 and 11 present some comparable information to that presented earlier for a later cohort, those born in 1975. Obviously, projecting the future over the lifetimes of these individuals and families is subject to a greater range of error than for the younger cohorts. Among the reasons are the potential financial solvency problems that Social Security may face in the future, which include the expected long-term actuarial deficit in OASDI which may become larger due to the reduced reflow of income credited to Social Security when the new tax bill passes (which will lower marginal tax rates and hence the tax rate applicable to one-half of Social Security benefits received by well-off retirees); and, indeed, Social Security's retirement and disability funds are scheduled to accrue immense surpluses from around 1990 to 2020 which are needed if we are to avoid drastic tax increases when the baby-boom generation retires. Of course, we have no guarantee that we will be able to accrue such massive surpluses (Boskin (1986) estimates that they will accumulate to a size approximately that of the entire national debt). There may be political pressure to use the surplus to bail out Medicare, to raise benefits, to lower taxes, etc. Still, we present these data as if the Social Security Administration's economic and demographic intermediate projections will hold, and the system will have sufficient funds so that tax rates and benefit formulae

remain as now scheduled. We also use the current tax law rather than the one about to be phased in.

In Table 9, we first note that the lower dollar figures reflect primarily 30 years of additional discounting. The absolute scale of the system in fact expands with increases in average wages. The earnings levels presented have increased with real wages as well, so that a person in this cohort at age 45 in 2020 will be receiving much higher wages than the 1985 wage index presented here, e.g., \$30,000 indexed to 1985 would correspond to over \$50,000 by 2020. These are still constant 1985 dollars; we choose this way of presenting the data to compare persons of approximately the same position in the income distribution. Note also that the retirement age under current law will have risen from 66 to 67 for this cohort relative to the 1945 cohort, that life expectancy has increased substantially, real wages have increased, OASI tax rates are somewhat higher, and the benefits would be taxed at higher tax brackets under the existing income tax (but not under the tax reform about to be passed -- whether that will be the tax law in effect when these persons retire is highly unlikely). The pattern of rates of return is quite similar for the different types of family and the different earnings level. Tables 9 and 10 reflect a similar qualitative pattern, despite the 30 years of additional discounting making the numbers smaller, to the corresponding Tables 1 and 6. As earnings levels increase, rates of return decrease and lifetime transfers become large negative amounts. As we move from single earner to two earner couples, rates of return decline substantially. Comparing Tables 9 and 10, with the same caveats we used in the comparison of Tables 1 and 6 (the partial ex post nature of treatment of widows who are presumed to

survive to age 50 with their husbands), suggests that the rates of return for widows are much lower, and the transfers somewhat smaller (including larger negative transfers) than those for the couples presented in Table 9. The striking feature is that women widowed in middle age are projected to do very poorly under Social Security into the indefinite future under current law.

Table 11, similar to Table 7, but in this case for the 1975 cohort, presents comparable information concerning the second earner or divorcee's minimum earnings level to receive incremental returns, the same information for widows, and the latest age at which widowhood or divorce could occur, subject to our assumptions, and any incremental returns be received on the taxes paid by working widows or divorced women. The pattern is quite similar to that reported in Table 7. Widows need substantial earnings levels to receive any incremental return, i.e., to switch from the survivor benefit to their own retired worker benefit. A widow whose husband has received (in 1985 adjusted and indexed dollars) \$30,000 per year would have to go back to work at age 50 for the remainder of her work life (assumed to be until age 67) earning \$22,800 a year in order to receive any incremental return. Similarly, the same woman would have to be widowed no later than age 40 if she went to back to work at two-thirds of her husband's earnings level before she received any incremental return. Analogous data are presented for divorcees and for those with husbands with different earnings levels.

Again, these data reveal the substantial variation in the treatment of divorced and widowed women, depending upon such things as the age at which these events occur, as well as their husbands' or ex-husband's earnings, and highlight one of the major issues involved in debates over

earnings sharing as a possible Social Security reform.

## 8. Conclusion

We have presented the results of a computer simulation of the expected present value of benefits, taxes, and transfers, and rates of return, and marginal linkage of benefits and taxes for persons in various income levels and family status. The most striking feature is the enormous variation in the treatment, both in total and at the margin, Social Security offers each of these archetypical family types. Perhaps this variation is desirable and warranted; still, it has not been systematically presented as an optimal design for the system given the magnitude of variation which we have derived.

These results do point out the tremendous amounts at stake for various family types in the Social Security system and any potential reforms in it. Often these amounts dwarf any conceivable changes in tax burdens under the individual income tax. For many groups in the population, the amount of the expected value of the transfers involved exceeds the median value of a home.

Because Social Security is so important, large and complex, information such as this, despite a history of related studies under earlier actuarial assumptions and law, seems not to have worked its way to the general public discourse concerning the efficiency and equity of the design of the Social Security system. We hope these results will contribute to a better understanding of how the current Social Security retirement system, as it is projected into the future, is likely to affect families of different types and circumstances.

Table 1  
 Comparison Across Divisions of Household Earnings for  
 1945 Cohort, Various Earnings Levels  
 (1985 dollars discounted at rate 3% to 1985)

Total Family Earnings Level (at 1985 wage index)			
Division of Earnings (Husband-Wife)	10,000	30,000	50,000
1-0 (single earner)			
P.V. Benefits	62,679	109,128	100,503
P.V. Taxes	48,951	136,498	140,253
P.V. Transfer	13,727	-27,370	-39,750
Rate of Return	3.74%	2.30%	1.95%
2/3 - 1/3			
P.V. Benefits	53,293	96,044	108,428
P.V. Taxes	48,264	144,760	218,119
P.V. Transfer	5,029	-48,715	-109,689
Rate of Return	3.30%	1.75%	0.80%
1/2 - 1/2			
P.V. Benefits	50,936	89,578	109,457
P.V. Taxes	47,926	143,777	233,433
P.V. Transfer	3,010	-54,199	-123,975
Rate of Return	3.18%	1.54%	0.61%

Table 2

Second Earners' Range of Zero Incremental Return  
(1945 Cohort)

First Earner's Earnings Level:	10,000	30,000	50,000
Second Earner's Minimum Earnings Level to Receive an Incremental Return <sup>a</sup>	2,900	9,600	10,000

<sup>a</sup> In this simulation, both earners' wages increase at the male age profile of wages.

Table 3  
 Comparison Among Single-earner Couples,  
 Single Males, and Single Females of  
 1945 Cohort, Various Earnings Levels  
 (1985 dollars discounted at rate 3% to 1985)

Earnings Level (at 1985 wage index)			
Family Type	10,000	30,000	50,000
<b>Single-earner Couple</b>			
P.V. Benefits	62,679	109,128	100,503
P.V. Taxes	48,951	136,498	140,253
P.V. Transfer	13,727	-27,370	-39,750
Rate of Return	3.74%	2.30%	1.95%
<b>Single Male</b>			
P.V. Benefits	29,913	52,282	48,532
P.V. Taxes	48,951	136,498	140,253
P.V. Transfer	-19,038	-84,216	-91,721
Rate of Return	1.42%	-0.25%	-0.60%
<b>Single Female</b>			
P.V. Benefits	40,306	71,715	69,590
P.V. Taxes	46,901	130,802	144,723
P.V. Transfer	-6,595	-59,087	-75,133
Rate of Return	2.55%	1.13%	0.68%

Table 4  
 Marriage Subsidy or Penalty  
 (1945 cohort; 1985 dollars discounted at 3% to 1985)

Husband's Earnings Level	Wife's Earnings Level	Wife Keeps Working (Change in Benefits= Change in Net Transfer)	Wife Stops Working		
			Change in benefits	Change in taxes	Change in transfer
\$40,000	\$40,000	-8,749	-25,814	-117,089	91,275
	20,000	-4,471	-14,568	-69,496	54,928
	0	54,388	-	-	-
\$30,000	30,000	-9,551	-25,305	-103,170	77,865
	15,000	3,214	-2,051	-52,122	50,071
	0	56,846	-	-	-
\$20,000	20,000	-4,656	-18,672	-69,514	50,842
	10,000	9,422	6,584	-34,748	41,332
	0	47,050	-	-	-

Table 5  
 "Deal" for Family (Including Estimated Treatment of Children)  
 From Marriage and Children<sup>a</sup>  
 (1945 and 1975 cohorts; 1985 dollars, discounted at 3% to 1985)

Husband's Earnings Level	Wife's Earnings Level	Wife Works	Wife Stops Working
\$30,000	\$30,000	-41,907	45,509
	15,000	-29,142	17,715
	0	24,490	

<sup>a</sup> Ignores value of child survivor benefits.

Table 6

Treatment of Widows<sup>a</sup> of  
1945 Cohort, Various Earnings Levels  
(1985 dollars discounted at rate 3% to 1985)

Total Family Earnings Level (at 1985 wage index)			
Division of Earnings (Husband-Wife)	10,000	30,000	50,000
<b>1-0 (single earner)</b>			
P.V. Benefits	35,147	62,486	57,327
P.V. Taxes <sup>b</sup>	36,056	97,771	101,570
P.V. Transfer	-909	-35,285	-44,243
Rate of Return	2.94%	1.84%	1.51%
<b>2/3 - 1/3</b>			
P.V. Benefits	28,875	48,909	57,256
P.V. Taxes <sup>b</sup>	40,141	120,390	181,795
P.V. Transfer	-11,266	-71,481	-124,539
Rate of Return	2.11%	0.54%	-0.23%
<b>1/2 - 1/2</b>			
P.V. Benefits	29,187	49,773	60,809
P.V. Taxes <sup>b</sup>	42,189	126,566	204,742
P.V. Transfer	-13,002	-76,793	-143,933
Rate of Return	1.97%	0.37%	-0.48%

<sup>a</sup> I.e., widows who lose their husbands at age 50.

<sup>b</sup> Includes taxes paid by husband before his death.

Table 7

Widows' and Divorced Women's Range of Zero Incremental Benefits  
(1945 Cohort)

Husband's Earnings Level:	10,000	30,000	50,000
Widow's Minimum Earnings Level to Receive an Incremental Return <sup>a</sup>	7,500	21,000	22,000
Latest age at which widowhood occurs, and widow first begins work at 2/3 of husband's wage, to receive an incremental return <sup>a</sup>	39	41	45
Divorced woman's minimum earnings level to receive an incremental return <sup>a</sup>	2,900	9,600	10,000
Latest age at which divorce occurs, and divorced woman first begins work at 2/3 of husband's wage, to receive an incremental return <sup>a</sup>	51	49	54

<sup>a</sup> In this simulation, both earners' wages increase at the male age profile of wages.

Table 8  
 Discounted Expected Marginal Benefit per Marginal Taxes Paid,  
 with Extra Taxes Spread Over Lifetime,  
 for 1960 Cohort at 3% Real Discount Rate

Earnings Level	Contributor	1-earner Couple	2-earner Couple	Single Male	Single Female
\$10,000	Male	.730	.546	.348	-
	Female	0	.301	-	.474
\$30,000	Male	.338	.517	.150	-
	Female	0	.286	-	.205
\$50,000	Male	*	.216	*	-
	Female	0	.119	-	*

\* At maximum tax.

Table 9  
 Comparison Across Divisions of Household Earnings for  
 1975 Cohort, Various Earnings Levels  
 (1985 dollars discounted at rate 3% to 1985)

Total Family Earnings Level (at 1985 wage index)			
Division of Earnings (Husband-Wife)	10,000	30,000	50,000
1-0 (single earner)			
P.V. Benefits	37,775	67,464	63,052
P.V. Taxes	33,273	99,820	112,081
P.V. Transfer	4,502	-32,356	-49,029
Rate of Return	3.37%	1.85%	1.36%
2/3 - 1/3			
P.V. Benefits	32,052	58,835	67,321
P.V. Taxes	32,796	98,387	159,560
P.V. Transfer	-744	-39,552	-92,239
Rate of Return	2.93%	1.49%	0.45%
1/2 - 1/2			
P.V. Benefits	30,587	54,874	67,152
P.V. Taxes	32,560	97,680	162,800
P.V. Transfer	-1,973	-42,806	-95,648
Rate of Return	2.82%	1.29%	0.34%

Table 10

Treatment of Widows<sup>a</sup> of  
1975 Cohort, Various Earnings Levels  
(1985 dollars discounted at rate 3% to 1985)

Total Family Earnings Level (at 1985 wage index)			
Division of Earnings (Husband-Wife)	10,000	30,000	50,000
<b>1-0 (single earner)</b>			
P.V. Benefits	20,854	39,394	36,999
P.V. Taxes <sup>b</sup>	24,503	73,509	85,835
P.V. Transfer	-3,649	-34,115	-48,836
Rate of Return	2.61%	1.48%	0.99%
<b>2/3 - 1/3</b>			
P.V. Benefits	17,133	29,673	36,350
P.V. Taxes <sup>b</sup>	27,220	81,658	134,642
P.V. Transfer	-10,087	-51,985	-98,292
Rate of Return	1.79%	0.34%	-0.44%
<b>1/2 - 1/2</b>			
P.V. Benefits	17,338	30,243	37,047
P.V. Taxes <sup>b</sup>	28,581	85,743	142,905
P.V. Transfer	-11,243	-55,500	-105,858
Rate of Return	1.65%	0.16%	-0.69%

<sup>a</sup> I.e., widows who lose their husbands at age 50.

<sup>b</sup> Includes taxes paid by husband before his death.

Table 11

Range of Zero Incremental Return for Second Earners, Widows, and Divorced Women  
(1975 Cohort)

First Earner's or Husband's Earnings Level:	10,000	30,000	50,000
Second Earner's or Divorced Woman's minimum earnings level to receive an incremental return <sup>a</sup>	2,900	9,600	10,000
Widow's minimum earnings level to receive an incremental return <sup>a</sup>	7,600	22,800	26,500
Latest age at which widowhood occurs, and widow first begins work at 2/3 of husband's wage, to receive an incremental return <sup>a</sup>	40	40	42
Latest age at which divorce occurs, and divorced woman first begins work at 2/3 of husband's wage, to receive an incremental return <sup>a</sup>	52	50	55

<sup>a</sup> In this simulation, both earners' wages increase at the male age profile of wages.

## References

- Auerbach, A.J. and L.J. Kotlikoff (1985), "The Efficiency Gains from Social Security Benefit - Tax Linkage," NBER Working Paper No. 1645, June.
- Barro, R. J. and M. Feldstein (1978), "The Impact of Social Security on Private Saving: A Debate," monograph, American Enterprise Institute.
- Boskin, M.J. (1986), Too Many Promises: The Uncertain Future of Social Security, Homewood, IL: Dow Jones-Irwin.
- Boskin, M.J., M. Avrin and K. Cone (1983), "Modeling Alternative Solutions to the Long-Run Social Security Funding Problem," in M. Feldstein (ed.), Behavioral Simulation Methods in Tax Policy Analysis, Chicago: University of Chicago Press.
- Boskin, M.J. and L.J. Kotlikoff (1986), "Public Debt and United States Saving: A New Test of the Neutrality Hypothesis," in K. Brunner and A.H. Meltzer (eds.), The "New Monetary Economics," Fiscal Issues and Unemployment, Amsterdam: North-Holland.
- Boskin, M. J., L.J. Kotlikoff, D.J. Puffert, and J.B. Shoven (1986), "Social Security: A Financial Appraisal Across and Within Generations," NBER Working Paper No. 1891, April.
- Boskin, M.J., L.J. Kotlikoff, and J.B. Shoven (1985), "Personal Security Accounts: A Proposal for Fundamental Social Security Reform," Policy Paper, Center for Economic Policy Research, Stanford University, September.
- Boskin, M.J. and J.B. Shoven (1986), "Poverty Among the Elderly: Where are the Holes in the Safety Net?," NBER Working Paper No. 1923, May.
- Burkhauser, R.V. and K.C. Holden (eds.) (1982), A Challenge to Social Security: The Changing Roles of Women and Men in American Society, New York: Academic Press.
- Flowers, M.R. (1977), Women and Social Security: An Institutional Dilemma, Washington, DC: American Enterprise Institute.
- Hurd, M.D. and J.B. Shoven (1985), "The Distributional Impact of Social Security," in D.A. Wise (ed.), Pensions, Labor, and Individual Choice, Chicago: University of Chicago Press.
- Lingg, B.A. (1982), "Social Security Benefits of Female Retired Workers and Two-Worker Couples," Social Security Bulletin 45(2), February.
- Pellechio, A.J. and G.P. Goodfellow (1983), "Individual Gains and Losses from Social Security Before and After the 1983 Amendments," Cato Journal, Fall.

Ricardo-Campbell, R. (1977), Social Security: Promise and Reality, Stanford: Hoover Institution Press.

Social Security Administration (1985), "Women and Social Security," Social Security Bulletin 48(2), February.

Thompson, L. (1983), "The Social Security Debate," Journal of Economic Literature XXI(4), December.