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THE TAX TREATMENT OF MARRIED COUPLES AND THE 1981 TAX LAW

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ABSTRACT

Currently U.S. Federal Income Tax schedules do not maintain marriage neutrality, that is, tax liabilities depend upon marital status. This paper shows the extent and distribution of the departure from neutrality both under current law and the new (1981) tax act. The new tax law establishes a secondary earner's deduction of 10% of secondary earner's wages (up to 3000 dollars). The child-care credit is also liberalized. Analyses of the revenue, welfare and labor supply effects of these provisions are also given.

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I. Introduction

Since the personal income tax was introduced into the United States in 1913, the selection of the taxable unit has been a source of controversy. The tax schedule has been applied to the individual, to the couple, and to the couple with income splitting. The choice has fluctuated over time and place, and even now there is no strong societal consensus.[1]

The income tax law of 1913 specified separate filing on a single rate schedule. Separate filing has the advantage of marriage neutrality, that is, tax liabilities are not affected by the mere fact of marital status. In community property states, however, the wife had a strong legal claim to one-half of her husband's income (and vice versa) and couples in such states took to filing two identical tax returns, each with one-half of the couple's income and deductions. Under a progressive tax, this tactic resulted in a lower tax liability. In 1930, the Supreme Court endorsed this procedure, and the geographic discrimination persisted until 1948.

By 1948, the tax was much heavier and much more progressive. States had begun to adopt community property legislation merely to secure for their residents the favorable treatment of income-splitting on the federal tax return. In that year, Congress provided that married couples would continue to be taxed on the single schedule, but that they would pay "twice the tax on one-half the combined income." This rule persists today in several state income tax laws, and it is equivalent to the income splitting practiced by residents of community property states.

Income splitting represented a substantial subsidy to marriage for one earner couples, and was so regarded. By 1969, the differential seemed excessive to Congress, which enacted a new schedule for single taxpayers which limited their tax to 120% of that for a married couple with the same taxable income. It was this law which established the current tax treatment of the married couple relative to single individuals.

Currently, single and married people face different tax schedules, with the tax liability of married individuals being based upon the couple's joint income. Consequently, tax burdens change with marital status, although one cannot predict a priori whether tax liabilities will increase or decrease when an individual marries. The answer depends in part upon the closeness of the incomes of the spouses. The general tendency is that the closer the income, the more likely that the "marriage tax" will be positive.

This state of affairs has been criticized for a number of reasons. Some observers, noting that the tax system often provides financial disincentives for marriage, have argued that the current regime encourages immorality. (See Rich [1979], Washington Post [1979].) Economists have tended to focus on possible inefficiencies induced when tax liability is based upon family income ("joint filing"). As Boskin and Sheshinski [1979] note, since the labor supply elasticities of husbands and wives differ, economic efficiency would be enhanced if their earned incomes were taxed at different rates. Yet, under a system of joint filing, spouses face the same marginal tax rate on the last dollar. A closely-related criticism is that the current tax regime tends to discourage married women from entering the marketplace. This is because under joint filing the wife's tax rate is a function of the husband's earnings.[2]

An excellent polemic against current law is provided by Moerschbraecher [1981], from which the following quotation is taken:

> The marriage penalty...serves as a disincentive to marriage, and an incentive to cohabitation, an incentive to divorce

> and a disincentive to reentry of the second spouse into the labor market. There is no reason for a tax provision which is not only arbitrary, but inconsistent and unintended.

This author surely overstates her case. In fact, the selection of a taxable unit is controversial precisely because it is difficult. The case for marriage neutrality is admittedly compelling, but the case for horizontal equity (couples with equal family incomes should pay equal taxes) is also appealing, as is the case for progressivity in the tax schedule. Yet, these three principles are incompatible. There is, in fact, no non-negative income tax which could provide marriage neutrality, horizontal equity and progressivity (Rosen [1977], Munnell [1978].)[3]

In a tax system with itemized deductions, separate filing does not even achieve marriage neutrality unless the "correct" allocation of deductions between the spouses can be determined. In common law states before 1948 deductions were allocated to the spouse making payment. For well-organized taxpayers this allowed deductions to be assigned in a tax-minimizing way, and it represented a departure from marriage neutrality as great as any present under the 1969 law. Deductions might plausibly be allocated in proportion to income, or split evenly, but without knowledge of the "correct" distribution substantial non-neutrality is inevitable. An identical set of concerns relates to the disposition of dependent exemptions.

In the search for a principle to violate, the recent literature emphasizes horizontal equity as the weakest link in the paradox. The trend towards a temporary and casual style of marriage militates against the assumption of the family as an integrated consumption unit. Furthermore, the comparison between couples of equal incomes is disingenuous. They are not really equal if one couple must work twice as many hours to achieve that income. Yet it does not follow that individual filing is an equitable (or efficient) alternative. The most salient characteristic of all known tax systems is the failure to tax non-market goods. If all the contributions of each spouse to a marriage, both physical and spiritual, were taxed, and if marriages were made between equals in the broad sense of the term, then joint and individual filing would be the same. The failure to tax non-market goods is the source of the difficulty, and it is not alleviated by individual filing. The case for joint filing (since it may now be seen to fail to achieve horizontal equity) is weakened, however.

The 1981 tax law does respond to the apparent inequity of the marriage tax. When it takes full effect in 1983, the bill provides that 10 percent of the secondary worker's earnings (up to $30,000) shall be exempt from taxation. The child care credit is expanded to 20 percent of the first $2400 in child or dependent care expenses for each of the taxpayers first two dependents. The credit is increased by one point for each $2000 that the taxpayer's income falls short of $30,000, with a maximum credit of 30 percent of expenses.[4] Together with the general rate reduction of 23 percent (only 19 percent in 1983), these charges will substantially enhance marriage neutrality at the expense of both horizontal equity and progressivity. It cannot be expected, therefore, to be the last legislative initiative on this subject.

It is the purpose of this paper to show the magnitude and distribution of the marriage tax under both the current and the new tax laws, and to show careful estimates of the effect on revenues, labor supply, and welfare of the introduction of the secondary earner's exemption, and the liberalization of the child-care credit.

Section II of this paper shows how the distribution and magnitude of the marriage tax burden (or benefit) is changed by the new tax law, under the assumption of no behavioral response. Static simulations showing the distribution of burden for the marriage tax are provided in Sunley [1980], but the document does not indicate the source of the data. The labor force behavior of married women is quite responsive to the net wage (see e.g. Rosen [1976] or Hall [1973]). Thus, ignoring the labor supply responses of married women is likely to lead to biased estimates of the effects of tax reform proposals. The simulations reported in part V explicitly incorporate endogenous work decisions for wives.

Unfortunately, even a rather complete set of variables relating to a household's tax situation does not include all of the information needed to predict the effects of taxes on labor supply. For example, standard theoretical considerations suggest that an important determinant of labor supply is the wage rate, but it is not available on any of our data sets. Section III of this paper outlines our approach to the problem of imputing such missing data, a more detailed discussion is given by Feenberg and Rosen [1980].

Section IV describes the behavioral assumptions (specified in a utility-theoretic format) for the simulations presented in section V. The trusting reader may proceed directly from section II to section V without confusion.

II. Static Simulations

As noted above, the distribution and size of the marriage tax depend largely upon the distribution of income between spouses, the degree of progressivity of the tax schedules, the personal exemption, and the difference between the single and joint schedules. A host of other provisions in the law also play at least a minimum role.

The most important of these other provisions, and the only one which the CPS data allow us to account for, is the earned income credit (EIC). The EIC provides a refundable credit of 10% of wages and salaries, but not more than $500, and only to individuals or couples with dependents. The credit vanishes gradually as income exceeds $5000 and vanishes completely at $10,000. Because the income limits for the take-back are independent of marital status, the EIC is the major source of marriage tax burden in low to moderate income households.

Other sources of non-neutrality in 1979 include the capital loss limits ($3000 single or joint), the zero-bracket amount ($2300 for single returns but only $3400 for joint returns), the child-care credit ($960 maximum for everyone), the minimum tax on preferences (a $10,000 offset is independent of marital status) and the alternative minimum tax on preferences, which is a progressive tax (rates from 0.1 to 0.25) on which income splitting is not allowed.

A. Data

The March 1980 Current Population Survey serves as the basic data source for the static (no behavioral response) simulations in this section. It is a good source because it is fairly recent, reflecting 1979 income levels, it is representative of the entire U.S. population and it includes separate income information for husbands and wives. Other possible surveys include husband's and wives labor income separately, but not their property income. Even here there is some ambiguity over the intra-family distribution of property income. The CPS data does not pretend to represent what individual property income would have been had the couple not married, or even what it would be if the couple divorced. It is merely the subjective allocation made by the respondent under a tax law which is neutral with respect to distribution. Under a non-neutral tax the distribution might be quite different.

The chief disadvantage of the CPS is the lack of any information on itemized deductions, but it is also true that CPS property income corresponds poorly with tax return data. Lastly, income items are truncated at $50,000, which affects the top 3% of husbands, but essentially no wives. No adjustment has been made to the income data, but an imputed value of deductible expense has been assumed.[5] More sophisticated procedures for imputing data are suggested in Section III of this paper, and are applied in Section V to a tax return data set.

Where 1983 income levels are required, they are obtained from a projected nominal per capita income growth factor of 1.49 for 1979 to 1983. This corresponds closely with both Administration and Congressional Budget Office projections, the disagreement among forecastors applies mostly to the decomposition of income growth into real and price-level components.

B. The Distribution of the Marriage Tax

In table II.1, the average marriage tax is given for each of several combinations of spouses' adjusted gross income. The law applied is that current in 1979-81 and the income levels are for 1979.[6] The marriage tax is defined by the difference between the tax due on separate filings using the individual income items, and the tax due on a joint return. Deductions and exemptions are allocated in proportion to income. This allocation is fairly crucial in determining the results, if a tax-minimizing distribution of deductions is allowed the estimated penalties are substantially larger.

The table clearly shows the tendency of the penalty to increase with joint income and to decrease with income inequality. The relative rarity of high income women is the source of sufficient inequality to make the preponderant marraige tax negative, as will be seen in a later table.

In figure II.1, an alternate mode of presentation is shown. The contours show lines of equal marriage penalty in spouse's income space. The same law as for table II.1 is applied. However, to produce a three-dimensional plot several additional assumptions must be made. There are assumed to be no children (this includes 17 million of the 41 million couples) deductions are assumed to be 20% of AGI and income is assumed to be labor income for the purpose of maximum tax. The same pattern as in table II.1 emerges but with perhaps greater clarity. Each contour is labelled with the percentage of childless couples who would fall into that region, given the assumed deductions. Table II.2 provides cumulative distributions of the marriage penalty and bonus for 1979. From column two we see that substantial penalties are not unusual, being present in 15% of the cases, but that a bonus of that size is somewhat more likely and goes to 23% of couples in the sample.

The secondary earner's deduction enacted in 1981 takes full effect in 1983, when it provides for a deduction of 10% of the secondary worker's earnings, but not over $3000. By 1983, a general tax cut of 19% will also be in effect, and changes in nominal income will also substantially affect real tax liabilities. Table II.3 repeats table II.1, but at 1983 income levels, and with 1983 tax rates without (second line) the secondary earner's deduction and (third line) with it. The top row and the left-hand column show little change, but the marriage penalty in most of the other cells is substantially reduced. Figure II.3 shows the contours of equal marriage tax amelioration, and figure II.4 shows the final situation, including the SED.

Figures II.5 and II.6 repeat figure II.3 and II.4 but with contours of equal fractions of income paid in marriage penalty. On II.2 we see that a non-trivial (11%) fraction of 1983 households would pay a penalty of 2% or more of family income without the SED, but that this would happen only among rather well off couples. The next figure shows the situation with the enacted law, only 2% of couples are so abused, and so on. It should be clear from these figures that

DISTRIBUTION OF MARRIED COUPLES

BY INCOME OF EACH SPOUSE, AND AVERAGE

MARRIAGE PENALTY, IN DOLLARS, 1979.

(Percent in Cell and Mean Marriage Penalty Paid in Cell)

WIFE'S INCOME

HUSBAND'S INCOME	0–5,000	5–10,000	10–20,000	20–30,000	30,000+
0–10,000	16.4% -2	5.8% 226	3.2% 22	0.3% -187	– -2680
10–20,000	21.1% -290	9.1% 406	6.9% 525	0.4% 1040	0.1% 1090
20–30,000	15.2% -734	4.5% 321	4.0% 869	0.5% 1920	0.1% 2900
30–40,000	4.2% -1380	1.0% 158	1.0% 1170	0.3% 2460	0.1% 3140
40–50,000	1.8% -2180	0.3% -305	0.3% 1070	0.1% 2770	– 4390
50,000+	2.2% -2880	0.4% -217	0.4% 628	0.1% 2570	0.1% 4640

Source: March, 1980, Current Population Survey and TAXSIM

Table II.1

Distribution of Marriage Penalty for all Couples (1979)

Marriage Penalty (- for bonus)	Percent of Returns	Cumulative Percent of Returns	Penalty Paid or Bonus Received in Bracket (billions of dollars)
less than -4000	.4	.04	-.7
-4000 to -3000	.9	1.3	-.9
-3000 to -2000	2.5	3.8	-2.2
-2000 to -1000	8.2	12.0	-4.5
-1000 to -500	11.3	23.3	-3.4
-500 to 0	25.8	49.1	-2.8
Subtotal for bonus			-14.5
0	5.8	54.9	0
0 to 500	30.6	85.5	3.3
500 to 1000	9.5	94.0	2.6
1000 to 2000	4.6	98.6	1.9
2000 to 3000	.9	99.5	.7
3000 to 4000	.4	99.9	.3
greater than 4000	.1	100.	.3
Subtotal for positive penalty			9.0

Number of Joint Returns in 1978 = 41,400,000

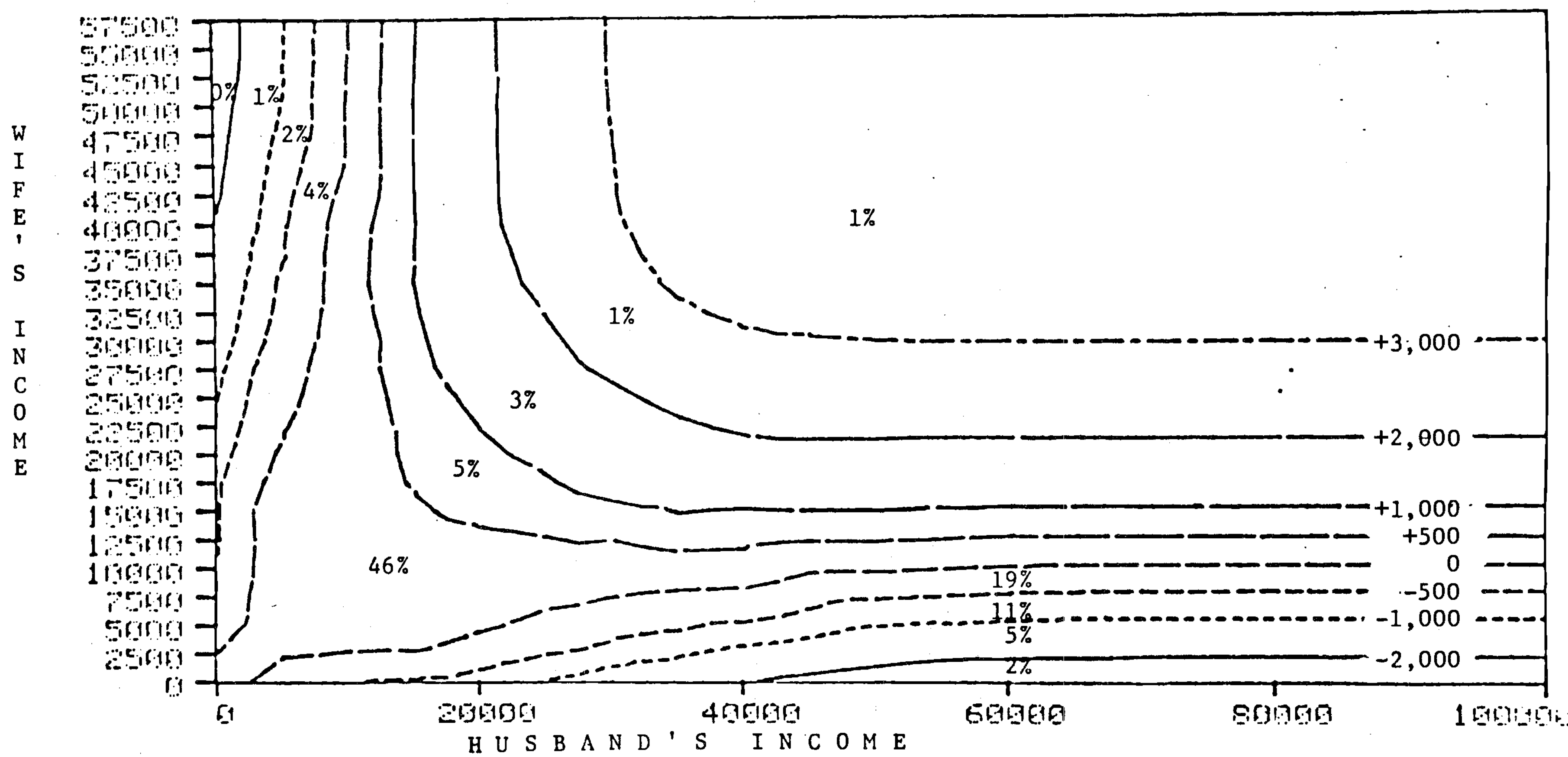
Source: March, 1980, CPS and TAXSIM

Table II.2

NOTE FOR FIGURE II.1

The contour plot shows lines of equal marriage penalty. Each line is labelled at the far right with the amount of penalty (negative values for a marriage bonus). For example, if the wife's income is $30,000 and the husband's income is $40,000 to $60,000 the penalty is about $3,000. The contours are symmetric about a 45% line through the origin so the husband's and wive's incomes may be interchanged. Each connected region of the graph is labelled with the percentage of childless couples whose incomes place them in that region. For example, 1% pay a penalty of $3,000 or more. Some of the regions are disconnected, for example 23% (= 19% + 4%) of the joint returns show a benefit of zero to $500.

PENALTY PAID BY A MARRIED COUPLE
WITHOUT CHILDREN, BY INCOME OF EACH SPOUSE
IN 1979



*Percentage of married couples without children predicted to pay penalties between amounts of contour lines in 1979.

FIGURE II.1

PREDICTED DISTRIBUTION OF MARRIED COUPLES BY

INCOME OF EACH SPOUSE, AND AVERAGE MARRIAGE PENALTY,

WITH AND WITHOUT THE SECONDARY EARNER'S DEDUCTION

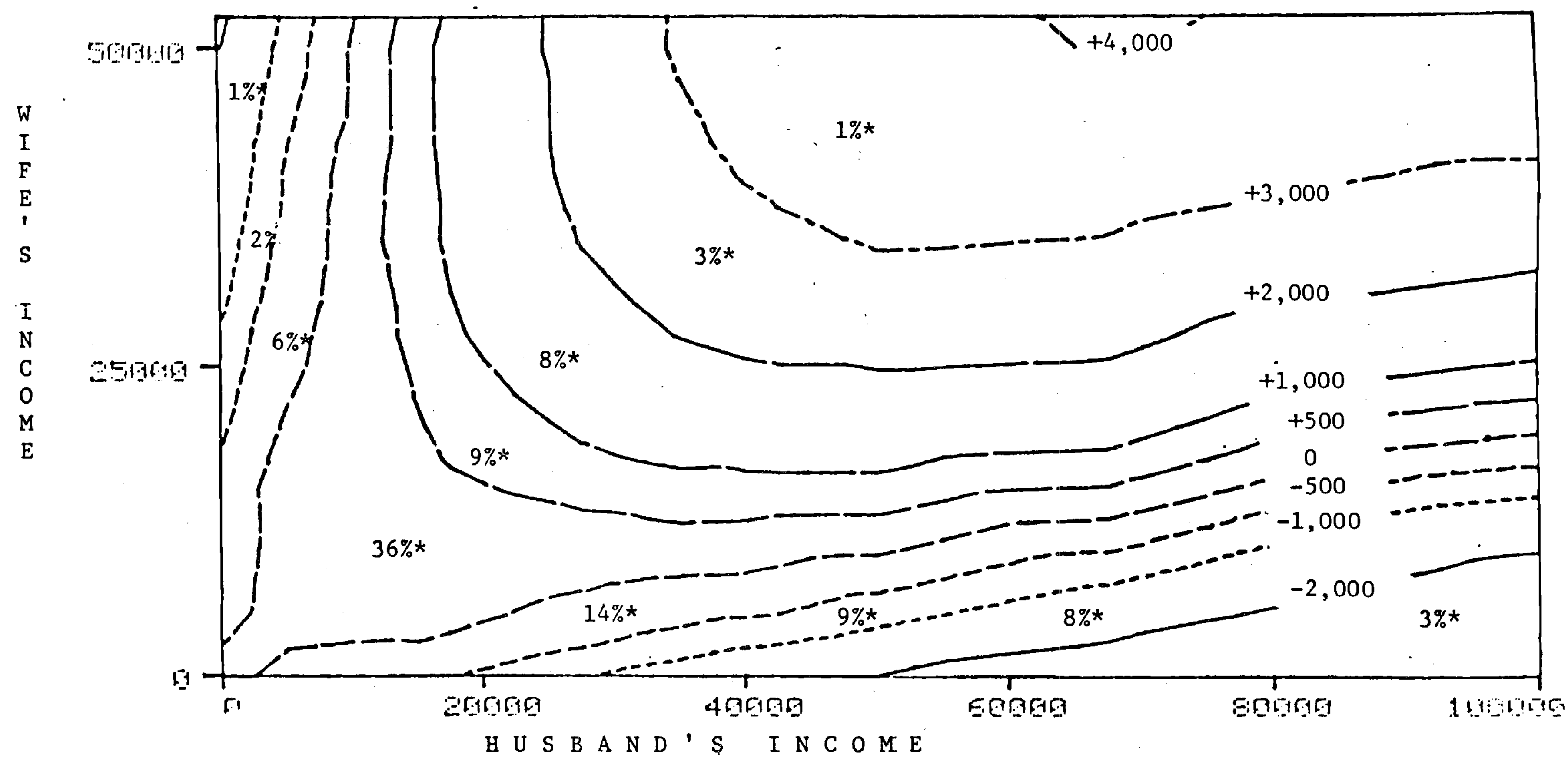
(Percent in Cell, Mean Marriage Penalty Paid in Cell without Secondary Earner's Deduction, and Mean Marriage Penalty Paid in Cell with Secondary Earner's Deduction)

	0- 5,000	5- 10,000	10- 20,000	20- 30,000	30,000+
0- 10,000	8.3% -18 -22	3.1% 200 169	3.4% -43 -89	0.8% -432 -471	0.2% -822 -871
10- 20,000	11.9% -287 -298	5.0% 377 255	6.3% 603 331	1.1% 934 598	0.2% 1190 702
20- 30,000	13.0% -738 -754	4.1% 310 139	6.5% 871 474	2.2% 1730 1050	0.3% 2500 1690
30- 40,000	9.6% -1250 -1270	2.7% 200 -8	3.3% 1110 627	1.2% 2330 1460	0.4% 3290 2300
40- 50,000	4.6% -1720 -1730	0.9% 7 7	1.5% 1120 1120	0.6% 2590 2590	0.3% 3560 2650
50,000+	5.2% -3240 -3240	1.0% -1090 -1250	1.3% 572 209	0.7% 2060 1300	0.5% 3870 2980

Source: March, 1980, Current Population Survey and TAXSIM.

Table II.3

PENALTY PAID BY A MARRIED COUPLE WITHOUT CHILDREN IF THERE WERE NO SECONDARY INCOME DEDUCTION, BY INCOME OF EACH SPOUSE, IN DOLLARS, 1983



*Percentage of married couples without children predicted to pay penalties between amounts of contour lines in 1983.

FIGURE II.2

TAX RELIEF GIVEN TO MARRIED COUPLES WITHOUT CHILDREN AS A RESULT OF THE SECONDARY INCOME DEDUCTION, IN DOLLARS, 1983

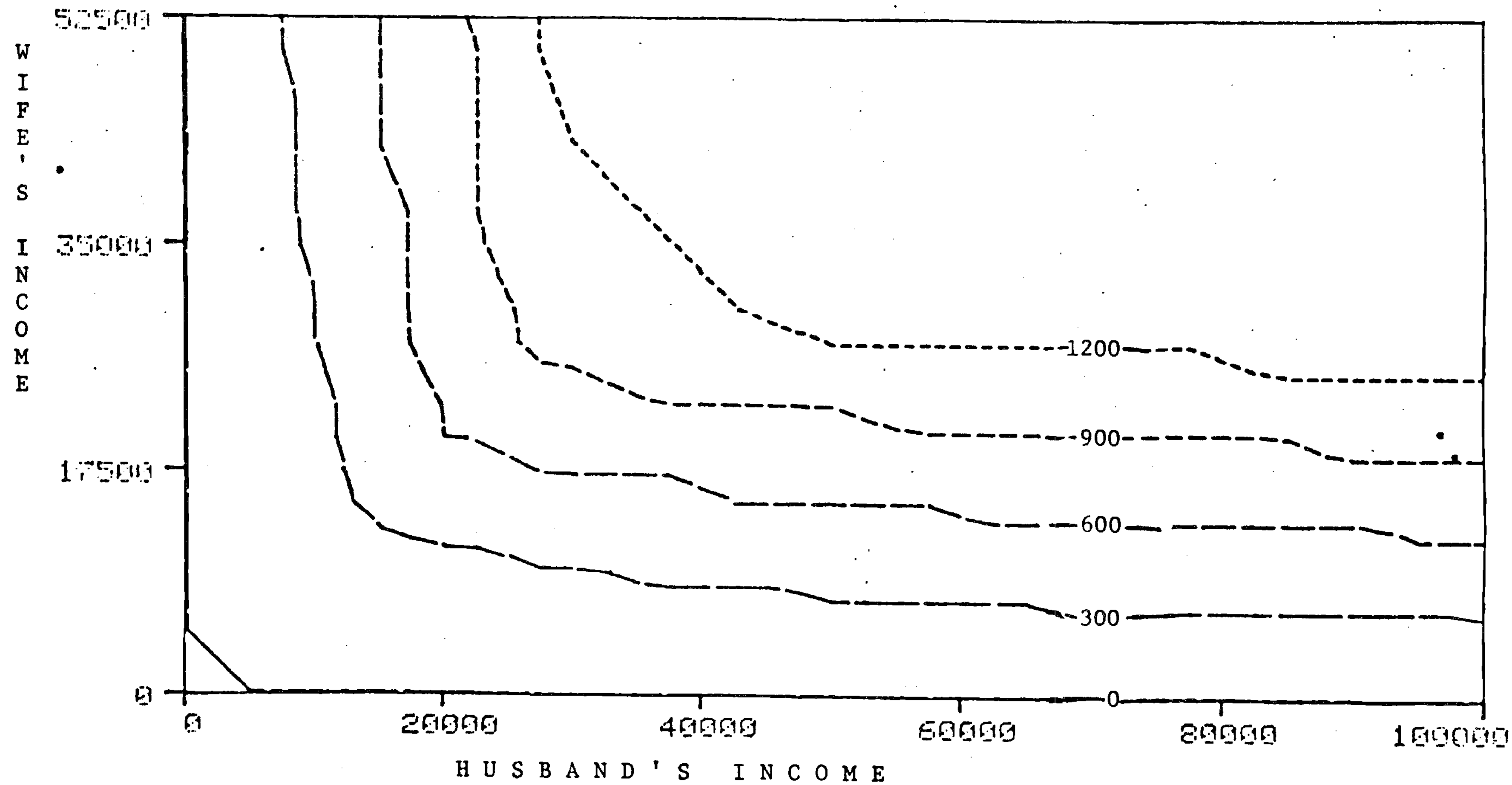
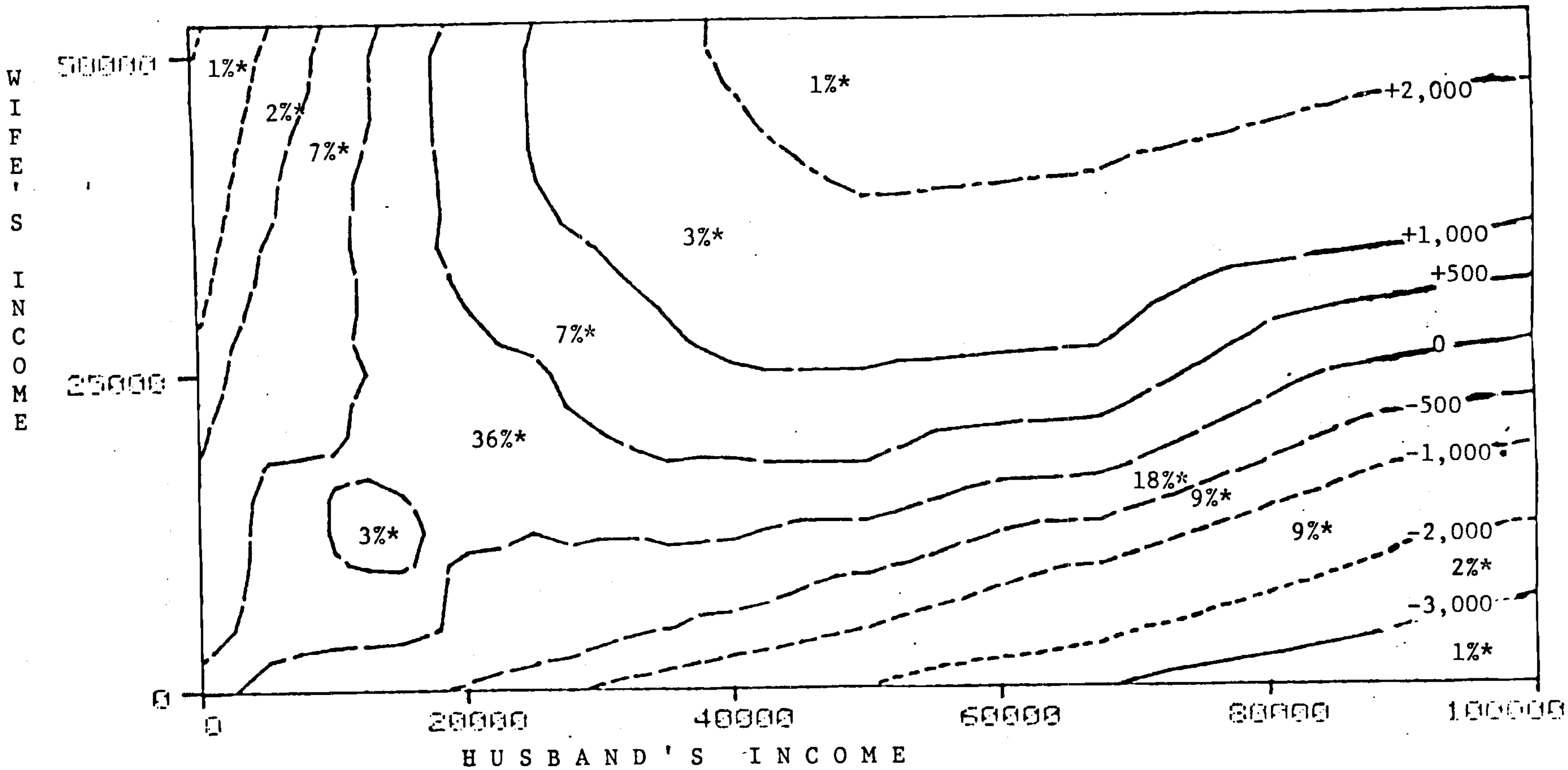


FIGURE II.3

PENALTY PAID BY A MARRIED COUPLE WITHOUT CHILDREN, BY INCOME OF EACH SPOUSE, IN DOLLARS, 1983



*Percentage of married couples without children predicted to pay penalties between amounts of contour lines in 1983.

FIGURE II.4

PENALTY PAID BY A MARRIED COUPLE WITHOUT CHILDREN IF THERE WERE NO SECONDARY INCOME DEDUCTION, BY INCOME OF EACH SPOUSE, AS A FRACTION OF INCOME, 1983

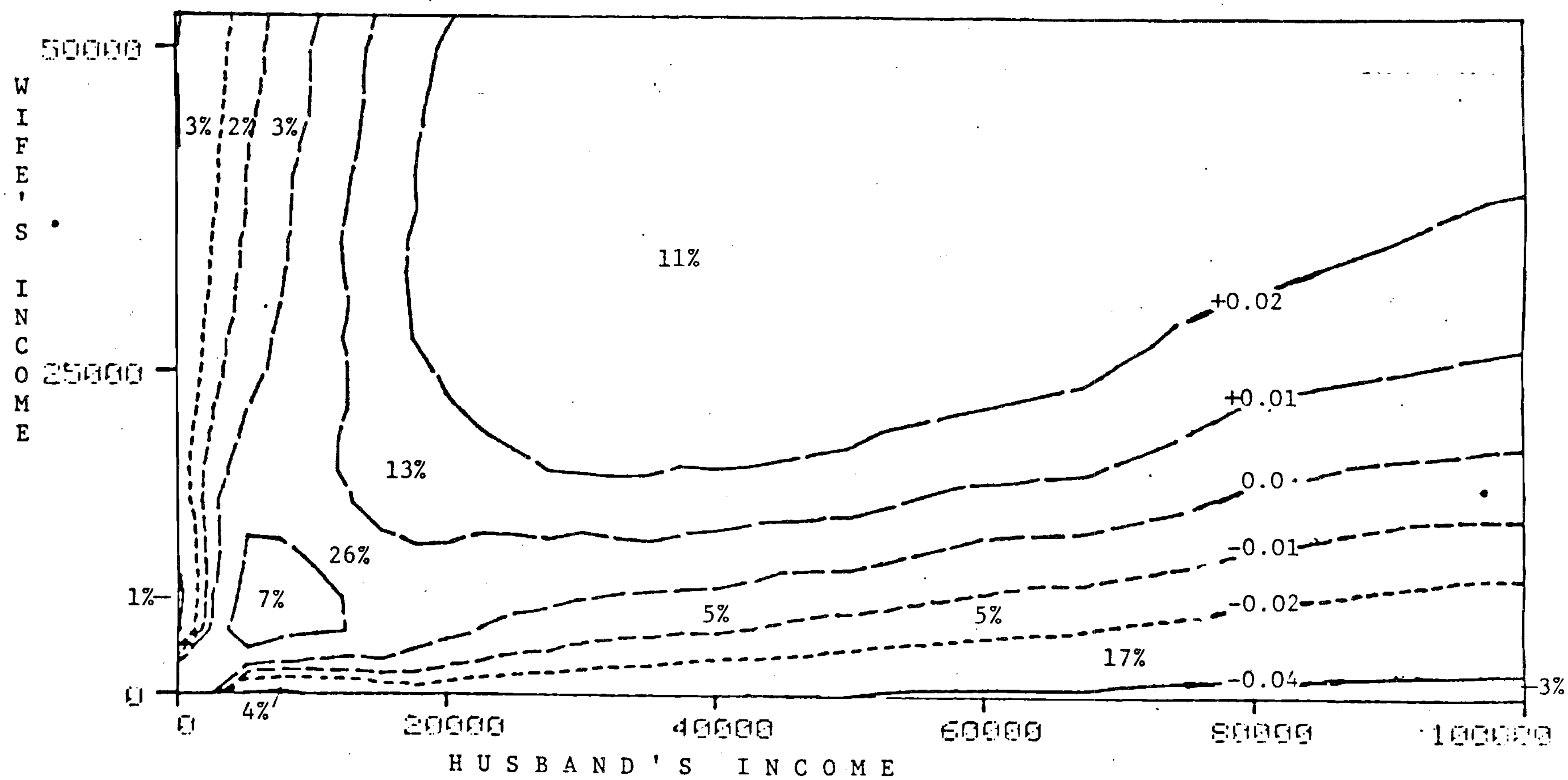


FIGURE II.5

PENALTY PAID BY A MARRIED COUPLE WITHOUT CHILDREN, BY INCOME
OF EACH SPOUSE, AS A FRACTION OF INCOME, 1983

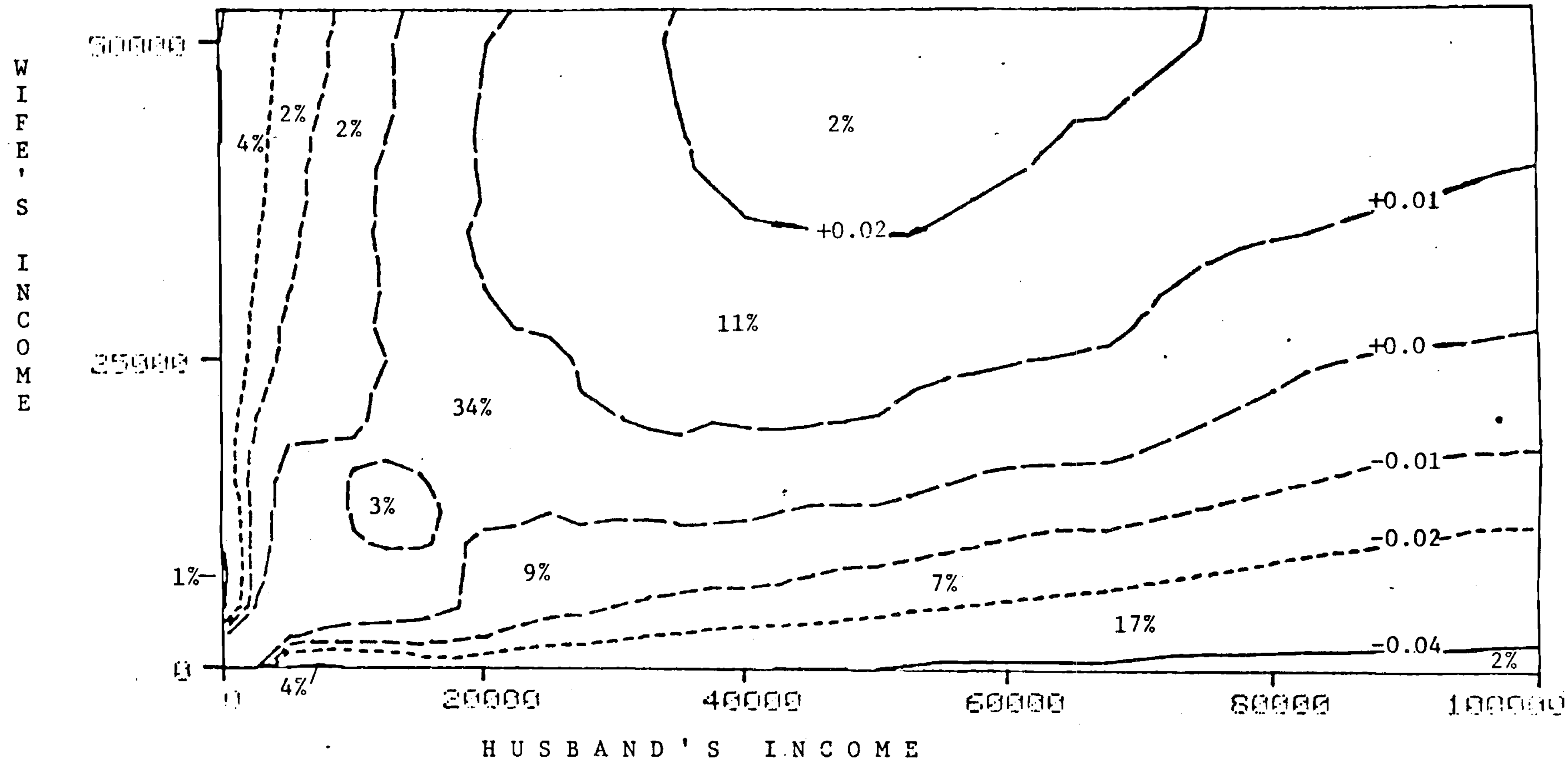


FIGURE II.6

Distribution of Marriage Penalty for All Couples in 1983
(1979 dollars)

Marriage Penalty (- for bonus)	Without Secondary Earner's Deduction			With Secondary Earner's Deduction			(see text)	
	Percent of Returns	Cumulative Percent of Returns	Amount of Penalty or Bonus	Percent of Returns	Cumulative Percent of Returns	Amount of Penalty or Bonus	Amount Passed on Prededuction Brackets	Mean Savings in Bracket
less than -4000	.1	.1	.5	.2	.2	-.8	-.6	32
-4000 to -3000	.3	.1	-.4	.4	.6	-.5	-.4	23
-3000 to -2000	1.9	2.3	-1.9	2.2	2.8	-2.1	-1.9	21
-2000 to -1000	6.5	8.8	-3.6	6.5	9.3	-3.7	-3.6	9
-1000 to -500	12.8	21.6	-3.7	13.2	22.5	-4.0	-3.7	6
-500 to 0	26.5	48.1	-2.8	30.4	52.9	-3.7	-2.3	46
Subtotal for bonus			-13.0			-14.7	-13.4	
0	5.9	54.	0	6.2	59.1	0	.2	71
0 to 500	31	85.1	3.2	28.2	87.3	2.7	1.8	130
500 to 1000	11.1	96.1	3.1	9.6	96.9	2.6	2.2	190
1000 to 2000	3.0	99.1	1.7	2.7	99.6	1.2	1.1	470
2000 to 3000	.5	99.6	.5	.3	99.9	.4	.4	550
3000 to 4000	.2	99.8	.3	.1	100	.2	.2	590
greater than 4000	.2	100	.2	-	100	.1	.2	1300
Subtotal for penalty			9.3			7.3	6.1	

Table II.4

any reduction in marriage penalties is obtained at the expense of progressivity. While this paper makes no attempt to balance these competing virtues, it does seek to emphasize the competition among them.

Table II.4 shows the cumulative distribution of penalty and bonus for 1983 with and without the secondary earner's deduction. The final two columns of the table show the amount of penalty or bonus and the mean change in tax revenue due to the deduction for those couple in the indicated brackets without the deduction, the other columns have the conventional structure. Without the deduction there is a slight reduction in marriage bonus from 14.5 billion dollars in 1979 to 13.0 billion in 1983. Gross marriage penalty, however, increases slightly from 9. to 9.3 billion. The overall reduction in absolute deviations is 1.2 billion. The introduction of a SED reduces the marriage penalty by 2 billion to 7.3 billion, but it increases the marriage bonus by 1.7 billion to 14.7 billion. The net improvement in absolute deviations of .3 billion is small relative to the improvement associated with the 1981 law's general reduction in progressivity.

The last two columns show that this generally poor showing occurs in spite of the fact that 3.2 billion dollars in reduction go to couples who would otherwise be paying a penalty and only .4 billion dollars go to those receiving a bonus. The SED's greatest effect is the movement of couples from the penalty category to the bonus category, it does not succeed at reducing the extent of the non-neutrality.

III. Methodological Issues in Behavioral Simulation

A behavioral simulation requires data on individual's tax situations and on their economic and demographic characteristics. The tax information is required to make careful predictions of the revenue implications of alternative tax regimes. The economic and demographic information is needed to estimate the impact of tax changes upon economic behavior.

The fundamental methodological problems of this study are consequences of the fact that no publically available data set has all this information. The Marhc CPS, whilel rich in income data, lacks the wage rate, which is asked in May. It also lacks any suitable hours-last-year variable, although hours-last-year is available. The data sources typically used by economists to estimate behavioral equations have virtually no federal income tax data. (See, for example, Institute for Social Research [1974].) On the other hand, data sets that are rich in tax information tend to tell us little else about members of the sample. For example, because individuals do not report wage rates and hours of work on their federal income tax returns, TAXSIM has no information on these crucial magnitudes. Clearly, then, one must bring together information from (at least) two different data sources in order to perform tax simulations with endogenous labor supply responses.

A popular technique for combining information is statistical matching[7]. The first step in this procedure is to isolate a set of variables that is common to both data sets. Then a search is made to determine which observations of each data set are "close" on the basis of these variables[8]. The close observations are pooled in order to form a "synthetic" observation, which is then treated as if it were generated by a single behavioral unit.

In this section we outline as an alternative an inexpensive imputation procedure which provides the promise of consistent estimates of revenue effects.

A. Predicting Tax Revenues

Let y be a vector of variables endogenous to the tax system. Included are items such as taxable income, which depends directly upon provisions of the tax code, as well as variables like pre-tax earnings, which depend upon the tax system only to the extent that the latter influences economic behavior. Let x be a vector of exogenous variables such as age or (in this study) property income. If the tax code at a given time is represented by the parameter B, then we can think of the tax system as a function t(x,y,b) which determines the amount of taxes owed by an individual given both the relevant exogenous and endogenous variables. Our problem is to determine how revenues change when there is a change from the current tax regime, denoted B', to some new tax regime, B".

Call the distribution of the exogenous and endogenous variables in the population $f(x,y \mid B')$. Then total tax revenue under the current regime B' is

$$T(B') = N \int_x \int_y t(x,y,B')f(x,y \mid B')dydx \qquad \text{(III.1)}$$

where N is the total number of tax-paying units.

The analytic integration implied by (III.1) cannot in practice be performed. An obvious alternative to (III.1) is its discrete analogue,

$$\hat{T}(B') = N \sum_{i=1}^{I} t(x_i,y_i, B')P_i \ , \qquad \text{(III.2)}$$

where y_i and x_i (i=1,...,I) are I sample observations from the universe of N tax-paying units, and P_i is one over the probability of the observation being included in the sample.

Under tax regime B" tax revenues are

$$\text{(III.3)} \qquad T(B") = \int_x \int_y t(x,y,B")f(x,y \mid B")dydx.$$

Unfortunately, even knowledge of $f(x,y \mid B')$ does not in general give us $f(x,y \mid B")$, the joint distribution of x and y under the new regime. Only with the restrictive assumption that y is inelastic with respect to the change in tax regimes can we estimate new tax revenues as

$$\text{(III.4)} \qquad \hat{T}(B") = \sum_{i=1}^{I} t(x,y,B")P_i \; .$$

For changes in tax regimes of the sort being analyzed in this paper, the exogeneity assumption is too strong.

If y is known to be some stochastic function of the x's, then one is tempted to replace the y's with their predicted values.

If y is known to be some stochastic function of the x's, then one is tempted to replace the y's with their predicted values:

$$\text{(III.5)} \qquad T(B") = \sum_{i=1}^{I} t(x,y(x,B"),B") \; P_i$$

but a much better procedure adds the prediction error under the known regime back to the new predicted y, i.e.,

$$\text{(III.6)} \qquad T(B") = \sum_{i=1}^{I} t(x,y(x,B")) + (y-y(x,B'),B") \; P_i$$

Of course, the discussion so far has ignored the possibility that some variables in the x or y vectors may be missing from the TAXSIM file.

B. Imputing Baseline Data

Most plausible theories of labor supply suggest that it is necessary to know something about individuals' wage rates and hours of work in order to predict how alternative tax regimes affect revenues. But federal tax returns include only the product of hours and the wage rate, that is, earnings. In this section we show how external information concerning the joint distribution of earning hours from the University of Michigan Panel Survey of Income Dynamics can be used in conjunction with tax return data to impute the missing data. The PSID was chosen because it is the only data set we could locate which includes both wage rate and annual income data for a sample of the U.S. population. The major disadvantage of the PSID is the sparsity of families in higher income brackets.

The first step in the imputation procedure is to estimate with the 1975 survey year data (giving 1974 income and hours) a regression of the wife's wage as some function of those variables that are common to the PSID and TAXSIM. The set of common variables consists of: wife's earnings, husband's earnings, a dummy to indicate if the wife is over 65 and the number of exemptions. A regression of the wife's wage on her own earnings may seem strange. Since earnings is the product of hours and the wage rate, it is an endogenous variable. This observation, though correct, is quite beside the point. The purpose of the equation is not to estimate a structural equation, but merely to describe the conditional distribution of the wage rate on the common variables.

The actual imputation applies the coefficient from the extraneous regression to the data in the TAXSIM model. To the conditional mean wage implied by the regression is added a random selection from the set of residuals.

The key assumption for this procedure to be correct is that conditional on the common variables the wife's wage rate must be linearly independent of the other variables in the model. This seems quite reasonable in that once we know earnings, etc., knowledge of the wage probably contributes little to predicting taxable income. The independence assumption is not necessarily true. It may be that extensive deductions are associated with high reservation wages, ceteris paribus. This would generate conditional dependence between the true value of the imputed variable and another variable in the model which would not be reflected in the imputation. Note that the presence of such dependence cannot be tested. Any data set with which the assumption might be tested would be a candidate for the simulation itself, and would obviate the need for the imputation procedure. In the absence of such dependence the synthetic data set will display the correct variance-covariance structure and the simulations will not be biased by the presence of error in the imputed variable. A more detailed justification and a complete specification for the imputation is contained in Feenberg and Rosen [1980].

Of course, for non-working wives this procedure could not be implemented because of the need for a wage variable to serve as a a regressand. Instead, a procedure was followed similar to that suggested by Hall [1973]. We estimated for the sample of working wives a regression of the wage rate on husband's income, number of dependents and an over 65 dummy variable, and used the results to impute wages to the non-workers. As is well-known, this procedure does not correct for the possible effects of selectivity bias. (See, e.g., Heckman [1979].) Given our paucity of explanatory variables, it seemed to us pretentious to attempt this rather subtle correction. Moreover, Hausman [1980, pp. 47, 48] has pointed out that in cases like ours, the correction usually makes no practical difference anyway.

IV: Behavioral Assumptions

We now turn to the question of how, given our figures on wages, rates and hours of work, we can simulate the effects of various tax changes on work effort and the distribution of family income. In effect, our task is to specify the function that relates hours of work to exogenous variables and the tax code. The framework used is the standard microeconomic theory of the leisure-income choice[9]. The theory views the hours of work decision as an outcome when the individual maximizes a utility function subject to a budget constraint. In part A of this section we discuss the budget constraint generated by the personal income tax system, and in part B we explain how preferences are modelled.

A. The Budget Constraint

Consider first the budget constraint faced by an untaxed individual with a wage w and unearned income I. The constraint can be represented graphically on a diagram with income plotted on the vertical axis, and hours of leisure on the horizontal. In figure IV.1, if the individual's time endowment is OT hours, then the budget constraint is a straight line MN with slope -w and vertical intercept I(=TN). Behind the linear budget constraint are the assumptions that the fixed costs associated with working are negligible, and that the gross wage does not vary with hours of work. These assumptions are common to most studies of labor supply. Although the consequences of relaxing them have been discussed[10], there is no agreement on whether they are important empirically. In this study, we retain the conventional assumption that the pretax budget constraint can be represented as a straight line.

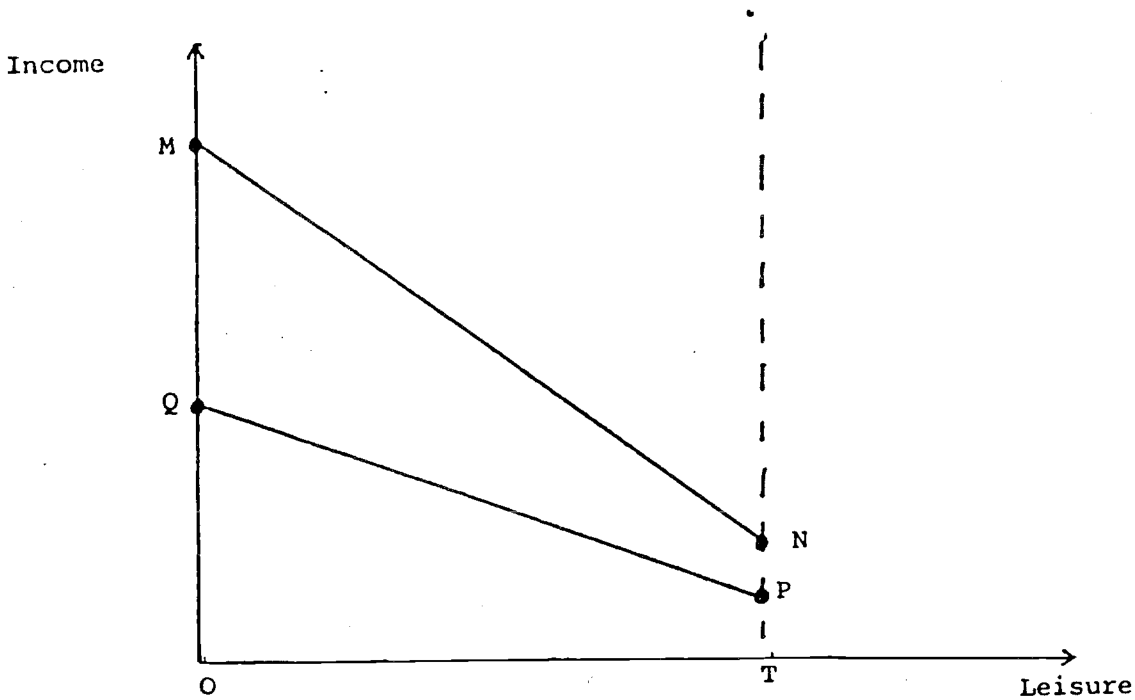


FIGURE IV.1

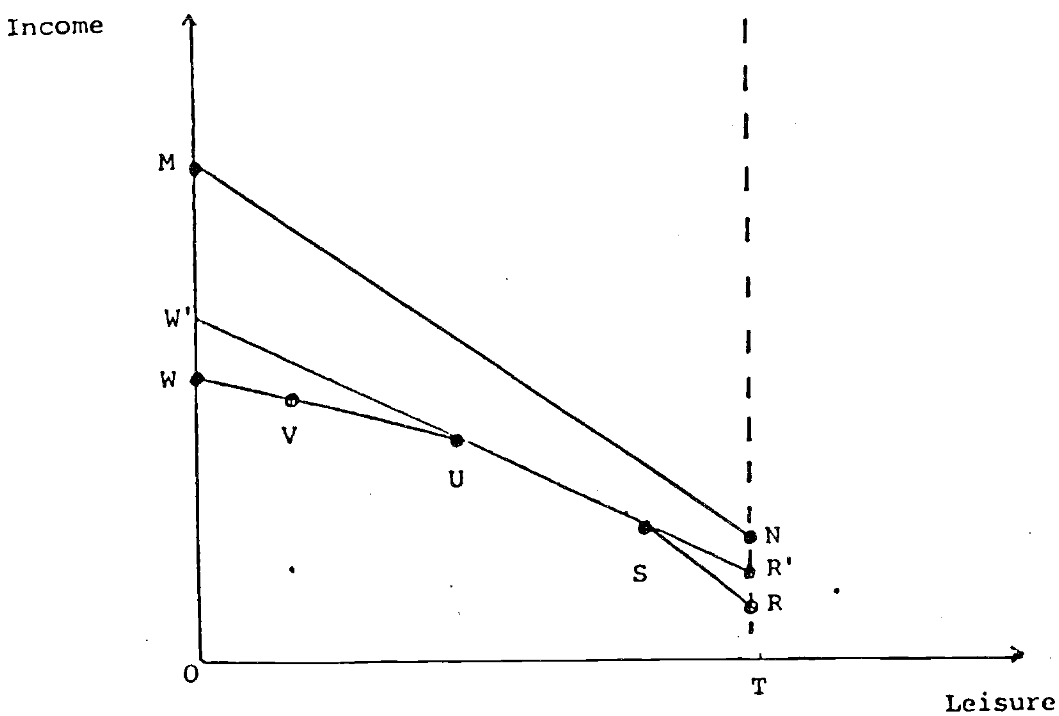


FIGURE IV.2

Assume now that the individual is subjected to a proportional tax on both earned and unearned income. Then the effective budget constraint facing the individual in figure IV.1 is PQ, with the tax rate being NP/NT. Note that even with such a simple tax system, one would have to know both the uncompensated elasticity of hours with respect to the wage and the income elasticity in order to predict the impact of taxes upon hours of work.

Of course, the U.S. tax system is progressive with respect to taxable income, not proportional. As an individual's income bracket changes, she generally faces a discrete increase in the marginal tax rate. This leads to a kinked budget constraint like RSUVW in figure IV.2. Observe that if the individual's optimum is along (say) segment US, then she behaves exactly as if optimizing along a linear budget constraint with the same slope as US, but with intercept W'. This fact, which has been observed by Hall [1973] and others is extremely useful, because it allows us to characterize the individual's opportunities as a series of straight lines. The distance TR' will be referred to as "effective" non-labor income.

Included in the tax code are a complicated set of exemptions, deductions, and credits. Conceptually, it is not difficult to include their effects in the budget constraint -- all that is required is that we be able to compute net income at any given number of hours of work. It should be noted, however, that some tax provisions actually lead to non-convexities in that there may be several points at which indifference curves are tangent to the budget constraint in order to find a global maximum. The specification of a complete utility function -- not just a labor supply curve -- thus becomes a necessity.

1. Functional Form

The standard static theory of labor supply behavior starts with a family utility function which depends upon family income and the amounts of leisure time consumed by each spouse. The labor supply of each spouse depends upon the net wages of both spouses and effective unearned income. Using several fairly reasonable assumptions, however, one can specify a family utility function with only two arguments: wife's leisure, and net family income. This simplification is permissable if the husband's labor supply is perfectly inelastic. In fact, many econometric studies of the labor supply behavior of married men have tended to show that both wage[11] and income effects are small in absolute value[12]. We therefore adopt the simpler model as a reasonable first approximation to reality.

Now that we have decided upon the arguments for the utility function, we turn to the question of its functional form. In making a selection, two criterion are important: (i) It should be simple, both to limit computational costs and to facilitate intuitive understanding of the results; and (ii) It should be fairly broadly consistent with econometric estimates of labor supply.

Recently, Hausman [1980] has suggested that one way to satisfy these criteria is to start with a labor supply function that fits the data fairly well, and then take advantage of duality theory to find the underlying (indirect) utility function. More specifically, Hausman observes that the linear labor supply function has proved very useful in explaining labor supply behavior:

(IV.1) $H = aw + bA + s$

where H is annual hours of work, w is the net wage, A is effective income, and a, b, and s are parameters. Using Roy's Identity, which relates various derivatives of the indirect utility function to H, Hausman shows that the indirect utility function, v(w,A), underlying (IV.1) is

$$v(w,A) = A + \frac{a}{b} w - \frac{a}{b^2} + \frac{s}{b} e^{bw}. \qquad \text{(IV.2)}$$

Given the ranges over which a particular individual's w and A will vary in our simulations, equations (IV.1) and (IV.2) seem to be adequate approximations, and they are adapted for use in this paper. We assign each family a set of utility function parameters calculated so that current behavior is perfectly predicted by equation (III.1) Specifically, assume that the hours elasticity with respect to the wage for the i^{th} family is A_i. Then a_i, b_i and s_i are the solutions to the system[13]:

$$w_i = \frac{w_i}{H_i} a_i \qquad \text{(IV.3a)}$$

$$A_i = \frac{w_i}{H_i} b_i \qquad \text{(IV.3b)}$$

$$s_i = H_i - a_i w_i - b_i A_i \qquad \text{(IV.3c)}$$

2. Elasticity Estimates

In order to solve equations (IV.3), estimates of wage and unearned income elasticities for married women are required. The literature suggests fairly high values for the wage elasticity. The studies reviewed by Heckman et al [1979] report values between 0.2 and 1.35 (pp. II.28, IV.3) and some investigators have proposed even larger estimates (see e.g. Block [1973] or Rosen [1976]). There is virtually no guidance with respect to how the wage elasticity varies with income level. Indeed, due to the thinness of all statistical samples in very high income groups (i.e., family income greater than $35,000 in 1974) essentially <u>nothing</u> is known about the labor supply response of the women at the top end of the scale. Nor is anything known about the effect of the number of dependents on the price or income elasticities, although the presence of small children is known to reduce mean labor supply dramatically. We use a conservative value of .5 in this paper.

With respect to η_A we find that here also the literature provides less than firm guidance. This is due in part to the problems involved in measuring correctly family unearned income. (Difficulties arise due to under-reporting, estimating imputed income from durable goods, etc.) In addition, unearned income is usually treated as an exogenous variable in hours equations, although in a life cycle context, it would be endogenous. Heckman and Killingsworth [1979] report that most investigators have found values of η_A between -0.002 and -2. We use -0.1 in our simulations.

The demand side of the labor market is not modeled, that is, it is assumed that the wage rate offered to married women will not be affected by the increase in supply. Given the small change in hours induced by the tax change relative to total hours in the economy, this is appropriate.

3. Welfare Effects

Given the explicit indirect utility function (IV.2) it is relatively straightforward to calculate a compensating or equivalent variation for the change in tax rates. We choose the equivalent variation as our measure of welfare loss; it is defined as the sum of money necessary to restore an individual to his original utility level, evaluated at the original prices. That is, EV is defined by the implicit equation:

$$v(w_0, A_1 + EV) = v(w_1, A_1)$$

which evaluates to:

$$Ev = e^{b(w_1-w_0)} \left(A_1 + \frac{a}{b} w_1 - \frac{a}{b^2} + \frac{a}{b}\right) - \left(A_1 + \frac{a}{b} w_0 - \frac{a}{b^2} + \frac{a}{b}\right)$$

The difference between the EV and the revenue loss of the change is an exact measure of deadweight loss (Hausman [1981]). The use of the Marshallian measure (the area under the labor supply curve between w_1 and w_0 minus the revenue loss) would not be justified. Though the Marshallian consumer surplus measure is ordinarily an excellent approximation to the compensating or equivalent variation (Willig [1976]), the same result does not hold for the corresponding measure of deadweight loss (Small and Rosen [1979], Hausman [1981]). The absolute error inherent in Marshall's measure of deadweight loss is the same as the error in his measure of consumer surplus, but relative to the smaller base the percentage error may be much larger.

V. Results

There are, of course, an essentially unlimited number of ways in which the tax treatment of the family could be modified. The effects of a number of alternatives, including voluntary or compulsory separate filing and a secondary earner's credit are evaluated in Feenberg and Rosen [1980]. In this paper only the reforms enacted in the 1981 tax law are discussed.

Each tax regime naturally induces a change in revenue collections. It is possible that in practice legislators might want to introduce additional taxes to keep revenues constant, or they might finance a tax reduction with bonds or money. However, one cannot know in advance what form these adjustments might take or what effects they might have. In the light of this ambiguity we have not attempted any equal revenue comparisons.

The baseline data in table V.1 is taken from a stratified, random sample of tax returns taken from the U.S. Treasury 1974 Tax Model. The subsample includes one in forty returns with non-working wives and one in twenty for couples with working wives. The data are extrapolated to reflect 1979[14] totals, and the 1979 tax law is applied. The table shows adjusted gross income, federal income tax liability, marginal tax rates on earned income, and the imputed hours of work per year for the wives. As to the general trend of the table, we see that average and marginal tax rates rise with AGI class. The number of hours worked tends to rise with income, but the relationship is not strictly increasing. As other family income increases there is an income effect which would decrease the number of hours that wives work if, as expected, leisure is a normal good.

However, there is also a tendency for the wife's pretax wage to be positively correlated with other family income, which encourages work in the market (assuming a positively sloped supply of hours schedule). One cannot say *a priori* which effect will dominate.

A. Secondary Earners Deduction

Table IV.2 shows the effects of allowing the family to deduct 10% of the first $30,000 of secondary worker's earnings from taxable income. A wage elasticity of hours with respect to the net wage of 0.5 is assumed. In order to maintain comparability with table IV.1, the adjusted gross income classes are those associated with the *status quo*.

STATUS QUO -- 1979 (JOINT RETURNS)

AGI Class	Number of Returns (in 1000s)	Average AGI	Tax Liability	Marginal Tax Rate	Hours Worked Per Year
<5000	1676	2862	24	-0.04	102
5-10,000	4180	7789	123	0.15	331
10-15,000	5744	12580	873	0.17	501
15-20,000	7168	17390	1799	0.23	517
20-30,000	12648	24450	3248	0.28	779
30-50,000	10483	37370	6543	0.33	1000
50-100,000	2877	65000	16290	0.47	741
>100,000	571	171600	65130	0.53	681
Mean		26908	4678	0.26	681
Total	4.53×10^7	1.2×10^{11}	2.1×10^{11}		3.1×10^{10}

TABLE V.1

SECONDARY EARNER'S DEDUCTION

AGI Class	Tax Liability (Exogenous)	Tax Liability ($\eta_w = 0.5$)	Marginal Tax Rate	Hours Worked	Change in Deadweight Loss
< 5000	24	25	-0.039	102	-1.34
5-10,000	120	121	0.15	332	-0.81
10-15,000	852	854	0.17	504	-2.7
15-20,000	1767	1773	0.17	524	-9.3
20-30,000	3161	3183	0.26	798	-30.5
30-50,000	6306	6369	0.31	1028	-180
50-100,000	15960	16110	0.45	773	-168
> 100,000	65010	65080	0.52	506	-606
Mean	4570	4603	0.25	697	-46
Total	2.073×10^{11}	2.087×10^{11}		3.16×10^{10}	-2.09×10^{9}

TABLE V.2

The deduction has a modest effect on labor supply. As a comparison with table V.1 shows, on average wives supply 15 more hours per year. The increase is most marked in the $30-$50,000 range, where the combination of a relatively high marginal tax rate and labor force participation rate increase the effect.

On the average, tax collections fall by about $72 (out of $4602), and the fall is greater in the higher brackets. For the sake of comparison we have noted in the second column of table IV.2 what the revenue predictions would have been had we postulated perfectly inelastic labor supplies for wives. The table suggest that about one-third of the revenue loss is restored by the increased tax base associated with the higher labor supply. Although this is considerably short of the claims of some that reductions in rates will be self-financing, it is significant enough to demonstrate the importance of incorporating endogenous behavior response in revenue predictions. The final column shows the deadweight loss of the deduction, evaluated according to the procedure given in III.3. Because all marginal rates are driven toward zero by the change, the deadweight loss is always negative. The reader may note the relatively high ratio of deadweight loss to revenue at high income levels, reaching ten to one at the highest level.

B. Child-Care Credit

The child-care credit started as a deduction, but was converted to a credit in 1976. The current rule allows 20% of dependent care expenses to be taken as a credit against tax due. Expenses are limited by the secondary earner's actual earnings, and by $2000 for each dependent up to two such dependents. The 1981

BASELINE DATA -- CHILD-CARE CREDIT

AGI Class	Number of Returns	Mean AGI	Tax Liability	Child-Care Expenses	Wages (Secondary Earner)
<5000	29.7	573	-12	0	121
5-10,000	47	9609	80	640	2316
10-15,000	157	12980	727	550	4543
20-30,000	1090	25190	2984	972	8715
30-50,000	759	36300	5469	175	11090
50-100,000	79.4	62850	14540	709	14750
>100,000	11	141700	47770	805	19240
Mean		27616	3780	707	8669
Total	$2.59x10^7$	$7.15x10^{10}$	$9.79x10^9$	$1.83x10^9$	$2.24x10^{19}$

TABLE V.3

law raises the dollar limit to $2400, but also introduces a sliding scale for the credit which increases the rate by 1% for each $2000 that the taxpayer's income falls short of $30,000 with a maximum rate of 30%.

The effect of the child-care credit on the wife's marginal after-tax wage rate is quite a bit more complicated and less exactly modelled than the secondary earner's deduction. There are three paths for the credit to affect the after tax wage. First, the expenses subject to the credit are limited by the amount of earnings for the secondary worker (or $166/month for a full-time student). Second, changes in earnings will affect AGI which in turn will affect the percentage credit allowed for individuals with AGI between $10,000 and $30,000[14]. Thirdly, changes in hours presumably affect the actual expenditures required for child care. The exact specification of this last relationship is obviously not possible, we make the simplifying assumption that marginal expenditure on child-care equals average expenditure on child-care. That is, expenses will be proportional to hours of work supplied. Of the three effects, it is the first that is most affected by the liberalization of the credit.

Although single parents are eligible for the credit, only married couples are included in the simulation, chiefly because little is known about the labor supply response of single men and women[15]. The same wage and income elasticities are used as for the secondary earner deduction simulation, in the absence of evidence to the contrary.[16]

Table V.4 shows the effects of liberalizing the child-care credit. For moderate incomes the feedback of the secondary earner's wages into the credit rate acts to raise the marginal tax rate. This lowers the after-tax wage rate, and when combined with the reduction in tax liability caused by the increased size of the credit results in a substantial decline in hours worked. Below $10,000, only the income effect is present, but the ten point increase in the amount of the credit leads to a similar effect. The overall effect is a four hour reduction in annual work effort. The $29 loss of revenue is accompanied by a $4-5 increase in deadweight loss. While the credit may have been intended to encourage mothers to enter the labor force, because it is keyed to expenses but not to earnings it cannot have that effect. An exception to that rule would be the rare case where child-care expenses exceeded earnings, in which case the after-tax wage rate is raised by 20 to 30 percent of the pretax level. This applies to only 2% of our sample.

Because marginal rates are raised, the deadweight loss of this tax reduction is positive, a remarkable event, although not without precedent.

EFFECTS OF LIBERALIZATING THE CHILD-CARE
AND DEPENDENT CARE CREDIT -- 1979 LEVELS

AGI CLASS	CHANGES IN			DEADWEIGHT LOSS
	TAXES (EXOGENOUS BEHAVIOR)	TAXES $\eta_w = 0.5$	HOURS	
5000	0	0	0	0
5-10,000	-50	-47	-3.5	0.50
10-15,000	-47	-49	-3.2	0.54
15-20,000	-63	-68	-4.4	0.66
20-30,000	-24	-30	-6.5	8.85
30-50,000	-4	-4	-0.7	6.97
50-100,000	0	0	0	0.4
100,000	-20	-24	-1.3	2.35
Mean	-26	-29	-3.9	4.34
Total	6.56×10^7	7.51×10^7	1.02×10^7	1.1×10^7

(Only those claiming credit are included.)

TABLE V.4

VI. Concluding Remarks

The departure from marriage neutrality under the current U.S. income tax system is quite substantial. The average amount of penalty paid by the 18.7 million couples whose tax liability would be lower if they were allowed to file as single individuals is $481 and the corresponding gain for each of the 20.3 million couples who benefit from joint filing is a startling $713. Only six percent of couples are not affected.

We have seen that no positive income tax system can achieve the simultaneous goals of marriage neutrality, horizontal equity, and progressivity, and that it might be expected that a device such as the secondary earner's deduction might enhance the first goal at the expense of the latter. However, the success of the SED in reducing the marriage penalty is more than matched by its success in increasing the marriage benefit for those couples who benefit, and by the transfer of many couples from the penalty to bonus categories. The net result is a slight increase in the average deviation from neutrality.

The SED also leads to a slight increase in labor supply by married women -- perhaps 15 hours per woman per year. The behavioral response has a significant effect on the estimated revenue cost of the deduction, reducing that estimate by about one-third to $72 per joint return. The reduction in deadweight loss (relative to a non-distorting distribution of the same reduction in revenue) is about twice the revenue loss.

While popular literature has emphasized the equity argument for a special treatment of secondary earners, we have seen that the deduction can be recommended only for its positive efficiency effect.

A similar examination of the liberalized child-care credit leads to the conclusion that it is a tax reduction which lowers after-tax wage rates. The average recepient of the credit gains about $29 in tax reductions but works about 4 hours less. There is a net increase in deadweight loss of $4-5.

Footnotes

1. A comprehensive history of the controversy is given in Munnell [1978]. Also see June O'Neill's paper in this volume.

2. This argument implicitly assumes that a husband's labor supply is not sensitive to tax rate changes generated by his wife's earnings.

3. Peter Mieszkovski and John Shoven have both pointed out that a proportional income tax could be combined with a uniform lump sum capitation grant to each individual. The resulting tax and transfer system could be quite progressive, at least at low to moderate income levels, if the lump sum grant were sufficiently generous, and the system would clearly be neutral with respect to marriage. In 1979 aggregate adjusted gross income was 1,464 billion, which yielded revenues of 214 billion. Given the population (220 million) and assuming static behavior a simple arithmetic identity yields the marginal tax rate necessary to raise the same revenue. That rate is 0.15 for a lump sum grant of zero, and increases by 0.015 for each $100 of the grant. While a system of this kind has many attractions, surely marriage neutrality is among the least of them.

4. Because the credit is available to married or single individuals, changes in the child-care credit do not strictly affect the marriage tax. It is included here because marriage and children are still intimately related for most Americans.

5. In part III the issue of data-imputation is taken more seriously, but the imputation of deduction is a peripheral issue in this section and the description of the procedure is relegated to this note. Each couple on the CPS tape was assigned an amount of deductable expense chosen randomly from those joint returns on the 1977 Tax Model with the same income and number of children. Returns were grouped in brackets $1500 wide and families with more than four children are grouped together.

6. In order to bring all figures to 1979 levels, we increase all dollar amounts by the proportional change in taxable income from 1974 or 1977 to 1979, and increase the number of returns according to the growth of the population.

7. It has been used, for example, to create the Brookings MERGE file. See Pechman and Okner [1974].

8. Criteria for doing the matching are discussed by Kadane [1978] and Barr and Turner [1978].

9. For a comprehensive discussion of the theory the reader is referred to Heckman, et al, [1979].

10. Hausman [1980] analyzes a model with fixed costs of work, and Rosen [1976] discusses a model in which full and part time workers receive different hourly wages.

11. This includes own and cross wage effects. For households in which the wife is the primary earner, i.e., her earnings exceed her husband's, the wife's labor supply is assumed to be perfectly inelastic.

12. See, for example, Heckman et al [1979, pp. II.28, II.34]. Hausman [1980] also finds a small wage effect, but a fairly substantial income effect.

13. Clearly, this procedure cannot be implemented for non-workers. For these individuals, the following ad hoc procedure is used: calculate the average H, w, and A for members of the individual's group who work between zero and one hundred hours. Substitute these means into system (IV.3), and use the implied values of a, b, and s for non-workers.

14. The extrapolation to 1983 seemed too extreme.

15. This included 70% of returns claiming the credit in 1977.

16. In the secondary earner's deduction simulation inelastic response was assumed for the primary earner, and elastic response only for the female secondary earner. With the 1977 data the sex of taxpayers is unknown and a few male secondary earners are inevitably given an elastic labor supply response.

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