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**SIMULATING GERMAN INCOME AND
SOCIAL SECURITY TAX PAYMENTS
USING THE GSOEP**

Johannes Schwarze

**All-University Gerontology Center
Maxwell School of Citizenship and Public Affairs
Syracuse University
Syracuse, New York 13244-1090**

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Cross-National Studies in Aging

Staff

Richard V. Burkhauser	Project Director
Timothy M. Smeeding	Project Investigator
Barbara Butrica	Project Programmer
Mary Daly	Research Associate
Detlef Jurkat	Project Translator

Affiliated Researchers

Greg Duncan	University of Michigan
Richard Hauser	University of Frankfurt
Joachim Merz	University of Lüneburg
Thesia Garner	U.S. Bureau of Labor Statistics
Barbara Boyle Torrey	National Academy of Sciences

Research Staff

Debra Bailey	Research Assistant
John G. Poupore	Research Assistant
John Phillips	Research Assistant
Bob Weathers	Research Assistant
Dave Wittenburg	Research Assistant

Administrative and Support Staff

Margaret Austin	Administrator and Budget Officer
Martha W. Bonney	Administrative Coordinator
Esther Gray	Administrative Secretary

Contact:

All-University Gerontology Center
Maxwell School of Citizenship and Public Affairs
426 Eggers Hall, Syracuse University
Syracuse, New York 13244-1090
United States of America
Telephone: (315) 443-9442
Internet: dwjurkat@mailbox.syr.edu
Fax: (315) 443-1081

German Socio-Economic Panel Project Group

German Institute for Economic Research, Berlin
(Deutsches Institut für Wirtschaftsforschung, Berlin)

Gert G. Wagner, Project Director

Research Staff

Joachim Frick
Elke Holst
Peter Krause
Rainer Pischner

Ulrich Rendtel
Kerstin Seiring
Jürgen Schupp
Johannes Schwarze

Administrative Staff

Christine Kurka
Franziska Guthke

Contact:

Socio-Economic Panel Project
Deutsches Institut für Wirtschaftsforschung
Königin-Luise-Straße 5
D-14195 Berlin
Germany
Telephone: 011-49-30 89 789-283
Internet: elke.holst@diw-berlin-d400.de
Fax: 011-49-30 89 789-200

ABSTRACT

This paper describes a simulation package designed to estimate the annual federal income and social security taxes paid by respondents in the West German sample of the German Socio-Economic Panel. Such information is critical for studying income distribution, poverty, and the effects of tax and transfer programs on economic well-being. The simulation package used a methodology similar to the one used in the Panel Study of Income Dynamics for United States households, making cross-national analyses with these two panels much more convenient.

SIMULATING GERMAN INCOME AND SOCIAL SECURITY TAX PAYMENTS USING THE GSOEP

This paper describes a simulation package designed to estimate the annual federal income and social security taxes paid by respondents in the West German sample of the German Socio-Economic Panel (GSOEP) (see Wagner et al. 1993 for a detailed discussion of the GSOEP).¹ The GSOEP does not currently provide information on the annual tax payments of its respondents. Such information is critical for studying income distribution, poverty, and the effects of tax and transfer programs on economic well-being. The simulation package described here uses a methodology to compute taxes for GSOEP respondents that is conceptually similar to the one used in the Panel Study of Income Dynamics for United States households. This similar computational methodology makes cross-national analyses with these two panels much more convenient.

Overview

Most international research on income focuses on net household income, which is typically defined as annual household income net of taxes. However, the average survey respondent in Germany is not likely to know this value. At best, an individual can report his or her monthly after-tax labor income. Thus, there is no direct way to obtain estimates of annual taxes paid by individuals or households from German survey data. Instead, estimates of taxes paid and of the components of after-tax income must be simulated.

Berntsen (1992) provides one method for computing after-tax household income for GSOEP respondents living in the western states of Germany. He computes tax values for income years 1983 through 1989 using a FORTRAN-based tax simulation package developed by Van Essen et al. (1986). The Berntsen approach attempts to capture the actual filing behavior of all respondents in

the original West German sample of the GSOEP; consequently, his tax program is very detailed and cannot be easily updated or modified. In addition, it makes fairly strong assumptions regarding missing and/or outlying values. Most importantly, there are no plans to extend this package beyond the 1989 survey year.

This paper presents an alternative tax simulation package for the GSOEP that can be used by individuals with limited knowledge of the German tax system. The package computes tax burdens for all of the existing waves of the West German sample of the GSOEP and can easily be extended to include future waves. Future releases of the GSOEP will contain tax computations developed for the East German sample. The tax programs are written as SAS macro files and can be called into any SAS program that has the appropriate input variables. The GSOEP tax simulation package is similar in design to that of the Panel Study of Income Dynamics (see Hill 1992). Both methods provide an approximation of the federal income and social security tax burdens of panel households based on the assumptions that all tax filers take the standard deduction, and that all married respondents file jointly. Although these assumptions probably overstate the taxes paid by upper income families, they provide a reasonable approximation of net of tax income for households in each country.

In this paper, discussion of the German income and social security tax simulation program is linked to discussion of Release I of the Syracuse University Panel Study of Income Dynamics and German Socio-Economic Panel Equivalent Data File. The most recent version of the Equivalent Data File is based on the first seven waves of the GSOEP (1984-1990) and so much of this paper focuses on the incorporation of the 1990 income and social security tax laws into the tax simulation package. However, the current version of the tax simulation package includes the parameters necessary to produce estimates of individual and household tax burdens for the years 1984 through

1993, and will be updated to reflect future changes in German income and social security tax laws. These updated estimates are not expected to be available until sometime in 1995.²

The paper has two sections. The first is an overview of the German income and social security tax systems. The second describes how the tax laws are incorporated into the simulation program, outlines the data requirements and key assumptions of the tax package, and provides an example of its use.

The German Income and Social Security Tax Systems

This section describes the basic framework of the German federal income tax and the German social security tax systems. The description is not meant to be exhaustive but to provide information on the major features of the two systems.

The German Income Tax System

Like the federal income tax system in the United States, the German tax system is quite complex, especially for high income earners and those with income from self-employment or non-labor earnings. Germany has a personal income tax system administered at the federal level and regulated by the Einkommenssteuergesetz. During the first seven waves of the GSOEP (1984-1990), German income tax laws changed six times. Although each of these changes is incorporated into the simulation program, the most significant changes occurred in 1990 and it is the 1990 rules which are discussed in this paper (see Bundesminister der Finanzen 1984, 1985, 1986, 1987a, 1987b, 1990).

Computing Taxable Income. The German tax system recognizes two types of filing units: single filers (all non-married persons), and joint filers (married persons). The principal difference

between the tax computations for these two tax filing units is in the application of the marginal tax rates to the tax base. Computation of the tax base is nearly identical for each of the filing units.

Computing taxable income for both individual and joint filers can be thought of as a four step process as outlined in Table 1. The first step is to calculate potentially taxable income from each of seven different income sources. These sources are:

1. Income from farming and foresting
2. Income from trade or business
3. Income from independent activity
4. Income from employment
5. Income from capital investment
6. Income from rental and leasing
7. Income from other sources.

Potentially taxable income is equal to gross income less income-related expenses.

Potentially taxable income from sources (1) through (3), treated as profits, is computed as sales receipts minus expenses. Potentially taxable income from sources (4) through (7) is computed as payments received minus expenses.³ Tax filers can compute their potentially taxable income from sources (4) through (7) either by taking a standard deduction or by itemizing their expenses. For employment income the standard deduction is 2,000 DM. Income from capital investment up to 600 DM for single filers and 1,200 DM for joint filers is tax free.⁴ For capital investment income above these thresholds the standard deduction is 100 DM for single filers and 200 DM for joint filers.

In addition to the standard deductions on employment and capital investment income, there are also provisions for pension income. For private sector workers, pension benefits from the German social security system as well as from commercial life insurance are not fully taxed. In theory these benefits come from previous contributions, which are taxed when contributed, and the interest accumulated on these contributions, which is not taxed. In fact, the German social security system is like the American system, "pay-as-you-go", and also, like the American system, has major

TABLE 1	
FOUR STEPS TO COMPUTING TAXABLE INCOME IN GERMANY	
Step 1: Taxable Income Sources	
Profit Income Method: Sales Receipts Minus Expenses	
<ol style="list-style-type: none"> 1. farming and foresting 2. trade or business 3. independent activity (e.g., dentists, physicians) 	
Net of Expenses Income Method: Payments Received Minus Expenses	
<ol style="list-style-type: none"> 4. employment (including pension benefits of civil servants) 5. capital investment 6. rental and leasing 7. other sources (including pension benefits from the German social security system as well as private employer pensions) 	
Step 2: Old Age Deductions	
Old age deduction	
Step 3: Expenses	
Special expenses	
Extraordinary expenses	
Loss deduction	
Step 4: Allowances	
Child allowance	
Housekeeping allowance	
Source: Bundesminister für Finanzen (various years).	

redistributive features. Thus, the "untaxed" share of benefits must be approximated. Under the German income tax system, this amount is estimated as a function of the pensioner's retirement age.⁵ Since civil servants do not make contributions into their pension plan, one could argue that their benefits should be fully taxed. However, they are allowed to shelter the lesser of 40 percent of their pension income or 4,800 DM from taxes.

Once potentially taxable income from each of the seven sources has been calculated, all the incomes are summed to obtain a single dollar amount for each filing unit. This amount is the potentially taxable income base from which all further allowances are deducted. In Step 2 the potentially taxable income base for filers aged 65 and over is further reduced. For single filers, the deduction equals the lesser of 40 percent of their income or 3,720 DM. For joint filers, the maximum old age deduction can be as high as 7,440 DM.

In Step 3 a series of deductions for standard and non-standard expenses are computed. These include deductions for special expenses, extraordinary expenses, and losses. **Special expenses** include expenses related to one's own care and special cases, such as own education or training, a child's education in private school, church taxes, and tax advice.

Special expense deductions for one's own care are computed by the tax authorities and are based on an individual's level of social security contributions (health, old age, and unemployment insurance) and earnings. An individual can take a deduction equal to a lump sum amount that varies with earnings and has an upper limit or some amount that is based on social security contributions up to some limit, whichever is larger.

Most people do not itemize expenses for special cases but simply take the standard special expense deduction of 108 DM for single and 216 DM for joint filers.

Extraordinary expenses and loss deductions also reduce the taxable base. Extraordinary expenses include educational expenses for children 18 years or older or for people with disabilities

living in the household. These expenses and deductions can only be used under special circumstances which must be fully explained to the tax authorities. There are no standard deductions or allowances for extraordinary expenses. Likewise, there are no standard deductions for losses.

Finally, in Step 4 allowances for children and housekeeping are deducted from potentially taxable income. A **child allowance** is permitted for each dependent child covered by the tax law. This deduction can be taken by an individual or, in the case of joint filers, by a couple. The deduction is 3,024 DM for each child. Until 1992 all children aged 16 and under who lived with their parents were eligible. In 1992 the age limit for the allowance was increased to 18 years of age. Allowances are also available for resident children between the ages of 18 and 27 who attend school or university or who participate in other kinds of education or training. Only one tax filing unit can claim a child. For single parents an additional **housekeeping allowance** of 5,616 DM is permitted.

Computing Taxes Paid. Once taxable income has been computed, actual taxes paid can be calculated. To do this the tax filing unit (single or joint) and the tax bracket must be known. Tax rates are identical for single and joint filers but the application of these tax rates to the tax base differs for each type of filing unit. For single filers the rates are applied directly to the tax base. For joint filers, the tax rates are applied to one-half of the couple's total taxable income and the resulting tax burden is doubled to obtain the total tax bill. This "splitting scale" method of taxation implies that each partner is assumed to "earn" one-half of the total taxable income of the couple.⁶ Thus, the income tax payments for single and joint filers can be calculated as:

$$\text{Single Filer Taxes} = (\text{Taxable Income}) * (\text{Tax Rate}) \quad (1)$$

$$\text{Joint Filer Taxes} = 2 * [(0.50 * \text{Taxable Income}) * (\text{Tax Rate})] \quad (2)$$

In 1990 the German tax function consisted of four brackets. Table 2 shows the income brackets and corresponding tax rates for taxable income in 1990. The first income bracket (from 0 DM to 5,616 DM) is the tax exempt zone in which no taxes are paid. Filers in the next bracket (5,616 DM to 8,153 DM) pay a constant proportional rate of 19 percent. Within the third income bracket (8,154 DM to 120,041 DM) the rate paid varies progressively from 19 to 52 percent. A constant rate of 53 percent is paid on all income above 120,041 DM (fourth income bracket).

At this point the income tax burden for the filing unit is complete. However, to get an accurate estimate of after-tax income, payroll taxes must also be included. The next section describes how this is computed.

The German Social Security System⁷

The German social security system is compulsory for most employees. It provides protection against income loss associated with poor health, old age, unemployment, and industrial injuries or diseases.⁸ Statistics published by the German government indicate that more than two-fifths of the German population is covered by the health insurance system either as employees or related persons (spouses and children). Less than one-fifth of the population is covered by private insurance agencies. The proportion of the population in Germany not covered by any health insurance plan is negligible. Similar pictures hold for old age and unemployment insurance.⁹

Coverage. The German health care, old age, and unemployment insurance systems are operated by quasi-independent organizations. These organizations are either independent statutory agencies or public authorities at the local, regional or federal level. However, they are subject to social insurance laws as outlined in the German Social Code (Sozialgesetzbuch). Specific rules are given by the Reichsversicherungsordnung and the Arbeitsförderungsgesetz. For our purposes it is sufficient to discuss the general rules only.

TABLE 2
GERMAN FEDERAL INCOME TAX BRACKETS IN 1990

Zone	Brackets (DM)	Tax Rate
Tax Exempt	0 to 5,616	0
Proportional	5,617 to 8,153	19
Progressive	8,154 to 120,041	19 to 52
Upper Proportional	120,041 and above	53

Source: Bundesminister für Finanzen (various years).

Health care, old age, and unemployment insurance are, in principle, compulsory for all workers in the private sector as well as for some self-employed persons. Civil servants are excluded from all of these compulsory insurance plans because their retirement benefits are guaranteed and paid by the state and unemployment is impossible.¹⁰ With few exceptions, all other employees are compulsorily insured. One exception, the marginally employed, will be discussed later. Another exempted class includes highly paid white collar workers who must join the old age and unemployment systems but who can leave the statutory health care insurance system if their yearly employment income exceeds the government determined minimum level.¹¹ These workers can either voluntarily join the statutory health care system or contract with a private health insurance corporation. Private health insurance rates are often lower than statutory ones but can vary with a worker's age. However, unlike the statutory health care system, private insurance rarely covers family members who do not work.

Contributions. Contributions to the social insurance fund are earnings related. Compulsory and voluntary members of the statutory social security system pay contributions related to their gross earnings, including the 13th month salary. Employers match employee contributions, collect contributions and transfer them to the relevant insurance institutions.

Contribution rates are fixed by different authorities. The rates for old age and unemployment insurance are fixed yearly by the Bundesminister für Arbeit und Sozialordnung.¹² In 1990 the worker's contribution rate for old age insurance was 9.35 percent (employers were required to contribute an additional 9.35 percent). The worker's contribution rate for unemployment insurance was 2.15 percent.

Unlike contribution rates for old age and unemployment insurance, contribution rates for health care insurance are regulated at the local level. Each health insurance agency that belongs to the statutory health insurance system calculates its own rate. The rates are not dependent on the

individual characteristics of the insured, as is the case in private health insurance, but are based on estimated expenses and estimated labor earnings of the insured population. Not all employees are free to choose their own health insurance. Blue collar workers must belong to Allgemeine Ortskrankenkasse (AOK), a special statutory health insurance system to which unemployed persons and most pensioners also belong.¹³ The AOK has an adverse selection problem because it insures a high proportion of high-risk individuals. This increases the contribution rate to AOK and individuals who have the choice of joining another system usually do so. White collar workers can join the Ersatzkrankenkasse system. White collar workers with earnings above a certain amount can choose to either join the Ersatzkrankenkasse system or contract with a private health insurance agency.¹⁴ In either of these cases employers must match workers' contributions. Employees who work for large corporations that have their own health plans are also exempted from joining a statutory health insurance plan. Contribution rates differ among these insurance agencies.¹⁵

The income base used to compute social security contributions is a worker's monthly gross earnings up to an inflation adjusted contribution ceiling. In 1990 the ceiling was 6,300 DM per month for old age and unemployment insurance contributions and 4,725 DM for health insurance contributions. An exception to this rule is the marginally employed rule (see Schwarze 1993). Workers who average less than 15 hours per week and receive a gross monthly income below some maximum (470 DM in 1990) are considered to be in "marginal employment." For students, marginal employment is defined as working an average of less than 20 hours a week. There is no limitation on income earned. Such employment is exempt from all social security taxes. Marginal employment is attractive for certain types of employers as well as employees (e.g., housewives) but its existence is quite controversial and has been the subject of several reform attempts (see Schwarze 1993).¹⁶

The GSOEP Tax Simulation Program

This section describes how the tax laws are incorporated into the simulation programs, outlines the key assumptions and data requirements of the tax package, and provides an example of its use.

As noted in the previous section the German tax system is complex. Thus, it would be difficult to incorporate each of the regulations described into a simple, easily updated program. Therefore, in general the simulation programs are based on a set of simplifying assumptions:

- all married persons file jointly
- all filing units take the standard deductions
- no filing unit itemizes
- when no standard deduction exists the allowance is ignored
- average national insurance contribution rates for old age pensions, health insurance, and unemployment insurance apply to all employees

Simulating Income Tax Burdens

As discussed in the overview and outlined in Table 1 the first step in computing the tax base is to compute potentially taxable income. To do this, assumptions about income related expenses for each of the seven income sources have to be made. One key assumption concerns how respondents report income from different sources. It is not clear whether respondents report their potentially taxable income (income minus expenses) or their gross income. Moreover, respondents may report gross income in some cases and income net of expenses in others. For example, individuals may report their gross income from labor earnings but their net income (profits) from self-employment. In this tax simulation package income from sources 1 through 3—self-employment income—and income from rentals or leasing is assumed to be net of expenses. Income from all other sources—4, 5, 6, and 7—is assumed to be gross income from which the standard deductions are subtracted.

Additional adjustments to income from employment and from social security and employer pensions for workers other than civil servants must be made. Income from employment must be adjusted for individuals who received short-time or bad-weather allowances. These allowances are tax-free and should be subtracted from taxable wage and salary income. Since the survey question on this topic only asks for the number of weeks respondents received such benefits, the simulation program simply assumes that these benefits are a fixed percentage of reported weekly gross income. Benefits for non-civil service retirees have to be divided into the taxable profit share portion and the non-taxed contribution portion. In principle, this division could be done separately for each person based on actual retirement age. However, for simplicity retirement is assumed to occur at age 60 for everyone, producing a constant profit share portion of benefits equal to 28 percent.

Additional deductions, such as the ones for old age and special expenses in Steps 2 and 3 of the income tax calculation, are treated uniformly for all filers. Persons over age 65 are assumed to deduct the lesser of 40 percent of their income or 3,720 DM. Deductions for self-employed individuals are set equal to the upper limit allowed because contributions to private old age and health insurance are not known. The simulation package also takes into account special regulations for joint filers and pensioners. Deductions for other special expenses are set equal to the standard deduction of 108 DM (216 DM for joint filers). Extraordinary expenses and loss deductions are ignored within the tax simulation package.

The tax simulation package computes the child allowance exactly as the German income tax laws require and applies this deduction to the taxable income base. The computation of the housekeeping deduction is only included in the tax simulation program for individual filers (M-TAX-I.SAS), because the deduction can only be taken by single persons. This allowance is a fixed amount which is deducted whenever a child is present in a single adult household. (See Appendix

Table 1 for a detailed comparison of the German Tax System and its implementation in the tax simulation package.)

Simulating Social Security Contributions

Most employees are compulsory members of the statutory social security system. As a first step, contributions to old-age insurance, health-care insurance, and unemployment insurance are calculated for every individual with positive income from employment. The income base is income from employment up to a certain limit (limits as well as contributions rates for every year can be seen in the programming code).

It is assumed that all private sector workers are charged the same contribution rate.¹⁷ The rate applied in the tax simulation program is the average rate of the statutory health insurance agencies. This assumption is made despite the fact that there is detailed information about health care insurance in some waves of the GSOEP.

The same assumption is made in the case of civil servants. These individuals can be identified in the GSOEP data by their employment status and are excluded from compulsory social insurance. However, civil servants are partially funded by their employer if they purchase private health insurance. As a result, almost every civil servant is covered in part by private health insurance.

It is difficult to identify all marginal employees even with detailed survey data (see Schwarze 1993). The present version of the tax simulation program does not consider hours worked in determining such employment. Rather, marginal employment is approximated based solely on yearly income from employment. If yearly gross labor earnings are below the ceiling, it is assumed that the worker is in marginal employment and no contributions to the social security system are computed. (See Appendix Table 2 for a detailed comparison of the German Social Security Tax System and its implementation in the tax simulation package.)

SAS Tax Simulation Programs

The tax simulation package contains two SAS macro files, one for single filers and one for joint filers. These files are called:

M-TAX-I.SAS: simulates annual income and social security taxes for single filers;

M-TAX-S.SAS: simulates annual income and social security taxes for joint filers.

These programs rely on an input data set that contains basic socio-demographic and employment identifiers as well as complete income information. The components of the input data set are described below. Users should note that the input data sets are identically constructed for all waves of the data. The simulation package relies only on variables that are obtained in each year of the survey.

Data Requirements. The tax program requires information on all income sources that tax filers receive. These variables are obtained from two different components of the survey. Data on individual income flows, such as self-employment income, wages and salaries, and social security benefits come from the individual survey data. Information on income flows to the household, such as income from capital investment, and rentals or leasing are taken from the household questionnaire. In most cases the individual income information reported in the GSOEP represents monthly payments. This information must be annualized by combining data on average monthly payments with information on the number of months during the year that payments were received (see Daly and Butrica 1994). Most of the household level income information is reported in annual amounts.

The simulation package also requires a few non-income variables. A critical variable in the calculation of taxable income is the year in which reported income is received. In the GSOEP as well as in most other surveys, yearly income is asked retrospectively, e.g., the income reported in

1984 belongs to 1983. This variable is used to indicate the calendar year of the taxable income base. The simulation program uses this variable to match the correct tax parameters to yearly income values. Finally the simulation package requires some basic socio-demographic information to identify individuals eligible for different components of income and social security taxes. These variables should correspond to the year for which the taxable income base was calculated. However, for simplicity the variables can be taken from the current survey as well.

Before the simulation programs can be run the input variables must be prepared. All income information must be annualized and potentially taxable income from all sources computed. When these variables are created they are assigned new names associated with the particular simulation program they belong to. Tables 3 and 4 provide a list of the simulation input variables identified by the names used in the tax programs, as well as a description of their content and the GSOEP survey variables used to create them.

Preparing the Input Data Files. Once the input variables have been created they must be put into two input data files. The structure of the data files must follow the guidelines below in order for the simulation program to work. Each of the programs in the package requires a separate input file. The input file for M-TAX-I.SAS contains income variables for single filers and the input file for M-TAX-S.SAS contains income variables for joint filers.

All persons who complete a GSOEP questionnaire are subject to German taxation. But determining the correct tax unit and linking the tax calculations to household income for each individual is not always straightforward since the tax filing unit and the household unit may be different. Thus, when preparing the data files household units must be separated into the appropriate tax filing units. In some cases this requires splitting a single survey household into several tax filing units, e.g., when children have their own income or when adults are present who are not married. To begin this process the sample should first be divided into married and non-married persons

TABLE 3
INCOME VARIABLES USED IN THE GSOEP TAX SIMULATION PACKAGE

Input Variable M-TAX-I	Input Variable M-TAX-S	Label	Corresponding GSOEP Variables^a
YG113	YG113F, YG113M	Gross earnings from farming and foresting, trade or business, and independent activity	Self-employed earnings P7602
YG4	YG4F, YG4M	Gross earnings from employment	Earnings/wages, P7601, earnings from second job, P7603, single yearly payments, P77. P7601 includes tax-free short-time allowance and bad-weather compensation which must be excluded.
YG4P	YG4PF, YG4PM	Pension income of civil servants or their relations	Old-age and disability pensions, P7604, P7903 indicates the retirement income of a former civil servant. P7605 (P7912) needed to confirm civil service status.
YG5	YG5	Gross earnings from capital investment	Computed from the household questions H4401 and H4402.
YG6	YG6	Gross earnings from rental and leasing	Computed from the household questions H41 should be used minus working and maintenance costs reported in H4201.
YG7	YG7F, YG7M	Social security and private employee pension income.	Computed from the same variables as YG5P, but P7904 and P7912 must be used to confirm non-civil service status.

^aQuestion numbers are from GSOEP Wave 10, 1993.

TABLE 4
ADDITIONAL VARIABLES USED IN THE GSOEP TAX SIMULATION PACKAGE

Input Variable M-TAX-I	Input Variable M-TAX-S	Label	Corresponding GSOEP Variables^a
A	A	Year in which the reported income was received (two digits)	None
ES	ESF, ESM	Employment status of individual: 3 = civil servant 4 = self-employed	P48 P14805 is checked. P14802 is checked
AGE	AGEF, AGEM	Age when reported receiving income (two digits)	Computed from variable GEBJAHR.
K	K	Children of the individual or the married couple.	Computed from _KZAHL

^aQuestion numbers are from GSOEP Wave 10, 1993.

(single and joint filers). This is accomplished using a survey variable that describes the marital status of every interviewed person in the GSOEP. All non-married persons, including cohabitators, are considered single person filing units. In principle, every married person is in a joint filing unit with his or her spouse. However, operationally the simulation program requires that both persons in the couple complete an individual interview. Married persons with non-interviewed partners are treated as single filers in the simulation program.

After the tax filing units have been established, two datasets can be constructed. Tables 5 and 6 illustrate the structure of the input data sets for single and joint filers. The data set for single filers includes one record for each single filer. The dataset for joint filers contains one record for each couple that files; this record includes information on both the husband and the wife. The input data can be maintained in separate files for each wave or can be pooled as shown by the examples in these tables. To ensure that the tax values can be merged onto other GSOEP sub-files person and household identification numbers are included in the input data.

Tax Simulation Output Variables. When the simulation programs are run, a set of output variables is automatically saved. Input variables are dropped following their use. The output variables, shown in Table 7, include estimated amounts for contributions (in current year DM) to social security, unemployment insurance and health insurance, and the annual income tax burden. These variables are used to compute yearly net of tax household income. In addition, the program outputs the yearly income tax base and the marginal tax rate for the individual or couple.

Computing Net of Tax Income Using the GSOEP Tax Simulation Package. Tables 8 and 9 provide example programs for single and joint filing units, respectively. These programs illustrate how output variables from the simulation package can be used to compute before and after government income for GSOEP households. The programs call the SAS macro files that simulate tax burdens and then use the output variables to compute net of tax household income.

TABLE 5
STRUCTURE OF INPUT DATASET FOR TAX SIMULATION
PROGRAM M-TAX-LSAS: SINGLE FILERS

HHNR	PERSNR	A	ES	AGE	K	YG13	YG4	YG4P	YG5	YG6	YG7
Example 1: Input Dataset for Wave 1 (1984), separately											
19	103	83	0	21	0	0	12,100	0	.	0	0
27	201	83	0	58	0	0	0	0	400	0	12,408
35	301	83	0	24	1	0	23,800	0	.	0	0
35	302	83	0	23	0	0	27,300	0	.	0	0
.
.
59684	596803	83	0	17	0	0	0	0	.	0	0
Example 2: Input Dataset for Wave 2 (1985), separately											
19	103	84	0	22	0	0	38,700	0	5	0	0
27	201	84	0	59	0	0	0	0	500	0	0
25	301	84	0	25	1	0	9,000	0	0	0	0
35	302	84	0	24	0	0	19,900	0	0	0	0
.
.
59684	596803	84	0	18	0	0	0	0	0	0	0
Example 3: Input Dataset for Wave 1 (1984) and Wave 2 (1985) as a pooled dataset											
19	101	83	0	21	0	0	12,100	0	0	0	0
27	201	83	0	58	0	0	0	0	400	0	12,408
35	301	83	0	24	1	0	23,800	0	0	0	0
35	302	83	0	23	0	0	27,300	0	0	0	0
.
.
59684	596803	83	0	17	0	0	0	0	0	0	0
19	101	84	0	22	0	0	38,700	0	500	0	0
27	201	84	0	59	0	0	0	0	0	0	0
35	301	84	0	25	1	0	9,000	0	0	0	0
35	302	84	0	24	0	0	19,900	0	0	0	0
.
.
59604	596803	84	0	18	0	0	0	0	0	0	0

HHNRAKT is the id of the household where the person with id PERSNR actually lived in. The id-variables are not used by the simulation program but may be necessary to rearrange the dataset after running the program. For the description of the other variables see Tables 3 and 4.

TABLE 6

**STRUCTURE OF INPUT DATASET FOR TAX SIMULATION PROGRAM M-TAX-S.SAS:
JOINT FILING UNITS (MARRIED COUPLES)**

HHNR	PERSNRF (female)	PERSNRM (male)	A	ESF	AGEF	ESM	AGEM	K	YG13F	YG4F	YG4PF	YG7F	YG13M	YG4M	YG4PM	YG7M	YG5	YG6
Example 1: Input Dataset for Wave 1 (1984), separately																		
19	102	101	83	0	44	0	54	0	0	0	0	0	0	0	0	0	.	0
124	1202	1201	83	0	71	0	73	0	0	0	0	1,416	0	0	0	39,600	.	0
213	2102	2101	83	0	57	0	56	0	0	14,718	0	.	.	37,960	0	0	.	0
.
.
59692	596902	596901	83	0	23	0	32	0	0	20,400	0	0	0	31,200	0	0	.	0

HHNRAKT is the id of the household where the female person with id PERSNRF actually lived in together with her husband id PERSNRM. The id-variables are not used by the simulation program but may be necessary to rearrange the dataset after running the program. For the description of the other variables, see Tables 3 and 4.

TABLE 7
OUTPUT VARIABLES FOR THE GSOEP TAX SIMULATION PACKAGE

Output Variable M-TAX-I	Output Variable M-TAX-S	Level^a	Label
CI	CI	M	Yearly contributions to the statutory social security system (individual, household).
TX	TX	M	Yearly tax value.
DTX	DTX	1	Marginal tax rate at given taxable income.
---	CIF, CIM	1	Same as CI but separated for each partner.
SI	SI	1	Sum of Step 1 income.
EK	EK	1	Sum of Step 2 income.
EV	EV	1	Taxable income.
HI	HIF, HIM	1	Health insurance contributions.
OI	OIF, OIM	1	Old-age insurance contributions.
UI	UIF, UIM	1	Unemployment insurance contributions.
Other variables		2	See programming code.
<p>^a(M) default output variables; (1) can be included as first step drop variables. Default: dropped when simulation program ends. (2) can be included as second step drop variables. Default: dropped when simulation program ends.</p>			

TABLE 8

**AN EXAMPLE PROGRAM WRITTEN IN SAS TO DEMONSTRATE HOW THE MACRO TAX
SIMULATION FILE FOR SINGLE TAX FILERS CAN BE USED
(PROGRAMMING CODE IN BOLD LETTERS)**

```

*****;
* PROGRAM:          EXAMP-I.SAS                                *;
* INPUT VARIABLES ON FILE:  INPUTDATA SET                      *;
*   YG13: GROSS YEARLY INCOME FROM FARMING AND FORESTING,    *;
*         TRADE OR BUSINESS AND FROM INDEPENDENT ACTIVITY    *;
*   YG4:  GROSS YEARLY INCOME FROM EMPLOYMENT                 *;
*   YG4P: PENSIONS OF CIVIL SERVANTS                          *;
*   YG5:  GROSS YEARLY INCOME FROM CAPITAL INVESTMENT        *;
*   YG6:  GROSS YEARLY INCOME FROM RENTAL AND LEASING        *;
*   YG7:  GROSS YEARLY INCOME FROM OTHER SOURCES             *;
*         INCLUDING: RETIREMENT INCOME FROM OLD-AGE           *;
*         INSURANCE AND PRIVATE LIFE INSURANCE               *;
*   ES:   EMPLOYMENT STATUS WHEN RECEIVING INCOME            *;
*   AGE:  AGE WHEN RECEIVING INCOME                          *;
*   K:   NUMBER OF (TAXABLE) CHILDREN IN HOUSEHOLD           *;
*   A:   YEAR IN WHICH INCOME WAS RECEIVED (83,...,93)       *;
* OUTPUT VARIABLES COMPUTED BY THE MACRO PROGRAM             *;
*   TX:  YEARLY INCOME TAX VALUES                           *;
*   CI:  YEARLY SOCIAL SECURITY TAX VALUES                   *;
*****;

* First step: include the input data set. For a description  *;
* see Table 5                                                *;

DATA NET;
SET INPUTDAT

* Second step: include the tax-simulation macro file for    *;
* single filers: M-TAX-I.SAS.                                *;
* The file must be on your disk                             *;

%INCLUDE 'M-TAX-I.SAS';

* Third step: call the macro-program with parameter A. The  *;
* macro-program then creates the output variables          *;
* mentioned above.                                         *;

%TAXI (A);

* Fourth step: computing a yearly before government income for a *;
* (Example) single filing person using the input variables  *;
* from input dataset and probably some transfer            *;
* payments received by the person                          *;

YBEFORE = YG13 + YG4 + YG4p + YG5 + YG6 + YG7 + TRANSFER;

* Last step: computing a yearly after government income deducting *;
* (Example) income and social security taxes TX and CI. Both *;
* are output from the macro.                                *;

YAFTER = YBEFORE - TX - CI;

PROC MEANS N NMISS MEAN MIN MAS;
ENDSAS;

```

TABLE 9

**AN EXAMPLE PROGRAM WRITTEN IN SAS TO DEMONSTRATE HOW THE MACRO TAX
SIMULATION FILE FOR JOINT TAX FILERS CAN BE USED
(PROGRAMMING CODE IN BOLD LETTERS)**

```

*****;
* PROGRAM: EXAMP-S.SAS *;
* INPUT VARIABLES ON FILE; INPUTDATA SET *;
* YG13F, YG13M: GROSS YEARLY INCOME FROM FARMING AND FORESTING *;
* TRADE OR BUSINESS AND FROM INDEPENDENT ACTIVITY *;
* YG4F, YG4M: GROSS YEARLY INCOME FROM EMPLOYMENT *;
* YG4PF, YG4PM: PENSIONS OF CIVIL SERVANTS *;
* YG5: GROSS YEARLY INCOME FROM CAPITAL INVESTMENT *;
* YG6: GROSS YEARLY INCOME FROM RENTAL AND LEASING *;
* YG7F, YG7M: GROSS YEARLY INCOME FROM OTHER SOURCES INCLUDING: *;
* RETIREMENT INCOME FROM OLD-AGE INSURANCE AND *;
* PRIVATE LIFE INSURANCE *;
* ESF, ESM: EMPLOYMENT STATUS WHEN RECEIVING INCOME *;
* AGEF, AGEM: AGE WHEN RECEIVING INCOME *;
* K: NUMBER OF (TAXABLE) CHILDREN IN HOUSEHOLD *;
* A: YEAR IN WHICH INCOME WAS RECEIVED (83,...,93) *;
* OUTPUT VARIABLES COMPUTED BY THE MACRO PROGRAM *;
* TX: YEARLY INCOME TAX VALUES *;
* CI: YEARLY SOCIAL SECURITY TAX VALUES *;
*****;

* First step: include the input data set. For a description *;
* see Table 6. *;

DATA NEW;
SET INPUTDAT;

* Second step: include the tax-simulation macro file for *;
* joint filers: M-TAX-S.SAS. *;
* The file must be on your disk. *;

%INCLUDE 'M-TAX-S.SAS';

* Third step: call the macro-program with parameter A. The *;
* macro-program then creates the output *;
* variables mentioned above. *;

%TAXI (A);

* Fourth step: computing a yearly before government income *;
* (Example) for a single filing person using the input *;
* variables from input dataset and probably *;
* some transfer payments received by the person. *;

YBEFORE = YG13M+YG13F + YG4M+YG4F + YG4PM+YG4PF + YG5 + YG6
+ YG7M+YG7F + TRANSFER;

* Last step: computing a yearly after government income *;
* (Example) deducting income and social security taxes *;
* TX and CI. Both are output from the macro *;

YAFTER = YBEFORE - TX - CI;

PROC MEANS N NMISS MEAN MIN MAX;
ENDSAS;

```

Summary

The tax programs discussed here have been developed to produce estimated tax burdens for individuals and households for the first ten waves of the GSOEP (1984 - 1993). Using these estimated tax burdens researchers can compute the after-tax annual income variables most frequently used to analyze changes in income distribution and economic well-being. Moreover, because the tax algorithms discussed in this paper are analogous in design to those used in the PSID, cross-national comparisons of the United States and Germany can be undertaken (see, for example, Burkhauser and Daly 1993; Burkhauser, Frick, and Schwarze 1994; Burkhauser and Poupore 1993; and Burkhauser and Wagner 1994). At present these estimated tax burdens are available to users on the Syracuse University PSID-GSOEP Equivalent Data File, which at present contains the first seven waves of GSOEP data (see Daly and Butrica 1994 for details of this dataset). A ten-wave version of this dataset is expected to be released sometime in 1995. It is expected that the tax burden values calculated with this package will be added to the 100 percent version of the GSOEP sometime in 1995.

APPENDIX TABLE 1

**TAXABLE INCOME UNDER THE 1990 GERMAN INCOME TAX LAW AND ASSUMPTIONS
USED IN THE TAX SIMULATION PROGRAM**

	1990 German Income Tax Law	Tax Simulation Program
Taxable Income Sources		
Farming and forestry	Entire amount is taxable.	Entire amount is taxable.
Trade or business	Entire amount is taxable.	Entire amount is taxable.
Independent activity	Entire amount is taxable.	Entire amount is taxable.
Employment	Standard deduction is 2,000 DM. Civil servants pay no taxes on the lesser amount of 40 percent of pension income or 4,800 DM.	Standard deduction is 2,000 DM. Civil servants pay no taxes on the lesser amount of 40 percent of pension income or 4,800 DM.
Capital investment	Tax-free up to 600 DM (1,200 DM for joint filers. 100 DM deductible (200 DM) on income over 600 DM (1200 DM).	Tax-free up to 600 DM (1,200 DM for joint filers. 100 DM deductible (200 DM) on income over 600 DM (1200 DM).
Rental and leasing	Entire amount is taxable.	Entire amount is taxable.
Other	Non-civil service workers taxed on profit share portion of income which is dependent on pensioner's retirement age.	Private sectors workers are taxed on 28 percent of pension income (assumes retirement age of 60).
Old Age Deductions		
Old age deduction	Equal to the lesser of 40 percent of income or 3,720 DM (7,440 DM for joint filers).	Equal to the lesser of 40 percent of income or 3,720 DM (7,440 DM for joint filers).
Expenses		
Special expenses	Standard deduction for special cases is 108 DM (216 for joint filers).	Standard deduction for special cases is 108 DM (216 for joint filers). Own care special expenses are ignored.
Extraordinary expenses	Deductible under special circumstances.	Extraordinary expenses are ignored.
Loss deduction	Deductible under special circumstances.	Loss deductions are ignored.
Allowances		
Child allowance	Equal to 3,024 DM per child.	Equal to 3,024 DM per child.
Housekeeping allowance	Equal to 5,616 DM for single filers with children.	Equal to 5,616 DM for single filers with children.

Source: Bundesminister für Finanzen (1990).

APPENDIX TABLE 2

PAYROLL TAXES UNDER THE GERMAN SOCIAL SECURITY LAW AND ASSUMPTIONS USED IN THE TAX SIMULATION PROGRAM

	German Social Security Law	Simulation Program
Coverage		
Old age	<p>Voluntary for civil servants and those marginally employed in the private sector.</p> <p>Marginally employed private sector workers are identified as those who work an average of 15 hours per week and receive monthly gross earnings below some ceiling (470 DM in 1990). For students, marginal employment is defined as working an average of less than 20 hours per week. These workers are not required to pay contributions into the social security system.</p> <p>Compulsory for all other private sector workers.</p>	<p>Excludes civil servants and the private sector marginally employed.</p> <p>Marginally employed private sector workers are identified as those whose yearly gross earnings are below some ceiling (5,640 DM in 1990).</p> <p>Includes all other private sector workers.</p>
Unemployment	<p>Voluntary for civil servants and those marginally employed in the private sector.</p> <p>Marginally employed private sector workers are identified as those who work an average of 15 hours per week and receive monthly gross earnings below some ceiling (470 DM in 1990). For students, marginal employment is defined as working an average of less than 20 hours per week. These workers are not required to pay contributions into the social security system.</p> <p>Compulsory for all other private sector workers.</p>	<p>Excludes civil servants and the private sector marginally employed.</p> <p>Marginally employed private sector workers are identified as those whose yearly gross earnings are below some ceiling (5,640 DM in 1990).</p> <p>Compulsory for all other private sector workers.</p>
Health care	<p>Voluntary for civil servants, private sector white-collar workers with income above some government determined minimum level and those marginally employed in the private sector.</p> <p>Marginally employed private sector workers are identified as those who work an average of 15 hours per week and receive monthly gross earnings below some ceiling (470 DM in 1990). For students, marginal employment is defined as working an average of less than 20 hours per week. These workers are not required to pay contributions into the social security system.</p> <p>Compulsory for all other private sector workers.</p>	<p>Excludes the private sector marginally employed.</p> <p>Marginally employed private sector workers are identified as those whose yearly gross earnings are below some ceiling (5,640 DM in 1990). Includes civil servants and all other private sector workers.</p>

APPENDIX TABLE 2 (CONT.)

	German Social Security Law	Simulation Program
Contributions		
Old age	Contribution rate is based on monthly gross earnings up to an inflation adjusted ceiling (6,300 DM in 1990). Worker's contribution rate equaled 9.35 percent of monthly gross earnings in 1990.	Contributions are based on positive employment income up to the inflation adjusted ceiling (6,300 DM per month in 1990). Above this ceiling, contributions are based on the inflation adjusted ceiling.
Unemployment	Contribution rate is based on monthly gross earnings up to an inflation adjusted ceiling (6,300 DM in 1990). Worker's contribution rate equaled 2.15 percent of monthly gross earnings in 1990.	Contributions are based on positive employment income up to the inflation adjusted ceiling (6,300 DM per month in 1990). Above this ceiling, contributions are based on the inflation adjusted ceiling.
Health Care	Contribution rates are based on monthly gross earnings up to an inflation adjusted ceiling (6,300 DM in 1990) and vary among statutory health insurance agencies. The workers' average contribution rate equaled 6.40 percent in 1990.	Contributions are based on positive employment income up to 75 percent of the inflation adjusted ceiling (6,300 DM per month in 1990). Above this ceiling, contributions are based on 75 percent of the inflation adjusted ceiling. Private sector workers and civil servants pay the average contribution rate of the statutory health agencies in a given year, regardless of the agency they actually belong to. In 1990 the average contribution rate among statutory health agencies was 6.40 percent.
Source: Bundesminister für Finanzen (1990).		

Endnotes

1. The GSOEP has collected data on a representative sample of people living in the western states of Germany since 1984. Since 1990 it has also collected similar data on people living in the eastern states of Germany. This data package is for the initial western states sample only.
2. Researchers at Syracuse University and the Deutsches Institut für Wirtschaftsforschung are jointly creating yearly tax values for the GSOEP which should be available sometime in 1995.
3. Income from employment includes the pension benefits of civil servants (pensions). Pension income from the German old-age-insurance system as well as income from private employee pensions is included in income from other sources.
4. After 1990 the threshold for taxable income from capital investment was increased to 6,000 DM for single filers and 12,000 DM for joint filers. Increasing the thresholds was a result of the introduction of a withholding tax on income from wealth.
3. For example, if someone retires at the age of 60 the "untaxed" share is assumed to be 28 percent and only this percentage of pension income is included in the tax base.
6. This method especially favors joint filers in which only one partner participates in the labor market and is in the highest tax bracket. Furthermore, this method generates strong disincentives for married women to work. Since the marginal tax rate for a second earner is a function of the earnings level of the first earner, the marginal tax rate on the earnings of the spouse of a high earner could be as high as 53 percent (e.g., Gustafson 1992, Schwarze 1993).
7. The term social security is used in a narrow sense, and relates exclusively to contributory insurance.
8. In 1995 compulsory long-term care insurance will be added to this system.
9. The Bundesminister für Arbeit und Sozialordnung (1991) reported that in 1989 close to 88 percent of the German population was covered by the health insurance system, 12 percent of the population was covered by private agencies and 0.2 percent of the population had no health insurance coverage at all. Also in 1989, 85 percent of the male and 80 percent of the female working population paid contributions to the old age insurance system.
10. Two kinds of public employees have to be distinguished in Germany. The first are blue and white collar workers hired by public authorities. Although it is difficult, they can be fired. The second are civil servants in a narrow sense. They are hired by the government or public authorities and cannot be fired, except for malfeasance. Unlike other public service employees, civil servants do not have the right to strike.
11. In 1989, this was 54,900 DM per year. By 1993, this level had increased by almost 20 percent to 64,800 DM per year.

12. All figures stated are for the western states of pre-reunification Germany.
13. In Germany, blue and white collar worker is a legal as well as a professional distinction. From 1996 on, all employees are free to choose their own health insurance.
14. In 1989 1,147 health insurance agencies belong to the statutory health insurance system. Most of the employees are insured by the 266 *Allgemeinen Ortskrankenkassen* for blue collar workers and 7 *Ersatzkrankenkassen* for white collar workers.
15. In 1989 workers' contribution rates averaged 6.45 percent for insurance agencies belonging to the statutory health insurance system. Among AOKs the average rate was 6.75 percent and for Ersatzkrankenkasse it was 6.3 percent.
16. A second exception involves a transition rate on labor income between the marginal employment ceiling and another ceiling, which was 610 DM in 1994. For income between 450 and 610 DM, in 1989 the employer paid the entire contribution to the social security system.
17. This is a gross simplification since rates vary significantly between the social and private health insurance systems as well as within the two systems. Also, white collar workers who earn above a maximum earning level can choose private insurance.

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Cross-National Studies in Aging

(list of papers)

Number	Title
1	An Introduction to the German Socio-Economic Panel for English Speaking Researchers. Richard V. Burkhauser. November 1991.
2	SDC - The GSOEP Data Cleaner: A Program Package for Generating New Income Data from the Original Data in the German Socio-Economic Panel. Roland Berntsen. March 1992.
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17	Alternative Perspectives on Economic Well-Being: A Cross-National Comparison of Single-Year Income, Permanent Income and Wealth as Measures of Economic Well-Being. Richard V. Burkhauser, Joachim R. Frick, and Johannes Schwarze. October 1994.
18	Relative Inequality and Poverty in Germany and the United States Using Alternative Equivalence Scales. Richard V. Burkhauser, Timothy M. Smeeding, and Joachim Merz. November 1994.
19	Simulating German Income and Social Security Tax Payments Using the GSOEP, Johannes Schwarze, March 1995.