FiFoSiM - Integrated tax benefit microsimulation and CGE model for Germany

Andreas Peichl
University of Cologne, Albertus-Magnus-Platz, 50923 Cologne, Germany, a.peichl@uni-koeln.de.
Thilo Schaefer
University of Cologne, Zuelpicher Str. 182, 50937 Cologne, Germany, schaefer@fifo-koeln.de.

Abstract

This paper describes FiFoSiM, the integrated tax benefit microsimulation and CGE model of the Center of Public Economics at the University of Cologne.
FiFoSiM consists of three main parts. The first part is a static tax benefit microsimulation module. The second part adds a behavioural component to the model: an econometrically estimated labour supply model. The third module is a CGE model which allows the user of FiFoSiM to assess the global economic effects of policy measures.
Two specific features distinguish FiFoSiM from other tax benefit models: First, the simultaneous use of two databases for the tax benefit module and second, the linkage of the tax benefit model to a CGE model.

1 Introduction

The aim of this paper is to describe FiFoSiM[1], the integrated tax benefit microsimulation and CGE model of the Center for Public Economics (CPE) at the University of Cologne (Finanzwissenschaftliches Forschungsinstitut an der Universität zu Köln (FiFo)). FiFoSiM consists of three main parts. The first part is a static tax benefit microsimulation module. The second part adds a behavioural component to the model: an econometrically estimated labour supply model. The third module is a CGE model which allows the user of FiFoSiM to assess the global economic effects of policy measures. Two specific features distinguish FiFoSiM from other tax benefit microsimulation models: First, the simultaneous use of two databases for the tax benefit module and second, the linkage of the tax benefit model with a CGE model.

The basic module of FiFoSiM is a static microsimulation model for the German tax and benefit system using income tax and household survey micro data. The approach of FiFoSiM is innovative insofar as it creates a dual database using two micro data sets for Germany: FAST98 and GSOEP.[2] FAST98 is a micro datafile from the German federal income tax statistics containing the relevant income tax data of nearly 3 million households in Germany. Our second data source, the German Socio-Economic Panel (GSOEP), is a representative panel study of private households in Germany. The simultaneous use of both databases allows for the imputation of missing values or variables in the other dataset using techniques of statistical matching.

Figure 1 shows the Basic setup of FiFoSiM. The layout of the tax benefit module follows several steps: First, the database is updated using the static ageing technique which allows controlling for changes in global structural variables and a differentiated adjustment for different income components of the households. Second, we simulate the current tax system in 2006 using the modified data. The result of this simulation is the benchmark for different reform scenarios which are also modelled using the modified database.

The modelling of the tax and transfer system uses the technique of microsimulation.[3] FiFoSiM computes individual tax payments for each case in the sample considering gross incomes and deductions in detail. The individual results are multiplied by the individual sample weights to extrapolate the fiscal effects of the reform with respect to the whole population. After simulating the tax payments and the received benefits we can compute the disposable income for

[1] This paper is based on the English documentation of FiFoSiM (see Peichl and Schaefer (2006)), which is a short version of the detailed German description (see Fuest et al. (2005b)). See also www.cpe-cologne.de for further information.

[2] In the last years several tax benefit microsimulation models for Germany have been developed (see for example Peichl (2005) or Wagenhals (2004)). Most of these models use either GSOEP or FAST data. FiFoSiM is so far the first model to combine these two databases.

[3] Cf. Gupta and Kapur (2000) or Harding (1996) for an introduction to the field of microsimulation.

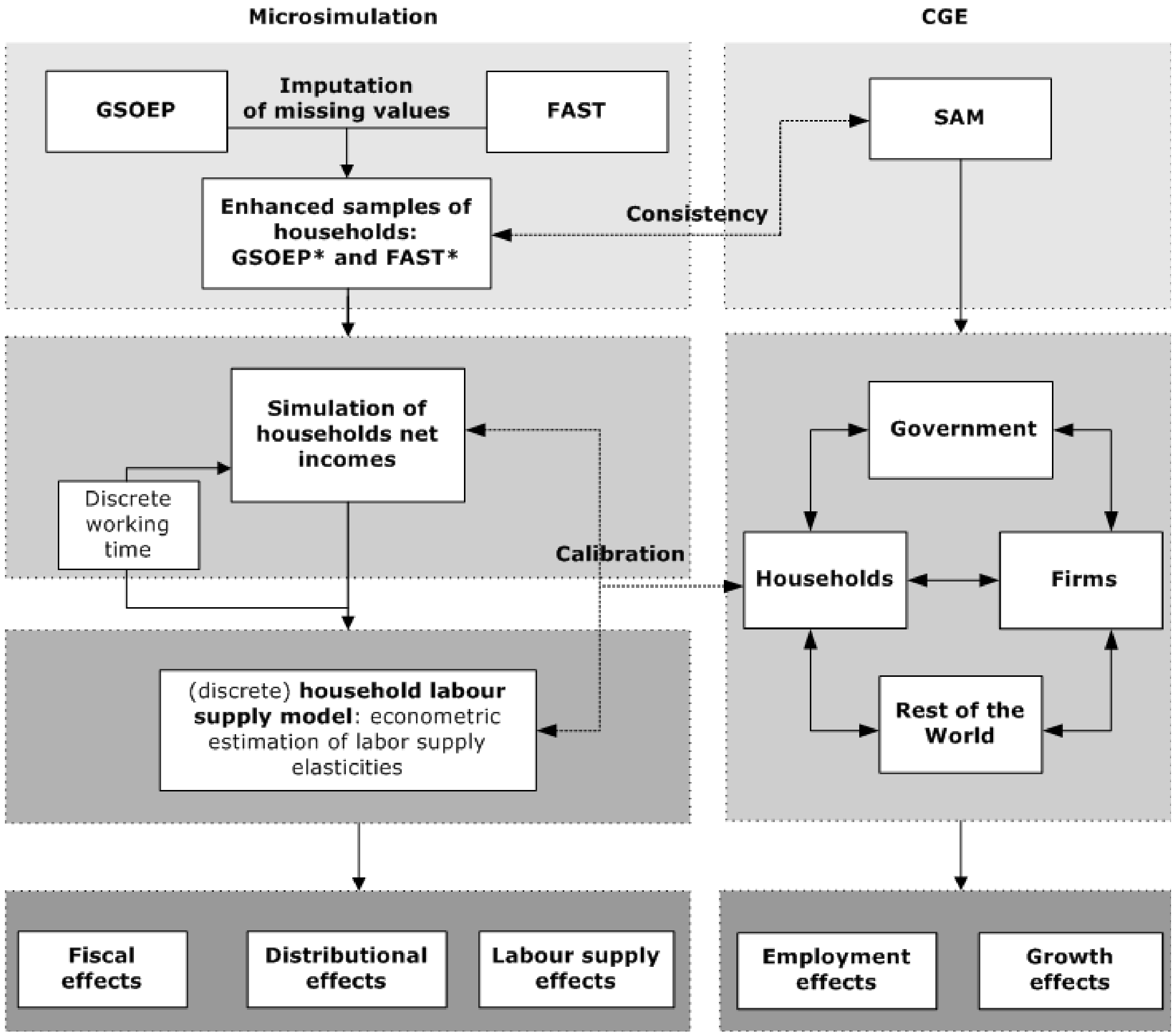

Figure 1: Basic setup FiFoSiM

each household. Based on these household net incomes we estimate the distributional and the labour supply effects of the analysed tax reforms. For the econometric estimation of labour supply elasticities, we apply a discrete choice household labour supply model. Furthermore, FiFoSiM contains a CGE module for the estimation of growth and employment effects, which is linked to the tax benefit module. This interaction allows for a better calibration of the model parameters and a more accurate estimation of the various effects of reform proposals.

The setup of this paper is as follows. Chapter 2 describes (the creation of) the dual database of FiFoSiM, while chapter 3 describes the tax benefit module. Chapter 4 contains a description of the labour supply model, while chapter 5 describes the CGE module. In chapter 6 several applications of FiFoSiM are presented and an outlook to some developments planned for the further improvement of FiFoSiM is given.

2 Database

A specific feature of FiFoSiM is the simultaneous use of two micro databases allowing for the imputation of missing values or variables in the other dataset.[4] Due to the time lags between the census and the availability, the data has to be updated to represent the German economy in the period of analysis.

2.1 Income tax scientific-use-file 1998 (FAST98)

The federal income tax statistics is published every three years but with a time lag of five to six years. This statistic contains all information from the personal income tax form (e.g. source and amounts of incomes, deductions, age, children) for every household subject to income taxation in Germany. For 1998, almost 30 million households are included in the micro database. FAST98 is the income tax scientific-use-file 1998 (FAST98) containing a 10%-sample of the German federal income tax statistics including the relevant tax data of nearly 3 million households.[5] The FAST micro data is especially suitable for a detailed analysis of the German tax system. All structural characteristics of the taxpayers are well represented and can be used for a differentiating analysis of tax reforms.

2.2 German Socio-Economic Panel (GSOEP)

The German Socio-Economic Panel (GSOEP) is a representative panel study of private households in Germany since 1984.[6] In 2003 GSOEP consists of more than 12,000 households with more than 30,000 individuals. The panel structure of GSOEP allows for longitudinal and cross section analysis of economic and social changes. GSOEP contains information about the working time and the social environment of the households which is used for the labour supply estimations. Furthermore, the bottom end of the income distribution is better represented in GSOEP than in FAST.

2.3 Creating the dual database

One special feature of FiFoSiM is the creation and usage of a dual database. To be more precise, FiFoSiM actually consists of two tax benefit microsimulation models. The first one is based on administrative tax data (FAST), the second on household survey data (GSOEP). The main reason for using the dual database instead of having only one merged database is

[4] Furthermore, a third database is used for the CGE module which is described in section 5.
[5] Cf. Merz et al. (2005) for a description of FAST98.
[6] See SOEP Group (2001) or Haisken De-New and Frick (2003) for a more detailed introduction to GSOEP.

the huge difference in the number of observations. Furthermore, both databases have several shortcomings, but nevertheless, they are the two most appropriate datasets available for the analysis of the German tax benefit system. Therefore, information from one database is used for the imputation of missing values or variables in the second dataset and vice versa. A complete matching of the two databases is also possible but not yet necessary as we only need some of the variables from the second file, which are missing for our analysis in the first file.[7] Hence, the dual database of FiFoSiM actually consists of two enhanced datasets, which allow for a better analysis of tax benefit reforms than the two raw datasets. Another aspect is the handling of missing values in existing variables in each dataset.

There exist several principal ways for matching datasets or the imputation of missing values.[8] In FiFoSiM several of these approaches are used due to the difference in the number of observations (3 million vs. 30,000). In general, information from the smaller GSOEP dataset is matched to the FAST data using the regression approach. FAST information is merged to GSOEP data using propensity score matching. Missing values in both datasets are imputed using different approaches depending on the specific circumstances in each case.

2.4 Updating the data samples

The database is updated to the year of analysis (i.e. 2007) using the static ageing technique[9] which allows controlling for changes in global structural variables as well as a differentiated adjustment for different income components of the households. Especially the income tax data sample needs to be updated as it describes the situation of 1998. The GSOEP data only needs to be adjusted from 2002. Furthermore, the use of different ageing factors for each database and the reweighing of the weighting factors ensure the consistency of the two databases.

The first step is to reproduce the fundamental structural changes of the population. This is done according to the following criteria: age (in 5 year categories), assessment for income tax (separate or joint) and region (East/West Germany). In the second step, the taxpayer's incomes are updated with respect to the varying development of different income types. Also different income growth rates between West and East as well as for positive and negative incomes are taken into account. This allows for a differentiated estimation of the income development. Based on empirical research of the DIW (see Bach and Schulz (2003)) different coefficients for positive and negative incomes are applied on each case's income. For the simulation model this

[7] There are mainly legal privacy issues in Germany militating against a complete match. Nevertheless, the matching of the anonymised databases does not allow for a deanonymisation of the individuals in the datasets.

[8] Rässler (2002) gives an introduction to statistical matching procedures and imputation techniques, as well as an overview of the vast literature and software packages that exist.

[9] Cf. Gupta and Kapur (2000) for an overview of the techniques to modify the data for the use in microsimulation models.

means that each income value is multiplied with the specific coefficient and thus extrapolated to the current income level. Of course, the coefficients only represent the average development, but regarding the whole population this method provides a satisfying approximation to the income structure of today.

2.5 Strength and limitations of the dual database

The use of the dual database and the two tax benefit microsimulation models based on the two enhanced datasets (FAST* and GSOEP*) allows us on the one hand to check consistency between the two models and on the other hand to choose the model which is most appropriate for each particular problem we want to analyse. However, these methods cannot guarantee the resulting datasets to retain all advantages of both databases. Beside the huge difference in size using methods of statistical matching leads to the loss of case-specific information. Nevertheless, both datasets are each enhanced through external information while maintaining their specific advantages. If the datasets were merged to one single database, lots of details and the huge number of cases in FAST would be lost. Table 1 presents some aggregated results for the revenue of the status quo personal income tax system for the years 2005-7 and for some selected variables that are merged into the other dataset.

	Ref.	FAST	FAST*	GSOEP	GSOEP*
PIT 2005	181.00	178.75	181.16	185.85	180.69
PIT 2006	192.85	190.02	192.64	197.27	192.23
PIT 2007	200.67	198.71	201.46	206.51	200.30

Table 1: Strength and limitations of the dual database
Notes: The reference value (Ref.) for the personal income tax is based on the estimation of the federal government for each year. * indicates the enhanced dataset.

The GSOEP values would overestimate the personal income tax in each year mainly because of missing information about deductions. On the contrary, the FAST simulations underestimate the tax revenue especially because of missing information about pension payments which are more heavily taxed since 1998. These shortcomings can be overcome using the enhanced datasets FAST* and GSOEP* which are part of the dual database of FiFoSiM.

The creation of this dual or enhanced database with information from administrative tax data and a household survey gives the users of FiFoSiM a powerful tool for the analysis of various questions regarding the German tax benefit system.

3 Tax benefit module

3.1 Modelling the German income tax law

Individuals are subject to personal income tax.[10] Residents are taxed on their global income; non-residents are taxed on income earned in Germany only.

The basic steps for the calculation of the personal income tax under German tax law are according to the scheme of table 2 as follows. The first step is to determine a taxpayer's income from different sources and to allocate it to the seven forms of income. The German tax law distinguishes between seven different categories of income: income from agriculture and forestry, business income, self employment income, salaries and wages from employment, investment income, rental income and other income (including, for example, annuities and certain capital gains). For each type of income, the tax law allows for certain income related deductions. In principle, all expenses that are necessary to obtain, maintain or preserve the income from a source are deductible from the receipts of that source. The second step is to sum up these incomes to obtain the adjusted gross income. Third, deductions like contributions to pension plans or charitable donations are taken into account, which gives taxable income as a result. Finally, the income tax is calculated by applying the tax rate schedule to taxable income.

	Sum of net incomes from 7 categories (receipts from each source minus expenses)
=	adjusted gross income
-	deductions (social security and insurance contributions, personal expenses)
=	taxable income x
$\cdot$	tax formula
=	tax payment T

Table 2: Calculation of the personal income tax

3.2 Modelling the benefit system

To simulate the labour supply effects, the calculation of net incomes has to take the transfer system into account as well. Federal transfers such as unemployment benefit, housing benefit, and social benefits are modelled in FiFoSiM.

[10] As the Germany tax benefit system is very complex, we focus on the major parts of the model in this description. A more detailed description can be found in the German version of this documentation (see Fuest et al. (2005b)).

4 Labour supply module

4.1 FiFoSiM labour supply module

To analyse the behavioural responses induced by different tax reform scenarios we simulate the labour supply responses. Following Van Soest (1995) we apply a structural discrete choice household labour supply model.[11] assuming that the household's head and his partner jointly maximise a household utility function in the arguments leisure of both partners and net income. Household i ($i = 1, ..., N$) can choose between a finite number ($j = 1, ..., J$) of combinations $(y_{ij}, lm_{ij}, lf_{ij})$, where y_{ij} is the net income, lm_{ij} the leisure of the husband and lf_{ij} the leisure of the wife of household i in combination j. Based on our data we choose three working time categories for men (unemployed, employed, overtime) and five for women (unemployed, employed, overtime and two part time categories).

We model the following translog[12] household utility function

$$V_{ij}\left(x_{ij}\right) = x_{ij}'Ax_{ij} + \beta' x_{ij} \tag{1}$$

where $x = \begin{pmatrix} \ln y_{ij}, & \ln lm_{ij}, & \ln lf_{ij} \end{pmatrix}'$ is the vector of the natural logs of the arguments of the utility function. The elements of x enter the utility function in linear (coefficients $\beta = (\beta_1, \beta_2, \beta_3)'$) and in quadratic and gross terms (coefficients $A_{(3\times3)} = (a_{ij})$). Using control variables z_p ($p = 1, ..., P$)[13] we control for observed heterogeneity in household preferences by defining the parameters β_m, α_{mn} as

$$\beta_m = \sum\nolimits_{p=1}^{P} \beta_{mp} z_p \tag{2}$$

$$\alpha_{mn} = \sum\nolimits_{p=1}^{P} \alpha_{mnp} z_p \tag{3}$$

where $m, n = 1, 2, 3$.

Following McFadden (1973) and his concept of random utility maximisation[14] we add a stochastic error term ε_{ij} for unobserved factors to the household utility function:

$$\begin{aligned} U_{ij}\left(x_{ij}\right) &= V_{ij}\left(x_{ij}\right) + \varepsilon_{ij} \\ &= x_{ij}'Ax_{ij} + \beta' x_{ij} + \varepsilon_{ij} \end{aligned} \tag{4}$$

[11] A detailed description of the FiFoSiM labour supply module is provided in the technical appendix and by Fuest et al. (2005b).

[12] Cf. Christensen et al. (1971).

[13] We use control variables for age, children, region and nationality , which are interacted with the leisure terms in the utility function because variables without variation across alternatives drop out of the estimation in the conditional logit model (see Train (2003)).

[14] Cf. McFadden (1981), McFadden (1985) and Greene (2003).

Assuming joint maximisation of the households utility function implies that household i chooses category k if the utility index of category k exceeds the utility index of any other category $l \in \{1, ..., J\} \backslash \{k\}$, if $U_{ik} > U_{il}$. This discrete choice modelling of the labour supply decision uses the probability of i to choose k relative to any other alternative l:

$$P(U_{ik} > U_{il}) = P\left[(x_{ik}' A x_{ik} + \beta' x_{ik}) - (x_{il}' A x_{il} + \beta' x_{il}) > \varepsilon_{il} - \varepsilon_{ik}\right] \quad (5)$$

Assuming that ε_{ij} are independently and identically distributed across all categories j to a Gumbel (extreme value) distribution, the difference of the utility index between any two categories follows a logistic distribution. This distributional assumption implies that the probability of choosing alternative $k \in \{1, ..., J\}$ for household i can be described by a conditional logit model[15]:

$$\begin{aligned} P(U_{ik} > U_{il}) &= \frac{\exp(V_{ik})}{\sum_{l=1}^{J} \exp(V_{il})} \quad (6) \\ &= \frac{\exp(x_{ik}' A x_{ik} + \beta' x_{ik})}{\sum_{l=1}^{J} \exp(x_{il}' A x_{il} + \beta' x_{il})} \end{aligned}$$

For the maximum likelihood estimation of the coefficients we assume that the hourly wage is constant across the working hour categories and does not depend on the actual working time.[16] For unemployed people we estimate their (possible) hourly wages by using the Heckman correction for sample selection[17]. The household's net incomes for each working time category are computed in the tax benefit module of FiFoSiM.

The labour supply module of FiFoSiM is based on GSOEP data, which is enriched by information taken from the FAST data as described in section 2.3. The sample of tax units is then categorised into 6 groups according to their assumed labour supply behaviour. We distinguish fully flexible couple households (both spouses are flexible), two types of partially flexible couple households (only the male or the female spouse has a flexible labour supply), flexible female and flexible male single households, and inflexible households. We assume that a person is not flexible in his/her labour supply, meaning he or she has an inelastic labour supply, if a person is either younger then 16 or older then 65 years of age, in education or military service receiving old-age or disability pensions or self employed or civil servant. Every other employed or unemployed person is assumed to have an elastic labour supply. We distinguish

[15] McFadden (1973). Cf. Greene (2003) or Train (2003) for textbook presentations.

[16] This assumption is common in the literature on structural discrete choice household labour supply models (see Van Soest and Das (2001)).

[17] Cf. Heckman (1976) and Heckman (1979). A detailed description of these estimations can be found in Fuest et al. (2005b).

between flexible and inflexible persons, because the labour supply decision of those assumed to be inflexible (e.g. pensioners, students) is supposed to be based on a different consumption leisure decision (or at least with a different weighting of the relevant determinants[18]) than that of those working full time.

4.2 Welfare effects

The computation of welfare measures is another important aspect for the evaluation of efficiency effects of tax reforms. Several methods and measures have been developed in the long literature of Welfare Economics.[19] The empirical application of these methods mostly focuses on the ex-post evaluation of consumer demand using time-series data from before and after a tax reform. Creedy and Kalb (2006) propose a method for the ex-ante analysis of the effects of tax reforms on the labour-leisure decision. As far as we know, this method has not been applied in a microsimulation model to real micro data yet.[20] Following this method, we compute the changes in the equivalent variation as a money metric welfare measure based on the microeconometrically estimated utility function of the labour supply model described in the appendix. The equivalent variation EV_i for each individual i can be expressed as:

$$EV_i = E_i(p^0, U_i^0) - E_i(p^0, U_i^1) = E_i(p^1, U_i^1) - E_i(p^0, U_i^1)$$

where E_i is the expenditure function, p the price (wage) vector and U_i the utility level before (superscript 0) and after (1) the reform. The change in the welfare (in terms of the (negative) excess burden) of the individual $\triangle W_i$ can be expressed as

$$\triangle W_i = -\left(EV_i - \triangle T_i\right)$$

where $\triangle T$ is the change in tax revenue. Assuming a Utilitarian aggregation function, the overall changes in welfare can be expressed as

$$\triangle W = \sum_i \triangle W_i.$$

5 CGE module

The tax benefit and labour supply modules of FiFoSiM only account for the household side of the economy. The computable general equilibrium (CGE) module allows us to simulate the

[18] Therefore, it is not possible to assume the same econometric relationship for these persons.
[19] See Slesnick (1998) for a comprehensive survey.
[20] Creedy and Kalb (2006), chapter 8, present an example with hypothetical data.

overall economic effects of policy changes including the production side.[21] Therefore effects on labour demand, employment and economic growth as well as wage and price levels can be assessed. The static CGE module of FiFoSiM models a small open economy with 12 sectors and one representative household.[22] The model is based on a social accounting matrix (SAM) for Germany which is created using the 2000 Input-Output-Table and the static ageing technique to transform the data to 2007.

FiFoSiM so far uses either the top-down or the bottom-up approach to combine the microsimulation and the CGE module. In the bottom-up linkage the representative household (income, labour supply, tax payments) in the CGE module is calibrated based on the simulation results of the microsimulation modules. For the top-down linkage changes of the wage or price level are computed in the CGE model and used in the microsimulation modules for the calculation of net incomes and the labour supply estimation.[23]

6 Applications and further development

6.1 Applications of FiFoSiM

The development of FiFoSiM started in September 2004. The first running version of the whole system was ready for use one year later. Since then, the model has been steadily improved and used for writing new publications. During the development of FiFoSiM, some introductory papers have been written. Peichl (2005) gives an overview on the evaluation of tax reforms using simulation models. Bergs and Peichl (2006) survey the basic principles and possible applications of CGE models. Ochmann and Peichl (2006) give an introduction to the measurement of distributional effects of fiscal reforms.

Furthermore, FiFoSiM can be used in many ways for the analysis of (reforms of) the tax benefit system. Fuest et al. (2005a) and Fuest et al. (2007a) analyse the fiscal, employment and growth effects of the reform proposal by Mitschke (2004) In Bergs, Fuest, Heilmann, Peichl and Schaefer (2006) this analysis is expanded to the negative income tax part (*Bürgergeld*) of this proposal. Fuest et al. (2006) and Fuest et al. (2007c) analyse the efficiency and equity effects of tax simplification. Tax simplification is modelled as the abolition of a set of deductions from the tax base included in the German income tax system. Furthermore, Peichl et al.

[21] This section is based on Bergs and Peichl (2006). See for example Shoven and Whalley (1984) for a different introduction to CGE modelling.

[22] The expressiveness of this simple CGE module as a stand-alone model is rather limited. In combination with the state-of-the-art microsimulation module it becomes a powerful tool, though. Nevertheless, the improvement of the CGE module is work in progress (see section 6).

[23] The top-down bottom-up approach is so far only executed manually and not automatically. This is also subject to future improvements (see section 6).

(2006) analyse the effects of these simplification measures on poverty and richness in Germany. Fuest et al. (2007b) analyse the distributional effects of different flat tax reform scenarios for Germany. Bergs, Fuest, Peichl and Schaefer (2006a) and Bergs, Fuest, Peichl and Schaefer (2006b) analyse different reform proposals for the taxation of families in Germany.

6.2 Further Development and conclusion

FiFoSiM is a state of the art tax benefit simulation model for Germany. FiFoSiM consists of three main parts: a static tax benefit micro simulation model, an econometrically estimated labour supply model and a CGE model. Two specific features distinguish FiFoSiM from other tax benefit models: First, the simultaneous use of two databases for the tax benefit module and second, the linkage of the tax benefit model with a CGE model. FiFoSiM can be used to analyse various policy reforms of the complex German tax and transfer system.

Nevertheless, several ideas for the further improvement of FiFoSiM exist. One major aspect of improvement is the modelling of indirect taxes. For this reason, expenditure data is needed and a third data source has to be included into the FiFoSiM database. The micro macro linkage between the microsimulation and the CGE module shall be improved using the top down bottom up approach. Furthermore, the CGE module is to be improved as well, for example by allowing for more different household types or a more sophisticated modelling of the labour market. Moreover, dynamic modules are planned. A small Ramsey type dynamic version of the CGE module exists, but has not been used for any publication yet. This module shall be improved and used in the future. The development is not settled yet. We expect new issues of the FAST and GSOEP data, which have to be implemented in the model, soon.

To sum up, the creation of the dual database and the linkage of the tax benefit model with a CGE model give the users of FiFoSiM a powerful tool for the analysis of various questions regarding the German tax benefit system. Both methods should be of interest for the enhancement of other microsimulation models as well.

References

Bach, S. and Schulz, E. (2003). Fortschreibungs- und Hochrechnungsrahmen für ein Einkommensteuer- Simulationsmodell. Projektbericht 1 zur Forschungskooperation Mikrosimulation mit dem Bundesministerium der Finanzen, Materialien des DIW Berlin, Nr. 26.

Bergs, C., Fuest, C., Heilmann, S., Peichl, A. and Schaefer, T. (2006). Aufkommens-, Beschäftigungs- und Wachstumswirkungen einer Reform des Steuer- und Transfersystems nach dem Bürgergeld-Vorschlag von Joachim Mitschke, FiFo-Bericht 08-2006.

Bergs, C., Fuest, C., Peichl, A. and Schaefer, T. (2006a). Das Familienrealsplitting als Reformoption in der Familienbesteuerung, *Wirtschaftsdienst* **86(10)**: 639–644.

Bergs, C., Fuest, C., Peichl, A. and Schaefer, T. (2006b). Reformoptionen der Familienbesteuerung - Aufkommens-, Verteilungs- und Arbeitsangebotseffekte, *Jahrbuch für Wirtschaftswissenschaften (Review of Economics) (forthcoming)* .

Bergs, C. and Peichl, A. (2006). Numerische Gleichgewichtsmodelle - Grundlagen und Anwendungsgebiete, Finanzwissenschaftliche Diskussionsbeiträge Nr. 06-2.

Christensen, L., Jorgenson, D. and Lau, L. (1971). Conjugate Duality and the Transcedental Logarithmic Function, *Econometrica* **39**: 255–256.

Creedy, J. and Kalb, G. (2006). *Labour supply and microsimulation: the evaluation of tax policy reforms*, Edward Elgar, Cheltenham.

Fuest, C., Peichl, A. and Schaefer, T. (2005a). Aufkommens-, Beschäftigungs- und Wachstumswirkungen einer Steuerreform nach dem Vorschlag von Mitschke, FiFo-Bericht 05-2005.

Fuest, C., Peichl, A. and Schaefer, T. (2005b). Dokumentation FiFoSiM: Integriertes Steuer-Transfer-Mikrosimulations- und CGE-Modell, Finanzwissenschaftliche Diskussionsbeiträge Nr. 05 - 03.

Fuest, C., Peichl, A. and Schaefer, T. (2006). Does Tax Simplification yield more Equity and Efficiency? An empirical analysis for Germany, Finanzwissenschaftliche Diskussionsbeiträge Nr. 06 - 05.

Fuest, C., Peichl, A. and Schaefer, T. (2007a). *Aufkommens-, Beschäftigungs- und Wachstumswirkungen einer Steuerreform nach dem Vorschlag von Mitschke*, Nomos, Baden-Baden.

Fuest, C., Peichl, A. and Schaefer, T. (2007b). Die Flat Tax: Wer gewinnt? Wer verliert? Eine empirische Analyse für Deutschland., *Steuer und Wirtschaft* pp. 22–29.

Fuest, C., Peichl, A. and Schaefer, T. (2007c). Führt Steuervereinfachung zu einer gerechteren Einkommensverteilung? Eine empirische Analyse für Deutschland, *Perspektiven der Wirtschaftspolitik* **8(1)**: 20–37.

Greene, W. (2003). *Econometric Analysis*, Prentice Hall, New Jersey.

Gupta, A. and Kapur, V. (2000). *Microsimulation in Government Policy and Forecasting*, North-Holland, Amsterdam.

Haisken De-New, J. and Frick, J. (2003). DTC - Desktop Compendium to The German Socio-Economic Panel Study (GSOEP).

Harding, A. (1996). *Microsimulation and public policy*, North-Holland, Elsevier, Amsterdam.

Heckman, J. (1976). The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models, *Annals of Economic and Social Measurement* **5**: 475–492.

Heckman, J. (1979). Sample Selection Bias as a Specification Error, *Econometrica* **47**: 153–161.

McFadden, D. (1973). Conditional Logit Analysis of Qualitative Choice Behaviour, *in* P. Zarembka (ed.), *Frontiers in Econometrics*, New York, pp. 105–142.

McFadden, D. (1981). Econometric Models of Probabilistic Choice, *in* C. Manski and D. McFadden (eds), *Structural Analysis of Discrete Data and Econometric Applications*, The MIT Press, Cambridge, pp. 198–272.

McFadden, D. (1985). Econometric Analysis of Qualitative Response Models, *in* Z. Griliches and M. Intrilligator (eds), *Handbook of Econometrics*, Elsevier, Amsterdam, pp. 1396–1456.

Merz, J., Vorgrimler, D. and Zwick, M. (2005). De facto anonymised microdata file on income tax statistics 1998, FDZ-Arbeitspapier Nr. 5.

Mitschke, J. (2004). *Erneuerung des deutschen Einkommensteuerrechts: Gesetzestextentwurf und Begründung*, Verlag Otto Schmidt, Köln.

Ochmann, R. and Peichl, A. (2006). Measuring Distributional Effects of Fiscal Reforms, Finanzwissenschaftliche Diskussionsbeiträge Nr. 06 - 09.

Peichl, A. (2005). Die Evaluation von Steuerreformen durch Simulationsmodelle, Finanzwissenschaftliche Diskussionsbeiträge Nr. 05-01.

Peichl, A. and Schaefer, T. (2006). Documentation FiFoSiM: Integrated Tax Benefit Microsimulation and CGE Model, Finanzwissenschaftliche Diskussionsbeiträge Nr. 06 - 10, Universität zu Köln.

Peichl, A., Schaefer, T. and Scheicher, C. (2006). Measuring Richness and Poverty - A micro data application to Germany and the EU-15, CPE discussion paper No. 06-11, University of Cologne.

Rässler, S. (2002). *Statistical Matching*, Springer, New York [u.a.].

Shoven, J. and Whalley, J. (1984). Applied General Equilibrium Models of Taxation and International Trade: An Introduction and Survey, *Journal of Economic Literature* **22**: 1007–1051.

Slesnick, D. T. (1998). Empirical Approaches to the Measurement of Welfare, *Journal of Economic Literature* **36(4)**: 2108–2165.

SOEP Group (2001). The German Socio-Economic Panel (GSOEP) after more than 15 years - Overview, *Vierteljahrshefte zur Wirtschaftsforschung* **70**: 7–14.

Train, K. (2003). *Discrete Choice Models Using Simulation*, Cambridge University Press, Cambridge.

Van Soest, A. (1995). Structural Models of Family Labor Supply: A Discrete Choice Approach, *Journal of Human Resources* **30**: 63–88.

Van Soest, A. and Das, M. (2001). Family Labor Supply and Proposed Tax Reforms in the Netherlands, *De Economist* **149(2)**: 191–218.

Wagenhals, G. (2004). Tax-benefit microsimulation models for Germany: A Survey, *IAW-Report / Institut fuer Angewandte Wirtschaftsforschung (Tübingen)* **32**(1): 55–74.