FINAL REPORT PROJECT AG/01/116
VALORISATION OF THE MICROSIMULATION MODEL FOR SOCIAL SECURITY MIMOSIS
Part 2

ANDRÉ DECOSTER, KRIS DE SWERDT, KRISTIAN ORSINI

CES, UNIVERSITY OF LEUVEN

MATHIEU LEFÈBVRE, CLAIRE MARÉCHAL,

ALEXIS PASZUKIEWICZ, SERGIO PERELMAN

CREPP, UNIVERSITY OF LIÈGE

KRISTEL ROMBAUT, GERLINDE VERBIST

CSB, UNIVERSITY OF ANTWERP

GUY VAN CAMP

FPS SOCIAL SECURITY

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INTRODUCTION

This report is part of the output of the project AG/01/116. The main objectives of project AG/01/116 were to further refine and validate the microsimulation model for social security, MIMOSIS, both by extending the data coverage and refining the modules as through a comparative study of how MIMOSIS is positioned in an international perspective and also by use of MIMOSIS for evaluation of (hypothetical) policy reforms.

The following text contains section 3 of the overall report of the project AG/01/116. This section describes MIMOSIS relative to other national and international models as far as underlying data, scope and flexibility are concerned. Two models will be described and compared in greater detail. One is the Finnish national microsimulation model TUJA and the other is the European wide microsimulation model EUROMOD. This analysis will be further refined and continued in more detail in the new project "MIMOD".

3 MIMOSIS COMPARED TO OTHER MICROSIMULATION MODELS

In this section we will discuss the position of MIMOSIS in the national and international "population" of microsimulation models. We will begin the comparison by looking at other Belgian models and how they relate to MIMOSIS. Thereafter we discuss the similarities and differences of MIMOSIS as compared to other national and international models. A well-known example of the latter category is EUROMOD (see section 3.5 for details), a microsimulation model for different European countries and to which a separate section will be devoted. An example of a national model and one that is also highlighted in a separate section is TUJA, a microsimulation model for Finland.

3.1 MIMOSIS AND OTHER MICROSIMULATION MODELS IN BELGIUM

Table 1 gives an overview of the various microsimulation models in Belgium. Three models use survey data, whereas three (MIMOSIS, SIRe and PICSOUS[26]) work with administrative data. All models are static, and, except for one, do not incorporate macro-economic effects or behavioural reactions (the exception being the indirect tax model ASTER which includes behavioural reactions in spending as result of price changes, and MIMOSIS, for which labour market reactions will be included in the near future). MISIM[27], MIMOSIS and MODÉTÉ have the widest coverage. The three models not only cover personal income taxes and social contributions, they also simulate the following social benefits: pensions, unemployment benefits, sickness and invalidity benefits, and family allowances. PICSOUS and SIRe only cover personal income taxes and social contributions. ASTER, as noted before, has been designed to analyse indirect taxes.

[26] PICSOUS has not been maintained after 1993.

[27] As the Socio-Economic Panel has ended in 1997, MISIM now runs on the Belgian data of EU-SILC.

TABLE 3-1 MIMOSIS AND OTHER MICROSIMULATION MODELS IN BELGIUM

Model	Coverage	Data source	Static/ Dynamic	Behav. Effects	Macro-link	Unit of analysis
ASTER[a] *CES - KULeuven*	• indirect taxes	Household Budget **Survey** (1987-1988, 1996-1997, 2001)	Static	yes	no	• individual • household
MISIM[b] *CSB-UA*	• personal income taxes • social contributions • social benefits	Socio-Economic Panel (**Survey,** 1992, 1997)	Static	no	no	• individual • fiscal unit • household
MIMOSIS	• personal income taxes • social contributions • social benefits	Various **administrative** datasets (2001)	Static	scheduled	no	• individual • fiscal unit • household
MODÉTÉ[c] *Dulbéa -Eté*	• personal income taxes • social contributions • social benefits	Panel Study of Belgian Households (**Survey**, 1994-2001)	Static	no	no	• individual • household
PICSOUS *FUNDP*	• personal income taxes	**Administrative** tax forms (1991, 1993)	Static	no	no	• fiscal unit
SIRe[d] *Ministry of Finance*	• personal income taxes	IPCAL (**administrative** file of tax forms, 1991-2001)	Static	no	no	• fiscal unit

[a] Decoster e.a. (1994; 1996); [b] Verbist (2002); [c] Joyeux (1998); [d] Standaert e.a. (1996).

Among the models listed in Table 3-1 MIMOSIS is unique in that it enables detailed analyses in a wide variety of policy fields. This level of detail is possible thanks to the use of administrative data and a very large sample (see supra). Moreover, the inclusion of labour supply reactions in the near future will enhance the potential of this model.

3.2 MIMOSIS AND SIMULATION MODELS IN OTHER COUNTRIES

In Table 3-2 and Table 3-3 we compare MIMOSIS with other (inter)national models of EU-countries and Norway. Table 3-2 lists 30 models, grouped per country, as well as information on the dataset used. Obviously tax-benefit models are well represented in European countries. Most models cover personal income taxes, as well as social contributions and social benefits. Some models have a very specific focus, as they simulate only one sector of social security (e.g. DESTINIE in France for pensions) or taxes (e.g. SPAIN in the United Kingdom). Models using survey data are more prevalent (19 of the 30 models in the list) than those using administrative data or a combination of administrative and survey data. This preponderance of survey-data based models is probably due to the fact that this kind of data is more easily accessible than administrative data. Administrative data-based models are more common in Northern Europe. Often these data are supplemented with information from surveys (e.g. household composition).

TABLE 3-2 MIMOSIS AND OTHER MICROSIMULATION MODELS IN EUROPE

Model	Coverage (SB=social benefits)	Data source	Administrative (A) /survey (S)
Austria			
AUSTROMOD (Fuchs, 2005)	• personal income taxes • social contributions • social benefits	EU-SILC 2003	S
Denmark			
LOV model (Statistics Denmark, 2005)	• personal income taxes • social contributions • social benefits	register-based statistical information	A
Finland			
SOMA (Haataja, 2003)	• personal income taxes • social contributions • social benefits	IDS (Income Distribution Survey)	A
TUJA (Haataja, 2003; Salomaki, 1996)	• personal income taxes • social contributions • social benefits	IDS (Income Distribution Survey)	A+S
France			
DESTINIE (Legendre e.a., 2001b)	• SB: pensions	Financial Asset Survey	S
INES (Legendre e.a., 2001b; Murat e.a., 2000)	• personal income taxes • social contributions • social benefits	Revenus fiscaux des ménages and Employment Survey	A+S
MYRIADE (Legendre e.a., 2001a; O'Donoghue, 2001)	• personal income taxes • social contributions • social benefits	Revenus fiscaux des ménages	A
SYSIFF (Legendre e.a., 2001a; O'Donoghue, 2001)	• personal income taxes • social benefits	Budget des familles	S
Germany			
FiFoSiM (Peichl, 2006)	• personal income taxes • social contributions • social benefits	FAST88 (sample of 10% of the German federal income tax statistics) and GSOEP	A+S
GMOD (Wagenhals, 2004)	• personal income taxes • social contributions • social benefits	GSOEP (the German Socio-Economic Panel)	S
KiTs (Wagenhals, 2004)	• personal income taxes • social contributions • social benefits • some indirect taxes	ICS (Income and Consumption Survey)	S
POTSDAM (Wagenhals, 2004)	• personal income taxes • social contributions • social benefits • indirect taxes	GSOEP , ICS and IAW tax panel (Institut für Angewandte Wirtschaftsforschung)	S

Model	Coverage (SB=social benefits)	Data source	Administrative (A) /survey (S)
STSM (Wagenhals, 2004)	• personal income taxes • social contributions • social benefits	GSOEP	S
Ireland			
SWITCH (Callan e.a., 2000)	• personal income taxes • social contributions • social benefits	Living in Ireland Survey	S
Italy			
AWARETAX (Gastaldi e.a., 2000)	• personal income taxes • social contributions • social benefits	SHIW (Survey of Household Income and Wealth)	S
ITAXMOD (Russo, 2004; Solera, 1999)	• personal income taxes • social contributions • SB: family allowances	SHIW	S
MAPP98 (Baldini, 2001)	• personal income taxes • social contributions • social benefits	SHIW	S
MIND (Bianchi e.a.)	• personal income taxes • social contributions • SB: pensions	SHIW	S
Norway			
LOTTE (Kornstad e.a., 2004; Aesness e.a., 2006)	• personal income taxes • social contributions • social benefits	IDS (Income Distribution Survey): a large representative sample survey based on information from administrative and statistical registers (including income tax files), the household composition is established by interviews	A+S
Spain			
ESPASIM (Levy, 2003; Prats e.a.)	• personal income taxes • social contributions • social benefits	Encuesta de Presupuestos Familiares (Household Budget Survey) and the Panel de Hogares de la Unión Europa (Spanish sample of the ECHP)	S
Sweden			
FASIT (Eklind e.a., 2002; Ericson e.a., 2006)	• personal income taxes • social contributions • social benefits	HEK (annual income distribution survey): data are collected from telephone interviews, administrative registers and tax return forms	A+S
MICROHUS (O'Donoghue, 2001)	• personal income taxes • social contributions • social benefits	HUS income distribution database (Household Market and Non-Market Activities)	S
SESIM	• personal income taxes • social contributions • social benefits	LINDA (Longitudinal Individual Data for Sweden)	A

Model	Coverage (SB=social benefits)	Data source	Administrative (A) /survey (S)
United Kingdom			
IGOTM (Hillary, 2001)	• personal income taxes • social contributions • social benefits	FES (Family Expenditure Survey), FRS (Family Resources Survey) and LFS (Labour Force Survey)	S
PENSIM (Zaidi e.a., 2001)	• SB: pensions (+ tax and benefit modelling for pensioners)	RS (Survey of Retirement and Retirement Plans), FES and SCELI (Social Change and Economic Life Initiative)	S
PENSIM2 (Zaidi e.a., 2001; N., 2005; Redway, 2003)	• SB: pensions (+ tax and benefit modelling for pensioners)	LLMDB (Lifetime Labour Market database), FRS and BHPS (British Household Panel Study)	A+S
POLIMOD (Redmond, 1998)	• personal income taxes • social contributions • social benefits	FES and FRS	S
PSM (Duncan, 2001)	• personal income taxes • social contributions • social benefits	FRS	S
SPAIN (Duncan, 2001)	• personal income taxes	output from TAXBEN	
TAXBEN (Duncan, 2001)	• personal income taxes • social contributions • social benefits	FES, FRS, LFS etc.	S

Table 3-3 presents an overview of the main characteristics of the models listed in Table 3-2. Most models are static (exceptions are DESTINIE, PENSIM and PENSIM2, which have pensions as their main focus, and MICROHUS, SESIM and MIND). With respect to the inclusion of behavioural reactions, about half of the models listed (17 out of 30) do not allow for this type of effects, whereas those that do incorporate behavioural reactions do so mainly with respect to labour supply. None of the models, except for FiFoSiM, incorporates linkages with the macro level. All models allow results to be presented at the individual level or at the level of the tax unit; most models also provide the possibility for analyses at the household level.

TABLE 3-3 MIMOSIS AND OTHER MICROSIMULATION MODELS IN EUROPE (CONTINUED)

Model	static (S)/ dynamic (D)	Behav. Effects	Macro-links	Unit of analysis		
				individual	tax unit	household
AUSTROMOD	S	no	no	x	x	x
LOV MODEL	S	no	no	x	x	x
SOMA	S	no	no	x	x	x
TUJA	S	no	no	x	x	x
DESTINIE	D	yes	no	x	x	
INES	S	yes	no	x	x	x

Model	static (S)/ dynamic (D)	Behav. Effects	Macro-links	Unit of analysis		
				individual	tax unit	household
MYRIADE	S	no	no	x	x	x
SYSIFF	S	no	no	x	x	x
FiFoSiM	S	yes	yes	x	x	x
GMOD	S	possible	no	x	x	x
KiTs	S	no	no	x	x	x
POTSDAM	S	possible	no	x	x	x
STSM	S	possible	no	x	x	x
SWITCH	S	no	no	x	x	x
AWARETAX	S	no	no	x	x	
ITAXMOD	S	no	no	x	x	
MAPP98	S	no	no	x	x	
MIND	D	yes	no	x	x	
LOTTE	S	yes	no	x	x	x
ESPASIM	S	no	no	x	x	x
FASIT	S	no	no	x	x	x
MICROHUS	D	yes	no	x	x	x
SESIM	D	yes	no	x	x	x
IGOTM	S	yes	no	x	x	x
PENSIM	D	no	no	x	x	x
PENSIM2	D	no	no	x	x	x
POLIMOD	S	no	no	x	x	x
PSM	S	no	no	x	x	x
SPAIN	S	yes	no	x	x	x
TAXBEN	S	yes	no	x	x	x

3.3 TUJA: THE FINNISH NATIONAL MICROSIMULATION MODEL

In this section we present in more detail one of the national microsimulation models mentioned in Table 3-2 and Table 3-3, namely the Finnish national model TUJA. We have chosen this model because of the close resemblance to MIMOSIS. Similar to MIMOSIS, TUJA also runs primarily on administrative data and has a wide coverage. It also is the basis for the Finnish part of the European microsimulation model EUROMOD (see next section).

The static microsimulation model TUJA was originally developed by the Finnish Ministry of Finance at the end of the 1980's. After the Governmental Institute for Economic Research (VATT) was established in 1990, the two organizations maintained and developed the model together.

The model runs on data coming from the Income Distribution Survey (IDS) (Haataja, 2003; Salomaki, 1996), which is collected by Statistics Finland (http://www.stat.fi/). The data source is

presented in the first part of this section. Next, we discuss the coverage of TUJA, as well as the results of the validation. Finally, we list some applications of TUJA.

3.3.1 The data source[28]

IDS is a sample survey for which data are collected through the use of registers and interviews. The administrative records are mostly used for the collection of income data. Interviews are conducted to obtain information on household composition, to collect information for the construction of classification variables such as activity or occupation, to augment register data and to allow for more flexibility in the use of register data. IDS uses a rotating two-year panel design. Because data are collected from different sources they have to be linked together. This is done by using the personal identification numbers (exact matching), that unambiguously identifies each Finnish citizen. The IDS of 2001 contains 10,736 households representing 28,303 individuals.

3.3.2 coverage and validation

TUJA covers the major part of the Finnish tax-benefit system, as is shown in Table 3-4. As far as benefits are concerned "pensions" is the most important category that is not simulated in the model. The other groups that are not simulated (child disability allowance, special child care allowance and other benefits) represent categories that are rather small in terms of budget and number of recipients. Social contributions are entirely covered in TUJA. With respect to taxes, the model includes earned income taxes, which is one of the major sources of government revenue, as well as state taxes from capital income, taxes that relate to property or real estate and taxes from deposit interests. Indirect taxes are not included (see also footnote 28).

[28] In order to evaluate the impact of the VAT-reform in the mid nineties, Salomaki (1996) merged the IDS data-set of 1994 with the data from the Household Budget Survey (HBS), thus enlarging the policy scope of the model. Two merging methods were used, namely average statistical merging and hot rank merging. The enlarged scope was only meant for the evaluation of the VAT-reform however and is *not* made permanently accessible in the model.

TABLE 3-4 COVERAGE OF TAX-BENEFIT REGULATIONS IN TUJA

	taxes and benefits simulated in TUJA	taxes and benefits not simulated in TUJA
Benefits		
	Child allowance	Pensions
	Child home care subsidy	Child disability allowance
	General housing benefit	Special child care allowance
	Social assistance	Other benefits
	Sickness benefit	
	Maternity benefit	
	Basic unemployment allowance	
	Earnings-related unemployment benefit	
	Labour market support	
	Student payment	
	Pensioner's housing benefit	
	Student's housing benefit	
Social insurance contributions		
	Employee contributions to pension and unemployment insurance	
	Personal contribution to sickness insurance	
	Employer contributions to social insurance	
	Self-employed and farmer contributions	
Taxes		
	State tax from capital income	Value-added tax
	Tax from deposit interest	
	Earned income taxes (state tax, municipal tax and church tax)	
	Property tax	
	Real estate tax	Excise taxes
Public service charges		
	Municipal day care fee	Private child care subsidy

Source: based on Viitamäki (2004)

Table 3-5 gives the validation results of TUJA by comparing expenditures and number of recipients with those found in statistics. The statistics mainly come from registers of tax authorities, from the Social Insurance Institution and the Social Welfare Board[29].

In general, the results of TUJA are quite close to the figures coming from the statistics, though for some categories, such as 'social assistance' and 'disposable income' there are differences. It is not immediately clear what explains these differences. Overall, the match is good, and given the fact that TUJA is a model that simulates tax-benefit regulations in detail, it is possible to use the model for high-quality simulations in the field of tax and social policy. Reforms can be simulated for a

[29] Some small adjustments have been made to the statistics to have them comparable with the model income concepts.

wide array of policy fields; it is possible to simulate both broad policy reforms as well as 'smaller' measures (small in terms of the number of recipients or the budget involved).

TABLE 3-5 AGGREGATE TAXES AND BENEFITS IN TUJA COMPARED WITH STATISTICS (MIL EURO AND 1000 RECIPIENTS), YEAR 2001

	TUJA		Statistics		TUJA/Statistics %	
	mil €	recipients (x1000)	mil €	recipients (x1000)	mil €	recipients (x1000)
Taxable capital income [1)]	6319.2	1251.5	6322.8	1012.6	0.1%	-19.1%
Tax from capital income (state)	981.6	742.2	1018.8	742.9	3.8%	0.1%
Wage and salary income [2)]	52060.8	2639.0	52941.6	2670.8	1.7%	1.2%
Earned income from agriculture	927.6	147.4	848.4	130.6	-8.5%	-11.4%
Earned income from forest	170.4	144.6	190.8	166.8	12.0%	15.4%
Earned income from business	1741.2	116.7	1762.8	114.8	1.2%	-1.6%
Earned income from business partnership	735.6	44.1	752.4	45.2	2.3%	2.5%
Pension income	14001.6	1226.6	14671.2	1311.0	4.8%	6.9%
Sickness benefit [3)]	286.8	126.6	285.6		-0.4%	
Labour market support	752.4	258.7	837.6	271.4	11.3%	4.9%
Basic unemployment benefit	73.2	40.7	86.4	43.7	18.0%	7.4%
Earning-related unemployment benefit	1138.8	270.6	1191.6	276.6	4.6%	2.2%
Child home care subsidy	343.2	100.3	345.6	116.1	0.7%	15.8%
Maternity payment	464.4	148.7	436.8	139.7	-5.9%	-6.1%
Student payment	429.6	333.6	444	322.4	3.4%	-3.4%
Private pension contributions	363.6	193.3	364.8	194.7	0.3%	0.7%
Employee unemployment + pension contribution	2704.8	2630.6	2600.4	2529.2	-3.9%	-3.9%
Taxable earned income (state taxation)	69262.8	4012.7	69960	4162.8	1.0%	3.7%
Taxable earned income (local taxation)	62202	3633.5	62712	3722.2	0.8%	2.4%
State earned income tax	6579.6	2407.5	6562.8	2418.7	-0.3%	0.5%
Municipal tax	10836	3619.1	10935.6	3705.4	0.9%	2.4%
Sickness contribution	1042.8	3602.0	1062	3658.9	1.8%	1.6%
Church tax	670.8	3086.9	675.6	3150.4	0.7%	2.1%
Tax from deposits [3)]	216	728.3	218.4		1.1%	
Child benefit	1380	611.5	1376.4	580.0	-0.3%	-5.2%
Social assistance	528	311.8	429.6	0.0	-18.6%	
Housing benefit for pensioners	212.4	146.2	246	165.2	15.8%	13.0%
Housing benefit (general) [4)]	427.2	226.1	400.8	158.5	-6.2%	-29.9%
Housing benefit for students	240	198.4	208.8	175.0	-13.0%	-11.8%
Municipal day care payment	214.8	120.9	225.6		5.0%	
Employer social insurance contribution	13670.4		12876		-5.8%	
Disposable income [5)]	63357.6	4205.7	63028.8	2380.0	-0.5%	-43.4%

Source: Viitamäki (2004)

1) The figures of *Tax Statistics 2001* has been made comparable by adding "the tax paid by companies"; 2) The income concept in model calculation and *Tax Statistics 2001* differs; 3) The receivers of benefit are not comparable (or not available) in statistics; 4) In Statistics the receivers are in the end of the year (or the time period differs otherwise); 5) In Statistics the disposable income is from *Income Distribution Statistics 2001* (Statistics Finland) and is on household level.

3.3.3 using TUJA

The model has been in use since the end of 1980's for more or less all significant reforms concerning income taxes or social benefits, e.g.

- the elimination of sickness tax deduction 1989

- the total tax reform 1989-91
- the food turn over reform proposal 1991
- the development of the structure of family social security 1991
- the student payment reform 1992
- the capital income reform 1993
- the VAT reform 1994
- the family security package 1994
- the development of the housing benefit 1995
- the incentive trap working group 1997
- the corporation and capital income reform 2005

Some of these reforms were large; however, the model is also used regularly for smaller "reforms" in the Ministry of Finance (changing the structure of tax deductions, planning the budget year's revenues, etc). In fact for all changes connected to personal income taxes, and often also benefits, the model is used. This is also the case when corporate taxes are changed because in the Finnish dual tax system the dividend and corporate tax rates are closely linked together. This means that TUJA is used very regularly in the Ministry of Finance.

Though VATT is a research institute the work is often - for practical reasons - closely related to the work in the Ministry. As a result the use of the model has focused more often on planning reforms, and less on the ex-post evaluation of the financial and distributional impact of tax and transfer reforms.

3.4 HOW DOES MIMOSIS COMPARE TO TUJA

In many ways, MIMOSIS and TUJA are very similar. They both work with a detailed administrative dataset. The dataset of TUJA is however updated on a regular basis. TUJA has been used for most of the significant policy reforms with respect to taxes and benefits in Finland. Given the scope and detail of MIMOSIS, it, too, is perfectly capable to take up a similar role for the analysis of Belgian policy reforms with respect to taxes and benefits. It will therefore be of crucial importance to describe a procedure and set up a framework for the recurrent update of MIMOSIS and the data underlying it. Only then will MIMOSIS keep its attractiveness and remain an invaluable tool for policy analysts and researchers alike.

3.5 EUROMOD: AN INTEGRATED EUROPEAN TAX-BENEFIT MODEL

EUROMOD is a European tax-benefit microsimulation model covering all pre-May-2004 EU-15 Member States (Sutherland, 2001). In the first part of the section we give a brief overview of the projects through which the development of EUROMOD was funded. Then in a second part the

actual construction of the model and the main construction tasks are discussed. Finally, the use of EUROMOD is illustrated.

3.5.1 Development of EUROMOD

The development of EUROMOD runs through 3 European Commission-funded projects:

- the initial model construction project with the original EU-15 Member States;
- the MICRESA project ("Micro-level analysis of the European Social Agenda") which explored the impact of national, social and fiscal policies, and reforms of these policies on poverty reduction in the original 15 Member States;
- the I-CUE project ("Improving the Capacity and Usability of EUROMOD") to expand and enhance EUROMOD to enable the incorporation of the 10 new Member States.

The initial model construction project was financed by the *Targeted Socio-Economic Research (TSER)* programme of the European Commission (CT97-3060) and the aim was to build a tax-benefit microsimulation model, EUROMOD, covering all member states of the European Union at that time (i.e. 1998). The MICRESA project was funded by the European Commission's "Improving Human Potential" programme, part of the Fifth Framework programme. The I-CUE project started in May 2005 and is supported by the FP6 Research Infrastructures Action as a Design Study.

The basic output from EUROMOD is the micro-level change in household disposable income as a result of policy changes. This in turn provides a basis for the calculation of

- estimates of aggregate effects on government revenue;
- distribution of gains and losses;
- the first-round impact on measures of poverty and inequality;
- differential effects on groups classified by individual or household characteristics;
- effective marginal tax rates and replacement rates, and changes to them;
- between-country differences in the costs and benefits of reforms.

3.5.2 construction of EUROMOD

The actual construction of EUROMOD involved three main tasks:

1. the development of a micro-database for each country, containing the input variables necessary for tax-benefit calculations, together with variables to be used in the analysis of model output;
2. the collection, the coding and the parameterisation of policy rules for 15 tax-benefit systems based on (existing) national models, e.g. MODÉTÉ for Belgium (see Table 3-7);
3. the testing and the validation of simulated outputs from the model.

Also two further tasks were essential:

4. designing the model framework;
5. documentation: Country Reports were written to document the data used, the tax-benefit rules and the coverage for each country, as well as the validation of some basic output.

DATA SOURCES

In Table 3-6 the main sources of micro-data for EUROMOD are presented. The source for each country was selected on the basis of suitability for tax-benefit modelling and availability for the project.

TABLE 3-6 SOURCES OF MICRO-DATA FOR EUROMOD, BY TYPE

Country	Base Dataset	Type
Austria	European Community Household Panel	ECHP
Belgium	Panel Survey on Belgian Households (PSBH)	National Panel
Denmark	European Community Household Panel	ECHP
Finland	Income distribution survey (IDS)	Register + survey
France	Budget de Famille (BdF)	Household Budget Survey
Germany	German Socio-Economic Panel (GSOEP)	National Panel
Greece	European Community Household Panel	ECHP
Ireland	Living in Ireland Survey (LII)	National Panel
Italy	Survey of Households Income and Wealth (SHIW95)	Income survey
Luxembourg	PSELL-2	National Panel
Netherlands	Sociaal-economisch panelonderzoek (SEP)	National Panel
Portugal	European Community Household Panel	ECHP
Spain	European Community Household Panel	ECHP
Sweden	Income distribution survey (IDS)	Register + survey
UK	Family Expenditure Survey (FES)	Household Budget Survey

Source: Sutherland (2001)

On the basis of these data sources common variables were defined for each of the countries. Country-specific variables were only added to the database when they were necessary for the simulation of the national tax-benefit system but not available or needed for other countries.

SIMULATION OF POLICY RULES

The following instruments are simulated in EUROMOD for all countries:

- income taxes (national and local)
- social insurance contributions (paid by employees, employers and the self-employed)

- family benefits
- housing benefits
- social assistance benefits and other income-related benefits.

The following instruments are *generally* not simulated in EUROMOD:

- capital and property taxes
- real estate taxes
- pensions and survivor benefits
- contributory benefits
- disability benefits
- indirect taxes.

In Table 3-7 the differences in coverage between national models and EUROMOD are summarized.

TABLE 3-7 EUROMOD AND NATIONAL MODELS: DIFFERENCES IN POLICY COVERAGE

Country	Elements simulated in National Model, not in EUROMOD	Elements simulated in EUROMOD, not in National Model	Name of National Model
Austria	N/A	N/A	N/A
Belgium	Unemployment benefit	Social assistance benefits (minimex and RGPA)	
Denmark	None	None	LOVMODEL
Finland	Sickness and Maternity Benefit, Student Benefit and Housing Benefit for Students, Unemployment Benefit, Pensioner's Housing Benefit	None	TUJA
France	None	None	SYSIFF
Germany	None	Social Assistance, Housing Benefit, Parts of income tax	DIW
Greece	N/A	N/A	N/A
Ireland	Back to Work Allowance, Back to School Allowance, Benefit and Privilege aspects of eligibility for unemployment assistance, Part-time Job Incentive scheme	Housing Benefits, Employer SICs	SWITCH
Italy	None	Level of detail for instruments where unit is the family. EUROMOD is able to determine the correct units of assessment whereas national model always takes entire household as unit.	ITALMOD
Luxembourg	N/A	N/A	N/A
Netherlands	N/A	N/A	N/A
Portugal	N/A	N/A	N/A
Spain	None	Regional income tax credits for children, dependent parents and the elderly.	ESPASIM
Sweden	Unemployment and Sickness benefits, Child Care benefits, Capital gains tax	None	
UK	Council tax	Contributory Job Seekers Allowance	POLIMOD

Notes: N/A - no national model available to the EUROMOD team.

Source: Sutherland (2001)

DESIGNING THE MODEL FRAMEWORK

The model design strategy concentrated on finding common features across countries throughout the model construction process. In practice it involved:

- identifying common structural characteristics in national policies;
- identifying common data requirements;
- parameterising and generalizing as many aspects of the model as possible.

Important aspects, such as the definition of the following important concepts are harmonised across countries:

- the income base for each tax and benefit;
- the unit of assessment or entitlement for each tax and benefit;
- the effective equivalence scales inherent in social benefit payments;
- the output income measure.

For the simulation framework to be valid across many countries, features of tax-benefit systems were conceptualized and then operationalised. A hierarchical structure was devised in which each tax-benefit "system" is made up of individual "policies", a "policy spine" and "modules". The "policies" are the elementary collections of tax-benefit instruments such as income taxes, social insurance contributions and social assistance benefits. The "policy spine" is a list of policies indicating the sequence in which they apply in the tax-benefit system. At the lowest level is the tax-benefit "module", which performs the calculation of a certain part of the tax or benefit (e.g. a deduction or applying a rate schedule to a tax base) on each fiscal unit. The "modules" represent the elementary building blocks of the tax-benefit system: only the "modules" contain actual tax-benefit rules. The other levels are necessary to structure these rules and apply them in the correct sequence.

TESTING AND VALIDATION

There were three stages in the validation process. During the *first* stage the policy rules were checked to ensure that they were coded correctly (e.g. through simple plausibility checks on the amounts of taxes and benefits relative to original income and household size).

During the *second* stage of validation the data were run through the model and the aggregate output statistics were compared with corresponding independent statistics for 1998 (e.g. compare the number of fiscal units paying income tax with corresponding information from tax administration statistics). An important component of the validation during this stage was the "cross-country validation" or the ranking of countries in terms of poverty and inequality statistics. The aim of this validation exercise was to show that EUROMOD baseline results were broadly in line with other sources and that EUROMOD is a reliable tool for simulation experiments with policy changes.

TABLE 3-8 EUROMOD INCOME INEQUALITY INDICATORS AND POVERTY RATES

	EUROMOD 1998		ECHP 1996	
	Gini	Poverty Rate %	Gini	Poverty Rate %
Austria	0.25	11.3	0.26	13
Belgium	0.24	14.8	0.28	17
Denmark	0.24	11.1	0.23	12
Finland*	0.23	9.4		
France	0.28	11.8	0.29	16
Germany	0.28	13.5	0.28	16
Greece	0.33	20.3	0.34	21
Ireland	0.33	18.0	0.33	18
Italy	0.34	19.9	0.33	19
Luxembourg	0.26	11.8	0.28	12
Netherlands	0.25	9.9	0.30	12
Portugal	0.36	21.9	0.37	22
Spain	0.32	18.5	0.33	18
Sweden*				
UK	0.31	20.0	0.34	19

Notes: -The poverty rate is percentage of persons in households below the poverty line which is defined as 60% of national median equivalised household disposable income. The equivalence scale is the "modified OECD". No adjustments are made for differences in purchasing power between or within countries.

* EUROMOD results for Sweden are not yet available. ECHP estimates do not include Finland or Sweden.

Source: Sutherland (2001)

As Table 3-8 shows, the Gini coefficients calculated on the basis of EUROMOD seem similar to the Gini coefficient calculated on the basis of the ECHP (European Community Household Panel). For some countries the Gini slightly differs, this is so for the UK, Belgium and especially for the Netherlands. Also the poverty rates calculated on the basis of EUROMOD and the poverty rates calculated on the basis of the ECHP are quite similar. But, as with the Gini, some poverty rates calculate by EUROMOD are lower than the ECHP poverty rates, this is so for the Netherlands, France, Germany and Belgium.

In the *third* stage of the validation process the results of simulated policy changes were compared with estimates obtained independently. This relied on having access to national models or published national model output, together with information about exactly how the estimates were obtained.

3.5.3 use and applications of EUROMOD

Before presenting the types of analysis that are feasible within EUROMOD some "limitations" on the use of EUROMOD are discussed.

LIMITATIONS

EUROMOD is a static model designed to calculate the immediate, "morning after" effect of policy changes. It does not incorporate the effects of behavioural changes (i.e. changes in (labour supply) behaviour following changes in tax-benefit policy, and hence incentives, are not modelled), nor does it model the long-term effect of change. As such EUROMOD cannot be used to examine a policy that is only designed to change behaviour and/or that only has impact in the long term (e.g. some forms of pension policies). Estimated behavioural responses are deliberately excluded in this first attempt at a multi-country microsimulation model mainly for reasons of feasibility and practicality. Another (evident) limitation is that EUROMOD can only simulate policies which depend on variables that are present in the underlying database.

APPLICATIONS

EUROMOD is increasingly used for comparative analyses of the characteristics and results of European tax-benefit models. We briefly discuss here three examples. For other illustrations we refer to the EUROMOD Working Papers on the website (http://www.iser.essex.ac.uk/msu/emod/).

CHILD POVERTY AND CHILD BENEFITS IN THE EUROPEAN UNION

In a preliminary exercise that used evidence from the European Community Household Panel it was found that family benefits vary in their importance to household incomes and in the prevention of child poverty across Europe (Immervoll et al, 2001). In one group of countries family benefits appear to have a significant effect on the protection of children from financial poverty. The UK and the Netherlands are both members of this group. EUROMOD was used to examine the extent to which differences in child benefits explain the very different levels of child poverty in the two countries. Also the effect of "swapping" child benefit systems between the two countries was explored. The major conclusion was that the poverty reduction properties of universal child benefits may be improved without resorting to means-testing or compromising the other functions of these benefits.

A EUROPEAN SOCIAL AGENDA: POVERTY BENCHMARKING AND SOCIAL TRANSFERS

The European countries which perform best in terms of reducing poverty tend to have higher social spending (Atkinson, 2000). Such statistical performance indicators need to be accompanied by the evaluation of the relationship between policy instruments and poverty reduction, showing the trade-off between poverty reduction and social spending at the level of individual policies. Illustrative estimates using EUROMOD suggest that employing universal social transfers to reduce a country's poverty rate from the EU-average of 18% to the best-performing average of 12% would necessitate an increase in social transfers of some 2% of GDP. More targeted schemes may allow sizeable expenditure savings but at the cost of increased disincentives; the design of Europe's

social agenda has to confront well-known issues of economic trade-offs; economic and social policy cannot be divorced.

MICROSIMULATION OF SOCIAL POLICY IN THE EUROPEAN UNION: CASE STUDY OF A EUROPEAN MINIMUM PENSION

The implications for poor pensioners of setting a European Minimum Pension (EMP) are explored for 6 countries (Atkinson et al., 2002). The analysis shows that the composition of the bottom of the combined income distribution is sensitive to assumptions about the comparability of purchasing power across countries and about the treatment of households of different types. The conclusion is that the formulation of policy for the protection of Europe's poorest people requires an appreciation, not only of the composition and location of this group (targeted are those in the bottom quintile group but recipients of EMP and pensioners are not all concentrated at the bottom of the overall distribution), but also of the assumptions that have been used to identify it (e.g. the choice of exchange rate to convert incomes in different countries into a common currency, the choice of equivalence scale used to account for differences in household size and composition). Aspects of the EMP proposal are identified which need further specification, such as the nature of the interaction of the EMP with existing national pension systems, and with national redistributive systems in general, and the choice between different treatments of the unit of assessment of pension income.

3.5.4 how does MIMOSIS compare to EUROMOD

There are some considerable differences between EUROMOD and MIMOSIS. Firstly, MIMOSIS has a much wider scope and detail than EUROMOD: it covers almost the entire social security system, thus including more sectors (e.g. unemployment benefits, sickness and invalidity benefits) and more measures per sector (e.g. a detailed reconstruction of the various reductions applicable for social security contributions). Secondly, MIMOSIS runs on a much larger database than the Belgian model in EUROMOD. A 'larger database' refers both to the number of individuals in the dataset, as well as to the number of variables. Moreover, variables in MIMOSIS are (probably) a much more precise representation of reality, as they come directly from administrative sources. (e.g. gross wages are directly observed in the MIMOSIS dataset, and not calculated out of net wages, as is done in EUROMOD). Overall, MIMOSIS enables more detailed and precise simulations than EUROMOD. The great advantage of EUROMOD however is its internationally comparative design. The differences between the two models imply that it is not obvious how to integrate them. This will be further investigated in the follow-up project "MIMOD".

7 REFERENCES

Aaberge, R., U. Colombino, and S. Strøm, (2004), Do More Equal Slices Shrink the Cake? An Empirical Investigation of Tax-Transfer Reform Proposals in Italy, *Journal of Population Economics*, 17, pp 767-785.

Aesness, J., Dagsvik, J.K., Thoresen, T.O. (2006), The Norwegian tax-benefit model system LOTTE, http://www.ssb.no/english/research_and_analysis/models/lotte_en/lottedescript.html.

Atkinson, A. B. (2000) A European Social Agenda: Poverty Benchmarking and Social Transfers, EUROMOD Working Paper EM3/00.

Atkinson, A.B. (2002) Evaluation of National Action Plans on Social Inclusion: the Role of EUROMOD, EUROMOD Working Paper EM1/02.

Atkinson, A.B., Bourguignon, F., O'Donoghue, C., Sutherland, H. and Utili, F. (2002) 'Microsimulation of Social Policy in the European Union: Case Study of a European Minimum Pension', Economica, pp. 69.229-243.

Atkinson, A.B., Cantillon, C., Marlier, E. and Nolan, B. (2005), Taking forward the EU social inclusion process - An independent report commissioned by the Luxembourg presidency of the Council of the European Union, http://www.ceps.lu/eu2005_lu/report/final_report.pdf

Baldini, M. (2001), Mapp98: un Modello di Analisi delle Politiche Pubbliche, http://www.capp.unimo.it/pubblicazioni/materiali_di_discussione/Mapp98.pdf.

Bargain O., (2004), Normative evaluation of tax policies: from households to individuals, IZA Discussion Paper No. 1441, available at SSRN: http://ssrn.com/abstract=643643

Bargain, O., and K. Orsini, (2006), In-Work Policies in Europe: Killing Two Birds with One Stone, *Labour Economics*, pp. 667-698.

Bargain, O., M. Caliendo, P. Haan, and K. Orsini, (2005), 'Making Work Pay' in a Rationed Labour Market: the Mini-Job Reform in Germany, DIW Working Paper, No. 536.

Bianchi, C., Romanelli, M., Vagliasindi, P.A., Retirement from the labour market and its social impact. Evidence from Italy using dynamic microsimulation, http://www.labor-torino.it/english/research/labsim/wild/BianchiRomanelliVagliasindi.pdf.

Bingley, P., and I. Walker, (1997), The Labour Supply, Unemployment and Participation of Lone Mothers in In-Work Transfer Programmes, *Economic Journal*, 107, pp 1375-1390.

Bloemen, H., and A. Kapteyn, (2007), The estimation of utility consistent labor supply models by means of simulated scores, *Journal of Applied Econometrics*, forthcoming.

Blundell, R., A. Duncan, J. McCrae, and C. Meghir, (2000), The Labour Market impact of the Working Families Tax Credit, *Fiscal Studies*, 21, pp 75-104.

Blundell, R., and T. MaCurdy, (1999), Labor Supply: A Review of Alternative Approaches, in Handbook of Labor Economics, Vol. 3A, ed. by O. Ashenfelter, and D. Card, pp. 1559-1695. Elsevier, Amsterdam, North Holland.

Bonin, H., W. Kempe, and H. Schneider, (2002), Household labor supply effects of low-wage subsidies in Germany, IZA Discussion Paper, No. 637.

Bourguignon, F., Spadaro, A., (2006), Microsimulation as a tool for evaluating redistribution policies, *Journal of Economic Inequality*, 4(1), pp. 77-106

Callan, T. e.a. (2000), Basic Income in Ireland: A Study for the Working Group on Basic Income. Final Report, http://www.taoiseach.gov.ie/upload/byphase1.june00.doc.

Carone, G., Immervoll, H., Paturot, D., Salomäki, A., (2004), Indicators of unemployment and low-wage traps (marginal effective tax rates on employment incomes, OECD Social, Employment and Migration Working Paper No. 18, Paris: OECD.

Carpentier, S., Cantillon, B., Van Den Bosch, K. en Verbist, G. (2006), Een analyse van de noodzakelijke voorwaarden om indicatoren beleidsanalytisch te gebruiken in het kader van de Belgische nationale actieplannen sociale insluiting, in *Belgisch Tijdschrift voor Sociale Zekerheid*, 3e trimester, pp. 327-365.

Creedy, J., and G. Kalb, (2005), Discrete Hours Labour Supply Modelling: Specification, Estimation and Simulation, *Journal of Economic Surveys*, 19, pp 697-734.

Dagsvik, J., and S. Strøm, (1989), A Labour Supply Model for Married Couples with Non-convex Budget Sets and Latent Rationing, Central bureau of statistics. discussion paper.

Dagsvik, J., and S. Strøm, (2004), Sectoral Labor Supply, Choice Restrictions and Functional Form, Statistics Norway Discussion Papers, No. 338.

Dagsvik, J., and S. Strøm, (2006), Sectoral Labour Supply, Choice Restrictions and Functional Form, *Journal of Applied Econometrics*, 21, pp 803-826.

Dagsvik, J., and Z. Jia, (2007), An Alternative Approach to Labor Supply Modelling, Emphasizing Job-type as Choice Variable., Mimeo.

De Beer, P. (1998), Een stroommodel van de arbeidsmarkt. Voorstudie naar de mogelijkheden, beperkingen en wenselijkheden, http://www.scp.nl/boeken/1998010101/Een_stroommodel_van_de_arbeidsmarkt.pdf.

De Vos, M., and J. Konings, (2007), D'une sécurité de l'emploi vers une sécurité du travail. Idées faveur d'un New Deal pour l'emploi en Belgique, Itinera paper.

Decoster A., Delhaye P. and Van Camp G. (1996), Users' Guide for ASTER. A Microsimulation Model for Indirect Taxes, Version 2, Public Economics Research Paper, nr. 48.

Decoster A., Rober D. and Van Dongen H. (1994), Users' Guide for ASTER. A Microsimulation Model for Indirect Taxes, Public Economics Research Paper nr. 36, C.E.S. (K.U.Leuven), 44 p.

Duncan, A. (2001), Microsimulation and Policy Setting in the United Kingdom, http://www.cerc.gouv.fr/meetings/seminaireoctobre2001/intervention1.doc.

Duncan, A., and C. Giles, (1996), Labour Supply Incentives and Recent Family Credit Reforms, *The Economic journal*, 106, pp 142-155.

Eissa, N., and H. Hoynes, (2004), Taxes and the Labor Market Participation of Married Couples: The Earned Income Tax Credit, *Journal of Public Economics*, 88, pp 1931-1958.

Eissa, N., and J. Liebman, (1996), Labor Supply Response to the Earned Income Tax Credit, *Quarterly Journal of Economics*, 111, pp 605-637.

Eklind, B., Löfbom, E. (2004), Reducing the need for social assistance by fifty per cent – a goal for Sweden between 1999 and 2004, http://www.h.scb.se/scb/Projekt/iariw/program/7Bsocialassmaj2.pdf.

Ericson, P., Fall, J. (2006), Tax Policy and Labour Market, http://www.snee.org/filer/papers/325.pdf.

EUROSTAT (2003), *DOC. E2/IPSE/2003* Working Group "Statistics on Income, Poverty & Social Exclusion": Laeken indicators – detailed calculation methodology.

Fasquelle, N. (2007), Perspectives financières de la sécurité sociale à l'horizon 2050, Bureau fédéral du Plan, forthcoming

Fasquelle, N. and S. Weemaes (1997), Perspectives financières de la sécurité sociale à l'horizon 2050, Planning Paper 83, Bureau fédéral du Plan, 1997

Festjens, M.-J. (1997), La réforme des pensions: une nouvelle génération, un nouveau contrat, Bureau fédéral du Plan, Planning Paper 82, 1997

Fuchs, M. (2005), AUSTROMOD/EUROMOD: An Adaptation of the Tax/Benefit Microsimulation Model EUROMOD to Austria. Distributional Effects of Implemented and Hypothetical Tax/Benefit Policy Changes in Austria 1998-2005, http://www.euro.centre.org/print_detail.php?xml_id=79.

Gastaldi, F., Liberati, P. (2000), Personal Income Tax and Child Allowances in Italy: a difficult interaction, http://selene.uab.es/mmercader/workshop/10 liberati.DOC.

Haan, P., (2006), Much ado about nothing: Conditional Logit vs. Random Coefficient Models for Estimating Labour Supply Elasticities, *Applied Economics Letters*, forthcomming.

Haan, P., and V. Steiner, (2005), Distributional Effects of the German Tax Reform 2000 – A Behavioral Microsimulation Analysis, Schmollers Jahrbuch - *Journal of Applied Social Science Studies*, 125, pp 39-49.

Haataja, A. (2003), Does Motherhood and Fatherhood still 'Pay' after the Policy Reforms of the 1990's in Finland?, http://www.natsem.canberra.edu.au/conference2003/papers/pdf/haataja_anita-1.pdf.

Hausman, J. A., and P. Ruud, (1984), Family Labor Supply with Taxes, *American Economic Review*, 74, pp 242-253.

Hillary, J. (2001), Tax Benefit Modelling in the Treasury, http://itm.bme.hu/dl/pénzinfo/5.%20Pénzinformatikai%20konferencia%20(2001)/Jude%20Hillary.pdf.

Immervoll, H., (2004), Average and marginal effective tax rates facing worker in the EU: a micro-level analysis of levels, distributions and driving factors, OECD Social, Employment and Migration Working Paper No. 19, Paris: OECD.

Immervoll , H., Kleven, H. J., Kreiner C. T., Saez, E., (2007), Welfare reform in European countries: a microsimulation analysis, *The Economic Journal*, 117(516), pp. 1-44

Immervoll, H., Sutherland, H. and De Vos, K. (2001), 'Reducing child poverty in the European Union: the role of child benefits', Chapter 16 in Vleminckx K, T M Smeeding (eds) Child Poverty, Child Well-being and Child Policy in Modern Nations: What Do We Know?, The Policy Press, Bristol.

Joyeux, C. (1998), Modété: Un modèle de microsimulation pour la Belgique, *Cahiers Economiques de Bruxelles*, 158, 2e trimester: 203-227.

Kornstad, T., Thoresen, T.O. (2004), Means-testing the child benefit, http://www.blackwell-synergy.com/doi/pdf/10.1111/j.0034-6586.2004.00110.x.

Lalive, R., van Ours, J., Zweimüller, J. (2006), How changes in financial incentives affect the duration of unemployment, *Review of Economic Studies*, vol. 73 (4), pp.1009-1038.

Larmuseau, H., Lelie, P., (2001), Financiële inactiviteitsvallen in de sociale zekerheid en de sociale bijstand. Een inventaris, *Belgisch Tijdschrift voor de Sociale Zekerheid*, 1ste trimester 2001, 5-78

Legendre, F., Lorgnet, J.P., Thibault, F. (2001a), MYRIADE: le modèle de microsimulation de la CNAF. Un outil d'évaluation des politiques sociales, http://www.caf.fr/web/WebCnaf.nsf/090ba6646193ccc8c125684f005898f3/788d9c30dd2de75bc1256e5b00486ffb/$FILE/RP66-MYRIADE,%20le%20mod%C3%A8le%20microsimulation%20CNAF.pdf.

Legendre, F., Lorgnet, J.P., Thibault, F. (2001b), Les modèles socio-économiques de microsimulation. Panorama et état des lieux pour la France, http://www.caf.fr/web/WebCnaf.nsf/090ba6646193ccc8c125684f005898f3/c7540ddf9b7d1257c1256e5a005107ce/$FILE/Les%20mod%C3%A8les%20socio-%C3%A9conomiques%20de%20microsimulation.pdf.

Levy, H. (2003), Tax-benefit reform in Spain in a European context: A non-behavioural and integrated microsimulation analysis. PhD Thesis, http://www.tdx.cesca.es/TESIS_UAB/AVAILABLE/TDX-1124104-170726//hlc1de1.pdf.

Maréchal, C., Paszukiewicz, A., Perelman, S., Van Camp, G., (2007), Adapting pensions to welfare : analysis of budgetary and ditributional effects using MIMOSIS, mimeo, CREPP, University of Liège

McFadden, D., (1974), Conditional Logit Analysis of Qualitative Choice Behavior, in Frontiers in Econometrics, ed. by P. Zarembka. Academic Press, New York.

Moore, M. P., and P. Ranjan, (2005), Globalisation VS Skill Biased Technological Change: Implications for Unemployment and Wage Inequality, *Economic Journal*, 115, pp 391-422.

Mot, E. (1991), Verkenning van microsimulatiemodellen: inventarisatie en aanbevelingen, Commissie Onderzoek Sociale Zekerheid.

Murat, F., Roth, N., Starzec, C. (2000), The Impact of Tax Benefit System Reforms Between 1990 and 1998 on Income Distribution in France: Evaluation by Microsimulation, http://selene.uab.es/mmercader/workshop/01%20starzec.DOC.

N. (2005), A New Pension Settlement for the Twenty-First Century (appendix f), http://news.bbc.co.uk/1/shared/bsp/hi/pdfs/30_11_05_appendixf.pdf.

N., SESIM – Dynamic Microsimulation. What is SESIM?, http://www.sesim.org/.

Nelissen, J. (1993), The redistributive impact of social security schemes on lifetime labour income, Proefschrift, Tilburg University.

Nickel, S. (1997), Unemployment and labour market rigidities: Europe versus North America, *Journal of Economic Perspectives*, vol.11 (3), pp.55-74.

Nickell, S. (1997), Unemployment and labour market rigidities: Europe versus North America, *Journal of Economic Perspectives*, 11(3), pp. 55-74

Nickell, S., Nunziata, L., Ochel, W. (2005), Unemployment in the OECD since the 1960s. What do we know?, *The Economic Journal*, vol.115 (January), pp.1-27.

Nickell, S., Nunziata, L., Ochel, W., (2005), Unemployment in the OECD since the 1960s. What do we know?, *The Economic Journal*, 115(500), pp. 1-27

O'Donoghue, C. (2001), Dynamic Microsimulation: A Methodological Survey, http://www.beje.decon.ufpe.br/v4n2/cathal.pdf.

OECD (2004a), Denmark Country chapter 2001, http://www.oecd.org/dataoecd/22/53/34006427.pdf

OECD (2004b), Finland Country chapter 2001, http://www.oecd.org/dataoecd/22/54/34006599.pdf

OECD (2004c), Norway Country chapter 2001, http://www.oecd.org/dataoecd/24/1/34007241.pdf

OECD (2004d), Sweden Country chapter 2001, http://www.oecd.org/dataoecd/23/50/34007441.pdf

OECD (2005), Economic Survey – Belgium 2005, Paris.

OECD (2007), *Taxing wages 2005-2006*, Paris: OECD.

Orsini, K., (2006a), Is Belgium 'Making Work Pay?', Ces Discussion Paper, no. 06-05.

Orsini, K., (2006b), Tax and Benefit Reforms and the Labour Market: What can we Learn?, Ces Discussion Paper, no. 06-06.

Orsini, K., Decoster, A., Van Camp, G., 2007, Overlevingspensioenen en toegelaten arbeid: winnaars en verliezers bij de invoering van het generatiepactsysteem, in Van Den Troost, A. and Vleminckx, K., eds., *Een pensioen op maat van vrouwen*, Garant, Antwerpen-Apeldoorn.

Orsini, K., Decoster, A., Van Camp, G., Stop the Grief and Back to Work! An Evaluation of the Government's Plan to Activate Widows and Widowers, forthcoming in *Cahiers Economiques de Bruxelles*

Peichl, A. (2006), The Distributional Effects of a Flat Tax Reform in Germany - A Microsimulation Analysis, http://www.cef-see.org/Peichl_Proceeds.doc.

Prats, M.M., Levy, H., Planas, M., EspaSim, http://selene.uab.es/espasim/eng.htm.

Redmond, G., Sutherland, H., Wilson, M. (1998), The Arithmetic of Tax and Social Security Reform: A User's Guide to Microsimulation Methods and Analysis, http://jasss.soc.surrey.ac.uk/3/1/review/hussenius.html.

Redway, H. (2003), Data Fusion by Statistical Matching, http://www.natsem.canberra.edu.au/conference2003/papers/pdf/redway_howard-1.pdf.

Russo, F. (2004), Vertical Equity and Welfare: Which Effective Redistribution? An Application to Italian Data, http://gemini.econ.umd.edu/cgi-bin/conference/download.cgi?db_name=IIPF60&paper_id=305.

Salomaki, A. (1996), 'Including Consumption Expenditure and Welfare Services in a Microsimulation Model', 93-109 in Harding, A. (ed.), *Microsimulation and Public Policy*, Amsterdam: Elsevier, 527 p.

Solera, C. (1999), Income Transfers and Support for Mothers' Employment: The Link to Family Poverty Risks. A comparison between Italy, Sweden and the U.K., http://www.lisproject.org/publications/liswps/192.pdf.

Standaert, I., Valenduc, C., (1996), Le modèle de micro-simulation de l'impôt des personnes physiques: SIRe, Ministère des Finances, Point d'appui Fiscalité, Research papers, No. 1

STATISTICS DENMARK (2005), The Law Model, http://www.dst.dk/HomeUK/Guide/documentation/Varedeklarationer/Emnegruppe/Emne.aspx?sysrid=1053&timespath=.

Sutherland, H. (ed.) (2001), EUROMOD: an integrated European Benefit-tax model. Final Report, http://www.iser.essex.ac.uk/msu/emod/publications/em901_cov.pdf.

van Ours, J.C., Vodopivec, M. (2006), How shortening the potential duration of unemployment benefits affects the duration of unemployment: Evidence of a natural experiment, *Journal of Labor Economics*, vol. 24 (2), pp.351-378.

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

Van Soest, A., M. Das, and X. Gong, (2002), A Structural Labour Supply Model with Flexible Preferences, *Journal of Econometrics*, 107, pp 345-374.

Verbist, G. (2002), An inquiry into the redistributive effect of personal income taxes in Belgium, Doctoral dissertation, University of Antwerp.

Verbist, G. (2006), The Evaluation of Tax-Benefit Policies (PowerPoint presentation).

Verbist, G., Rombaut, K., (2007), Simulation of a time restriction on the entitlement to unemployment benefits using MIMOSIS, mimeo, CSB, University of Antwerp

Vermandere, C., and E. Stevens, (2002), Een volgende aflevering in het datawarehouse-feuilleton, Over.werk no. 1-2/2002.

Viitamäki, H. (2004), EUROMOD Country Report Finland (1998, 2001 and 2003 Tax Benefit Systems), Microsimulation Unit, Essex University, http://www.iser.essex.ac.uk/msu/emod/countries/finland/cr980103fi0904.pdf.

Wagenhals, G. (2004), Tax-benefit microsimulation models for Germany: A Survey, *http://www.uni-hohenheim.de/RePEc/hoh/papers/235.pdf*.

Zaida, A., Rake, K. (2001), Dynamic Microsimulation Models: A Review and Some Lessons for SAGE, http://www.lse.ac.uk/collections/SAGE/pdf/SAGE_DP2.pdf.