

Population ageing and future tax burdens

An integrated micro-macro analysis of possible taxation policy changes

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Background

- Norway will experience one of the sharpest increases in public expenses as a share of GDP in OECD if present welfare schemes are maintained.
 - The ratio of the number of individuals 67 years to the working force is expected to increase from 22 percent in 2002 to about 36 percent in 2050.
 - Over the same period the number of old-age pensioners is expected to increase by 78.7 percent.
 - The pay-as-you-go based pension system is still maturing.
 - Wage indexation of public pension benefits.

Purpose of this study

- **Substantive:** How will aging affect the necessary tax burden in the next decades in Norway
 - accounting for incentive effects on labour supply from changes in taxes, wages and non-labour income
- **Methodology:** Integrating a detailed microeconomic model of labour supply into a large scale CGE model

The microeconomic model

allows large heterogeneity in labour supply behaviour

- Simultaneous labour supply decisions of household members
- Both couples and singles
- Flexible representation of preferences (depending on age, number of children 0-2, 3-6, 7-14)
- Exact representation of complex budget sets induced by tax-transfer rules
- Constraints on hours-of-work opportunities

Basic assumptions

$$U(C, h, j) = v(C, h) \varepsilon(h, w, j) \\ = v(f(wh, I), h) \varepsilon(h, w, j)$$

- $v(f(wh, I), h)$ is the systematic component
- $\varepsilon(h, w, j)$ is the stochastic component
- $\text{Prob}(\varepsilon < u) = \exp(-1/u)$

Labour supply wage elasticities, Married couples, Norway 1994

Household income decile	Female		Male	
	Own	Cross	Own	Cross
I	2.54	-0.29	1.77	-0.12
II	0.97	-0.67	1.17	-0.08
III-VIII	0.41	-0.47	0.31	-0.24
IX	0.20	-0.34	0.08	-0.14
X	0.26	-0.10	0.05	-0.42
All	0.52	-0.42	0.39	-0.23

The micro model: Aggregate labour supply Elasticities

across couples and singles, 20-62 years old

»Wage 0.12

»Income -0.17

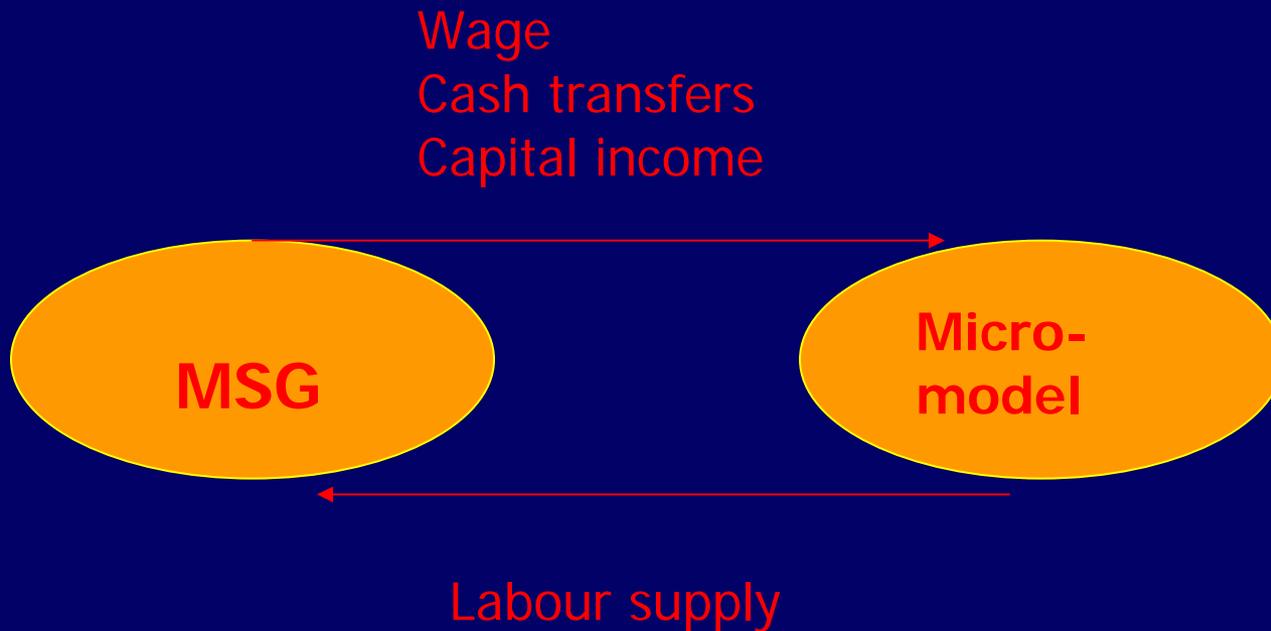
Observed and predicted *relative* distributions of disposable income in 2001

Deciles	Couples		Single males		Single females	
	Observed	Simulated	Observed	Simulated	Simulated	Simulated
<i>1</i>	50	49	41	42	45	47
<i>2</i>	68	64	54	55	56	61
<i>3</i>	77	74	65	67	68	71
<i>4</i>	83	83	76	76	79	79
<i>5</i>	89	90	87	86	90	88
<i>6</i>	95	98	97	97	101	98
<i>7</i>	102	107	107	108	111	108
<i>8</i>	111	117	119	121	123	121
<i>9</i>	125	131	137	141	139	138
<i>10</i>	199	187	218	207	189	188

The CGE model MSG6

- Disaggregated:
 - 60 commodity groups,
 - detailed representation of taxes and government expenditure (endogenous)
- Dynamic
- General equilibrium:
 - Markets clear, full employment, rational behaviour)
 - Decreasing returns to scale in industries modifies somewhat the SOE determination of factor prices.
 - Growth determined by supply side conditions productivity, resources
 - Net foreign debt (wealth) does not explode
- Ignore mobility problems & bottle-necks.

Integration of the Micro- and the CGE-model



Simulations

		Tax system			
		Current (instrument: pay-roll tax rate)		Flat Tax (instrument: flat tax rate)	
		1995	2050	1995	2050
Labour Supply	Exog.				
	Endog.				

Equilibrium in 2050. Change in % from 1995.
Current Tax System. Endogenous pay-roll tax
Endogenous vs Exogenous Labour Supply

	Exog. Lab. Supp.	Endog. Lab. Supp.
Private consumption	436,6	457,2
Government consumption	63,7	62,4
Real disposable national income	291,3	305,0
Consumer real wage rate	243,4	246,1
Employment, mill. man-hours	12,8	18,0
Pay-roll tax rate	97,9	61,6

Comments

- The necessary increase in the pay-roll tax rate reduced from 98 percent to 62 percent *when endogenous labour supply is accounted for.*
- Compared with earlier projections, our results imply that a larger part of the increased consumption by the elderly is financed by reduced leisure enjoyed by the working generations.
- Probably, an increase in tax revenue resulting from free choice is easier to implement politically than redistribution through higher tax rates.

Reforming the Tax system...

- Labour supply is important
- Policies can help boosting labour supply
- A Flat Tax reform is a candidate

**Equilibrium in 2050. Change in % from 1995.
 Flat Tax Reform in 1995. Endog. flat tax
 Endogenous vs Exogenous Labour Supply**

	Exog. lab. supply	Endog. lab. supply
Private consumption	436,6	513,4
Government consumption	63,7	58,9
Real disp national income	291,3	338,6
Consumer real wage rate	210,0	209,9
Employment, mill. man-hours	12,8	31,7
Flat Tax rate	33,3	-4,6

Comments

- The average flat tax rate - *ceteris paribus* - in 1995 is 24.0%
- Fiscal sustainability in 2050 would require to increase it to 32.0% if labour supply is kept exogenous
- If we take labour supply as endogenous, then fiscal sustainability would require only a 22.9% flat rate
- However, if we account for endogenous supply also in 1995, then the new equilibrium in 1995 would imply a 18.3% flat rate

Summary of equilibrium tax rates

		Tax system			
		Current (instrument: pay-roll tax rate)		Flat Tax (instrument: flat tax rate)	
		1995	2050	1995	2050
Labour Supply	Exog.	13.0	26.0	24.0	32.0
	Endog.	13.0	21.0	18.3	22.9

Conclusions

- Endogenous labour supply contributes to a much less worrying picture of future fiscal sustainability
- In particular, the problem appears to be reduced to manageable dimensions when the tax system is reformed in order to improve the incentives to labour supply
- Possible undesirable implications of FT
- Alternative policies to boost labour supply:
 - Pension reform
 - ...