Income Re-distribution by Financing Methods: Evidence from CGE Model in South Korea

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I. Introduction

- Policy makers are interested in the possible effects of proposed policy options
- There was a persistent increase in social expenditures in South Korea
- Main causes are low fertility (TFR = 1.18) and/or rapid aging
- CGE model is a good policy analysis tool for both economists and policy makers
- But the entry barriers are ‘very’ high

I. Introduction (2)

- ORANI-G model is employed for the purpose of analyzing the effects of social expenditures
- Financing methods are also important for economists
- Specifically, a version of CGE model with Social Accounting Matrix (SAM) is selected (Horridge and Corong 2012)

I. Introduction (3)

- So far, analysis of income re-distribution is limited only to partial equilibrium approach (Nam 2008) *or* to Social Accounting Matrix approach (Noh and Nam 2006)
- But dynamic analysis is not possible with those analysis tools
- The aim for this study is threefold: (1) prepare a new Social Accounting matrix for the year of 2009, (2) apply ORANI-G model to Korea, and (3) analyze re-distribution effects of social expenditure by financing methods
- Finally, policy recommendations will be proposed

II. Model and Database

- A version of ORANI model with SAM is chosen
- All the standard Neo-classical assumptions are employed: profit maximization, utility maximization, etc.
- Previous CGE models for South Korea are: Moon (2000, 2004), Moon et al. (2010), Lee, et al. (2010)
- Production structure, Intermediate inputs, Investment demands, and households demand follows ORANI-G model

II. Model and Database (2)

- 2009 Input-Output Table (basic price) compiled by the Bank of Korea was employed as a backbone
- Tax table is prepared by combining producers price and basic price tables
- Other information for assembling social accounting matrix are: National Income statistics (Bank of Korea), Household Income Dynamics Survey (Statistics Korea), among others

II. Model and Database (3)

- Data Matrix (from ORANI-G, M. Horridge)

		Absorption Matrix					
		1	2	3	4	5	6
		Producers	Investors	Household	Export	Government	Change in Inventories
	Size	¬ I ®	¬ I ®	¬ 1 ®	¬ 1 ®	¬ 1 ®	¬ 1 ®
Basic Flows	C´S -	V1BAS	V2BAS	V3BAS	V4BAS	V5BAS	V6BAS
Margins	C´S´M -	V1MAR	V2MAR	V3MAR	V4MAR	V5MAR	n/a
Taxes	C´S -	V1TAX	V2TAX	V3TAX	V4TAX	V5TAX	n/a
Labour	O -	V1LAB					
Capital	1 -	V1CAP					
Land	1 -	V1LND					
Production Tax	1 -	V1PTX					
Other Costs	1 -	V1OCT					

II. Model and Database (4)

- Columns of SAM represents expenditures, whereas rows represents receipts
- Row sum must be equal to column sum, i.e., receipts = expenditures (double book-keeping)
- Account names for 2009 South Korea Social Accounting Matrix are: 1 Firm, 2 DomCom, 3 ImpCom, 4 Labor, 5 Capital, 6 ProdTax, 7 ComTax, 8 Tariff, 9 DirTax, 10 Households 11 Enterprises, 12 GovCurrent, 13 GovInvest, 14 PrvInvest, 15 Stocks, 16 ROW
- The Macro SAM for 2009 are:

II. Model and Database (5)

III. Classification of Industries

- Originally, there are 28 activities (commodities), but
- 26th industry (Education and Health) is divided into Education sector, Health sector, and Social security sector
- Now, the total number of industries become 30!
- C1 Agric, C2 Coal, Oil, Gas, and Mining, C3 Food and Beverages, C4 Textiles and Leather, (so on) C24 Real Estate Services, C25 Public Administration and National Defense, C26 Education, C27 Health, C28 Social Security, C29, Other Social services, C30 NEC
- Social security occupy 6.08% in total production, and 12.8% in empl.

IV. Setting-up Scenarios

- We want to investigate the redistribution effects of social expenditure
- Constant real government balance vs. allowing government deficits
- Scenario 1: 5% increase in 3 social expenditure sectors, and 5% increase in income tax rate for 8-10 income group -> keep real Gov balance const. and f_inctaxrate_h becomes endog.
- Scenario 2: same as Scenario 1, but 2% increase in corporate tax. Ftaxent becomes endog.
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IV. Scenarios

- Scenario 3: same social expenditure, but f_inctaxrate(h) exogenous & f_inctaxrate_h exogenous, while ftaxent endog. Note that f_inctaxrate_h is common to all household groups
- Scenario 4: all tax rates are exog. Social expenditure is financed by budget deficit. I.e., real Gov. budget balance is endog.

real variables	S1	S2	S3	S4
production	0.233	0.182	0.242	0.233
import(cif)	0.114	0.024	0.13	0.114
real invest	0	0	0	0
(nominal invest)	0.209	0.024	0.242	0.209
private consumption	0.274	-0.21	0.36	0.274
export	-0.382	-0.049	-0.441	-0.382
gov expenditure	2.148	2.146	2.148	2.148
Exr (phi)	0	0	0	0
gdp deflator	0.384	0.07	0.441	0.384
real Gov Balance	0	0	0	-2.578
(Nominal balance)	0.384	0.07	0.441	-2.204
real wage	0	0	0	0
(Nominal wage)	0.831	0.471	0.895	0.831
total tax rate	1.257	1.313	1.535	-0.034
Bud Surp/GDP	-0.006	-0.002	-0.006	-0.009
employment	0.485	0.418	0.497	0.485
f_taxrate_h	3.642	6.756	0	0
f_taxent	0	2	10.816	0

VI. Simulation Results

- Increase in Gov Expenditure makes GDP to increase.
- Real GDP and employment are largest in Scenario 3, due to the increase in private consumption (0.36%)
- Real GDP(0.182) and employment (0.418) is lowest when increased ftaxent.
- B/c increase in enterprise burden decrease employment & household tax increase makes household consumption to decrease
- The results for Scenario 1 and Scenario 4 are similar except income re-distribution effects and government behaviors

VI. Simulation Results (2): tax burden of HH

Income decile	S 1	S 2	S 3	S 4
I	4.291	7.01	0.675	0.626
II	4.328	7.045	0.697	0.662
III	4.353	7.069	0.719	0.686
IV	4.396	7.112	0.757	0.727
V	4.411	7.126	0.769	0.742
VI	4.419	7.134	0.777	0.749
VII	4.417	7.132	0.773	0.748
VIII	9.643	7.138	0.782	0.753
IX	9.635	7.129	0.772	0.745
X	9.601	7.096	0.743	0.714
F_taxent (ord. ch.)	0.496	2.114	11.441	0.496

VII. Conclusion

- Constructed 2009 SAM for the South Korean Economy
- Analyzed the redistribution effects of Social expenditure by financing methods
- Scenario 1 has the biggest real GDP increase (tax increase in the rich). The rich pays more tax
- Scenario 2 & 3 which increase tax burden of enterprises deteriorate production activity. Tax rate increase for the whole households and no significant improvements in income re-distribution.
- Scenario 4 which increases in Gov deficit does not bring income redistribution while household burden is smallest

VII. Conclusion (2)

- Policy makers should carefully design the policy options for the expansion of social expenditure
- Financing methods are important determinants for the real activity in the economy
- For the pre-eminent policy analysis, CGE modeling is a useful tool and pore attention should be given

Remaining Questions

- How to check consistency of data (basedata)?
- How to make shock in transfer income from government to households?
- How to analyze fiscal expenditure by type: current expenditures can be analyzed with f5, but what about other items which do not have values?
- How can we analyze government capital expenditures?