Jidea6 and Accountant

- Is the accountant useful? -

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Contents

1. Introduction

What is the Accountant?

- The system of national accounts is merely presenting the static feature of economic indicators.
- The accountant attached to I-O model is, based on SNA tables, rearranging the contents of the tables and with additional tables and equations, characterized by its dynamic feature in explaining the relations among various economic indicators in SNA and in I-O model.

Usefulness of Accountant

- Accountant makes the value of macro variables in SNA consistent with the value of the sectoral sum of economic indicators in I-O model.
- Some variables in SNA can be a good controller to adjust the level of some variables in I-O Model.
- This collaboration of SNA and I-O through the accountant is one of the most important points to be emphasized.
- First application of accountant to Japanese I-O model is by Meade(1996), Father of the accountant of Japan.

Problems of Accountant

- Time and energy consuming job to prepare an accountant in addition to building the I-O model.
- Only few variables in SNA can be put in the position to affect the variables in I-O model to avoid the model being too complicated.
- In Jidea5 only the personal disposable income takes the position to control I-O model.
- A simple question: What will be a simulation result by the I-O model without accountant?
- Purpose of this paper: to find out the answer to this question by making use of final test..

4. Concluding Remarks

- As far as the aggregated variables are concerned, I-O model without accountant performs well showing somewhat better results than the model with accountant.
- If the main concern of the study is in the sectoral I-O analysis, not particularly interested in the macro variables in SNA base, I-O model without accountant is enough.

Concluding Remarks (continued)

- If the behavior of macro variables in SNA is also points of analysis, I-O model with accountant has certainly vital importance. A good example is Imagawa (1998).
- Final test itself is not almighty to test the performance of the model as a whole, since it is more applicable to test the behavior of aggregated variables. It is not wise to apply the final test to all the equations in I-O model like Jidea6 of 66 sectors.

2. Summary of Accountant in Jidea6

Table-1 Number of Equations in Accountant of Jidea6

item	reg.file name	identity equation	identity equation with fex	equation with coefficient of behavioral proportion	estimated equation
Business disposable income	disincbs	1	1	0	1
Property income	propinc	6	1	10	4
Casualty insurance	nlcnlp	6	0	9	1
Current transfers	cto	1	2	9	1
Households	househol	11	2	19	5
Imputed social contribution	isc	0	1	4	0
Saving	savrat	2	2	0	1
Non_financial corporations	n_finan	15	0	7	7
Financial corporations	financil	9	4	8	8
Private non_profit institutions	n_profit	11	0	4	1
General government	govrmnt	19	6	6	3
NIPA, GDP, GNP	gne	2	5	0	0
Consolidated saving and investment	conssav	4	1	0	0
External balance	external	1	1	0	0
National income and its disposition	consincm	5	0	0	0
total	329	93	26(52)	76(152)	32

Four Types of Equation

- Identity

  f totipr = ipr1 + ipr2 + ipr3 (1)

  Identity with fex

  fex iprdisc = cffpr - totipr (2)

  id cffpr = totipr + iprdisc (3)

- Identity with coefficient of behavioral proportion

  fex ratio1 = cffpr/totipr (4)

  f cffpr = ratio1*totipr (5)

  Regression equation

  r savrat = dum85, dum90, dum95, agedrat, landpri, motvshare, 1/disincr (6)

Accountant in Detail (Example: Househol.Reg)

Table-2	SNA Households (including Private Unincorprated Enterprises)			HOUSEHOL.REG
2004	Notation of items	payable	receivable	
dinhop	2.4 Disposable income,net		286619.6	
opsmhon	1.3 Operating surplus and mixed income, net		47104.1	<— from PROPINC.REG
inohlhon	(1) Operating surplus (imputed service of owner-occ		27026.5	< — ratio*opsmhon
mixinchon	(2) Mixed income, net		20077.6	< — ratio*opsmhon
comhor	1.4. Compensation of employees, receivable		255376.0	comhor = **totwag + comhdisc + comfor - comfop**
comwshor	(1) Wages and salaries		218506.6	< — ratio*comhor
comeschor	(2) Employers' social contributions		36869.4	< — ratio*comhor
iprhor	1.5 Property income, receivable		21937.6	<— from PROPINC.REG
inthor	(1) Interest		4481.9	As a residual
divhor	(2) Dividends		4896.8	< -- ratio*iprhor, ratio = f(totprorat, timet)
proinchor	(3) Property income attributed to insurance policy h		9542.5	< — f(**totpro**, unempr, timet)
renhor	(4) Rent		3016.4	< — ratio*iprhor ratio =f(realestrat, etc)
taxablehor =	2.5 Balance of primary income, net (=1.3+1.4+1.5-1.1)		310471.4	taxablehor = comhor + opsmhon + iprhor - iprhop
sbhor	2.6 Social benefits other than social transfers in kin		68741.1	< -- sbhorpop = f(unempr, gdppop)
ssbhor	(1) Social security benefits in cash		45616.8	= sbssbcgop < --= ratio*sbgop from
pfsbhor	(2) Pension funded social benefits		5443.4	< — ratio*sbhor **Govrmnt.Reg**
uesbhor	(3) Unfunded employee social benefits (2.2(2))		9904.6	< — ratio*sbhor
sabhor	(4) Social assistance benefits		7776.4	As a residual
ctohor	2.7 Other current transfers, receivable		18766.4	< — from CTO.REG
ctonlichor	(1) Non-life insurance claims		2897.0	< — from NLCNLP.REG
ctomcthor	(2) Miscellaneous current transfers		15869.4	As a residual
homet=	Resources of secondary disposable income account		397978.9	= taxablehor + sbhor + ctohor
iprhop	1.1 Property income, payable	13946.3		<— from PROPINC.REG
(inhop	(1) Interest	13634.6	)	sum
inchop	a. Consumer debt interest	6095.0		< — ratio*iprhop
inohop	b. Other interest	7539.6		As a residual
renhop	(2) Rent	311.7		< — ratio*iprhop
tdihop	2.1 Current taxes on income, wealth, et	24099.1		sum
tditihop	(1) Taxes on income	22195.6		< — ratio*taxablehor
tdiocthop	(2) Other current taxes	1903.4		< — f(gdp)
schop	2.2 Social contributions, payable	65140.8		< — ratio*gdphor gdphor from
aschop	(1) Actual social contributions	55236.2		< — ratio*schop **PROPINC.REG**
(ascahop	a. Employers' actual social contributio	26907.3	)	sum
ascachop	(a) Compulsory employers' actual so	22467.6		< — ratio*aschop -> to Govrmnt.Reg
ascavhop	(b) Voluntary employers' actual soci	4439.8		< — ratio*aschop
(ascbhop	b. Employees' social contributions	28328.9	)	sum
ascbchop	(a) Compulsory employees' social c	26926.8		< — ratio*aschop ->to Govrmnt.Reg
ascbvhop	(b) Voluntary employees' social contr	1402.1		As a residual
ascihop	(2) Imputed social contributions	9904.6		As a residual(= schop - aschop)
ctohop	2.3 Other current transfers, payable	22119.4		< — from CTO.REG
ctonliphop	(1) Net non-life insurance premiums	2973.3		< — from NLCNLP.REG
ctomcthop	(2) Miscellaneous current transfers	19146.1		As a residual
dinhop =	2.5 + 2.6 +2.7 - 2.1 - 2.2 - 2.3		286619.6	
foehop	4.1 Final consumption expenditure	279186.8		
savhop	4.2 Saving, net	7831.2		disinc = foehop + savhop
dinhop	4.3 Disposable income, net		286619.6	= homet - tdihop - schop - ctohop
chgpen	4.4 Changes in pension reserves , receivable		398.4	
disinc	Resources of Disposable income account	287018.0	287018.0	disinc = dinhop + **chgpen**
Note:	Contents of original table were rearranged to arrive at disinc.			
Source:	*Annual Report on National Accounts*, 2006,pp. 28-31.			

3. Simulation Test of Jidea6 with/without Accountant

- Revision of disposable income function

  r disincr = dum85, dum90, dum95, totoutr (7)

  By-pass or a short cut in I-O model connecting the I-O and disposable income in SNA directly.

- Final Test

  Final test is, like a historical simulation, the procedure to judge the feasibility or the predictability of a newly estimated model, or a set of estimated equations including identities as a whole.

  Actual values of the exogenous variables for the whole observation period, and the actual values of the predetermined endogenous variables in the initial year are taken into the model, and runs the model for historical simulation.

Rewriting Dyme.cfg & LASTDATA for final Test

- Title of run ;Final Test JIDEA6 07/08/26
- Start year ;2000 < -- for final test
- Finish year ;2005 < -- for final test
- Discrepancy yr ;2000 < -- for final test
- Use all data? ;no < -- for final test
- VecFix file ;Vecfixes
- MacroFix file ;Macfixes
- Vam file ;dyme
- G bank ;dyme
- debug start yr ;2006 < -- for final test
- Max iterations ;120
- Full model iteration;200
- Use profit scaling (Phillips curve)?;no

- LASTDATA should be same with finish year of Dyme.cfg.

Final test (continued)

- Estimated values by this historical simulation should be compared with the actual value of the same variable. Error produced in the historical simulation accumulates year by year.
- The average rate of differences or error should be within a permissible range of difference.
- Measurement of this accumulated error is called Root Mean Square Error (RMSE).

$$\text{RMSE} = \sqrt{\frac{\sum ((Est - Act) / Act) **2}{n}}$$

Simulation Results without Accountant

Table-3 Historical Simulation without Accountant (Sim AN)

Year	GDPR	Inv	Cons	Exp	Imp	Emp	UnER	Infl	GrGDP	GrGDPN
2000	519	93.8	300.2	56.3	54.2	64460	4.73	0.15	0.93	1.08
2001	541.2	89.3	320.4	56.9	58.8	62767	7.04	-0.41	4.27	3.86
2002	544.5	89	331.2	57.4	62.3	62828	6.07	-1.73	0.61	-1.12
2003	525.2	92	325.8	60.7	72.1	64105	3.83	2.61	-3.54	-0.93
2004	524.4	90	326.2	66	73.9	64411	3.02	-1.27	-0.16	-1.43
2005	541.7	90.9	333.9	75.7	79.2	64986	2.28	-0.26	3.31	3.05

Note: GDPR; GDP in Real Terms, Inv; Busuness Investment, Cons; Private & Business Consumption,

Exp; Exportd, Imp; Imports, Emp; Employment, UnER; Rate of Unemployment, Infl; Inflation rate,

GrGDP; Growth Rate of GDPR, GrGDPN; Growth Rate of Nominal GDP

Simulation Results with Accountant

Table-4 Historical Simulation with Accountant (Sim AY)

Year	GDPR	Inv	Cons	Exp	Imp	Emp	UnER	Infl	GrGDP	GrGDPN
2000	519	93.8	300.2	56.3	54.2	64460	4.73	0.15	0.93	1.08
2001	543.8	89.9	320.1	57.1	59.2	63128	6.51	0.59	4.76	5.35
2002	545.5	89.2	332.7	57.6	63.1	62791	6.13	-2.25	0.31	-1.94
2003	524.7	91.4	322.2	60.6	74	64068	3.89	2.62	-3.8	-1.18
2004	520.6	88.5	325.5	65.7	75.5	64066	3.54	-2.18	-0.79	-2.97
2005	537.2	89.1	338.3	75.3	80.8	64527	2.97	-0.13	3.19	3.06

Note: Same as Table-3.

Comparison of Two Simulation Results-1

Table-5 Results of Final Test negative : underestimated

Comparison with Actual Data (Difference: 100.0*(Sim - Actual)/Actual) positive : overestimated

Year	Actual GDPR	Sim AN GDPR	Sim AY GDPR	Difference(%) Sim AN	Difference(%) Sim AY	Actual INVR	Sim AN INVR	Sim AY INVR	Difference(%) Sim AN	Difference(%) Sim AY
2000	518.9	519.0	519.0	0.0	0.0	93.8	93.8	93.8	0.0	0.0
2001	519.6	541.2	543.8	4.2	4.7	93.5	89.3	89.9	-4.5	-3.9
2002	509.4	544.5	545.5	6.9	7.1	85.5	89.0	89.2	4.1	4.3
2003	503.4	525.2	524.7	4.3	4.2	91.9	92.0	91.4	0.1	-0.5
2004	511.0	524.4	520.6	2.6	1.9	96.5	90.0	88.5	-6.7	-8.3
2005	522.4	541.7	537.2	3.7	2.8	103.3	90.9	89.1	-12.0	-13.7
SQSum/5				20.8	20.3				45.3	58.3
RMSE(Root Mean Square Error)				4.6	4.5				6.7	7.6

Comparison of Two Simulation Results-2

Table-5 Results of Final Test

negative : underestimated

Comparison with Actual Data (Difference: 100.0*(Sim − Actual)/Actual)

positive : overestimated

Year	Actual Cons	Sim AN Cons	Sim AY Cons	Difference(%) Sim AN	Difference(%) Sim AY	Actual infl	Sim AN infl	Sim AY infl	Difference(%) Sim AN	Difference(%) Sim AY
2000	300.2	300.2	300.2	0.0	0.0	0.15	0.15	0.15	0.0	0.0
2001	307.5	320.4	320.1	4.2	4.1	−1.11	−0.41	0.59	−0.6	−1.5
2002	305.7	331.2	332.7	8.3	8.8	−0.19	−1.73	−2.25	8.1	10.8
2003	302.1	325.8	322.2	7.8	6.7	−0.94	2.61	2.62	−3.8	−3.8
2004	303.5	326.2	325.5	7.5	7.2	−0.50	−1.27	−2.18	1.5	3.4
2005	309.2	333.9	338.3	8.0	9.4	−0.27	−0.26	−0.13	0.0	−0.5
SQSum/5				53.7	56.0				16.5	29.2
RMSE(Root Mean Square Error)				7.3	7.5				4.1	5.4

Comparison of Two Simulation Results-3

Table-5 Results of Final Test

negative : underestimated

Comparison with Actual Data (Difference: 100.0*(Sim − Actual)/Actual)

positive : overestimated

Year	Actual EXPR	Sim AN EXPR	Sim AY EXPR	Difference(%) Sim AN	Difference(%) Sim AY	Actual IMPR	Sim AN IMPR	Sim AY IMPR	Difference(%) Sim AN	Difference(%) Sim AY
2000	56.3	56.3	56.3	0.0	0.0	54.2	54.2	54.2	0.0	0.0
2001	53.2	56.9	57.1	7.0	7.3	54.8	58.8	59.2	7.3	8.0
2002	56.3	57.4	57.6	2.0	2.3	56.3	62.3	63.1	10.7	12.1
2003	61.7	60.7	60.6	−1.6	−1.8	60.2	72.1	74.0	19.8	22.9
2004	68.6	66.0	65.7	−3.8	−4.2	65.6	73.9	75.5	12.7	15.1
2005	71.7	75.7	75.3	5.6	5.0	68.6	79.2	80.8	15.5	17.8
SQSum/5				20.1	21.1				191.3	256.0
RMSE(Root Mean Square Error)				4.5	4.6				13.8	16.0

Comparison of Two Simulation Results-4

Table-5 Results of Final Test negative : underestimated

Comparison with Actual Data (Difference: 100.0*(Sim - Actual)/Actual) positive : overestimated

Year	Actual Employmnt	Sim AN Employmnt	Sim AY Employmnt	Difference(%) Sim AN	Difference(%) Sim AY	Actual Unempr	Sim AN Unempr	Sim AY Unempr	Difference(%) Sim AN	Difference(%) Sim AY
2000	64460	64460	64460	0.0	0.0	4.7	4.73	4.73	0.0	0.0
2001	64120	62767	63128	-2.1	-1.5	5.0	7.04	6.51	40.8	30.2
2002	63300	62828	62791	-0.7	-0.8	5.4	6.07	6.13	12.4	13.5
2003	63160	64105	64068	1.5	1.4	5.3	3.83	3.89	-27.7	-26.6
2004	63290	64411	64066	1.8	1.2	4.7	3.02	3.54	-35.7	-24.7
2005	63560	64986	64527	2.2	1.5	4.4	2.28	2.97	-48.2	-32.5
SQSum/5				3.1	1.8				1237.4	693.6
RMSE(Root Mean Square Error)				1.8	1.3				35.2	26.3

Summary of Comparison

- Both Sim AN and Sim AY are performing very well to estimate some selected macro economic variables.
- Though Sim AY is beating Sim AN in estimating GDPR, difference is very small, and except for estimation of employment (Emp) and rate of unemployment (Unempr), Sim AN is marking better results in private investment in real terms (Invr), private and business consumption in real terms (Cons), growth rate of GDP deflator (infl), exports in real terms (Expr) and imports (Impr). In estimating employment (Emp), both Sim AY and Sim AN are showing good results.

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