The Expansion Input -Output Tables

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Abstract

This paper is an attempt in order to present some variance of input-output expansion.The System of National Accounts with version 1968 and 1993 recommended on social accounting matrix, but until now some countries compiled SAM from supply and use tables and some other countries compiled SAM from input-output system. SAM seems to apply for CGE model but it is not meaning in SAM multipliers analysis. The parallel with ideas of social accounting system developed by Stone (1961), Pyatt andRoe (1977) is demographic-economic modeling was knew by Miyazawa's concept. These ideas developed in order to describe the interrelation between income from production, income from redistribution, consumption, accumulation, it like as "no start and no the end" in Buddha theory.

Index terms— input-output, social accounting matrix, demographic-economic modeling, System of National Accounts.

1 Introduction

he Input -output extension are one of the useful tools of economic research. The matrixes can be used for policy analysis and economic planning, and offers an efficient means of summarizing complex economic relationships and identifying gaps in statistical information.

In the past decades, there has been a noticeable shift of interest from the basic input-output table to the social account matrix (SAM) as evident from the increased momentum in the design, construction and use of social accounting matrices in many countries (Piatt and Roe, 1997; **??**ohen et al., 1984;Pyatt and Round, 1985). The argument in favor of working with SAM or extended input-output models is the increasingly prevalent requirement by policy -makers and the larger public alike appraise.

Social accounting matrices are compiled according to the same accounting principles used for input-output table; each transaction is recorded twice so that any inflow to one account must be balanced by an outflow of another account. The extension of inputoutput table based on linking the location of production account and the location income and consumption of institutional as household, Government and enterprise.

Another way, the Miyazawa's concept of the interrelation income multiplier was designed to analyze the structure of income distribution by endogenous consumption demand in the standard Leontief model;

2 II.

Being an extension of the existing national economic accounts, a SAM is a consistent and complete representation of the socio-economic system that captures the interdependencies of institutional groups. It is both a conceptual framework and a data system that can support analyses of socio-economic policy issues, used to evaluate the socio-economic impact of exogenous changes, or serve as a database for general equilibrium modeling.

3 III.

Updating Input-Output The SAM can be extended by input-output framework or supply and use tables. The first of all we have to compile or update a input-output table (or supply and use tables). The Leontief system was described by equations as follows:A.X+Y=X 1 X= (I-A) -1 .Y 2 Y = C + G + I + E -M 3 M i /TDD i <1 4 5 Y A I X . 1**6**

Where A is the direct input coefficient matrix X is vector of supply or sectoral output Y is vector of final demand (I -A)

4 Updat a

i .TDD i = IC i + C i + G i + I i Accounts. © 2012 Global Journals Inc. (US) 2012 (D D D D) C Year M i is import of commodity i TDD i is total domestic demand of commodity i

From these basic relations of the I/O table, the following formulas were derived with formula (7) take into account the three changes in X, namely price changes, technical changes and changes in Y (final demand) through the years. Given the structure of the National's economy and the relatively short time break from the last updating of input-output table which was for the year t 1 , formula (8) was used to calculate the technical coefficient matrix A for the updated year t 2 I/O table, which assumes that there was no or small change in prices and technical change x is the amount of the product of sector i absorbedas its inputby sector j in year t22 t ij

x is the amount of the product of sector i absorbedas its inputby sector j in year t21 t j

II is an element of the vector II in 2003 or the total intermediate input in year t12 t j

II is an element of the vector II in year t2 2 t kj va is an element of the value added matrix in year t2,

where k is factor of value added at factor cost 1 t kj va is an element of the value added matrix in year t1,

where k is factor of value added at factor cost1 t j

VA is an element of the vector value added in year t12 t J

VA is an element of the vector value added in year t2 These formulas were used to compute the technical coefficient matrix A and therefore the intermediate demand matrix of the input-output table and the value added matrix, which is broken-down into payments to labor and capital, depreciation, and indirect taxes.

As stated above, equation (**??**) was used with an assumption that technological change and the change in prices have not occurred during the last years. One issue with the vector GI is of course the property of this vector since it is an(1x industry) Therefore this must be recalculated to get a vector. This could be done with the data from the last input-output table or S.U.T as follows:

From last I/O or S.U.T, the supply matrix S is taken out. This is an industry-by-commodity matrix With a simple formula presented below, the commodity-bycommodity GI vector can be calculateda t c t GI s GI 2 2 '. (10) Where c t GI 2 is vector of gross input by commodity of the year t2 a t GI 2 is column vector of gross input by industry of the year t2 s is coefficient matrix of S with dimension (industry x product) s ' is transpose of s with dimension (product x industry)

The use matrix of the S.U.T can be used to get the use matrix of the year t2:a t t t GI 2 1 2 . (11) With 2003 U is coefficient matrix of use table in year t1 2005 U is coefficient matrix of use table in year t2

From the above formulas, now the A matrix of I/O in year t2 can be computed using the following formula:1 2 . s U A t (12)

With s -1 is an inverse of matrix s (commodity technology assumption)

But while coming at matrix A, one problem arose. Some elements of this matrix is negative and thus should be corrected by changing it to 0. Further, to balance the I/O table, we use RAS method.

The value added matrix and the final demand matrix is left to be computed. The value added matrix can be calculated from the formula:c t GI A B 2 . (**13**)

where B is the matrix containing both the A matrix and the value added matrix

The final demand or the Y was computed using equation (3). Coming from the basic relations of the I/O table with equations from (1) to (6), we take the equations (**??**) and (**??**) to compute the ratio of imported goods in Total domestic demand. From this structure of imported goods in domestic demand, the intermediate input matrix can easily be achieved. The value added matrix of non-competitive table remains the same as in the competitive table. In the final demand matrix, all the elements are different except for the export vector.ed - orb – to d with dimens m se m t t G U U 1 2 With 2003 U 2 is coeff 2 is c c vector. (**1x**

V.

5 Sam Building

In this section, the construction of the SAM will be discussed greatly in detail. Constructing a SAM table is a rather complicated issue and requires deep knowledge of the SNA, the input-output table, supply and use tables as well as different updating and balancing methods namely the RAS method, not least the knowledge on the performance of the National's economy

The Social Accounts track the monetary flows between industries and institutions. The relation between a SAM and an I/O table is the fact that the input-output accounts are a subset of the entire social accounts recorded in a country. The social accounts track all monetary flows, both market and non-market. The market flows are those between producers of goods and services and consumers, both industrial, and nonindustrial (i.e households, government, investment, and trade). The non-market flows are those between households and government,

government and households, capital and households and so on. These flows are often called inter-institutional transfers.

A classical and very simple aggregate version of SAM is introduced in the table below: The detailed elements of the SAM extended by input-output system are in the following table.

6 Demographic -Economic Modeling

Miyazawa expanded I/O model into a demographic model -economic modeling and this model has been completed by Batey and Madden (1983). The model introduces the concept of Leontief inverse matrix and expand Leontief extended system for Keynes multipliers, which can analyze the relationship between income groups and consumer groups, respectively. The model is also used to analyze the structure of income in order to describe quantitatively the relationship between income from production and income not from production. In which case, it is classified according to the system of national accounts published by the United Nations (UN "System of National Accounts -SNA", 1993), non-production income includes income from property and income from transfer.

Demographic -Economic model is created by Miyazawa (1966), it's a similar form to the Social Accounting Matrix, in order to describe the distribution and redistribution of the economy. Essentially, the Demographic -Economic model and the Social Accounting Matrix are similar and it could easily be changed from one model to another depending on other study purposes. In this study, Demographic -Economic model is developed in institutional regions (households, other type of enterprise, State region is divided by type of tax). These institutional regions are considered as endogenous variables: saving and relations with foreign countries are considered as exogenous variables. This model is a combination between the notion of interregional I/O model and demographic -economic model, as presented in matrix form below:P=AP+F=(I-A) -1 F**(14)**

The SAM can be used similarly, note that the matrix, A is not only descries production account but also descries re-distribution from property and transfer; the vector of row total, x, represents the endogenous variables, whereas the vector f represents the exogenous variables. The vector of endogenous variables, x, can be solved in equation (**??**5):x = Af + x = (I-A) -1 x = Mx (15)

Where, M is the aggregate multiplier matrix.

Another way, the Miyazawa's concept of the interrelation income multiplier was designed to analyze the structure of income distribution by endogenous consumption demand in the standard Leontief model; these ideas were also incorporated in the familiar social account systems developed by Stone (1961), **??**yatt and Roe (1997), and in the parallel developments of demographic-economic modeling associated with Batey and Madden (1983); In order to linkage the concept on interregional input output modeling and demographic - Where: A -direct input coefficients matrix; x 1 is a vector of output; x 2 is total income for fold division of household groups; x 3 is total income of Government institutional; x 4 is total income of enterprises institutional; h is an matrix (vector) of households income groups from production; g is a vector of Government income form production (indirect taxes minus subsidies); e is an matrix of income of enterprises groups from production (operating surplus and consumption of fixed capital); c 1 is a corresponding matrix of household consumption coefficients; g 1 is a vector of Government consumption coefficients; c 2 is a vector on redistributing between the household groups and Government institutional; c 3 is a matrix on redistributing of household institutional to enterprise groups; g 2 , g 3 are expenditure of Government to households and enterprises institutional; e 1 , e 2 , e 3 are matrixes on redistribute from enterprise institutional to household, government and other groups of enterprises.

Regarding equation (**??**8

7 C

Miyazawa suggested an innovative way of partitioning the system of regions and the developments of demographic -economic modeling associated with Batey and Madden (1983); the other innovative way for linking of sectoral and institutional, it is also referred as internal and external multipliers and relation (24) may be obtained:x' = 4 3 2 x x x (21) f' = 4 3 2 f f f (22) We c B v c A . ' 1 x x + ' 1 f f = ' 1 x x (23) ' 1 x x = 2 1 2 1 1 1) .( ) .(.A I v B I c . ' 1 f f (24)

Where: 1 is interpreted as enlarged Leontief inverse, the elementary of 1 includes direct impact, indirect impact and induce effects by household and government consumptions, they contain elements which are larger than those of the (I-A) -1 matrix, because they include extra output required to meet the consumption groups output effects. 2 is interpreted as enlarged Miyazawa matrix multipliers, the matrix 2 can be decomposed as follow:2 = (I -(I-B) -1 .v.(I-A) -1 .c) -1 .(I -B) -1**(25)**

(I -B) -1 is referred as internal multipliers of redistribution income and (I -(I-B) -1 .v.(I-A) -1 .c) -1 is referred as external multipliers that induced effects by income from production, these mean income from re-distribution dose not dependent direct income from re-distribution of each institutional, but also dependent re-distribution income of other institutional and induced by consumption expenditure. The equation (26) introduce the hierarchical sequence of modeling which multiplicatively separates the enlarged Leontief inverse matrix and enlarged Keynesian multipliers matrix, interrelationship multipliers from the interrelationship effects

We shall explain how to define and measure interrelationship feedback effects in interrelationship settings. Solving the equation (**??**3), (**??**4) and (26) for X 1 and X' yields:X' = (I-B) -1 .v. X 1 (27) X 1 = (I-A) -1 .c.X'**(28)**

These are the interrelationship feedback effects. The equation (??7) and (28) present the relationship between production and total income. The Demographic-Economic modeling described in table ?? below Below in table is the explanation of each cell in the SAM 2005 table ??II.

8 Conclusion

This paper is an attempt in order to present some variance of input-output expansion. The System of National Accounts with version 1968 and 1993 recommended on social accounting matrix, but until now some countries compiled SAM from supply and use tables and some other countries compiled SAM from input-output system. SAM seems to apply for CGE model but it is not meaning in SAM multipliers analysis. The parallel with ideas of social accounting system developed by Stone (1961), Pyatt and Roe (1977) is demographic -economic modeling was knew by Miyazawa's concept. These ideas developed in order to describe the interrelation between income from production, income from redistribution, consumption, accumulation, it like as "no start and no the end" in Buddha theory.

Especially, The analysis of I/O models and demographic -economic model showed the changes of the economy cause of different impacts to sectors and institutional regions. So, calculation on this element is necessary to plan the tax policy and other policies. Such as, analyze the index of power of dispersion shows that [1] [2] [3]

Figure 1: The

Figure 2: Table

[1] T © 2012 Global Journals Inc. (US)

[2] . Industry is the industry sectors from the I/O tableThe Expansion Input -Output Tables © 2012 Global Journals Inc. (US)

[3] The Expansion Input -Output Tables © 2012 Global Journals Inc. (US)

IV. Competitive and Non-Competitive i/o Tables

In the competitive I/O table the intermediate inputs include both commodities produced domestically and imported.

b) Non-competitive I/O table:

In this kind of I/O tables, the intermediate inputs are broken-down into commodities produced domestically and commodities imported from the rest of the world.

Following is the indirect method of how to come from the competitive I/O table at a non-competitive I/O table.

[Note: a) Competitive I/O table:]

Figure 3:

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ations of the I/O tab
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	(1)	(2)
	(1)	
	ustry Ind ry	Commodity
1-Industry		Make matrix
2-Commodity	Use matrix	
3-Factors	xxxxxxx	
4-Institutions		4x2
5-ROW	5x1	

Each cell represents a sub-matrix. Rows represent an institutional or industry receipt of income. Columns represent an institutional or industry payr

balance exactly so all flows are counted. Following is the explanation of the data contained in each cell of th

2. Commodity is the commodities also from the I/O table

Figure 4: Table 1 :

2

	(1) Commodity	(2) Factors	(3) Institutions	(4) I-S	(5) ROW
1-Commodity	1x1	1x2			1x5
2-Factors	2x1			2x4	
3-Institutions	3x1				
4-Saving		4x2	4x3	4x4	4x5
5-ROW	5x1		5x3	5x4	5x5

From table 2 can convert to table 3 can apply a paper of Bui Trinh, Kiyoshi Kobayashi and Kwang Moon Kim (2012).

VI.

Figure 5: Table 2 :

		The Expansion Input -Output Tables	
	Cells 3x1, 4x1, 5x1, 6x1	Payments by industries to government namely indirect taxes and import duties	
2012	Cells 9x1, 10x1, 11x1 Cell 13x1	Operating surpluses and depreciations of the enterprises Total foreign imports to industry use or payments to imports	
	Cell 1x2	Payments made by household to commodities or total final consumption of household	
	Cell 6x2, 7x2, 8x2	Taxes paid by household to government	
Volume XII Issue XIV Version I	Cell 12x2 Cell 13x2 Cell 12x3 Cell 1x8 Cell 2x8 Cell 9x8, 10x8 Cell 7x9, 7x10, 7x11 Cell 9x9, 10x9,	Household saving Imports to household final demand Government saving Transfers made by government to state commodities Transfers made by government to household Transfers made by government to state and non-state enterprises Payments in terms of Direct taxes made by enterprises to government	
(D D D D)	11x9,0x10, 10x10, 11x10, 9x11,	Inter-institutional transfers by enterprises to enterprises and property incomes	D D D D) C (
Global Journal of Human Social Science	Cell 13x11 Cell 6x12 Cell 13x12 Cell 1x13 Cell 2x13 Cell 7x13, 8x13 Cell 12x13 10x11, 11x11	Transfers made by the FDI enterprises to the rest of the world Import duties paid to the government Import of investment goods Export Payments from the rest of the world to household Tax payments and transfers from the rest of the world to the government Foreign transfers	

[Note: C]

Figure 6:

[SNA ()] , *SNA* 1993. (a publication of the Commission of the European Communities)

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