



**International Workshop on Supply and Use Accounts
11 – 13, December 2018, Beijing, China**

**Balancing Supply and Use table
Vietnam's experiences**

Prepared by

**Tran Thi Thu
General Statistics Office of Vietnam**



Outline Presentation

1. Data Source and Methodology
2. Balancing SUT
 - + RAS Method
 - + Expert method
 - Trade and Transport margins
 - Case study by using RAS to balance
 - Balancing by expert method



Data Source

- Input – Output survey conducted in 2012
 - 42 provinces
 - 30,000 establishments
 - Collecting information on output, intermediate consumption, trade margins and transportation costs
- Other surveys
 - Enterprises survey 2012
 - Vietnam household Living Standards survey 2012
 - The retail trade survey 2012
- Other information
 - Banking and fiscal statistics
 - Administrative data



Methodology

1. Compiling the Supply table:

- We have private questionnaires in order to select main product and by – products for each establishment and follow COICOP.
- The elements of supply table are basic's price



Methodology (Cont.)

2. Compiling the Use matrix

- Input structure includes intermediate input and value added
- The elements of intermediate input matrix are purchase's price, that means row vectors of trade and transport margins equal "Zero"



Methodology (Cont.)

Value added size:

Compensation of employees

Tax on production (excludes tax on products) less subsidies

+ VAT

+ Special consumption tax

+ Other tax

Operating surplus

Depreciation



Methodology (Cont.)

Final demand size:
(Based on Population
and Housing survey,
Agriculture and rural
survey, Standard
Living survey,
Enterprises survey...)

Household consumption
Government consumption
Fixed capital formation
Change in inventory
Export



Balancing SUT

- Introduction of RAS method to balance SUT.
 - The RAS method is the most widely known and commonly used automatic procedure.
 - Main target of RAS method:
 - + Balancing the columns and rows of input – output or supply and use tables when updating or revising these tables.



Balancing SUT (Cont.)

- Expert method to balance SUT
 - Normally, we use RAS method to balance manually if the errors from the SUT are below 3%.
 - However, if the error is over 3%, we use expert method to adjust SUT and based on commodity flow.



BALANCING SUT (Cont.)

The vectors for
balancing:

Trade margin
Transportation margin: + Road Margin + Railway margin + Water Margin + Air Margin
Imports
Import duties
Taxies on product



- Trade and Transport Margins

1. Trade margin:

- We design private questionnaires for trade units.
- Trade margin in Vietnam is estimated based on rate of trade margin on commodity. That is why trade margin of Vietnam is about 8.5%

2. Transport margin:

- We calculate from trade units and transport units
- Total Trade and transport margins is about 11%



Layout of Trade Margins Table

TO				INTERMEDIATE DEMAND		FINAL DEMAND				TOTAL		
				INDUSTRY		SECTORS						
FROM				1	2j..... 25	H	G	FCF	CI		E ^F E ^D	M ^F M ^D
I	I	P	1	Quadrant I		Quadrant II					$\sum TdM_i$	
N	N	R	2									
T	P	O	:									
E	U	D	i	TdM _{ij}		TdM _{ik}						
R	T	C	:									
M	S	T	25									
TOTAL				$\sum TdM_j$		$\sum TdM_k$						

Layout of Transport Margins Table

TO				INTERMEDIATE DEMAND		FINAL DEMAND				TOTnL					
				INDUSTRY		SECTORS									
FROM				1	2j.....	n	H	G		FCF	CI	E ^F	E ^D	M ^F
I	I	P	1	Quadrant I				Quadrant II				$\sum TnM_i$			
N	N	R	2												
T	P	O	:												
E	U	D	i												
R	T	C	:												
M	S	T	25												
TOTAL				$\sum TnM_j$				$\sum TnM_k$							

Use table at producer's price

				USE TABLE at		TRADE	TRANSPORT	
				PURCHASER'S	-	MARGINS	MARGINS	=
				PRICE		TABLE	TABLE	
						Totals = TdM_j	Totals = TnM_j	
TO					INTERMEDIATE DEMAND	FINAL DEMAND		
					INDUSTRY	SECTORS		
FROM					1 2 22	PCE GCE GFCF		
					1 2 22	E M		GO
I		C	1	Quadrant I		Quadrant II		X_i
N	I	O	2					at
T	N	M	:					Prod
E	P	M	:					Prices
R	U	O	T_d					X_{T_d}
M	T	D	T_n		$T_n M_j$			X_{T_n}
E	S	T	:					
D		Y	22					
P	I		1	Quadrant III		Quadrant IV		
R	N		:	VALUE ADDED		VALUE ADDED		
I	P		p	V_{p_i}				
M	U		:	Purch price = Prod price				
	T		4					
GI					X_j at PRODUCERS' PRICES	F_k at PRODUCERS' PRICES		

The Supply and Use framework

	<i>Industries</i>	<i>Products</i>					
<i>Industries</i>		Supply matrix at basic price (S)	Transportation margin	Trade margin	Tax on product		Gross output by industries
<i>Products</i>	Use matrix at purchase price (U)					Final demand	Gross output by products
	Transportation margin	Transportation margin				Transportation margin	
	Trade margin	Trade margin				Trade margin	
	Tax on product	Tax on product				Tax on product	
	Import	Import				Import	
	Value added						
	Gross output by industries	Gross output by products					

Case study of balancing SUT

Table 1: Matrix of Domestic Production

Sectors	Sector 1	Sector 2	Sector 3	Row Totals	Correct Row Totals	Balancing
Sector 1	21.2	29.0	19.9	70.1	75.0	4.9
Sector 2	9.0	48.8	22.4	80.1	82.0	1.9
Sector 3	49.8	62.2	7.8	119.8	125.0	5.2
Column Totals	80.0	140.0	50.0			
Correct Column Totals	85.0	150.0	45.0			
Balancing	5.0	10.0	-5.0			



Case study

- The basic data in table 1 is a simple matrix of domestic production, showing 3 commodities and 3 kinds of industry. The margin totals are assumed to be known accurately while the internal entries have been estimated from various less reliable sources. The task is to revise the less reliable entries so they are relevant with the correct margin totals. RAS adjustment can be a procedure in which columns and rows are successively forced to add up to the correct margin totals and the balancing value of rows and columns become 0

Table 2: First Iteration: Recalculating the Column Totals ($X_C^{new}(t_1).A$ - First Round)

Sectors	Sector 1	Sector 2	Sector 3	Row Totals	Correct Row Totals	Balancing
Sector 1	22.7	31.0	21.3	75.0	75.0	0.0
Sector 2	9.2	50.0	22.9	82.0	82.0	0.0
Sector 3	52.0	64.9	8.1	125.0	125.0	0.0
Column Totals	83.9	145.9	52.3			
Correct Column Totals	85.0	150.0	45.0			
Balancing	1.1	4.1	-7.3			

Table 2 presents the matrix A to be reallocated by Correct Row Totals first time with formula: $AR^{new}(t_1) = X_C^{new}(t_1).A$. X_C^{new} is the new vector of gross output by rows of round time t_i , A is coefficient matrix of direct input.

In this case, for the example with the first row and the first column (The old value is 21.2). The new value would be 22.7 after reallocation, and $22.7 = 21.2 / 70.1 * 75$

Table 3 shows the matrix A recalculated the column totals:
 $X_{C\text{new}}(t1).A.X_{R\text{new}}(t1)$.

For the example of the first column with the balancing column value is 1.1 The old value of the first row and first column is 22.7 The new value of the first row and first column would be 23.0 after reallocation, and $23.0 = 22.7 / 83.9 * 85$.

Table 3: Second Iteration: Recalculating the Column Totals (second Round)

Sectors	Sector 1	Sector 2	Sector 3	Row Totals	Correct Row Totals	Balancing
Sector 1	23.0	31.9	18.3	73.2	75.0	1.8
Sector 2	9.3	51.4	19.7	80.4	82.0	1.6
Sector 3	52.7	66.8	7.0	126.4	125.0	-1.4
Column Totals	85.0	150.0	45.0			
Correct Column Totals						
Totals	85.0	150.0	45.0			
Balancing	0.0	0.0	0.0			

After that, we copy value from table 3 (from sector 1 to sector 3) and paste special again into table 1. In this case we have to put about 7 times for balancing with correct column vectors and correct row vectors become 0. This result is shown in table 4.

Table 4: The result after practice RAS method

	Agriculture	Industry	Services	Row Totals	Correct Row Totals	Balancing
Crops	23.6	32.4	18.5	74.5	75.0	0
Manufactures	9.5	52.2	19.8	81.4	82.0	0
Services	51.9	65.4	6.8	124.1	125.0	0
Column Totals	85.0	150.0	45.0			
Correct Column Totals	85.0	150.0	45.0			
Balancing	0.0	0.0	0.0			



Balancing SUT using expert method

- Tax on production and subsidies
 - Determination of the tax rate is based on the IO data collection survey, information on the total value of taxes on production and production subsidies
 - Product taxes are separated into import duties and product taxes other (VAT, excise, etc.), using the ratio of import tax to the import value of each commodity to allocate import duties for intermediate consumption and final use.
 - The deductible VAT on final use should be allocated to final use (except for accumulative current assets, which are not taxable).



Trade and transportation fees

- The rate of trade and transportation fees for each product are calculated from the IO data collection survey, detail of freight costs by five transport sectors: rail-way freight services; Road freight transport services, Pipeline transportation services; water-way transportation services; Air cargo services. Trade and transportation fees are allocated into intermediate consumption and final use in proportion to the cost of production.



FISIM and FISIM allocation

- The production value of banking operations includes: direct and underground services (FISIM), FISIM is allocated based on the interest rates of bank loans of economic sectors on the total interest paid on loans of both the economy (loans for production and loans for final use).



Information on final consumption of living standard survey 2012

- In the IO data survey 2012, information collected on household final consumption, representing the whole country, and detailed for 164 product products. Therefore, the final use survey of households in the living standard survey 2012 is just information for reference.



Thank you