A 2007 social accounting matrix (SAM) for Vietnam

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Abstract: This paper documents a Vietnam Social Accounting Matrix (SAM) for the year 2007. The national SAM is based on newly estimated supply-use tables, national accounts, state budgets, and balance of payments. The SAM reconciles these data using cross-entropy estimation techniques. The final SAM is a detailed representation of Vietnam's economy. It separates 63 activities and commodities; rural/urban labor by different education levels; and households by rural/urban areas and farm/nonfarm expenditure quintiles. Labor and household information is drawn from the 2006 Vietnam Household Living Standards Survey. Finally, the SAM identifies government, investment and foreign accounts. It is therefore an ideal tool for economywide impact assessments, including SAM-based multiplier analysis and computable general equilibrium (CGE) modeling.

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List of acronyms

CGE   Computable general equilibrium
GDP   Gross domestic product
GSO   Government Statistical Office
IMF   International Monetary Fund
SAM   Social accounting matrix
SUT   Supply-use table
VHLSS Vietnam Household Living Standards Survey
VND   Vietnamese Dong

1. Introduction

This paper outlines the construction of a 2007 social accounting matrix (SAM) for Vietnam. A SAM is a consistent data framework that captures the information contained in the national income and product accounts and the supply-use table (SUT), as well as the monetary flows between institutions. A SAM is an ex-post accounting framework since, within its square matrix, total receipts must equal total payments for each account contained within the SAM. Since the required data is not drawn from a single source, information from various sources must be compiled and made consistent. This process is valuable since it helps identify inconsistencies among Vietnam's statistical sources. For example, there are invariably differences between the incomes and expenditures reported by households in Living Standards Surveys. SAMs are economy-wide databases which are used in conjunction with analytical techniques to strengthen the evidence underlying policy decisions. One of the major advances of the 2007 SAM over previous SAMs for Vietnam is that it is based on a new 2007 SUT constructed by General Statistics Office of Vietnam. It is therefore the most up-to-date representation of Vietnam's economic structure.

Section 2 reviews the general structure of SAMs and Section 3 presents the key features of the Vietnam SAM. The first step in constructing a SAM is compiling information from various sources into a SAM format or framework known as the 'prior SAM'. The construction of the prior SAM takes place in two stages. A 'macro SAM' is first constructed using aggregate information from national accounts and other macroeconomic databases. This SAM is then disaggregated across sectors, factors and households to derive a more detailed 'micro SAM'. Given the diversity of its data sources, the prior SAM is invariably inconsistent (i.e., there are inequalities between receipts and payments). Section 4 describes the data sources used to construct the prior SAM. Finally, Section 5 outlines the basic cross-entropy estimation approach used to reconcile the imbalances in the prior SAM.

The second step in constructing a SAM is reconciling receipts and payments so that row and column totals are equal (i.e., 'balancing' the SAM). This is also done in two stages. The reliability of the various data sources is first assessed based on the observed inequalities between row and column accounts. The SAM is then balanced using cross-entropy econometrics. The cross-entropy approach is described in Section 5 together with a description of the constraints imposed during the estimation procedure. The final section summarizes the details of the new Vietnam SAM.

2. General structure of SAMs

One way of depicting the economy is the circular flow diagram shown in Figure 1, which captures all transfers and real transactions between sectors and institutions. Production activities purchase land, labor and capital inputs from the factor markets, and intermediate inputs from commodity markets, and use these to produce goods and services. These are supplemented by imports (M) and then sold through commodity markets to households (C), the government (G), investors (I) and foreigners (E). In the circular flow diagram, each institution's expenditure becomes another institution's income. For example, household and government purchases of commodities provide the incomes producers need to continue the production process. Additional inter-institutional transfers, such as taxes and savings, ensure that the circular flow of incomes is closed. In other words, all income and expenditure flows are accounted for and there are no leakages from the system.

A SAM is an economy-wide data framework usually representing the real economy of a country, as depicted in Figure 1.[1] More technically, a SAM is a square matrix in which each account is represented by a row and column. Each cell shows the payment from the account of its column to the account of its row – the incomes of an account appear along its row, its expenditures along its column. The underlying principle of double-entry accounting requires that, for each account in the SAM, total revenue (row total) equals total expenditure (column total). Table 1 shows an aggregate SAM (with verbal explanations in place of numbers).

The SAM distinguishes between 'activities' (the entities that carry out production) and 'commodities' (representing markets for goods and non-factor services). SAM flows are valued at producers' prices in the activity accounts and at market prices (including indirect commodity taxes and transactions costs) in the commodity accounts. The commodities are activity outputs, either exported or sold domestically, and imports. In the activity columns, payments are made to commodities (intermediate demand), and factors of production (value-added comprising of operating surplus and compensation of employees). In the commodity columns, payments are made to domestic activities, the rest of the world, and various tax accounts (for domestic and import taxes). This treatment provides the data needed to model imports as perfect or imperfect substitutes vis-à-vis domestic production.

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[1] For general discussions of SAMs and SAM-based modeling, see Pyatt and Round (1985), Reinert and Roland-Holst (1997), Pyatt (1988), Robinson and Roland-Holst (1988), and Breisinger, Thomas and Thurlow (2009).

Figure 1: Circular Flow Diagram of the Economy
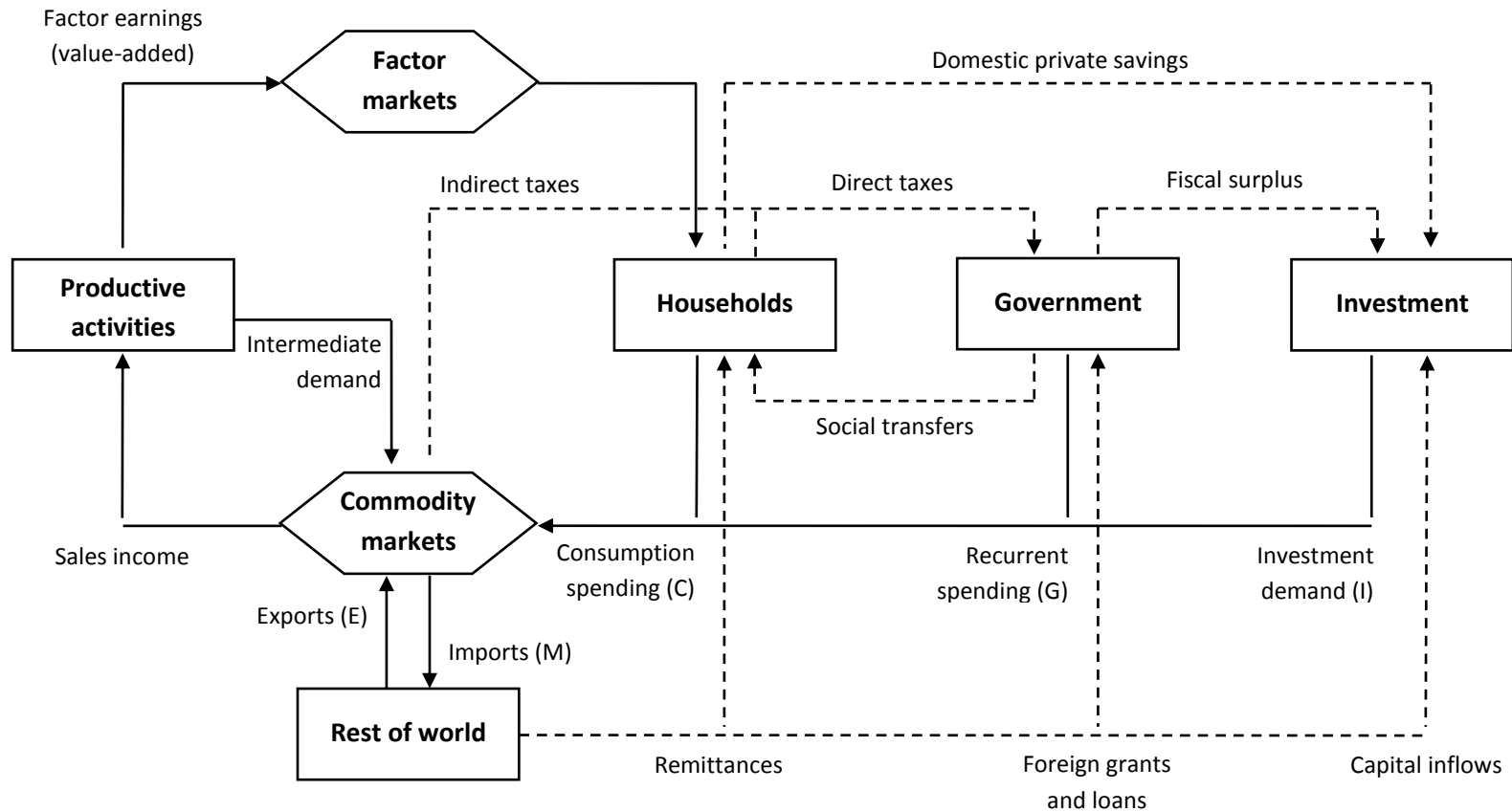
Source: Breisinger, Thomas and Thurlow (2009).

Table 1: Basic structure of a SAM

	Activities	Commod-ities	Factors	Enterprises	Households	Government	Investment	Rest of the World	Total
Activities		Marketed output			Home consump-tion				Activity income
Commodities	Inter-mediate inputs	Transaction costs			Marketed consump-tion	Government consump-tion	Investment, change in stocks	Exports	Total demand
Factors	Value-added							Foreign factor earnings	Factor earnings
Enterprises			Factor income to enterprises			Transfers to enterprises		Foreign enterprise receipts	Enterprise earnings
Households			Factor income to households	Indirect capital payments	Inter-household transfers	Transfers to households		Foreign remittances received	Household income
Government	Producer taxes	Sales taxes, import tariffs	Factor taxes	Corporate taxes	Personal taxes			Government transfers from rest of	Government income
Savings				Enterprise savings	Household savings	Government savings		Foreign savings	Savings
Rest of the World		Imports		Repatriated earnings	Foreign remittances paid	Government transfers to rest of world			Foreign exchange outflow
Total	Gross output	Total supply	Factor expenditure	Enterprise expenditure	Household expenditure	Government expenditure	Investment	Foreign exchange inflow	

The government is disaggregated into a core government account and different tax collection accounts, one for each tax type. This disaggregation is necessary since otherwise the economic interpretation of some payments is often ambiguous. In the SAM, direct payments between the government and households are reserved for transfers. Finally, payments from the government to factors (for the labor services provided by public sector employees) are captured in the government services activity. Government consumption demand is a purchase of the output from the government services activity, which in turn, pays labor.

The SAM contains a number of factors of production, which earn incomes from their use in the production process, and then pay their incomes to enterprises, households, government and the rest of the world. Indirect capital earnings or enterprise profits are taxed according to average corporate tax rates and some profits may be repatriated abroad. The remaining capital earnings, together with other factors' earnings (e.g. land and labor) are paid to households. Households use their incomes to pay taxes, save, and consume domestically produced and imported commodities.

3. Structure of the 2007 Vietnam SAM

Sectoral production and trade

The SAM is based on a new 2007 supply-use table for Vietnam. The SAM therefore contains detailed information on the structure of production and foreign trade. The original SUT separated industries into 112 different activities and products into 138 commodities. The new SAM aggregates away some of these details in order to expand on factor markets and household income and spending patterns. The next section describes the various data sources used to produce the new SAM, while this section describes its overall structure.

The national SAM identifies 63 sectors, of which 23 are in agriculture (see Table 2). Agricultural production is divided into crop agriculture (7 subsectors), livestock (3), fisheries (2) and forestry. Most of the sectors identified in the SAM are in industry, which is separated into mining (4 subsectors), manufacturing (30), utilities (2) and construction. Finally, the SAM also contains information on 12 different service sectors, including private services (9 subsectors) and public or government services (3).

Table 3 shows the structure sectoral of gross domestic product (GDP). Agriculture accounts for 15.6 percent of total GDP in Vietnam, most of which is generated by crop agriculture, particularly paddy rice. One of the advantages of a SAM is that is shows the structural linkages of an economy. For example, while Vietnam exports some of paddy rice, most of this is passed downstream to the rice husking or processing sector. Although this sector contributes relatively little to national GDP (only 0.05 percent), it generates a disproportionate amount of the country's export earnings (3.13 percent). Not all sectors have these strong "forward production" linkages. For example, there is very little refining of domestically-sourced crude oil. This is evident in the table. While crude oil generates 9.1 percent of total GDP, much of this is exported directly without being passed to the downstream refining sector ("petroleum products" in Table 3). Rather, refined oil imports account for a large share of Vietnam's total import bill (13.1 percent). Measuring these kinds of upstream and downstream production linkages is one of the key motivations for constructing a SAM since it allows analysts to determine how changes in the performance of a sector will affect other sectors of the country, as well as the external balance and overall availability of foreign exchange.

Table 2: Sectors in the 2007 Vietnam SAM

No	Code	Description	No	Code	Description
Agriculture					
1	padd	Paddy rice	8	bovp	Cows and pigs
2	sugr	Sugarcane	9	poul	Poultry
3	acrp	Other annual crops	10	oliv	Other livestock
4	rubb	Rubber	11	fore	Forestry
5	coff	Coffee	12	fish	Capture fishery
6	ltea	Tea leaf	13	aqua	Aquaculture
7	pcrp	Other perennial crops			
Industry					
14	coal	Coal mining	33	foot	Footwear
15	coil	Crude oil	34	wood	Wood products
16	ngas	Natural gas	35	papr	Paper products
17	omin	Other mining	36	prnt	Printing products
18	meat	Meat processing	37	fuel	Petroleum products
19	pfsh	Fish processing	38	chem	Other chemicals
20	pveg	Vegetable and fruit processing	39	nmet	Non-metallic minerals
21	poil	Oils and fats processing	40	ceme	Cement
22	dair	Dairy	41	metl	Basic metals
23	rice	Rice husking	42	metp	Metal products
24	flou	Other flours	43	mach	Machinery and equipment
25	food	Other food processing	44	emch	Electrical machinery
26	bevn	Non-alcoholic beverages	45	vehe	Vehicles and transport equipment
27	beva	Alcoholic beverages	46	furn	Furniture
28	toba	Tobacco processing	47	oman	Other manufacturing
29	fibr	Yarn and other fibers	48	elec	Electricity and gas distribution
30	text	Textiles	49	watr	Water distribution and utilities
31	clth	Clothing	50	cons	Construction
32	leat	Leather products			
Services					
51	trad	Retail and wholesale trade	58	fsrv	Financial services
52	hotl	Hotels and catering	59	real	Real estate
53	trnr	Road transport	60	admn	Public administration
54	trna	Air transport	61	educ	Education
55	trno	Other transport	62	heal	Health
56	comm	Communications	63	osrv	Other services
57	busi	Business services			

Table 3: Sectoral production and trade structure

Sectors	Share of total (%)			Indirect tax rates (%)		
	GDP	Imports	Exports	Producer	Imports	Exports
Total GDP	**100.00**	**100.00**	**100.00**	**0.59**	**3.12**	
Agriculture	**15.62**	**2.30**	**7.20**	**0.43**	**2.92**	
Crops	**10.42**	**1.67**	**2.99**	**0.56**	**3.86**	
Paddy rice	5.62	0.04	0.00	0.65	13.71	
Sugarcane	0.31	0.01	0.00	0.65	3.43	
Other annual crops	1.28	1.06	0.50	0.65	4.17	
Rubber	0.31	0.28	0.47	0.31	1.03	
Coffee	0.77	0.01	1.66	0.31	6.86	
Tea leaf	0.09	0.01	0.02	0.31	7.59	
Other perennial crops	2.04	0.26	0.33	0.31	4.02	
Livestock	**1.39**	**0.02**	**0.78**	**0.16**	**1.87**	
Cows and pigs	0.80	0.00	0.68	0.16	0.17	
Poultry	0.31	0.01	0.01	0.16	1.71	
Other livestock	0.29	0.00	0.09	0.16	3.51	
Forestry	**1.30**	**0.59**	**0.01**	**0.49**	**0.12**	
Fisheries	**2.51**	**0.03**	**3.42**	**0.32**	**6.16**	
Capture fishery	1.08	0.02	0.13	0.13	6.43	
Aquaculture	1.43	0.00	3.29	0.41	3.54	
Industry	**42.70**	**90.35**	**86.89**	**0.31**	**3.38**	
Mining	**10.27**	**0.40**	**15.15**	**0.78**	**1.35**	
Coal mining	0.69	0.05	1.40	2.92	1.72	
Crude oil	9.07	0.00	13.35	0.07	0.34	
Natural gas		0.15	0.00		1.73	
Other mining	0.52	0.20	0.39	2.86	0.98	
Manufacturing	**19.22**	**89.78**	**71.74**	**0.27**	**3.40**	
Processed foods	**3.65**	**3.27**	**22.48**	**0.14**	**6.85**	
Meat processing	0.19	0.12	0.75	0.17	4.83	
Fish processing	0.67	0.45	8.94	0.09	8.25	
Vegetable/fruit processing	0.20	0.04	1.19	0.16	12.98	
Oils and fats processing	0.03	1.02	0.49	0.07	2.55	
Dairy	0.45	0.41	0.62	0.02	8.26	
Rice husking	0.05	0.00	3.13	0.04	15.39	
Other flours	0.05	0.09	2.34	0.04	4.15	
Other food processing	1.01	0.71	1.78	0.15	10.31	
Non-alcoholic beverages	0.17	0.02	0.52	0.45	19.09	
Alcoholic beverages	0.63	0.20	1.76	0.45	5.76	
Tobacco processing	0.20	0.22	0.95	0.10	10.70	
Textiles and clothing	**3.34**	**7.42**	**17.02**	**0.17**	**6.14**	
Yarn and other fibers	0.41	0.43	0.37	0.20	4.96	
Textiles	0.35	5.02	2.28	0.20	6.92	
Clothing	1.24	0.27	7.76	0.22	16.45	
Leather products	0.55	1.34	1.88	0.10	1.00	
Footwear	0.80	0.34	4.73	0.08	8.12	

Table 3 continued: Sectoral production and trade structure

Sectors	Share of total (%)			Indirect tax rates (%)		
	GDP	Exports	Imports	Producer	Imports	Exports
Wood and paper	**1.21**	**1.72**	**1.78**	**0.38**	**5.23**	
Wood products	0.57	0.31	1.28	0.51	3.31	
Paper products	0.41	1.38	0.36	0.32	5.66	
Printing products	0.23	0.03	0.14	0.26	5.00	
Chemicals	**2.27**	**29.00**	**4.15**	**0.20**	**2.46**	
Petroleum products	0.03	13.12	0.46	0.05	2.39	
Other chemicals	2.24	15.88	3.69	0.21	2.53	
Machinery	**5.27**	**46.07**	**17.52**	**0.29**	**3.11**	
Basic metals	0.41	10.24	1.40	0.33	1.12	
Metal products	1.34	6.84	5.22	0.34	1.20	
Machinery and equipment	0.21	3.31	0.63	0.25	3.46	
Electrical machinery	1.32	1.36	1.07	0.12	2.09	
Vehicles/transport equip.	1.99	24.32	9.20	0.42	4.50	
Other manufacturing	**3.48**	**2.30**	**8.79**	**0.72**	**5.74**	
Non-metallic minerals	0.60	0.45	0.68	0.41	6.36	
Cement	1.14	0.25	0.04	0.43	5.32	
Furniture	1.28	0.13	5.60	1.30	13.12	
Other manufacturing	0.46	1.47	2.46	0.39	4.96	
Utilities	**3.86**	**0.18**	**0.00**	**0.29**	**0.35**	
Electricity/gas distribution	3.59	0.17	0.00	0.22	0.34	
Water distribution	0.27	0.00		1.08	13.72	
Construction	**9.34**			**0.22**		
Services	**41.68**	**7.35**	**5.91**	**1.36**		
Private services	**31.70**	**5.85**	**5.62**	**1.61**		
Retail and wholesale trade	13.32	0.03	0.31	2.74		
Hotels and catering	3.40	1.00	2.44	1.69		
Road transport	2.87	0.36	0.55	1.68		
Air transport	0.15	0.67	0.49	0.01		
Other transport	0.91	0.69	0.19	2.00		
Communications	2.25	0.39	0.66	0.17		
Business services	1.81	0.54	0.34	0.59		
Financial services	1.40	1.73	0.49	0.20		
Real estate	4.25	0.24	0.06	0.67		
Other services	1.35	0.21	0.10	0.52		
Government	**9.97**	**1.51**	**0.29**	**0.39**		
Public administration	4.36			0.33		
Education	4.08	1.16	0.17	0.38		
Health	1.53	0.34	0.13	0.54		

Source: 2007 Vietnam social accounting matrix.

Notes: "GDP" is gross domestic product.

Factor income generation and distribution

As mentioned above, one of the reasons for aggregating the sectors in the new SAM was to expand the detail on factors' incomes and expenditures. Table 4 shows factor income shares within different sectors. The SAM differentiates between different kinds of factors, including labor, capital, agricultural land, and livestock stocks. Labor is further disaggregated by rural/urban areas and workers' education levels. "Primary" refers to workers with some primary schooling (grades 1-4); "secondary" includes workers with some secondary schooling (grades 5-11); and "tertiary" includes workers who have completed secondary school or higher education (12 or higher).

Not surprisingly, the table shows that a vast majority of agricultural value-added is generated by labor in the rural areas (46.6 percent) rather than in urban areas (4.9 percent). A larger share of labor income in agriculture is earned by primary-educated workers compared to the national average. By contrast, very little labor value-added in agriculture comes from tertiary-educated labor (only 6.5 percent). This reflects the general lower-skilled intensity of agriculture. The remaining agricultural value-added is earned by capital (6.3 percent) and agricultural land and livestock (42.3 percent). Agricultural land can be used for both crops and aquaculture (i.e., ponds). It is noticeable that factor income shares are similar across different agricultural subsectors. This is due to a lack of information on labor usage within agriculture, and constrains the construction of the both the SUT and SAM.

Industry, by contrast, is far more intensive in its use of higher skilled labor. For example, manufacturing labor value-added is mainly generated by secondary- and tertiary-educated workers, although the former dominates overall. However, while labor is still an important factor input into the manufacturing sector, it is capital that is responsible for most value-added generated in the industrial sectors. For example, capital in the crude oil sector accounts for 98.1 percent of total value-added. This reflects the higher capital-intensity typically associated with industrial production.

Finally, services are the most intensive user of higher-skilled labor, with tertiary-educated workers generating 37.6 percent of total sectoral GDP. Moreover, labor is also a more important overall than capital. This is particularly true for the government sector (including health and education) where value-added is overwhelmingly generated by high-skilled workers.

Table 4: Factor contributions to sectoral value-added (columns sum to 100%)

Sectors	Labor					Capital	Land &
	Urban	Rural	Tertiary	Second.	Primary		livestock
Total GDP	**21.25**	**31.19**	**23.59**	**24.37**	**4.48**	**40.96**	**6.60**
Agriculture	**4.90**	**46.58**	**6.48**	**34.10**	**10.90**	**6.26**	**42.26**
Crops	2.63	42.87	4.66	29.86	10.98	4.70	49.80
Paddy rice	2.71	44.15	4.79	30.75	11.31	3.38	49.77
Sugarcane	2.71	44.15	4.79	30.75	11.31	3.38	49.77
Other annual crops	2.71	44.15	4.79	30.75	11.31	3.38	49.77
Rubber	2.45	39.99	4.34	27.86	10.24	7.68	49.88
Coffee	2.45	39.99	4.34	27.86	10.24	7.68	49.88
Tea leaf	2.45	39.99	4.34	27.86	10.24	7.68	49.88
Other perennial crops	2.45	39.99	4.34	27.86	10.24	7.68	49.88
Livestock	**2.43**	**39.60**	**4.30**	**27.59**	**10.14**	**7.98**	**49.99**
Cows and pigs	2.43	39.60	4.30	27.59	10.14	7.98	49.99
Poultry	2.43	39.60	4.30	27.59	10.14	7.98	49.99
Other livestock	2.43	39.60	4.30	27.59	10.14	7.98	49.99
Forestry	**14.73**	**75.77**	**17.71**	**62.47**	**10.32**	**9.50**	
Fisheries	**10.62**	**50.79**	**9.45**	**40.64**	**11.31**	**10.07**	**28.53**
Capture fishery	14.69	70.28	13.08	56.24	15.65	15.02	
Aquaculture	7.55	36.13	6.73	28.91	8.05	6.34	49.97
Industry	**16.10**	**26.17**	**16.16**	**22.85**	**3.25**	**57.74**	
Mining	**4.02**	**4.39**	**4.59**	**3.57**	**0.24**	**91.60**	
Coal mining	39.50	24.59	44.46	19.64		35.91	
Crude oil	1.18	0.73	1.32	0.58		98.09	
Natural gas							
Other mining	6.68	41.32	8.97	34.31	4.72	52.00	
Manufacturing	**17.79**	**26.10**	**18.04**	**22.08**	**3.78**	**56.11**	
Foods	**15.67**	**23.86**	**13.16**	**20.25**	**6.12**	**60.46**	
Meat processing	19.39	29.51	16.28	25.05	7.57	51.11	
Fish processing	16.53	25.16	13.88	21.35	6.45	58.32	
Vegetable/fruit processing	15.55	23.67	13.06	20.10	6.07	60.77	
Oils and fats processing	9.50	14.45	7.97	12.27	3.71	76.05	
Dairy	9.05	13.77	7.60	11.69	3.53	77.18	
Rice husking	4.48	6.82	3.76	5.79	1.75	88.69	
Other flours	4.48	6.82	3.76	5.79	1.75	88.69	
Other food processing	15.44	23.50	12.96	19.95	6.03	61.07	
Non-alcoholic beverages	19.96	30.39	16.76	25.79	7.80	49.65	
Alcoholic beverages	19.96	30.39	16.76	25.79	7.80	49.65	
Tobacco processing	14.82	22.56	12.44	19.15	5.79	62.62	
Textiles and clothing	**24.72**	**36.31**	**24.30**	**34.05**	**2.69**	**38.96**	
Yarn and other fibers	12.24	16.45	12.66	14.59	1.45	71.31	
Textiles	12.24	16.45	12.66	14.59	1.45	71.31	
Clothing	32.95	44.27	34.07	39.26	3.89	22.79	
Leather products	27.81	33.22	22.54	37.59	0.89	38.97	
Footwear	21.66	44.91	21.34	42.00	3.22	33.43	

Table 4 continued: Factor contributions to sectoral value-added (columns sum to 100%)

Sectors	Labor					Capital	Land &
	Urban	Rural	Tertiary	Second.	Primary		livestock
Wood and paper	**18.18**	**34.98**	**16.24**	**31.83**	**5.10**	**46.83**	
Wood products	12.78	54.25	9.39	46.88	10.77	32.97	
Paper products	18.62	20.21	14.95	23.89		61.17	
Printing products	31.04	13.04	35.89	8.19		55.92	
Chemicals	**20.99**	**14.20**	**17.15**	**13.99**	**4.05**	**64.81**	
Petroleum products	11.57	7.82	9.45	7.71	2.23	80.61	
Other chemicals	21.11	14.28	17.25	14.07	4.07	64.60	
Machinery	**14.17**	**18.02**	**19.50**	**11.27**	**1.42**	**67.81**	
Basic metals	6.90	15.69	13.97	8.63		77.41	
Metal products	16.87	28.01	15.51	26.39	2.97	55.12	
Machinery and equipment	30.12	19.50	35.54	12.40	1.68	50.38	
Electrical machinery	11.73	20.77	27.95	4.55		67.50	
Vehicles/transport equip.	13.80	9.80	16.05	5.95	1.59	76.40	
Other manufacturing	**16.63**	**35.58**	**16.13**	**30.78**	**5.30**	**47.79**	
Non-metallic minerals	13.85	25.81	16.58	18.38	4.71	60.33	
Cement	14.42	26.87	17.26	19.13	4.91	58.70	
Furniture	19.57	45.87	15.67	43.85	5.91	34.56	
Other manufacturing	17.55	41.13	14.06	39.32	5.30	41.32	
Utilities	**27.55**	**14.16**	**32.26**	**9.24**	**0.21**	**58.29**	
Electricity/gas distribution	26.74	13.97	31.57	9.15		59.29	
Water distribution	38.40	16.68	41.60	10.46	3.02	44.92	
Construction	**21.16**	**55.21**	**18.36**	**51.27**	**6.74**	**23.63**	
Services	**32.65**	**30.57**	**37.61**	**22.29**	**3.32**	**36.78**	
Private services	**31.40**	**28.28**	**29.08**	**26.23**	**4.37**	**40.32**	
Retail and wholesale trade	29.03	36.46	22.20	36.13	7.16	34.51	
Hotels and catering	35.77	26.48	20.91	34.05	7.30	37.75	
Road transport	30.19	24.54	19.88	31.81	3.04	45.26	
Air transport	12.49	10.15	8.22	13.16	1.26	77.36	
Other transport	22.69	18.44	14.94	23.90	2.29	58.87	
Communications	18.93	18.80	33.15	4.58		62.26	
Business services	45.64	23.93	56.70	12.87		30.43	
Financial services	21.95	9.66	28.88	1.61	1.13	68.39	
Real estate	42.44	22.25	52.73	11.96		35.31	
Other services	30.85	28.63	30.62	24.64	4.22	40.52	
Government	**36.64**	**37.86**	**64.75**	**9.74**		**25.51**	
Public administration	40.71	37.03	66.28	11.46		22.27	
Education	30.05	41.08	63.66	7.47		28.87	
Health	42.56	31.64	63.29	10.91		25.80	

Source: 2007 Vietnam social accounting matrix.

Notes: "Land and livestock" includes aquaculture ponds.

Identifying different factors, especially labor, is critical to capturing the effects of policy changes and external shocks on the distribution of household incomes. Table 5 summarizes how different households generate their incomes. For example, the table indicates that households as a whole in Vietnam earn 21.9 percent of their incomes from capital returns (i.e., mostly nonfarm enterprise profits). Most of their incomes come from labor wages and salaries, particularly from secondary and tertiary-educated labor. Land and livestock returns are also important, accounting for about five percent of total household incomes.

However, it is the disaggregation of households into representative groups that is the main feature of the SAM. The new 2007 SAM separates households in the 2006 Vietnam Household Living Standard Survey (VHLSS) across rural/urban areas and farm/nonfarm households. Households are also disaggregated based on national per capita expenditure quintiles. This information is used to expand the single household account in the SUT.

Table 5 shows that lower-income households rely heavily on lower-skilled labor incomes and on agricultural profits as captured by land and livestock earnings. Capital is also less important for lower-income households. For example, while households in the top expenditure quintile receive more than a quarter of their income from capital, this accounts for only 14.8 percent of incomes for households in the lowest quintile. Farm households are amongst the poorer sections of Vietnam's population and this is reflected in the greater similarities between their income patterns and those of the lower quintile households.

Table 5: Factor income distribution (rows sum to 100%)

Households	Labor					Capital	Land & livestock
	Urban	Rural	Tertiary	Second.	Primary		
All households	28.24	41.46	31.35	32.40	5.95	21.87	8.43
Urban	70.08	0.00	43.61	23.59	2.89	28.32	1.59
Farm	68.86	0.00	27.04	36.43	5.39	23.15	8.00
Non-farm	70.39	0.00	47.73	20.40	2.26	29.61	0.00
Rural	0.00	69.44	23.08	38.34	8.02	17.51	13.05
Farm	0.00	69.81	22.16	39.56	8.09	15.27	14.92
Non-farm	0.00	66.82	29.49	29.85	7.48	33.18	0.00
Quintile 1 (low)	5.99	63.58	10.34	43.20	16.03	14.80	15.63
Quintile 2	9.46	60.26	15.46	43.15	11.11	16.56	13.72
Quintile 3	18.76	51.89	21.53	41.63	7.49	18.92	10.44
Quintile 4	28.37	42.73	31.34	35.01	4.76	21.16	7.74
Quintile 5 (high)	41.48	27.08	43.75	22.14	2.67	26.27	5.17

Source: 2007 Vietnam social accounting matrix.

Household expenditure

Finally, the SAM is an economywide data framework and so it capture not just how households earn their incomes, but also how they spend them. This completes the flow of incomes from production to incomes (via factor markets) to consumption (i.e., both the demand and supply of goods). Here the detailed information captured in the household breakdown reveals differences that can be important for assessing policies and shocks. For example, a much larger share of lower-income households' consumption spending goes on agricultural goods and processed foods (62.7 percent) compared to higher-income households (27.5 percent). While the table shows only food versus non-food spending, the SAM contains detailed information on household spending on all 63 commodity groups. This information is crucial for assessing such external shocks as changes in world commodity prices.

Table 6: Household consumption spending shares

Households	Consumption share (%)		Population	Per capita consumption	
	Food	Non-food	(1000s)	VND1000	US$
All households	38.0	62.0	82,404	9,215	576
Urban	30.3	69.7	22,042	14,620	914
Farm	34.7	65.3	6,161	10,028	627
Non-farm	29.3	70.7	15,880	16,401	1,025
Rural	43.7	56.3	60,362	7,242	453
Farm	44.7	55.3	54,416	6,962	435
Non-farm	37.6	62.4	5,946	9,804	613
Quintile 1 (low)	62.7	37.3	16,480	3,295	206
Quintile 2	53.3	46.7	16,449	5,439	340
Quintile 3	44.7	55.3	16,500	7,513	470
Quintile 4	37.3	62.7	16,491	10,371	648
Quintile 5 (high)	27.5	72.5	16,483	19,451	1,216

Source: 2007 Vietnam social accounting matrix.

This section has provided some information on the key features of the SAM. It is focused on sector, factor and household disaggregation. However, the 2007 Vietnam SAM also contains detailed information on how government and agricultural/nonagricultural enterprises earn and spend their revenues. Similarly, the SAM maintains a consistent accounting of savings and their use to finance investment and changes in inventories or stocks. Compiling this comprehensive database necessitates drawing on a wide range of data sources, which are identified and discussed in the next section.

4. Constructing the prior social accounting matrix

The initial task in building a SAM involves compiling data from various sources into the SAM framework. For Vietnam, this information was drawn from national accounts, national supply-use tables, government or state budgets and balance of payments. This information often uses (1) different disaggregation of sectors, production factors, and socio-economic household groups, (2) different years and/or base-year prices, and (3) different data collection and compilation techniques. Consequently, the initial or prior SAM inevitably includes imbalances between row and column account totals.

The macro SAM shown in Table 6 is an aggregation of the more detailed micro SAM. This section explains how each macro SAM entry is derived and disaggregated to arrive at the prior micro SAM. Each entry in the SAM is discussed below. The notation for SAM entries is (row, column) and the values are in billions of 2007 Vietnamese dong. The final disaggregated SAM is quite large and is included in the accompanying spreadsheet file.

   i.   *Total value-added or GDP at factor cost (Factors, Activities)… 952*

   This is the value of gross domestic product (GDP) at factor cost or alternatively, total value-added generated by labor, capital and land. Sectoral GDP is drawn directly the 2007 Supply-Use Table (SUT) (GSO GSO 2009c). The original SUT distinguishes 112 industries or activities, but the 2007 Vietnam SAM aggregates these to 63 activities. Value-added is then further divided into the returns to labor; capital; land and livestock capital using technical coefficients from the SUT.

   Labor income is split across rural and urban areas and across three educational groups: "primary" refers to workers with some primary schooling (grades 1-4); "secondary" includes workers with some secondary schooling (grades 5-11); and "tertiary" includes workers who have completed secondary school or higher education (12 or higher). Workers' incomes from wage and non-farm enterprises are drawn from the 2006 Vietnam Household Living Standards Survey (VHLSS) (GSO GSO 2006). Capital is disaggregated into agricultural capital, livestock capital and nonagricultural capital. Finally, crop land and aquaculture ponds are separated from labor and capital (half of the sector's labor and capital from the SUT).

   The value of GDP at factor cost in the SUT is below the value implied by national accounts of VND 1020 billion (authors calculations using GSO 2009a and GSO GSO 2009b).

Table 7: 2007 Macro SAM for Vietnam (VND billions)

	Activities	Commod-ities	Factors	Enterprises	Households	Government	Investment	Rest of the World	Total
Activities		2,710							2,710
Commodities	1,742	206			759	140	480	767	4,093
Factors	952								952
Enterprises			332			31		18	381
Households			560	157		37		59	812
Government	16	153	8	149	8			4	338
Savings				76	44	130		230	480
Rest of the World		1,025	52						1,077
Total	2,710	4,093	952	381	812	338	480	1,077	

Source: 2007 Vietnam social accounting matrix.

ii. *Intermediate demand (Commodities, Activities)… 1,742*

This is the value of intermediate inputs used in the production process (i.e., the "use" matrix). The technical coefficients are based on the 2007 SUT (GSO GSO 2009c). These coefficients are the share of inputs used per value unit of output. A cut-off was applied to remove inputs with very small coefficients (i.e., below 0.001 or 0.1 percent of output value). This adjustment facilitates SAM-based analysis, but introduces small imbalances in the commodity accounts.

iii. *Producer taxes (Government, Activities)… 16*

Producer taxes are taken from the 2007 SUT (GSO GSO 2009c). Although the values do not perfectly reconcile, these include license taxes (VND 0.9 billion) and natural resource taxes (VND 19.9 billion) reported in the 2007 state budget (GSO 2009a).

iv. *Marketed supply (Activities, Commodities)… 2,710*

This is the value of total marketed output (i.e., the "supply" matrix). Since all output is assumed to be supplied to markets, this value is equivalent to gross output, where gross output is the sum of intermediate demand and GDP at factor cost. The original SUT (GSO, GSO 2009c) distinguishes between 138 commodities, but these were aggregated to 63 commodities in the 2007 SAM. Moreover, some industries in the SUT produced more than one commodity. Production of individual commodities was "backed-out" assuming the same technologies for all commodities produced by the same industry. This produces a diagonal supply matrix.

v. Transaction costs *(Commodities, Commodities)… 206*

This is the cost of trading and transporting goods from the farm or factory to domestic markets or to the border (in the case of exports), and vice versa (in the case of imports). These margins were taken from the SUT (GSO GSO 2009c) and split proportionally across imports, exports and domestically sold goods.

vi. *Indirect taxes (Government, Commodities)… 153*

While the macro SAM shows only a single row and column for government taxes, this cell entry actually consists of a number of distinct tax accounts. These include specific

accounts for direct, indirect and trade taxes as reported in the SUT (GSO GSO 2009c) and state budget (GSO 2009a).

The commodity tax entry consists of two indirect taxes: (1) import tariffs and (2) sales taxes. Both tax collection values were taken from the 2007 SUT. The total value of import tariff collections (VND 32 billion) in the SUT is slightly below the value in the state budget (VND 38 billion). The latter is defined as "import minus export taxes plus any special consumption tax on imports". The tax collection values in the SAM were also based on the SUT (VND 121 billion). These are higher than the values appearing in the state budget (VND 87 billion). The budget includes "value added tax" plus "special consumption taxes on domestic goods". The values from the SUT are chosen to maintain overall balance in the commodity accounts of the SAM, as well as the gap between GDP at factor cost and market prices.

vii.   *Imports (Rest of world, Commodities)… 1,025*

The value of total imports of goods and services was taken from the 2007 SUT (GSO GSO 2009c). It is slightly below the value appearing in national accounts (VND 1032 billion) (GSO GSO 2009b).

viii.   *Private consumption demand (Commodities, Households)… 759*

The payment from households to commodities is equal to household consumption of marketed production. The 2007 SAM does not distinguish between home-produced and marketed products and so this cell entry refers to both sources. The total level of private consumption of each commodity is based on the 2007 SUT (GSO GSO 2009c). Households in the SAM are disaggregated by rural and urban areas; farm and nonfarm households; and national per capita expenditure quintiles. This was based on information from the 2007 VHLSS (GSO GSO 2006). Consumption shares for each commodity were used to disaggregate consumption spending across the various household groups.

ix.   *Public consumption or recurrent demand (Commodities, Government)… 140*

This is the level of government recurrent expenditures. The 2007 SUT itemizes government consumption spending across commodities such as machinery and vehicles, but assumes that households are responsible for education, health and other social spending (financed by transfers from the government to households). By contrast, the

2007 SAM includes these items as part of government expenditures. As such, the final value of government consumption spending in the SAM is larger than the value in the 2007 SUT (VND 79 billion). Similarly, the value of household consumption spending (see above) is smaller in the SAM than in the SUT table (VND 818 billion). It is, however, closer to the value appearing in national accounts (VND 751 billion) (GSO GSO 2009b).

x. *Gross capital formation or investment demand (Commodities, Investment)… 480*

This is the aggregate value of public and private investment (VND 467 billion) as well as changes in inventories or stocks (VND 13 billion). This more detailed investment demand vector is taken from the 2007 SUT. The aggregate value of investment is consistent with national accounts (VND 476 billion). National accounts differ though in its valuation of gross fixed capital formation (VND 425 billion) and changes in stocks (VND 51 billion).

xi. *Exports (Commodities, Rest of world)… 767*

The value of total exports of goods and services was taken from the 2007 SUT (GSO GSO 2009c). It is significantly below the export value in national accounts (VND 878 billion) (GSO GSO 2009b).

xii. *Factor taxes (Government, Factors)… 8*

The model distinguishes between agricultural and nonagricultural capital. Nonagricultural capital pays taxes to the government (VND 5.7 billion), which includes "taxes on transfers of property". Agricultural land also pays taxes to the government (VND 2.4 billion), which includes "agricultural taxes" and "taxes on land use right transfers". Both taxes are drawn from the state budget (GSO 2009a).

xiii. *Factor payments to rest of world (Rest of world, Factors)… 52*

Nonagricultural capital repatriates some of its profits to foreign owners of the capital. The value of these remitted profits is taken from the balance of payments (IMF 2009) and is equal to "factor transfers debits".

xiv. *Factors earnings paid to enterprises (Enterprises, Factors)… 332*

The 2007 SAM distinguishes between agricultural and nonagricultural enterprises. Enterprises earn the returns to capital generated during the production process after

they have paid factor taxes and repatriated profits. Agricultural enterprises earn all agricultural capital incomes, while all nonagricultural capital is paid to nonagricultural enterprises.

xv. *Factor payments to households (Households, Factors)… 560*

Households receive factors includes directly from labor, livestock and agricultural land. The total value of these receipts depends largely on the sectoral value-added composition. They are distributed to different representative household groups based on incomes reported in the 2006 VHLSS. Labor income distribution is based on reported wage receipts and half of reported farm/nonfarm enterprise earnings (assuming that the remaining half is returns to capital). Earnings from crop land, aquaculture ponds, and livestock capital are distributed based on the reported incomes from these separate farm enterprises in the VHLSS.

xvi. *Government transfers to enterprises (Enterprises, Government)… 31*

These transfers from the government to nonagricultural enterprises are taken from the state budget (GSO 2009a). In the budget they consist of "economic expenditures" (VND 20 billion) and "interest on domestic debt" (VND 11 billion).

xvii. *Foreign transfers to enterprises (Enterprises, Rest of world)… 18*

Foreign transfers received by nonagricultural enterprises are taken from balance of payments (IMF 2009) and is equal to "factor transfers credits".

xviii. *Direct corporate taxes (Government, Enterprises)… 149*

Corporate income taxes are paid by nonagricultural enterprises to the government. The value of these taxes is taken from the state budget (GSO 2009a).

xix. *Enterprise transfers to households (Households, Enterprises)… 157*

Enterprises pay indirect capital returns to households. Nonagricultural enterprises payments are according to the nonfarm profits earned by all households as reported in the 2006 VHLSS. Agricultural enterprise payments to farm households are based on reported farm profits, including crops, livestock, agricultural services and aquaculture.

xx.   *Enterprise private savings (Savings, Enterprises)… 76*

In the absence of supporting data, it is assumed that enterprises save approximately 20 percent of their earnings, and that savings rates are twice as high for nonagricultural enterprises as for agricultural enterprises.

xxi.   *Government transfers to households (Households, Government)… 37*

This is social security and other transfers paid by the government to households. The total level of "social subsidies" was taken from the state budget (GSO 2009a). This was disaggregated across households using information reported by households in 2006 VHLSS (GSO GSO 2006). This included information on "pension and disability allowances", "welfare payments", "disaster recovery allowances" and "other social security".

xxii.   *Foreign remittances received by households (Households, Rest of world)… 59*

This is foreign workers' remittances to domestic households as reported in the balance of payments (IMF 2009) and is equal to "foreign transfer credits". This was disaggregated across households using reported "foreign remittance" incomes in the 2006 VHLSS (GSO GSO 2006).

xxiii. *Direct personal taxes (Government, Households)… 8*

Personal income taxes are paid by households to the government. The value of these taxes is taken from the state budget (GSO 2009a) and includes "individual income tax" (VND 7.4 billion) and "land and housing taxes" (VND 0.4 billion).

xxiv.   *Household private savings (Savings, Households)… 44*

In the absence of supporting data, household savings is treated as a residual balancing item after accounting for all incomes and expenditures.

xxv.   *Foreign transfers to the government (Government, Rest of world)… 4*

Government income from the rest of the world is the value of "foreign grants" as reported in the state budget (GSO 2009a).

xxvi.   *Public savings or recurrent fiscal balance (Savings, Government)… 130*

Government savings includes public investment and is treated as a residual balancing after accounting item for all government revenues and payments (GSO 2009a). The result is larger than the recurrent fiscal surplus reported in the state budget (VND 109 billion).

xxvii.   *Current account balance (Savings, Rest of world)… 230*

This is the current account balance or the total value of foreign savings. It is treated as a residual balancing item after accounting for all foreign receipts and payments (IMF 2009). The result is larger than the foreign balance reported in the balance of payments (VND 152 billion).

5. Balancing the prior SAM

The range of datasets used to construct the prior micro SAM implies that there will inevitably be imbalances (i.e., row and column totals are unequal). Cross-entropy econometrics is used to reconcile SAM accounts (see Robinson et al., 2001). This approach begins with the construction of the prior SAM, which as explained in the previous section, used a variety of data from a number of sources of varying quality. This prior SAM provided the initial 'best guess' for the estimation procedure. Additional information is then brought to bear, including knowledge about aggregate values from national accounts and technology coefficients. A balanced SAM was then estimated by minimizing the entropy 'distance' measure between the final SAM and the initial unbalanced prior SAM, taking into account of all additional information.

Balancing procedure for the SAM

The balancing procedure takes places in two stages. First, a very detailed national SAM was constructed using the supply-use table, national accounts, state budgets and balance of payments. At this stage, the SAM contains aggregate entries for factors and households. This aggregate national SAM was then balanced using cross-entropy.

After balancing the national SAM, it was then disaggregated across factors and households. Since the aggregate national SAM is balanced, this results in imbalances for the household accounts only. These household accounts were again balanced using cross-entropy, but holding all other non-household-related entries of the national SAM constant. Given the imbalances in the household survey between incomes and expenditures, the target household income/expenditure total for the final balanced SAM was the expenditure totals in the unbalanced prior SAM.

Cross-Entropy Estimation of the Balanced SAM

Table 8 presents the equations defining the SAM estimation procedure. Starting from an initial estimate of the SAM, additional information is imposed in the form of constraints on the estimation. Equation 1 specifies that row sums and corresponding column sums must be equal, which is the defining characteristic for a consistent set of SAM accounts. Equation 2 specifies that sub-accounts of the SAM must equal control totals, and that these totals are assumed to be measured with error (Equation 3). An example would be the estimate of GDP provided by national accounts, which is the total value of the Factor-Activity matrix in the prior SAM. The matrix G is an aggregator matrix, with entries equal to 0 or 1. The index k is general and can include individual cells, column/row sums, and any combination of cells such as macro

aggregates. Equation 4 allows for the imposition of information about column coefficients in the SAM rather than cell values, also allowing for error (Equation 5).

Table 8: Cross-entropy SAM estimation equations

Index	
i, j	Row (i) and column (j) entries
k	Set of constraints
w	Set of weights
Symbol	
T_{ij}	SAM in values
$A_{ij}, \bar{A}_{ij}$	SAM in column coefficients
G_{kij}	Aggregator matrix for each constraint k
$\gamma_{ij}, \bar{\gamma}_{ij}$	Aggregate value for constraint k
e_k	Error on each constraint k
e_{ij}^A	Error on each cell coefficient
$W, \bar{W}$	Weights and prior on error term for each constraint k or cell coefficient i,j
$\bar{V}$	Error support set indexed over w for each constraint k or cell coefficient i,j
Equations	

$$\sum_i T_{ij} = \sum_j T_{ij} \tag{1}$$

$$\sum_i \sum_j G_{kij} \cdot T_{ij} = y_k \tag{2}$$

$$\gamma_k = \bar{\gamma}_k + e_k \tag{3}$$

$$A_{ij} = T_{ij} \Big/ \sum_i T_{ij} \qquad \text{with} \qquad \sum_i A_{ij} = 1 \forall i \tag{4}$$

$$A_{ij} = \bar{A}_{ij} + e_{ij}^A \qquad \text{for some i and j} \tag{5}$$

$$e_k = \sum_w W_{kw} \cdot \bar{V}_{kw} \tag{6}$$

$$e_{ij}^A = \sum_w W_{ijw}^A \cdot \bar{V}_{ijw}^A \tag{7}$$

$$\sum_w W_{kw} = 1 \qquad \text{with} \qquad 0 \leq W_{kw} \leq 1 \tag{8}$$

$$\sum_w W_{ijw}^A = 1 \qquad \text{with} \qquad 0 \leq W_{ijw}^A \leq 1 \tag{9}$$

$$\min \left[\sum_k \sum_w W_{kw} \cdot (\ln W_{kw} - \ln \bar{W}_{kw}) + \sum_i \sum_j \sum_w W_{ijw}^A \cdot \left(\ln W_{ijw}^A - \ln \bar{W}_{ijw}^A \right) \right] \tag{10}$$

The error specification in Equations 2 and 3 describes the errors as a weighted sum of a specified 'support set' (the V parameters). The weights (W) are probabilities to be estimated, starting from a prior on the standard error of measurement of aggregates of flows (Equation 8) or coefficients (Equation 9). The number of elements in the error support set (w) determines how many moments of the error distribution are estimated. The probability weights must be non-negative and sum to one (Equations 8 and 9). The objective function is the cross-entropy distance between the estimated probability weights and their prior for the errors in both coefficients and aggregates of SAM flows. It can be shown that this minimand is uniquely appropriate, and that using any other minimand introduces unwarranted assumptions (or information) about the errors.

Various constraints were imposed on the model according to the perceived reliability of the data. Certain values that appeared in the supply-use table and national accounts were maintained in order to remain consistent with the overall macro structure of the economy. The macroeconomic aggregates that were maintained in the micro-SAM include: total labor value-added; total capital value-added; household final demand; government spending; investment demand; exports; imports; government borrowing/saving; current account balance; sales taxes; import tariffs; direct taxes on enterprises; government transfers to enterprises; enterprise transfers to the rest of the world; enterprise transfers to government; household transfers to government; government transfers to the rest of the world; and household foreign transfers received. The same standard errors were applied to all representative household groups.

6. Comparing the 2003 and 2007 SAMs

In this final section we briefly compare the 2003 and 2007 SAMs. Table 9 presents the macro SAM entries for the 2003 and 2007 SAM adjusted to 2007 prices using the GDP deflator. Real GDP at factor cost expanded by 34 percent during 2003-2007, which is equivalent to an average annual increase of 7.6 percent. Demand for intermediate goods increased faster than GDP reflecting the increase in importance of forward and backward production linkages in the economy. This surge in intermediate demand led to a larger increase in the value of gross output than in total value-added. On the expenditure-side, government recurrent spending almost tripled during 2003-2007. By contrast, private consumption spending was the slowest growing component of GDP, expanding by 37 percent over the period (i.e., an annual rate of 8.3 percent).

Along with rapid economic growth, Vietnam underwent a period of structural transformation. Table 10 reports sectors' contributions to national GDP. Agriculture's share of total GDP fell from 24.5 to 15.8 percent between 2003 and 2007. Crops accounted for the largest absolute decline (given its large initial size). However, it was the livestock and fisheries subsectors whose contributions to GDP virtually halved over four years. By contrast, services' share of total GDP rose significantly from 32.3 to 41.5 percent. Overall, industry maintained its contribution at around two fifths of total value-added. However, there was a slight shift in the composition of industrial GDP during 2003-2007, with construction growing rapidly and slower growth in both mining and manufacturing.

Import supply rose much faster than export demand during 2003-2007, with imports expanding by 82 percent over the whole period compared to 54 percent for exports (see Table 9). Although industry's contribution to total GDP remained fairly stable, its contribution to foreign trade increased substantially. The share of industrial goods in total imports and exports increased by 4.8 and 9.2 percentage points, respectively. This was driven primarily by manufactures, especially petroleum imports and food and machinery exports. The latter partly reflects the deepening of sectoral linkages within Vietnam, as exports shift from raw agricultural materials to processed foods with higher value-added.

Table 9: 2003 and 2007 Macro SAMs for Vietnam (VND billion in 2007 prices)

	Activities	Commod-ities	Factors	Enterprises	Households	Government	Investment	Rest of the World	Total
Activities		1683 2710 (1.61)							1683 2710 (1.61)
Commodities	969 1742 (1.80)	124 206 (1.66)			552 759 (1.37)	49 140 (2.81)	295 480 (1.62)	498 767 (1.54)	2490 4093 (1.64)
Factors	709 952 (1.34)								709 952 (1.34)
Enterprises			242 332 (1.37)			21 31 (1.44)		0 18 (70.22)	263 381 (1.44)
Households			436 560 (1.28)	130 157 (1.20)		66 37 (0.56)		42 59 (1.38)	676 812 (1.20)
Government	3 16 (4.11)	119 153 (1.28)	17 8 (0.46)	25 149 (5.88)	11 8 (0.72)			-1 4 (-2.02)	175 338 (1.93)
Savings				107 76 (0.71)	113 44 (0.39)	37 130 (3.44)		36 230 (6.25)	295 480 (1.62)
Rest of the World		562 1025 (1.82)	13 52 (3.81)						575 1077 (1.87)
Total	1683 2710 (1.61)	2490 4093 (1.64)	709 952 (1.34)	263 381 (1.44)	676 812 (1.20)	175 338 (1.93)	295 480 (1.62)	575 1077 (1.87)	

Source: 2003 and 2007 Vietnam social accounting matrices.

Notes: Top entry in each cell is 2003 value in 2007 prices (adjusted by GDP deflator); second entry is 2007 value; third entry is ratio of 2007 to 2003.

Table 10: Sectoral production and trade, 2003 and 2007

Sectors	Share of GDP (%)		Share of imports (%)		Share of exports (%)	
	2003	2007	2003	2007	2003	2007
Total GDP	100.00	100.00	100.00	100.00	100.00	100.00
Agriculture	24.54	15.84	1.83	2.25	7.62	6.95
Crops	14.78	10.80	1.28	1.64	5.40	3.06
Livestock	3.96	1.37	0.06	0.02	0.40	0.77
Forestry	1.07	1.21	0.45	0.56	0.03	0.01
Fisheries	4.73	2.46	0.05	0.02	1.79	3.11
Industry	43.15	42.65	85.47	90.39	77.67	87.20
Mining	11.46	10.64	0.58	0.35	21.33	16.81
Manufacturing	22.03	18.20	75.42	89.87	53.49	70.38
Processed foods	5.67	3.49	4.05	3.31	12.42	21.56
Textiles and clothing	3.93	3.18	13.28	7.31	21.61	16.59
Wood and paper	1.63	1.13	2.93	1.63	3.85	1.81
Chemicals	3.21	2.12	13.23	28.97	2.27	4.25
Machinery	4.55	4.97	39.49	46.44	11.14	17.44
Other manufacturing	3.04	3.32	2.44	2.19	2.19	8.73
Utilities	3.92	3.78	9.46	0.17	2.86	0.00
Construction	5.73	10.02				
Services	32.31	41.51	12.71	7.36	14.70	5.86
Private services	29.21	31.64	12.71	5.88	14.70	5.56
Government	3.10	9.88		1.48		0.30

Source: 2003 and 2007 Vietnam social accounting matrices.

Notes: "GDP" is gross domestic product.

Table 11 reports changes in household income and consumption patterns. Per capita consumption spending grew from VND 7.0 million (US$440) in 2003 (in 2007 prices) to VND 9.2 million (US$576) in 2007. This rapid income growth was over and above an average increase in Vietnam's population of 1.27 percent per year during 2003-2007. This reflects a substantial improvement in household welfare during this period and underpinned the decline in poverty observed in the household surveys. In line with Engel's Law, the share of food in households' consumption spending declined slightly from 41 percent in 2003 to 38 percent in 2007. This decline was larger in urban areas, even though per capita consumption grew more rapidly in rural areas (i.e., 7.0 percent compared 5.9 percent in urban areas). However, population growth in urban areas was significantly faster during this period, such that urban households' share of total consumer spending rose more in absolute terms.

Table 11: Household consumption spending, 2003 and 2007

Households	Consumption share (%)		Population (1000s)	Per capita consumption	
	Food	Non-food		VND1000	US$
All households (2003)	41.0	59.0	78,352	7,045	440
Urban	34.9	65.1	19,564	11,626	727
Rural	45.3	54.7	58,788	5,521	345
All households (2007)	38.0	62.0	82,404	9,215	576
Urban	30.3	69.7	22,042	14,620	914
Rural	43.7	56.3	60,362	7,242	453

Source: 2003 and 2007 Vietnam social accounting matrices.

Notes: Per capita consumption values in 2007 prices (adjusted by GDP deflator).

In summary, the 2003-2007 period was characterized by rapid economic growth, a deepening of sectoral linkages, and the increasing importance of the public sector. Vietnam also experienced a large decline in the contribution of agriculture and an equally large expansion of services (part of which was driven by public spending). The country's trade balance worsened, due mainly to large increases in import demand, especially for petroleum. Much of the expansion of exports involved agriculture moving up the value-chain to processed foods. While there was a notable increase in private remittances, the burgeoning trade deficit resulted in a much current account deficit (i.e., 24 percent in 2007 compared to 5 percent in 2003). Rapid economic growth benefited households, with real consumption spending outpacing population growth, especially in rural areas. This clearly reflects the rapid pace of structural transformation in Vietnam, and underlines the importance of maintaining up-to-date SAMs for use in conducting growth and poverty analysis and designing policies.

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