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RICE PRICE POLICIES IN INDONESIA: A COMPUTABLE GENERAL EQUILIBRIUM (CGE) ANALYSIS

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Abstract

This paper presents an agriculture sector focused Computable General Equilibrium (CGE) model for analyzing the economy-wide impacts of changes in production technology, protection, and market structure on resource allocation, production, and trade in Indonesia. The paper incorporates a specification of the rice market and models Bulog's (National Logistic Agency) behavior using a mixed complementarity approach. This approach allows the specification of inequalities and changes in policy regime as prices and/or stocks move within specified bands. The model is used to examine the impact on the Indonesian economy of changes in rice yields given different assumptions about the operations of Bulog. The general equilibrium approach does capture and quantify the effects of the price support policies on resource allocation, trade, relative prices, and the government budget. An important result is the inefficient allocation of resources within the agriculture sector and the rest of the economy if Bulog operates to maintain the rice price when there are significant increases in rice productivity. Instead of releasing resources to other high-value agriculture uses and non-agriculture uses, the price support scheme attracts more resources into rice production. In addition, the price support program is costly and strains the government accounts, even if the administrative cost of operating the program are ignored.

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List of Abbreviations

AG-CGE	Agriculture Sector Focused Computable General Equilibrium
BPS	Biro Pusat Statistik
Bulog	National Logistic Agency
CES	Constant Elasticity of Substitution
CET	Constant Elasticity of Transformation
CGE	Computable General Equilibrium
COL	Jakarta Cost of Living Index
Dolog	Regional Logistic Agency
GAMS	General Algebraic Modeling System
KUDs	Village Cooperatives
SAM	Social Accounting Matrix

1. Introduction

Food policy in Indonesia aims to achieve food security by increasing food production, raising farm income, improving nutritional status of the people, and to ensure the availability of food supplies at affordable prices (Bulog, 1995). For the last 27 years, Indonesian food policy has centered on rice, the most important staple crop and sometimes referred to as a strategic crop. Maize, soybean, sugar cane, and cassava are considered important secondary crops. Since the early 1970s, rice policy in Indonesia have sought to attain food self sufficiency through price support policies, price stabilization policies, and public investment policies (Pearson et al., 1991). Bulog (national logistic agency) was authorized to implement the pricing policies for rice and to provide monthly rations to the military and civil service. Bulog also provides assistance in releasing food from stocks in case of national catastrophes such as earthquakes and floods. Bulog's market interventions were later extended to a wide variety of commodities including maize, mungbean, sugarcane, soybean, soybean meal, wheat, wheat flour, chicken, and eggs. Currently, rice, sugarcane, garlic, soybean, wheat, wheat flour, and crude palm oil are included on the list. In addition, Bulog occasionally operates in other commodity markets, especially when the price fluctuates extensively due to shortages or market imperfections[1].

Bulog's intervention to achieve commodity price stabilization has been acclaimed for its contribution to Indonesia's political stability and development. With an average annual growth rate of 6.7 percent, one of the fastest growing economies in Asia, Indonesia's dependence on agriculture has declined. The contribution of agriculture to GDP is nearly 23% in 1995 compared to 48% in the early 1970s. In addition, as the international economy moves toward trade liberalization, multilateral trade agreements have emphasized reduction of government protection in the agriculture sector. Consequently, the debate in Indonesia on market interventions has been accelerated in recent times.

In order to assess the economy-wide impacts of commodity market interventions, this study presents an Agriculture sector focused Computable General Equilibrium (AG-CGE) model for Indonesia. This analytical framework focuses on agriculture and on links between the agriculture and non-agriculture sectors. The model provides a good framework for analyzing the impacts of changes in production technology, protection, subsidies, and market structure on resource allocation, production, employment, and trade. The model used in this paper incorporates a specification of the rice market and the role of Bulog, and is used to examine how changes in rice yields affect the economy under different scenarios concerning Bulog's management of the market and trade.

[1] For Example, when there was a sudden chili price hike in February 1996, Bulog imported chili from Thailand and sold it in local markets.

In the next section, we discuss the operational structure of Bulog for long-term protected commodities: rice, soybean, sugar cane, and wheat. Section 3 introduces the Social Accounting Matrix (SAM), which incorporates much of the data used in the model. Section 4 outlines the equations of the core CGE model and a specification for Bulog operations in the rice market. Section 5 discusses model calibration, policy experiments, and their results.

2. Price Policies and Operational Structure of Bulog[2]

2.1 Rice

The basic concepts underlining the current price level policies for rice were laid out by Mears and Afiff in 1969. The four major policy objectives are: (1) setting the floor price high enough to stimulate production, (2) establishing a ceiling price which assures a reasonable price for consumers, (3) maintaining sufficient range between these two prices to provide traders and millers reasonable profit after holding rice between crop seasons, and (4) keeping an appropriate price relationship between domestic and international markets. Bulog's implementation of these price and price stabilization policies for rice involves setting a floor price and a ceiling price, procuring paddy or milled rice, stock management and quality control, distribution, as well as importing and exporting.

The floor price and ceiling price are determined by Bulog in conjunction with three ministries: Coordinating Ministry of Economics, Ministry of Trade, and Ministry of Agriculture. During the last decade, floor price decisions were based on simulation analyses drawing on estimates of elasticities and other parameters. The impact of different combinations of floor prices and fertilizer prices on farmers' income, inflation, consumer prices, and farmers' term of trade were analyzed and "appropriate" price levels were then selected (Amang, 1993). The floor price for paddy is usually announced during October to December for the following calendar year. However, the ceiling price has not been officially announced since 1980, yet experienced private traders said to have been able to project the price that Bulog defends. Before 1979, the Jakarta cost of living index (COL) was used as the primary criterion for setting the ceiling price. During the year, Bulog would occasionally release stocks to limit the price increases of the bundle of COL rice varieties so that the changes stay within the rate of inflation.[3] In April 1979, when consumer price indices (CPI) for 17 major cities were introduced, the CPI become the new basis for setting the ceiling prices (Mears, 1981). The margin between the floor price and consumer retail price fluctuates over time (Table A.1.4.). The average margin in the 1990s has been approximately 21%.

Chart 1 illustrates Bulog's market operations for paddy and rice. Village cooperatives (KUDs) were established in 1973 with one of their functions being the purchase of paddy from farmers. Dolog (regional logistic agency) pays the floor price plus a commission for the KUDs services in purchasing paddy from farmers. If KUDs are pressed beyond their

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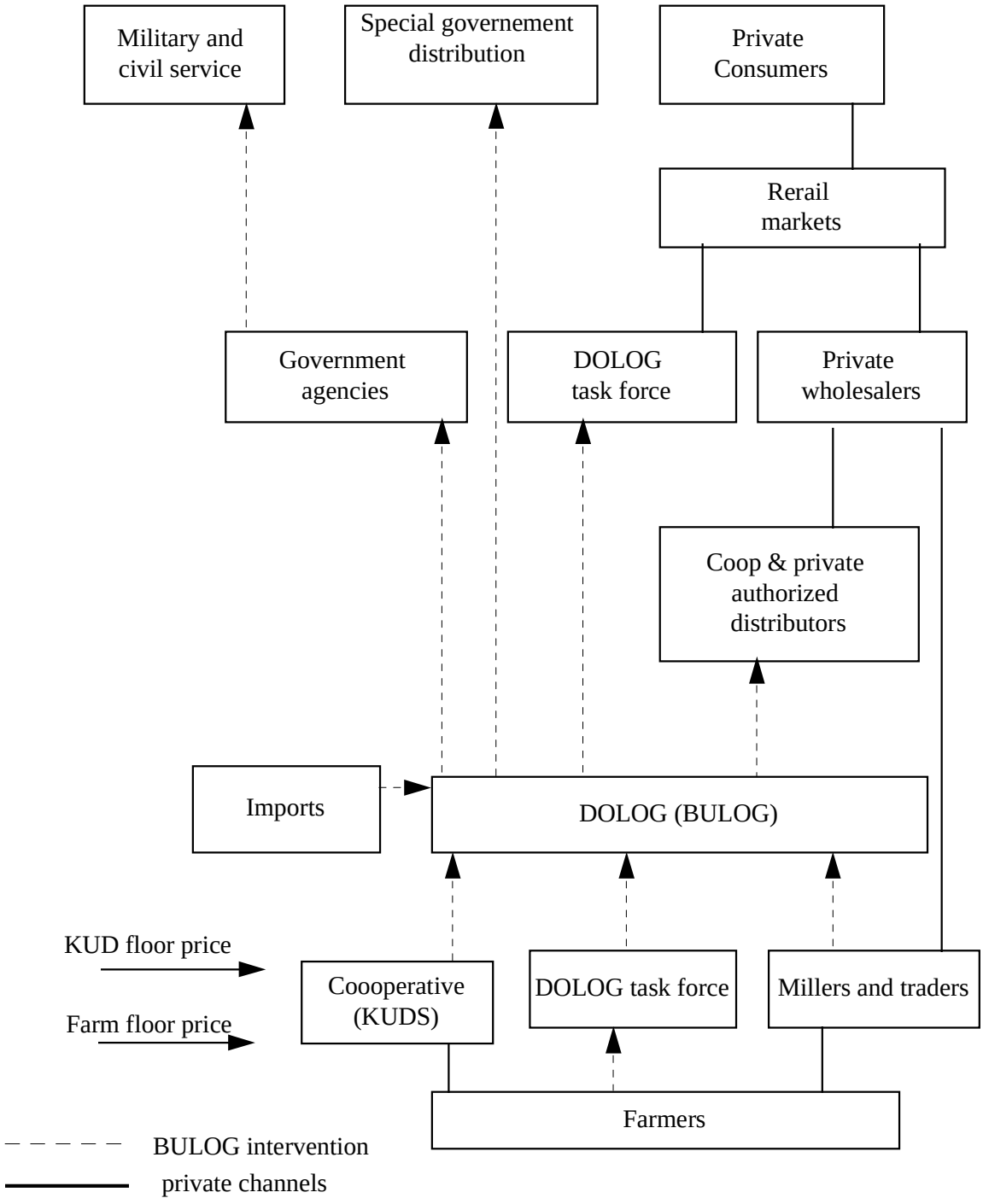
[2] Materials in this section are largely drawn from Bulog: The National Grain Authority of Indonesia (1992) Jakarta Indonesia, and Bulog: National Logistic Agency (1995) Jakarta. Indonesia.

[3] These include the six most prevalent rice varieties found in the latest bi-monthly market survey by the Census Bureau.

Chart 1. BULOG market operations for paddy and rice

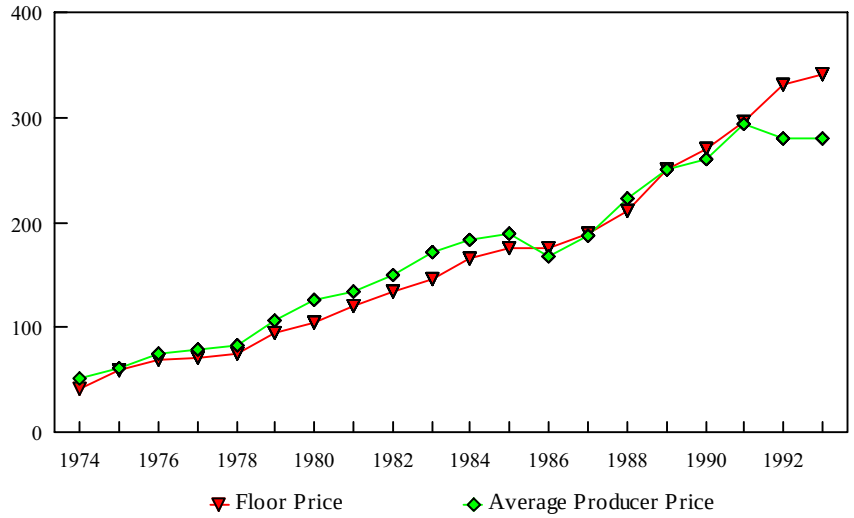


Source: Adapted from BULOG: The national food grain authority of Indonesia , 1982.

capacity, Dolog task forces are prepared to buy directly from farmers. Bulog also purchases paddy or rice from private traders. The government announced floor price requires certain quality standards including moisture content, percent of broken and discolored grains, etc. If the grain quality is not met as specified, Bulog's agents may adjust the purchase price in the field according to the prevailing price list. Figure 1 shows the historical relationship between government announced floor price and farm level paddy price from 1974 to 1993.

The purpose of Bulog purchasing rice is to keep the market price near the floor price and of releasing stocks to keep the retail market price at or below the desired inflation rate. These activities are mainly supported by stock management. Since rice production in Indonesia is continuous, rice is being harvested somewhere in the country at any given time. In Java, which accounts for 60% of total production, rainy season rice is planted in November and harvested from March. The data indicate that Java rice production dominates Bulog's monthly domestic procurement, with most of Bulog's purchases being conducted during

Figure 2.1. Government support floor price and average producer price for paddy , 1974-1993



Source: Statistik Bulog Tahun 1969-91 and 1983-93

March, April, and May. Bulog's domestic procurement of rice has never been over 10% of total rice production. Although Indonesia claims to have been self-sufficient in rice in 1985, it has been importing on and off since 1987. The amount of imports reached three million tons in 1995 following the drought year.

Bulog storage facilities are scattered throughout the country and total capacity of Bulog's warehouses is around 3.5 million tons. In recent years, Bulog maintains an average of two million tons of rice per year as a combined operational stocks, buffer stock and surplus stock. Operational stock, held for military and civil service, is 500 thousand tons a year. Buffer stock, sometimes refereed to as "food security reserve stock" to stabilize prices, is

around one million tons. Surplus stock is the excess of rice above operational and buffer stock. Bulog's occasional releases during the last ten years have averaged around 8% of total available rice.

Fertilizer subsidies have also been an important instrument of rice policy in Indonesia. Since the late 1960s, fertilizer subsidies have been given to farmers by setting the wholesale prices of urea, triple super phosphate (TSP), and ammonia. Village cooperatives (KUD) and traders are allowed to distribute fertilizers to farmers at the official retail price level. Domestic fertilizer manufacturing plants were constructed in the mid-1970s in order to ensure adequate supplies (Pearson, et al., 1991). Timmer (1985) estimated that approximately one-half of the growth in rice production from 1968 to 1984 was attributed to improved incentives to farmers created by stable rice prices and fertilizer subsidies. However, the government has been gradually phasing out the fertilizer subsidy program and, from the beginning of 1994, only urea is being subsidized. The ratio of paddy support price and subsidized domestic urea fertilizer price increased from 1970 to 1985, and was constant during the past decade.

Development of irrigation infrastructure and maintenance, transportation facilities, research and development, and dissemination of seeds and technologies for high yielding varieties are among the policy instruments used in Indonesia. Various intensification programs are known by the acronyms BIMAS, INMAS, INSUS, and SUPRA-INSUS. The first of these, the BIMAS programs, helped farmers to use improved seeds, fertilizers, pesticides, and adopt better cultivation and water management practices. The INMAS programs provided farmers with improved access to capital and extension services related to rice production. INSUS and SUPRA-INSUS programs were designed to accelerate technology adoption by requiring farmers groups of 50 to 100 with contiguous plots to make joint decisions on seeds, planting times, pest management, and off-season crop choices (Piggott, et. al., 1993). As a result, paddy production has more than doubled, from 21 million tons in 1973 to over 46 million tons in 1994. Most of these increases were due to increases in yields, from 2.56 to 4.34 tons of rice per hectare compared to an increase in area harvested from 8.4 to 10.6 million hectares in the same period (Table A.1.1.). Indonesia rice yields are among the highest in the world, although, there is still scope for quality improvement.

2.2 Soybean

Soybean is one of the important secondary crops, usually grown following rice. Some argued that soybean production in Indonesia is largely inefficient mainly due to the low yield (Rosegrant, *et al.*, 1986; Wiebe, 1990). With the five year development plan (PELITA V) 1988/89 -1993/94, a diversification program has been adopted to promote the development of soybean along with other secondary crops. Government policies to stimulate the domestic production and stabilize the retail market prices for soybean included price level policy, trade policy, and input subsidies. Earlier, credit and chemical fertilizers (urea, TSP, ammonia) were being subsidized to soybean farmers, however, these programs have been gradually

phasing out and only urea is being subsidized in 1994 . Currently, Indonesia is producing nearly one and a half million tons of soybean and importing half a million tons each year to meet domestic consumption (Table A.1.2.). Average annual soybean production growth is 7%, which is largely due to increase in area harvested.

Bulog is assigned to implement price and trade policy for soybean. Chart 2 illustrates the Bulog market operation for soybean since 1977. Bulog sets the import quotas to protect the domestic producer. The floor price for soybean is supported by direct purchase of KUDs, Bulog task force, and Association of Wholesalers and Distributors (AWSD) from the farmers. However, the government floor price has not been effective since the average producer price is always above the floor price (Table A.1.5.). As a result from the beginning of 1983, Bulog no longer purchases from domestic farmers. Majority of Bulog imports are distributed directly to the soybean product manufacturers. The Bulog ceiling price for manufactures and retail markets are monitored and adjusted by quantity allocations to the region. In recent years, Bulog annual soybean stock average 124 thousand tons, which is 6% of annual domestic demand.

2.3 Sugar

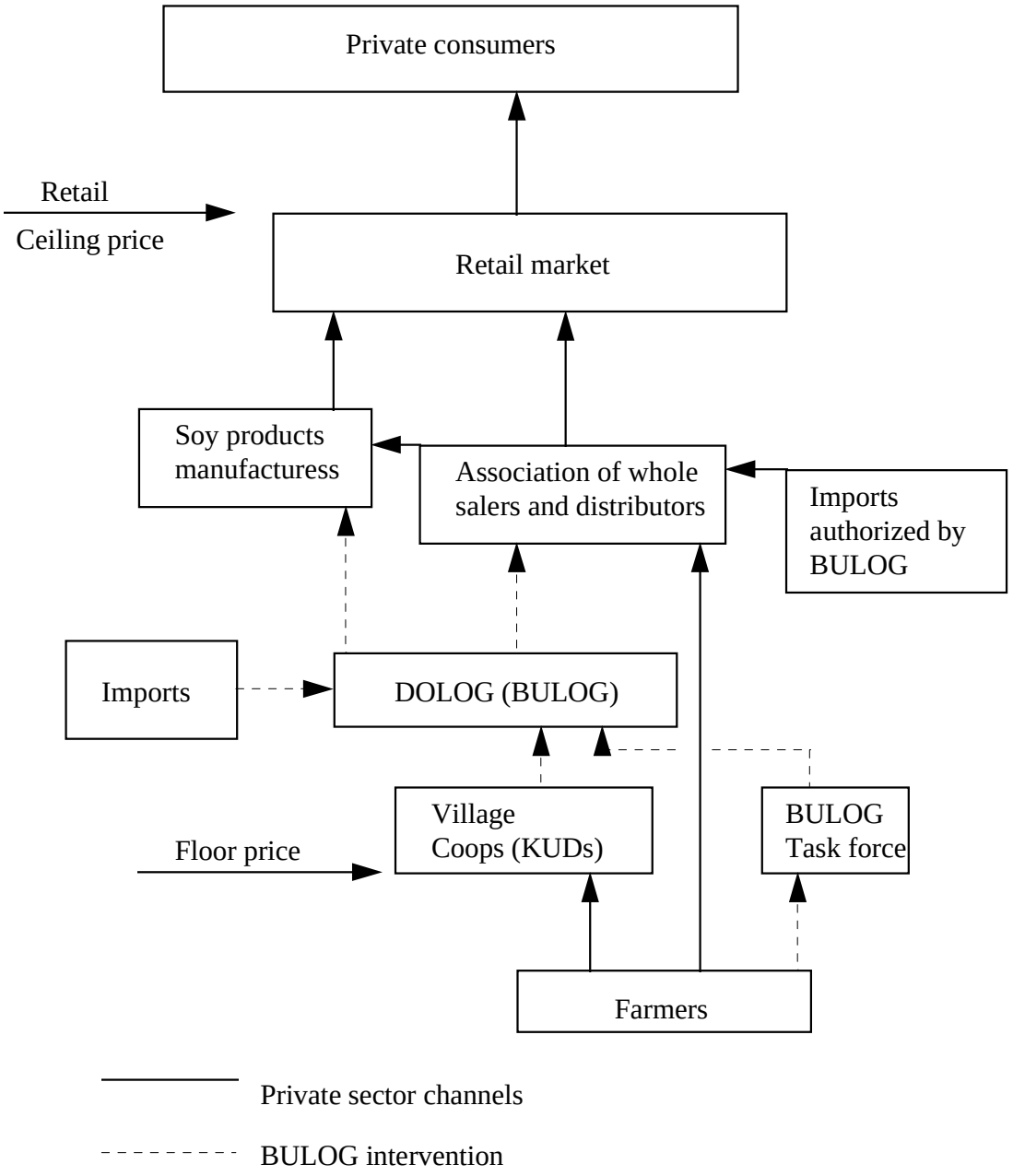
Sugarcane is widely considered as one of the strategic commodities in Indonesia. Price level policies, trade policy, and input subsidies are also used to support domestic cane sugar production and achieve market stability. Since 1982, marketing of sugar cane and white sugar has been controlled by Bulog. The Sugar cane industry has been heavily subsidized by the government, amounting to US $313 million in 1991, with 75% in the form of price setting (Soentoro and Sudaryanto, 1996).

Chart 3 displays the Bulog market operation for sugar. At the farm level, cooperatives are authorized to collect the sugarcane from farmers and send it to the mills. Farmers receive payments for their cane in terms of sugar and cash from cooperatives. The floor price support is mainly supervised by cooperatives. White sugar from mills and imports is distributed by Dolog to large industrial users, cooperatives, and private distributors in each province. The allocations to provincial distributors are increased or decreased according to how the price moves in relation to the desired ceiling price.

The government has maintained the floor price for sugarcane in proportion to that of rice. The ratio of the floor price for sugarcane (ex-factory price[4]) to the price of rice has been maintained at 1.5 since 1983 (Soentoro and Sudaryanto, 1996). During the last decade, the government announced floor prices has been on average 64% above the London fob sugar price, protecting local producers from the world market (Table A.1.6.). Nevertheless,

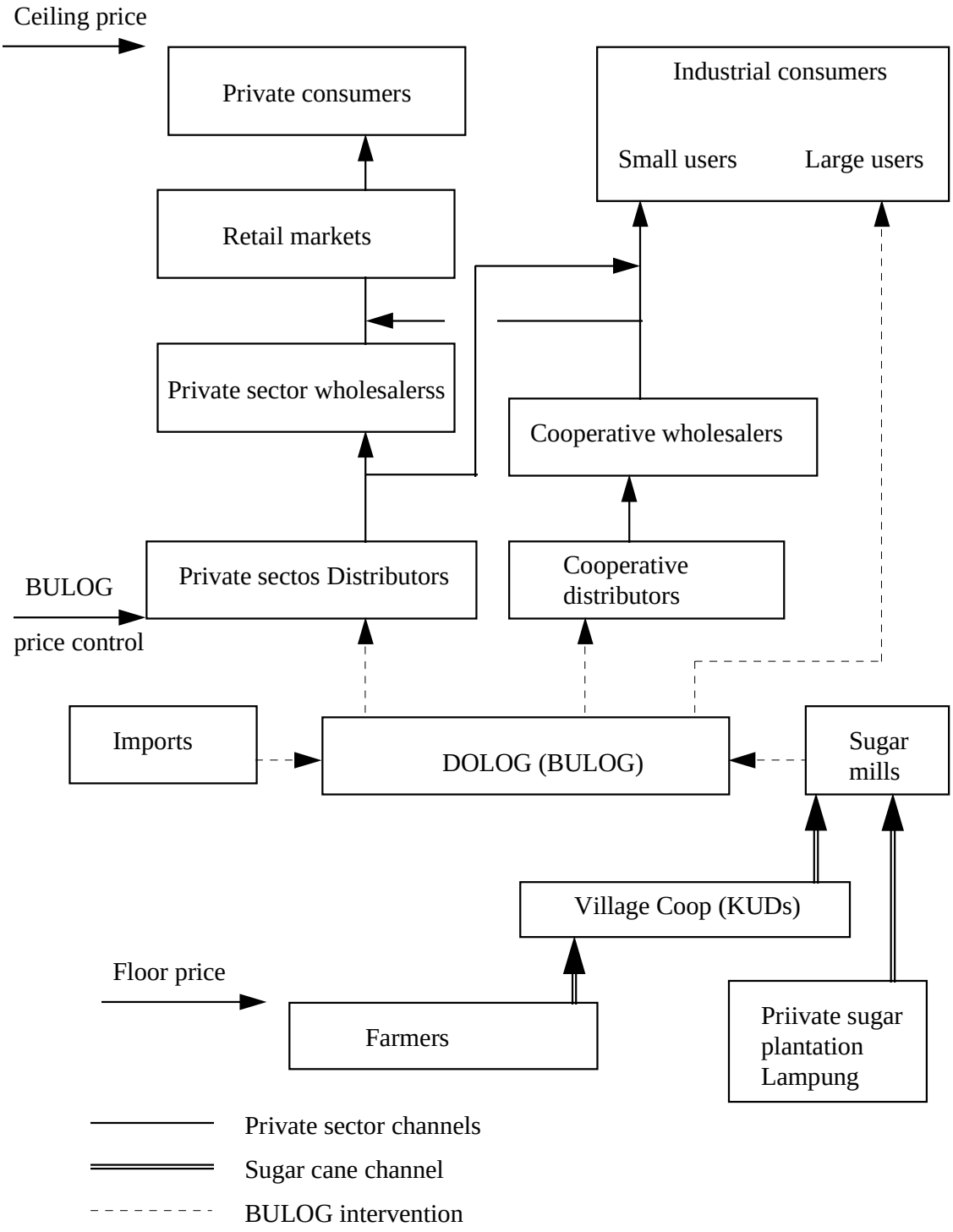
[4] Price received by farmers and millers.

Chart 2 BULOG market operation for soybean



Source: Adapted from BULOG: The national food grain authority of indonesia, 1982.

Chart 3 BULOG market Intervention for white sugar



Source: Adapted from BULOG: The national food grain authority of Indonesia , 1982.

domestic cane sugar productivity has been stagnant for the last ten years. While production increases over the past ten years have been nearly 5% per year, they are largely due to increases in area harvested. In 1993, Indonesia produced 2.4 million tons of sugar and imported 237 thousand tons, which is 10% of the total sugar supply. In recent years, Bulog's annual stock of sugar has been approximately 42% of domestic production.

2.4 Wheat and wheat flour

All wheat consumed in Indonesia is imported. Since 1971, Bulog has regulated both international and domestic marketing of wheat and wheat flour (Chart 4). PT Bogasari in Java and PT Berdikari in Sulawesi are the only two private flour mills which received licenses from Bulog to import, process, and distribute wheat and wheat flour. Between the two, PT Bogasari maintains a dominant position, with 87% of the domestic market and, in addition, they strongly influence or control management of PT Berdikari (Kompas, 1995a).

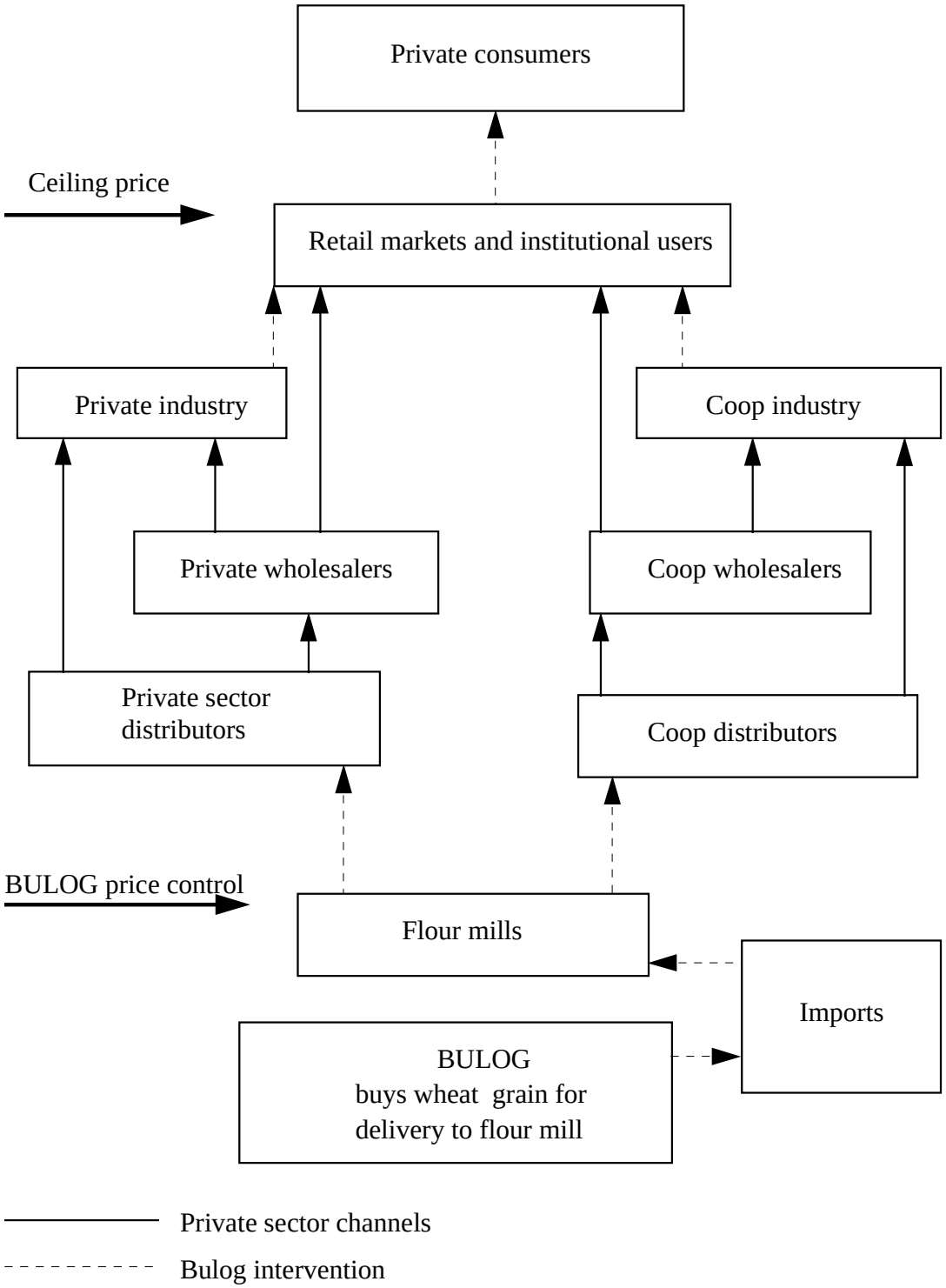
Imported wheat grains are sent directly to the private flour mills at a price determined by Bulog. Wheat flour is distributed to industries and other consumers through both private and cooperative distributors, at a price determined by Bulog. Similar to other controlled crops, the price ceiling for wheat flour is realized by adjusting the quantity distributed from the factory.

The wheat grain price for flour mills has been fixed at 141 Rp/kg since 1984 regardless of price fluctuations in the world market. The difference is being subsidized by Bulog with the fund provided by processing and distribution industry. However, studies argued that the subsidy seemed to be mostly incurred to consumers (Kwik Kian Gie, 1995; Kompas 1995b). The amount of subsidy reached approximately US $ 300 million in 1994 (Kompas 1995b).

2.5 Funding and expenditure

Bulog receives its funding in terms of credit from the Ministry of Finance via the Central Bank, and the amount of credit is limited by the current value of stocks in the pipeline. The interest rate charged to Bulog is adjusted periodically; the annual rate is 12% for the year 1996 (Bulog, 1996). Bulog, then makes payments for the imported commodities by opening letter of credits to the supplier, and for domestic procurement by transfer payment through the bank upon receiving complete documentation of the transactions, while farmers receive cash for their commodities from Bulog's agents. Private traders use their own funds and KUDs are financed by the Peoples' Bank of Indonesia with the credit limit depending upon potential availability of commodities in the region. The annual rate charged to KUD was 14% for 1996 and is also adjusted periodically (Bulog, 1996). Bulog annual expenditure for purchase, release, stock management, distribution, imports, and administration is approximately US$ 1.5 billion in 1991-92 (Bulog, 1995).

Chart 4 BULOG market intervention for wheat and wheat flour



Source: Adapted from BULOG: The national food grain authority of Indonesia , 1982.

3. The Social Accounting Matrix (SAM) for Indonesia

A SAM is a system for organizing economic transactions over a defined period of time (usually a year) and is in the form of a square matrix, with column sums equaling corresponding row sums. A SAM provides a single framework that reconciles both the input-output accounts (which portrays the system of interindustry linkages in the economy) and the national income and product accounts. The SAM generalizes the input-output idea that one sectors's purchase is another sector's sale to include *all* transactions in the economy, not just inter-industry flows. Any flow of money from, say, a household to a productive sector (representing the purchase of that sector's output by the household), or from a household to the government (representing tax payments), is recorded in the SAM as an expenditure *by* some actor (a column) *to* some other actor as revenue (a row).

The second idea embodied in the SAM, derived from national income accounting, is that income always equals expenditure. While true for the economy as a whole, the SAM requires a balance in the accounts of every actor in the economy. For example, the income from sales in the agriculture sector must equal its total expenditures on intermediate inputs, labor, imports, and capital services. Traditionally, this balance is captured in double-entry bookkeeping by the requirement that the two sides of the ledger must be equal. In the SAM, incomes appear along the rows, and expenditures down the columns; thus the budget constraints require that the row sum (income) must equal the corresponding column sum (expenditure) for every actor.

The SAM also distinguishes between "activities" and "commodities," allowing for two different effects. First, it permits more than one type of activity to produce the same commodity, thereby allowing for different production technologies. For example, small- and large-scale farmers may produce the same crop (a single "commodity"), but with different factor intensities (two or more "activities"). Second, this treatment addresses several difficult problems that arise from dealing with imports. If imports are at all competitive with domestically produced goods (which is usually the case), then domestic demand will consist of both types of goods. However, only domestic goods are exported. Separating activity accounts (or the domestic *production* of goods) from commodity accounts (the domestic *demand* for goods) enables us to portray this difference.

The different accounts in the SAM outline the boundaries of an economywide model. Table 3.1 presents an aggregate SAM for Indonesia for 1990, which provides a useful representation for discussing the equations of the core CGE model, while Table 3.2 shows the level of dis-aggregation of the aggregate SAM underlying the CGE model of this paper.[5] Specifying a "complete" model requires that the market, behavioral, and system relationships embodied in each account in the SAM be described in the model. The *activity*, *commodity*,

[5] Appendix 3 presents the full dis-aggregated SAM as described in Table 3.2.

and *factor* accounts all require the specification of market behavior (supply, demand, and clearing conditions). The *households, enterprise*, and *government* accounts embody the private and public sector budget constraints (income equal expenditure). Finally, the *capital* and *world* accounts represent the macroeconomic requirements for internal (saving equals investment) and external (exports plus capital inflows equal imports) balance.[6]

[6] See Pyatt and Round (1985) for more information on Social Accounting Matrices, and for more information on Social Accounting Matrices for Indonesia see Biro Pusat Statistik (BPS) (1994a), the government official agency responsible for data collection and processing at the national level.

Table 3.1. An Aggregate SAM For Indonesia, 1990 (BILLIONS OF 1990 RP)

		Expenditures or Outlays										
		Value Added			*Suppliers*		*Institutions*					
		Labor (1)	Land (2)	Capital (3)	Activity (4)	Commodity (5)	Households (6)	Enterprise (7)	Government (8)	Capital (9)	World (12)	Total
Receipts	*Value Added*											
	Labor				94027.1							94027.1
	Land				13953.5							13953.5
	Capital				90616.5							90616.5
	Suppliers											
	Activity					355053.2					53288.7	408341.9
	Commodity				200540.3		127330.9		15502.8	64790.0		408163.9
	Institutions											
	Households	94027.1	13953.5	35855.3			4616.2	242.7	5723.4		3612.6	158030.9
	Enterprise			54761.2							-4272.0	50489.2
	Government				9204.5	3064.9	1997.8	23059.1			-4090.1	33236.2
	Capital Account						24086.0	19667.5	12010.0		9026.5	64790.0
	World					50045.8		7519.9				57565.7
	Total	94027.1	13953.5	90616.5	408341.9	408163.9	158030.9	50489.2	33236.2	64790.0	57565.7	

Source: Biro Pusat Statistik (1994a) and (1994b)

Table 3.2. SAM disaggregation (Activities, Commodities, factors, and institutions)

Set	Elements
Activities/Commodities	*Agricultural* (13)
	Rice, Soybeans, Maize, Cassava, Vegetables and fruits, Other food, Rubber, Sugarcane, Coconut, Palm Oil, Other non-food, Livestock, Forestry
	Other (21)
	Fishery, Oil, Mining, Food processsing, Textiles, Paper, Fertilizer, Chemical, Petroleum refinery, Cement, Steel, Other manufacturing, Construction, Electricity-Gas-Water, Trade, Restaurant and Hotels, Transportation and Communication, Services, Public Administration, Other Services.
Factors of Production	*Labor* (10)
	Rural paid agriculture labor, Urban paid agriculture labor, Rural unpaid agriculture labor, Urban unpaid agriculture labor, Rural production transport equipment operator and manual labor, Urban production transport equipment operator and manual labor, Rural clerical sales and services labor, Urban clerical sales and services labor, Rural professional and managerial labor, Urban professional and managerial labor,
	Land
	Capital
Institutions	*Households* (8)
	Agriculture: Agricultural worker, Small farmer, Medium farmer, Large farmer Other: Rural lower level, Rural higher level, Urban lower level, Urban higher level
	Companies
	Government
	Rest of the World

4. Equations of the Core CGE Model

The SAM presented above provides a description of the circular flow of income in the Indonesian economy from activities to factors of production, to institutions, to commodities, and back to activities. The role of the AG-CGE model is to specify the market, behavioral, and system relationships embodied in each account of the SAM. This section presents the equations of AG-CGE that capture these relationships. First, Table 4.1 lists all the model indices, parameters, and variables of the model. Second, equations defining the price system are presented, followed by equations defining production technology, value added, and the mapping of value added into institutional income. Then equations specifying the balance between supply and demand for goods by the different agents complete the circular flow. Finally, the market clearing conditions and the macro closure rules, often referred to as system constraints that the model economy must satisfy, are presented.

Some notational conventions are followed consistently. Endogenous variables are presented in upper case, while parameters and exogenous variables are always lower case or Greek letters. Indices appear as lower case subscripts, and consist of sectors (*i* and *j*), primary factors of production (*f*), and households (*h*). In a few equations, an index is replaced by a specific entry from the set. Appendix 2 to this paper presents the basic elements (sets, parameters, variables, and equations) of the model in GAMS syntax

4.1 Price Equations

Table 4.2. presents the equations defining prices in the model. Equations (1) and (2) define import and export domestic prices, respectively. On the import and export side, the "small country" assumption is maintained as the world price of imports (pwm) and exports (pwe) are exogenous.[7] Both the domestic price of imports (PM) and the domestic price of exports (PE) are the tariff or subsidy-inclusive world price times the exchange rate (EXR).

Equation (3) defines domestic commodity prices (PDC) as the domestic activity goods price multiplied by the make matrix coefficients. Equations (4) and (5) describe the prices for the composite commodities Q and X. Q is total sectoral domestic use, which is a constant elasticity of substitution (CES) aggregation of sectoral imports (M) and domestic goods supplied to the domestic market (D). X is total sectoral output, which is a constant elasticity of transformation (CET) aggregation of goods supplied to the export market (E) and goods sold on the domestic market (D)[8].

[7]The model can easily incorporate downward-sloping demand curves for exports, endogenizing the world price of exports, pwe.

[8] Equations (4) and (5) are cost functions arising from first-order conditions for the CES and CET functions. Since CES and CET aggregation functions are linearly homogeneous, the cost functions can be replaced by the accounting identities shown (showing each price as the average of a traded price and a domestic price), as the first order conditions will be incorporated in the import demand and export supply functions presented later.

Table 4.1. Definition of Model Indices, parameters, and Variables

i, j	Sectors	Rice	Furniture
		Soybeans	Textiles
		Maize	Paper
		Cassava	Fertilizer
		Vegetables and fruits	Chemical
		Other	Petroleum Refinery
		Rubber	Cement
		Sugarcane	Steel
		Coconut	Other manufacturing
		Palmoil	Construction
		Other	Electricity, gas, and water
		Livestock	Trade
		Forestry	Restaurants and hotels
		Fishery	Transportation and communication
		Oil	Services
		Mining	Public administration
		Food Processing	Other services
iag	Agricultural Sectors	Rice	Sugarcane
		Soybeans	Coconut
		Maize	Palmoil
		Cassava	Other
		Vegetables and fruits	Livestock
		Other	Forestry
		Rubber	Fishery
iagn	Non-agricultural Sectors (iag + iagn = i)		
IE	Export sectors		
IE1	Export sectors with CET function		
IE2	Export sectors with no CET function		
IE2A	Export price fixed to domestic price and exports E adjusts		
IE2B	Export price free and exports E is fixed		
IED	Sectors with export demand equation		
IEDN	Sectors with no export demand equation		
IEN	Non export sectors		
IM	Import Sectors		
IMN	Non Import Sectors		
MQRN	mport rationed sectors		
F	Factors of production		
	Agriculture Rural Paid labor		
	Agriculture Urban Paid labor		
	Agriculture Rural Unpaid labor		
	Agriculture Urban Unpaid labor		
	Rural Production & Transprt & Manual		
	Urban Production & Transprt & Manual		
	Rural Clerical & Sales & Services		
	Urban Clerical & Sales & Services		
	Rural Prof & Tech & Supervisor		
	Urban Prof & Tech & Supervisor		
	Land		
	Capital		
ITOP	Subsidized consumption sector		
ITARG	Target price sectors	Rice	
IESET	Non CET sectors	Rice	

Table 4.1. (cont.)

Parameters

A	AC(i)	Armington function shift parameter
	AD2(i)	CES shift parameter
	ALPHA2(i,f)	CES factor share parameter
	ALPHA(i,f)	Cobb Douglas factor share parameter
	AT(i)	CET function shift parameter
	A(i,j)	Input-output coefficients
B	B(i,j)	Capital composition matrix
C	CWTS(i)	Consumer price weights
D	DELTA(i)	Armington function share parameter
	DEPR(i)	Depreciation rates
	DSTR(i)	Ratio of inventory investment to gross output
E	ECON(l)	Export demand constant
	ESR0	Enterprise savings ratio
	ETA(i)	Export demand price elasticirty
	ETR0	Enterprise tax rate
	EXRB	Base exchange rate
F	FMAP(hh,f)	Factors to household map
G	GAMMA(i)	CET functiom share parameter
	GLES(l)	Government consumption shares
K	KSHR(i)	Shares of investment by sector of destination
M	MAKE(i,j)	Make matrix coefficients
P	PVB(i)	Base value added price
	PWMB(i)	Base import price
	PWM(l)	World market price of imports (in dollars)
	PWSE(i)	World price of export substitutes
	PWTS(i)	Price index weights
	PXB(i)	Base output price
R	RHOC(i)	Armington function exponent
	RHOP(i)	CES production function exponent
	RHOT(i)	CET function exponent
S	SREMIT(hh)	Remittance shares
	STRANS(hh)	Government transfer shares
	SYENTH(hh)	Share of enterprise income to households
	SYENT(f)	Enterprise shares of factor income
	SYTR(hh)	Share of household income transferred to other households
T	TC(i)	Consumption tax (+) or subsidy (-) rates
	TE(i)	Tax (+) or subsidy (-) rates on exports
	TH(hh)	Household tax rate
	TM20(i)	Initial values of import premium rates
	TMB(i)	Base tariff rate
	TM(i)	Tariff rates on imports
	TXB(i)	Base indirect tax
	TX(i)	Indirect tax rates
Y	YMAP(hh,hh)	household to households map

Variables

B	BULOGE(i)	Bulog exports
	BULOGM(i)	Bulog imports
	BULOGP(i)	Bulog purchases
	BULOGS(i)	Bulog sales
	BULSTK(i)	Bulog stocks
C	CD(i)	Final demand for private consumption
	CH(hh)	Household consumption
	CONTAX	Consumption tax revenue
D	DA(i)	Domestic activity sales
	DC(i)	Domesrtic commodity sales
	DEPREC	Total depreciation expenditure
	DK(i)	Volume of investment by sector of destination
	DST(i)	Inventory investment by sector
E	ENTSAV	Enterprise savings
	ENTTAX	Enterprise tax revenue
	ENTTF	Enterprise transfers abroad
	ESR	Enterprise savings rate
	ETR	Enterprise tax rate
	EXPTAX	Export subsidy payments
	EXR	Exchange rate (RP per $)
	E(i)	Exports
F	FBOR	Government foreign borrowing
	FDSC(i,f)	Factor demand by sector
	FLABTF	Labor transfers abroad
	FSAV	Net foreign savings
	FS(f)	Factor supply
	FXDINV	Fixed capital investment
G	GDPVA	Value added in market prices GDP
	GDTOT	Total volume of government consumption
	GD(i)	Final demand for government consumption
	GOVGDP	Government to GDP ratio
	GOVSAV	Government savings
	GOVTH	Government transfers to households
	GR	Government revenue
H	HHSAV	Total household savings
	HHTAX	Household tax revenue
I	ID(i)	Final demand for productive investment
	INDTAX	Indirect tax revenue
	INT(i)	Intermediates uses
	INVEST	Total investment
	INVGDP	Investment to GDP ratio
M	MINIMAND	Walras law minimand
	MPS(hh)	Marginal propensity to save by household type
	M(i)	Imports
P	PC(i)	Consumption price of composite goods
	PDA(l)	Domestic activity goods price
	PDC(i)	Domestic commodiy goods price
	PE(i)	Domestic price of exports
	PINDCON	Consumer price index
	PINDEX	Producer price index
	PK(i)	Price of capital goods by sector of destination
	PM(i)	Domestic price of imports
	PQ(i)	Price of composite good
	PREMY	Premium income
	PV(i)	Value added price
	PWE(l)	World price of exports
	PX(i)	Average output price
Q	Q(i)	Composite goods supply
R	REMIT	Remittances
	REMITENT	Enterprise remittances
	RGDP	Real GDP
S	SAVING	Total savings
	SPC(i)	Variable subsidy
T	TARIFF	Tariff revenue
	TM2(i)	Import premium
W	WALRAS1	Slack variable for savings investment equation
	WFDIST(i,f)	Factor price sectoral proportionality ratios
	WF(f)	Average factor price
X	X(i)	Domestic output
Y	YENT	Enterprise income
	YFCTR(f)	Factor income
	YH(hh)	Household income

Table 4.2. Price equations

1.	$PM_i = pwm_i \cdot (1+tm_i) \cdot EXR$	Import prices $(i \in im)$
2.	$PE_i = pwe_i \cdot (1-te_i) \cdot EXR$	Export prices $(i \in ie)$
3.	$PDC_j = \sum_i make_{ij} \cdot PDA_i$	Definition of commodity prices
4.	$PQ_i = \dfrac{PDC_i \cdot CD_i + PM_i \cdot M_i}{Q_i}$	Composite good prices net of cons. taxes
5.	$PX_i = \dfrac{PDA_i \cdot DA_i + PE_i \cdot E_i}{X_i}$	Average producer prices.
6.	$PC_i = PQ_i\,(1 + tc_i - SPC_i)$	Consumption prices of composite good
7.	$pcup_i - PC_i \geq 0$	$(i \in itop)$ Fertilizer price ceiling
8.	$PX_i - pxtarg_i + dpxtarg_i \geq 0$	$(i \in itarg)$ Producer price target floor
9.	$pctarg_i + dpctarg_i - PC_i \geq 0$	$(i \in itarg)$ Consumer price target ceiling
10.	$BUL_i^{stk} = stk_i^{o} + BULOG_i^{pur} - BULOG_i^{sal} + BULOG_i^{M} - BULOG_i^{E}$	$(i \in itarg)$ Bulog's Stocks
11.	$stk_i^{o} + dstk_i \leq BUL_i^{stk}$	$(i \in itarg)$ Upper bound on Bulog's Stocks
12.	$BUL_i^{stk} \leq stk_i^{o} - dstk_i$	$(i \in itarg)$ Lower bound on Bulog's Stocks
13.	$PV_i = PX_i \cdot (1-tx_i) - \sum_j PC_j \cdot a_{ji}$	Value added prices net of indirect taxes
14.	$PK_i = \sum_j b_{ji} \cdot PC_j$	Composite capital good prices
15.	$PINDEX = \sum_i pwts_i \cdot PX_i$	Producer price index
16.	$PINDCON = \sum_i cwts_i \cdot PC_i$	Consumer price index

Equations (6) through (12) provide an example of complementarity problems or variational inequalities applied to an economic model capturing specific policy aspects.[9] Equation (6) and inequality (7) introduces a policy tool to maintain a ceiling on consumer prices. Equation (6) distinguishes the consumption price of a composite good (PC) and the price for composite goods (PQ) by including a consumption subsidy/tax parameter (tc) and a subsidy variable (SPC). Equation (7) imposes a ceiling on consumer prices by exogenously setting $pcup_i$ – the ceiling level – as a proportion of the consumption price (PC). If the composite price (PQ) goes up, pushing the consumption price (PC) to exceed the ceiling price level, the subsidy variable (SPC), which is initially set to zero, adjusts by assuming a positive value, and thus maintains the consumption price at a level that satisfies the inequality in (7). There is a complementary slackness relationship between SPC and PC. If the PC inequality is strict, SPC is zero. Otherwise, SPC will be positive.

Inequalities (8) and (9) describe the producer and consumer price support scheme, respectively. In (8), producer prices (PX) are not allowed to fall below an exogenously set level determined by (dpxtarg). Similarly, consumer prices (PC) cannot exceed a pre-determined level set by (dpctarg). Equation (10) specifies Bulog's stocks being equal to intial stocks (stk^o) plus the net of Bulog's domestic and international trade activities. Inequalities (11) and (12) set upper and lower bounds on Bulog's stock levels. For example, when stock levels are low and hit the lower bound, Bulog will experience a period of stock accumulation by purchasing from domestic and international sources. Again, there is a complementary slackness relationship between the producer-price and consumer-price inequalities and the Bulog stocking and de-stocking variables.

Equation (13) defines the sectoral price of value added, or "net" price (PV), which is the output price minus unit indirect taxes (tx) and the unit cost of intermediate inputs (based on the fixed input-output coefficients, a_{ij}). The product PV•X equals sectoral value added at factor cost, which appears as a payment by the activities account to the primary factor account in the SAM.

Equation (14) gives the price (PK) of a unit of capital installed in sector i. The price is sectorally differentiated, reflecting the fact that capital used in different sectors is heterogeneous. For example, a unit of capital installed in an agricultural sector can have a different composition than a unit installed in an industrial sector (*e.g.*, more machinery and fewer buildings in the agricultural sector compared to the industrial sector). The sectoral

[9] For an introduction to complemintarity problems applied to economic analysis that uses GAMS see Rutherford (1994) or Lofgren and Sherman (1997).

composition of capital goods by sector of origin (that is, machinery, construction, and so on) is contained in the columns of the capital coefficients matrix, b_{ij}. Since each column of this matrix sums to unity, PK for each sector is simply the weighted average of the unit cost of capital goods required to create a unit of capital in each investing sector.

This core CGE model is static, with the economywide capital stock fixed exogenously. Within the single period, the model does generate savings, investment, and demand for capital goods. However, by assumption, these capital goods are not installed during the period, so that investment simply represents a demand category with no effect on supply in the model. Hence, the heterogeneity of capital is of limited importance in the static model, since its only effect will emerge through its impact on the sectoral structure of investment final demand. In dynamic models, the heterogeneity assumption can be very important and affect the properties of different growth paths.

Equations (15) and (16) define a producer price index and a consumer price index. It is convenient to have the two indices defined for purposes of using either as a numeraire (unit of account) under different macro closure rules.

4.2 Quantity Equations

Table 4.3. contains the block of quantity equations, which describe the supply side of the model. The functional forms chosen must satisfy certain restrictions of general equilibrium theory. Equations (17) to (19) define the production technology and demand for factors. Equation (17) is a constant elasticity of substitution production function, and equation (18) is the demand function for factors derived from the first order conditions for profit maximization subject to equation (17). Equation (19) defines intermediate demand as a Leontief function with fixed input-output coefficients.

Equation (20) specifies the commodity-activity relationship using the “make” matrix coefficients. Equations (21) to (23) distinguish between tradable and non-tradable sectors of the economy. Equation (21) contains the CET transformation functions combining exports and domestic sales, while equation (22) is defined over a set of tradable sectors with no CET function. In the case of Indonesia, this set includes the rice sector which is controlled by Bulog operations. For sectors with no exports, the CET formulation is not needed and is replaced by equation (23).

Equation (24) shows the export supply functions corresponding to equation (21), which depend on relative prices (PE/PD). Equation (25) is specific for the rice sector in Indonesia and reflects the assumption that domestic rice producers do not distinguish between local domestic prices and export prices – domestic and foreign rice are assumed to

Table 4.3. Quantity equations

17.	$X_i = a_i^D \cdot \left[\sum_f \delta_{i,f} FDSC_{i,f}^{-\rho_i^P} \right]^{-\frac{1}{\rho_i^P}}$	CES Production function
18.	$FDSC_{if} = X_i \cdot \left[\frac{\delta_{if} \cdot PV_i}{(a_i^D)^{\rho_i^P} \cdot WF_f \cdot wfdist_{if}} \right]^{\sigma_i^P}$	Where $\sigma_i^P = \frac{1}{\rho_i^P + 1}$ Demand function for primary factors (First order condition for profit maximization)
19.	$INT_i = \sum_j a_{ji} \cdot X_j$	Total intermediate uses
20.	$DA_i = \sum_j make_{ij} \cdot DC_i$	Commodity/activity relationship
21.	$X_i = a_i^T \left[\gamma_i E_i^{\rho_i^T} + (1 - \gamma_i) D_i^{\rho_i^T} \right]^{\frac{1}{\rho_i^T}}$	*i0ie1* Gross domestic output as a composite good
22.	$X_i = E_i + D_i$	*i0ie2*
23.	$X_i = D_i$	*i0ien*
24.	$E_i = D_i \left[\frac{PE_i (1-\gamma_i)}{PDA_i \cdot \gamma_i} \right]^{\frac{1}{\rho_i^T - 1}}$	Export Supply
25.	$PDA_i = PE_i$	*i0ie2a*
26.	$E_i = econ_i \left[\frac{PW_i^e}{pwse_i} \right]^{-\omega_i}$	*i0ied* World Export Demand
27.	$Q_i = a_i^C \left[\alpha_i M_i^{-\rho_i^C} + (1-\alpha_i) D_i^{-\rho_i^C} \right]^{-\frac{1}{\rho_i^C}}$	*i0ie2a* Total Supply as a composite good
28.	$Q_i = DC_i$	*i0imn*
29.	$M_i = D_i \left[\frac{P_i^d \cdot \alpha_i}{P_i^m (1-\alpha_i)} \right]^{\frac{1}{1+\rho_i^C}}$	*i0im*

be perfect substitutes. Equation (26) gives the world export demand function for sectors in which the economy is assumed to have some market power (and thereby faces a downward sloping demand curve). For the AG-CGE model, we currently assume no market power for any Indonesian exports. Equations (27) to (29) give the CES aggregation functions describing how imports and domestic products are demanded, and the corresponding import demand functions, which depend on relative prices (PD/PM). Again, equation (28) is defined over sectors with no imports (imn).

Note that the production function is nested. At the top level, output is a fixed-coefficients function of real value added and intermediate inputs. Real value added is a CES function of the primary factors of production. The capital input is a fixed coefficients aggregate of capital goods, but only the aggregate is shown in the production function of equation (17). Intermediate inputs are required according to fixed input-output coefficients as specified in equation (19), and each intermediate input is a CES aggregation of imported and domestic goods.

In addition, in equation (21), total domestic production (X) is supplied to domestic (D) or foreign (E) markets. These three "goods" (X, D, and E) are all distinct, with separate prices, even though they have the same sectoral classification. Imports (M) and domestic goods (D) are also distinct from their composite (Q), with separate sectoral prices. The model allows two-way trade (that is, simultaneous exports and imports) at the sectoral level, again reflecting empirical realities in developing economies.[10]

One implication of this treatment of exports and imports is the partial insulation of the domestic price system from changes in world prices of sectoral substitutes. Through choice of substitution elasticities, the CET and CES functions provide a *continuum* of tradability at the sector level. This treatment is empirically more realistic than the extreme dichotomy between traded goods (where domestic and foreign products are perfect substitutes) and non-traded goods commonly found in analytic trade models. It also permits a richer specification of import demand than the two extremes of assuming either perfectly competitive and non-competitive imports. While flexible, the particular functional forms adopted here (CES and CET) do embody strong assumptions about separability and the absence of income effects. The ratios of exports and imports to domestic sales (E/D and M/D) at the sectoral level depend only on relative prices, and the demand for factor inputs in production does not depend on the export share.[11]

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[10] In the AG-CGE model, rice is the only commodity which is assumed to be a perfect substitute with exports and imports on world markets. Trade in rice is treated specially.

[11] It is possible to weaken these strong assumptions without losing the fundamental property that domestic and foreign goods are imperfect substitutes.

Table 4.4. Income equations

30.	$YFCTR_f \;\; ' \;\; \sum_i WF_f @ FDSC_{if} @ WFDIST_{if}$		Factor Income
31.	$YENT \;\; ' \;\; \sum_f syent_f @ YFCTR_f \;\%\; REMITENT @ R \;\%\; PREMY$		Capital Income
32.	$YH_{hh} \;\; ' \;\; \sum_f fmap_{hh,f} @ (1 \;\&\; syent_f) @ YFCTR_f$ $\%\; sremit_{hh} @ (REMIT \;\&\; FLABTF) @ EXR$ $\%\; strans_{hh} @ GOVTH \;\%\; \sum_h ymap_{hh,h} @ sytr_h @ YH_h$ $\%\; syenth_{hh} @ (YENT \;\&\; ENTTAX \;\&\; ENTSAV \;\&\; ENTTF @ EXR)$		Single Household Income
33.	$CH_{hh} \;\; ' \;\; (1 \& th_{hh}) @ (1 \& MPS_{hh}) @ YH_{hh} \;\&\; \sum_h ymap_{hh,h} @ sytr_h @ YH_{hh}$		Household Disposable Income
34.	$TARIFF \;\; ' \;\; \sum_i tm_i @ PWM_i @ M_i @ EXR$	$i \in im$	Tariff revenue
35.	$PREMY \;\; ' \;\; \sum_i tm2_i @ M_i @ pwm_i @ EXR$	$i \in im$	Import Premuim
36.	$CONTAX \;\; ' \;\; \sum_i (tc_i \& SPC_i) @ PQ_i @ Q_i$		Consumption taxes
37.	$INDTAX \;\; ' \;\; \sum_i tx_i @ PX_i @ X_i$		Indirect taxes
38.	$EXPTAX \;\; ' \;\; \sum_i te_i @ PWE_i @ E_i @ EXR$	$i \in ie$	Export subsidy payments
39.	$HHTAX \;\; ' \;\; \sum_{hh} th_{hh} @ YH_{hh}$		Total household taxes
40.	$DEPREC \;\; ' \;\; \sum_i depr_i @ PK_i @ FDSC_{i,Capital}$		Depreciation Expenditure
41.	$ENTTAX \;\; ' \;\; etr @ YENT$		Total enterprise taxes
42.	$ENTSAV \;\; ' \;\; esr @ YENT$		Total enterprise savings
43.	$HHSAV \;\; ' \;\; \sum_{hh} MPS_{hh} @ YH_{hh} @ (1 \& th_{hh})$		Household savings
44.	$GR \;\; ' \;\; TARIFF \;\%\; CONTAX \;\%\; INDTAX \;\%\; HHTAX \;\%\; FBOR @ EXR \;\%\; ENTTAX \;\%\; EXPTAX$		Government revenue
45.	$SAVING \;\; ' \;\; HHSAV \;\%\; ENTSAV \;\%\; DEPREC \;\%\; GOVSAV \;\%\; EXR @ FSAV$		Total savings

4.3 Income Equations

Table 4.4 presents the equations which map the flow of income from value added to institutions and ultimately to households. These equations fill out the inter-institutional entries in the SAM. Many of the entries in this part of the SAM (and the income and expenditure flows they represent) will be specific to the structure of a particular economy. The distinction between parameters and variables also becomes important. While conceivably variable, many of these items are set exogenously or determined by simple share or multiplier relationships, rather than through complex behavioral representations.

Equation (30) defines factor incomes, which in turn are distributed to capital and labor households in equations (31) and (32).[12] Then in equation (33) household disposable income is defined. Equations (34) to (43) determine government tariff (TARIFF), import premiums (PREMY), consumption tax (CONTAX), indirect tax (INDTAX), export tax/subsidies (EXPTAX), income tax (HHTAX), and corporate taxe (ENTTAX) revenue, while total government revenue (GR) is obtained as their sum in equation (44) plus the government foreign borrowing (FBOR). The components of savings include household savings (HHSAV) from fixed savings propensities (mps) in equation (43), corporate savings (ENTSAV) as a fixed proportion of corporate income (esr) in equation (42), financial depreciation (DEPREC) in equation (40), and government savings (GOVSAV), obtained as the difference between government revenue and consumption. Total savings (SAVING) in equation (45) includes these three domestic elements plus foreign savings in domestic currency (FSAV.EXR).

Note that these income equations also embody the three major macro balances: savings-investment, the government deficit, and the current account. Firms and households save fixed proportions (depr and mps) of their incomes, enterprises save a fixed share of their income (esr), government savings is the budget surplus or deficit, and foreign savings represents the capital inflow required to balance international payments, *i.e.*, net foreign savings. Since the model satisfies Walras' Law, the three macro balances must satisfy the identity:

Private savings % government savings % foreign savings ' Investment

[12]The mapping schemes are used to move from factor incomes to households in CGE models. In applications, the mapping choice is driven by the focus of the model (*i.e.* models concerned with income distribution will have more elaborate mappings) or by the availability of data on household expenditure patterns.

The modeler must avoid the specification of independent equations for *each* of these components, since without some residual category, the resulting model will be overdetermined. The range of alternative macro "closures" is discussed further below.

4.4 Expenditure Equations

Table 4.5. provides equations which complete the circular flow in the economy, determining the demand for goods by the various actors. Private consumption (CD) is obtained in equation (46), a Stone-Geary linear expenditure system (LES).[13] In equation (47), government demand (GD) for final goods is defined using fixed shares of aggregate real spending on goods and services (GDTOT) plus the net of Bulog's sale/purchase activities. Equation (48) determines government total expenditures including Bulog's external trade activity. Aggregate nominal fixed investment (FXDINV) is calculated in equation (49) as total investment (INVEST) minus inventory accumulation. Aggregate fixed investment is converted into real sectoral investment by sector of destination (DK) in equation (50) using fixed *nominal* shares (kshr), which sum to one over all sectors. Equation (51) translates investment by sector of destination into demand for capital goods by sector of origin (ID), using the capital composition matrix (b_{ij}).[14]

4.5 Market Clearing Conditions and Macroeconomic Closure

Table 4.6. contains equations defining the system constraints that the model economy must satisfy. While recognizing that the model is a general equilibrium system, with all endogenous variables jointly determined, it is nevertheless useful to think in terms of matching each of these equilibrium conditions with an "equilibrating variable." In a competitive market economy, these equilibrium conditions correspond to market-clearing conditions, with prices adjusting to clear each market.

Equation (52) states that the sectoral supply of composite commodities must equal demand, and thus defines market-clearing equilibrium in the product markets. There is also an analogous sectoral market-clearing equation for domestically produced goods sold on the domestic market (D). However, from equation (29) it is evident that the ratio of imports to domestic sales is the same for all categories of imports. Thus, at the sectoral level, specifying

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[13]See, for example, Dervis, de Melo, and Robinson (1982) who include an appendix about the LES and their application in CGEs.

[14]Note that, given the definition of PK in equation (13):

$$FXDINV \equiv \sum_i PK_i \cdot DK_i \equiv \sum_i PC_i \cdot ID_i \ .$$

Table 4.5. Expenditure equations

46.	$PC_i \cdot CD_i = \sum_{hh} PC_i \cdot (\alpha_{i,hh} + \beta_{i,hh} \cdot (CH_{hh} - \sum_j PC_j \cdot (\gamma_{j,hh})$	Private consumption
47.	$GD_i = gles_i \cdot GDTOT + BULOGP_i - BULOGS_i$	Government consumption
48.	$GR = \sum_i PC_i \cdot GD_i + GOVSAV + GOVTH - \sum_{itarg} BULOGE_{itarg}\ EXR\ PWE_{itarg} + \sum_{itarg} BULOGM_{itarg}\ EXR\ pwm_{itarg}$	Government savings
49.	$FXDINV = INVEST - \sum_i PC_i \cdot DST_i$	Total fixed investment
50.	$PK_i \cdot DK_i = kshr_i \cdot FXDINV$	Real fixed investment by sector of destination
51.	$ID_i = \sum_j b_{ij} \cdot DK_j$	Investment final demand by sector of origin

a separate market-clearing condition for domestically produced goods sold on the domestic market amounts to multiplying through both sides of equation (52) by the ratio D_i/Q_i. Since, if equation (52) holds, so will this new equation in which both sides are multiplied by the same number, no separate equation is required.[15]

The equilibrating variables for equation (52) are sectoral prices. There are eleven prices in the model which have sectoral subscripts: pwm, PWE, PM, PDC, PDA, PE, PQ, PX, PC, PV,and PK. The world prices (pwm and PWE) are treated as exogenous. Of the remaining nine, eight appear on the left hand side of price equations, leaving PDA as the variable "free" to adjust.

Equation (53) defines equilibrium in factor markets. The supplies of primary factors (fs_f) are fixed exogenously. Market clearing requires that total factor demand equal supply, and the equilibrating variables are the average factor prices (WF_f). In the model specified here, all primary factors are

[15]The same reasoning can be used to justify why there is no separate market-clearing condition for domestic output (X), since this involves adding exports to both sides of this adjusted market-clearing condition.

Table 4.6. Market clearing and macro economic closures

52.	$Q_i = INT_i + CD_i + GD_i + ID_i + DST_i$	Goods markets equilibrium
53.	$fs_f = \sum_i FDSC_{i,f}$	Factor markets equilibrium
54.	$\sum_i pwm_i \cdot M_i + \sum_{itarg} BULOGM_{itarg} \cdot EXR \cdot pwm_{itarg} = \sum_i PWE_i \cdot E_i + FSAV + FBOR + REMIT + ENTTF + FLABTF + REMITENT + \sum_{itarg} BULOGE_{itarg} \cdot EXR \cdot PWE_{itarg}$	External balance
55.	$SAVING = INVEST$	Saving-Investment balance
56.	$GDPVA = \sum_i PV_i \cdot X_i + INDTAX + TARIFF + CONTAX$	Value added including indirect taxes
57.	$RGDP = \sum_i (pvb_i + txb_i + pxb) \cdot X_i + tmb_i \cdot exrb \cdot pwmb_i \cdot M_i$	Real GDP
58.	$GOVGDP = \frac{\sum_i PC_i \cdot GD_i}{GDPVA}$	Gov't to GDP share
59.	$GOVGDP = \frac{\sum_i PC_i \cdot ID_i}{GDPVA}$	Investment to GDP share

intersectorally mobile: factor demands are determined through equation (18), market clearing is achieved via changing factor prices (WF_f) together with exogenous sectoral-specific parameters ($wdist_{if}$). In empirical applications for developing countries, however, it is common to assume that sectoral capital stocks are fixed exogenously. Fixing sectoral capital stocks means that the factor demands ($FDSC_{i1}$) of equation (18) are fixed, so that aggregate supply and demand for capital are automatically equal, and the market clearing condition for capital in equation (53) is redundant and can be dropped. Without factor conform to some initial pattern of distortions embodied in the $wfdist_i$ parameters. Thus, with fixed capital mobility, however, sectoral rental rates will not be the same across sectors, nor can they be made to

stocks, the wfdist parameters become endogenous.[16]

The remaining two equations describe macroeconomic equilibrium conditions for the balance of payments and savings-investment balance. Satisfying each of these requires the specification of the variables that will adjust to achieve equilibrium and constrain other variables by fixing them exogenously. In equation (54), the balance of payments (the balance of trade in goods and non-factor services) is represented in a simple form: foreign savings (FSAV) is the difference between total imports and total exports. With foreign savings set exogenously, the equilibrating variable for this equation is the exchange rate (EXR). Equilibrium will be achieved through movements in EXR that affect export and import prices (PM and PE) relative to domestic good prices (PDA) — in other words, by changing the relative price of tradables to nontradables, or the real exchange rate. For example, an increase in the exchange rate represents a real depreciation, so that tradable prices (PM and PE) rise relative to PD. Given the export supply and import demand functions, the result will be higher exports and lower imports. Thus, from an initial equilibrium, any fall in foreign savings will lead to a new equilibrium with a higher (depreciated) real exchange rate.[17] Alternative foreign exchange market closure choices are also possible. For example, the exchange rate can be fixed, and foreign savings can adjust.

The last macro closure condition in equation (55) requires that aggregate savings equal aggregate investment. The components of total savings have already been discussed: government savings is determined as the residual after government revenue is spent on fixed real government consumption (GDTOT), private savings are determined by fixed savings rates, and foreign savings (in at least one closure choice) are fixed exogenously. This specification, which is used in the AG-CGE model, corresponds to a "savings driven" model, in which aggregate investment is the endogenous sum of the separate savings components. This is often called "neoclassical" closure in the CGE literature.

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[16]In fact, the wfdist parameters become endogenous for all but one sector. This asymmetry occurs because fixing capital stocks in n sectors requires n new variables to ensure that equation (18) is satisfied. Since the market clearing condition is automatically satisfied, the average return to capital (WF_1) is no longer needed to clear the market, so that WF_1 together with n-1 wfdist variables are sufficient to satisfy equation (18). In practice, it is convenient to fix WF_1 to one, and solve for the n wfdist parameter.

[17]The role of the real exchange rate in this class of models has been much discussed, often in a very confused way. These issues have been sorted out by de Melo and Robinson (1989) and in Devarajan, Lewis, and Robinson (1993), where it is shown that these models can be seen as extensions of the "Salter-Swan" model of a small, open economy with non-tradables.

As with the balance of payments equation, there are alternative ways to achieve savings-investment equilibrium. Various "investment driven" closures have been used in which aggregate investment (INVEST) is fixed and some savings component or parameter (such as mps, esr, or even FSAV) becomes endogenous. "Keynesian" closures, which incorporate multiplier mechanisms, are possible as well.[18]

Equations (56) and (57) define nominal and real GDP. Real GDP (RGDP). Both are defined from the value added side. They can be used to define the GDP deflator, which is sometimes chosen as the numeraire in CGE models. In the AG-CGE model, the numeraire is the consumer price index, PINDCON. With this numeraire, changes in nominal incomes measure real welfare changes and nominal wages measure real wages in consumer prices, which is convenient for purposes of presenting results.

After macro closure decisions are made, careful counting of the equations and variables in the model indicates that the number of equations is one more than the number of endogenous variables. However, the core CGE model satisfies Walras' Law. Therefore, the equations defining the equilibrium conditions (Tables 4.4 and 4.5) are not although the choice has no effect on the solution of the model. all independent; any one of them can be dropped, thus equating the number of variables and equations. In practice, the savings-investment equation is most frequently dropped,

[18]Recent discussions of macro closure in developing country CGE models are in Chapter 8 of Devarajan, Lewis and Robinson (1997), as well as Robinson (1989), Adelman and Robinson (1988), Dewatripont and Michel (1987), and Rattso (1982). The seminal article on macro closure is Sen (1963). See also Taylor (1990).

5. Base Solution, Policy Experiments, and Results

The model uses from the 1990 SAM data to provide the benchmark for comparing the results of policy experiments. The base run of the model starts from the benchmark data for 1990, and then updates indirect tax rates and tariff rates to 1995 values. We also assume a fifteen percent wedge between world export and import prices of rice, compared to the initial domestic price, facing Bulog when it operates in world markets. This base solution provides the benchmark against which results from various experiments are compared. This section presents the base structure of the Indonesian economy, describes the policy experiments, and reports the results.

5.1 Structure of the Economy: Base Solution

Table 5.1 presents base sectoral data and values of various elasticity parameters. The model is calibrated, using the SAM data and these elasticity parameters, so that the base solution replicates the input SAM. The base SAM is assumed to represent an equilibrium for the model economy, and the parameters of the model are initialized to insure that the model solution in fact replicates the SAM. In our case, we then change some parameters (indirect taxes, tariffs, and world rice prices) to update the model. The new base solution of the AG-CGE, which provides the benchmark for making comparisons, is thus an updated base, with some data from 1995.

In the core AG-CGE model, constant elasticity of substitution and transformation (CES and CET) functions are used to represent production and trade aggregation functions. Elasticities of substitution between factors in production and elasticities of substitution between home-produced goods and imports are shown in Table 5.1. Sectoral elasticities of transformation of output into exports and home-used domestic output are also listed. Consumer expenditures are determined using Stone-Geary utility functions for each household (eight in all). Income and own-price elasticities of demand by households are listed in Appendix 4.

Table 5.1 shows the structure of sectoral value added, output, trade, and trade ratios. The table is organized to focus on the agriculture sector as opposed to the rest of the Economy. Agriculture value added is 26.4 percent of total value added, while of that 26.4 percent, 16.2 percent is from Food crops, 3.5 percent from Other agriculture, 2.6 percent from Livestock, 1.9 percent from Forestry, and 2.1 percent from Fishery. The table also shows how value added is distributed among other non-agriculture sectors.

5.2 Policy Experiments

To conduct a policy experiment, one or more policy parameters are changed from their initial base value and the model is then solved for a new equilibrium. We consider three sets of experiments where rice productivity shocks are introduced: (1) an adverse

Table 5.1. Structure of the Indonesian Economy, 1990, the base year for the Model

	Sectoral composition (Percent)					Ratios		Elasticities		
	Value Added (VA)	Output (X)	Domestic supply (Q)	Exports (E)	Imports (M)	Exports / output (E/X)	Imports / domestic supply (M/Q)	Substitution elasticity (rhoc)	Transformation elasticity (rhot)	Production elasticity (rhop)
Agriculture	26.4	19.0	19.5	3.2	2.0	2.6	1.2			
Food crops										
Rice	8.4	8.2	7.8	0.0	0.0	0.0	0.0	0.75	1.25	0.33
Soybeans	0.6	0.3	0.4	0.0	0.5	0.0	8.9	0.75	1.25	0.33
Maize	0.8	0.4	0.4	0.1	0.0	1.0	0.1	0.75	1.25	0.33
Cassava	1.1	0.5	0.6	0.0	0.0	0.0	0.0	0.75	1.25	0.33
Vegetables and fruits	4.2	2.1	2.5	0.0	0.2	0.1	0.6	0.75	1.25	0.33
Other	1.1	0.6	0.7	0.3	0.6	3.9	5.4	0.75	1.25	0.33
Total	16.2	12.2	12.3	0.4	1.4					
Other Agriculture										
Rubber	0.4	0.2	0.2	0.1	0.0	4.1	0.1	0.75	1.25	0.33
Sugarcane	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.75	1.25	0.33
Coconut	0.7	0.3	0.3	0.0	0.0	0.2	0.0	0.75	1.25	0.33
Palmoil	0.5	0.3	0.2	0.6	0.0	17.5	0.0	0.75	1.25	0.33
Other	1.6	0.9	0.8	1.3	0.2	11.4	1.6	0.75	1.25	0.33
Total	3.5	2.1	1.8	2.0	0.2					
Livestock	2.6	2.4	2.5	0.1	0.1	0.2	0.2	0.75	1.25	0.33
Forestry	1.9	1.0	1.2	0.2	0.3	1.3	1.6	0.75	1.25	0.33
Fishery	2.1	1.3	1.6	0.6	0.0	3.6	0.0	0.75	1.25	0.33
Non-agriculture	73.6	81.0	80.5	96.8	98.0	16.7	14.7			
Oil	13.5	6.8	3.5	22.9	4.5	27.7	8.0	0.50	1.50	1.00
Mining	2.8	1.5	1.4	2.9	0.8	15.4	3.8	0.50	1.50	1.00
Food Processing	6.1	6.3	6.4	7.5	2.5	9.7	2.5	1.50	2.00	-0.33
Furniture	2.8	2.9	1.3	13.7	0.1	39.5	0.5	1.50	2.00	-0.33
Textiles	2.6	3.7	2.9	10.5	4.6	23.5	9.9	1.50	2.00	-0.33
Paper	0.7	0.9	1.0	0.6	1.1	5.5	6.8	1.50	2.00	-0.33
Fertilizer	0.5	0.8	0.7	0.9	0.5	9.5	4.6	0.50	2.00	1.00
Chemical	1.1	1.6	3.6	1.6	14.1	8.3	24.4	0.50	2.00	1.00
Petroleum Refinery	4.5	5.4	3.5	18.5	2.9	28.0	5.1	0.50	1.50	1.00
Cement	0.6	0.7	1.1	0.8	1.9	8.9	10.8	0.50	2.00	1.00
Steel	1.1	1.4	2.0	2.7	5.3	15.4	16.9	0.50	2.00	1.00
Other manufacturing	4.2	5.9	13.1	6.6	46.1	9.3	22.2	0.50	2.00	1.00
Construction	7.0	10.6	9.8	0.0	0.0	0.0	0.0	1.50	2.00	-0.33
Electricity, gas, and water	0.9	1.2	1.1	0.0	0.0	0.0	0.0	0.50	2.00	1.00
Trade	-1.8	9.3	8.3	0.4	0.6	0.3	0.4	2.00	0.50	-0.50
Restaurants and hotels	4.2	4.1	3.7	2.0	2.0	4.0	3.4	1.25	0.50	-0.20
Transportation and communication	1.9	5.4	5.1	1.6	2.3	2.4	2.9	0.50	0.50	1.00
Services	9.7	5.9	5.5	3.3	4.5	4.6	5.2	1.25	0.50	-0.20
Public administration	9.6	5.2	5.1	0.5	3.3	0.8	4.1	1.25	0.50	-0.20
Other services	1.6	1.4	1.4	0.0	0.9	0.2	3.9	1.25	0.50	-0.20
Total	100.0	100.0	100.0	100.0	100.0					

productivity shock, (2) a favorable productivity shock, and (3) a favorable productivity shock where Bulog does not intervene in the rice market. To simulate rice productivity changes, we change the shift parameter in the production function for rice. Such changes can be interpreted as resulting from a temporary shock (e.g., weather, drought) or a permanent change (e.g., adopting new technology). In either case, we assume that the economy adjusts to the change, achieving a new market equilibrium.

For the first set of experiments, an adverse production shock, rice productivity is decreased in a series of five cumulative experiments. In each, rice productivity falls five percent, for a cumulative total of 25 percent decline in experiment 5. The second and the third set of experiments are similar, with sets of five cumulative experiments.

In the first two sets of experiments, Bulog is assumed to stabilize producer and consumer prices within a plus-or-minus band of five percent.[19] The nature of Bulog intervention depends on the direction of the price change.[20] In the first set, with rice productivity falling (by 5 to 25 percent), there will be excess demand for rice and consumer prices will tend to rise. When the consumer price of rice hits the ceiling of the price band, Bulog intervenes by selling enough quantities of rice in the domestic market to satisfy the excess demand. Bulog first sells rice from its buffer stocks. In the model's stylization of Bulog behavior, once the buffer stock hits its lower limit, Bulog starts importing, buying rice on the international market at the prevailing spot price.[21] The productivity increase experiments are symmetric. The productivity increase generates an excess supply of rice, which should cause producer prices to fall. When the producer price hits the floor value, Bulog intervenes by purchasing rice from the domestic market to maintain the market price at the floor value. As Bulog purchases rice, it first replenishes its buffer stock. When stocks are at maximum target levels, Bulog starts exporting at the spot world export price (which is assumed to be 30 percent below the spot world import price).

5.3 Results

This section presents the results from the three sets of policy experiments focusing on the overall fiscal position of the government, changes in rice prices and quantities, and on selected macro aggregates.

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[19] Note that we can specify more or less than five percent ceiling on consumer prices for rice.

[20] Bulog behavior is modeled by specifying different “regimes” defined by inequalities in prices and buffer stocks. The regime switches are modeled using a mixed complementarity programming model.

[21] Bulog's buffer stock amounts to three and half percent of the initial level of rice production. The Buffer stock is set exogenously, and can be varied. In fact policy experiments can be implemented to test the effect of varying Bulog stocking capacity in response to a productivity shock.

Rice Productivity Decline: Experiment 1

When rice productivity declines, the consumer price of rice tends to increase, prompting Bulog intervention to maintain the price within the 5% band. Tables 5.2, 5.3, and 5.4 list the results of this policy experiment. Table 5.2 shows the effect of the productivity shock on the government accounts. Initially, when rice productivity drops by 5%, there is a decline in government expenditure, because Bulog is earning money by selling from its buffer stock. However, as rice productivity continues to decline and Bulog intervenes more, net government expenditure rises as Bulog is forced to purchase imports (at spot world prices) to maintain the buffer stock at its minimum target level. The information on Bulog purchases/sales and Bulog imports/exports indicate how Bulog is intervening in the rice market. As rice productivity declines by 5%, Bulog sales increase from zero in the base year to 0.25 billion Rp, and Bulog imports remain unchanged since sales from existing buffer stocks are sufficient to maintain the consumer price for rice within the band. However, as rice productivity falls by 10% or more, the volume of Bulog intervention in the rice market increases. Bulog sales cause buffer stocks to hit their lower limit, and Bulog starts importing. Below 10%, Bulog operations involve only increasing imports, which is reflected in the net government expenditure figures. Imports increase and the program becomes more costly.

Table 5.3 gives more detail on the impact of rice productivity decline on the rice sector. The consumption price of rice (Pc) hits the price ceiling when productivity falls by 5%. Since a 5% price band on rice prices is maintained (consumer and producer prices), the percentage change in Pc from its base value remains the same with further declines in rice productivity. Price stabilization becomes more costly as rice productivity falls. Bulog has to pay for imports at fixed world prices, but their domestic price increase as the exchange rate depreciates in reaction to the increased aggregate imports. The domestic output of rice (X) falls with the productivity decline. The supply of rice (Q) falls by less, as Bulog sells stocks and imports.

At the macro level, the aggregate effects of an adverse rice productivity shock, shown in Table 5.4, include a significant contraction in real GDP (-4.3% with a 25% decline in rice productivity), as rice output falls. Government consumption net of Bulog sales fall, while imports increase. The increase in real imports leads to a significant depreciation of the real exchange rate (2.8%). The depreciation is required to generate additional exports to pay for the additional imports. Both aggregate exports and imports increase. The macro impact of this scenario is significant, even though rice is a relatively small share of GDP (about 6%). Bulog operations matter at the economywide level.

Table 5.2. Government accounts, rice productivity decline* (BN. 1990 RP)

	Base	Rice Productivity decline				
	values	5%	10%	15%	20%	25%
Expenditure						
BULOG imports / (exports)	0.00	0.00	1.41	3.04	4.70	6.37
BULOG purchases / (sales)	0.00	(0.25)	(1.74)	(3.16)	(4.56)	(5.93)
Fertilizer subsidy	0.00	0.00	0.00	0.02	0.05	0.08
Government consumption	15.07	14.94	15.08	15.22	15.37	15.51
Government savings	10.24	10.35	10.79	10.92	10.99	11.02
Government transfers	5.72	5.72	5.72	5.72	5.72	5.72
Total Expenditures	31.04	30.76	31.26	31.77	32.27	32.78
Revenue						
Consumption tax / subsidy	0.00	0.00	0.00	-0.02	-0.05	-0.08
Enterprise tax	21.75	21.56	21.84	22.14	22.44	22.74
Foreign borrowing	-4.09	-4.06	-4.12	-4.18	-4.24	-4.30
Household tax	2.02	2.00	2.00	2.00	2.00	2.00
Indirect taxes	8.25	8.17	8.43	8.69	8.95	9.21
Tariff revenue	3.11	3.09	3.10	3.11	3.12	3.14
Total Revenue	31.04	30.76	31.26	31.77	32.27	32.78

* 5% variation in producer and consumer prices is allowed
3.5 % stocking capacity for BULOG

Table 5.3. Rice prices and quantities, rice productivity decline

	Base values*	Rice productivity decline				
		5%	10%	15%	20%	25%
Percent change in prices**:						
Domestic price of exports (Pe)	0.85	-0.77	0.65	2.19	3.73	5.25
Domestic price of imports (Pm)	1.15	-0.77	0.65	2.19	3.73	5.25
Average output price (Px)	0.99	5.19	5.15	5.12	5.08	5.05
Price of composite good (Pq)	0.99	5.00	5.00	5.00	5.00	5.00
Domestic activity goods price (Pda)	0.99	5.19	5.16	5.12	5.08	5.05
Domestic commodity goods price (Pdc)	0.99	5.00	5.00	5.00	5.00	5.00
Consumption price of composite good (Pc)	0.99	5.00	5.00	5.00	5.00	5.00
Percent change in quantities**:						
Exports (E)	0.00	0.00	0.00	0.00	0.00	0.00
Imports (M)	0.01	14.01	inf***	inf	inf	inf
Domestic output (X)	29.71	-3.79	-12.35	-20.68	-28.87	-36.91
Composite goods supply (Q)	30.61	-3.00	-6.95	-10.87	-14.71	-18.49
Domestic activity sales (DA)	29.70	-3.79	-12.35	-20.69	-28.87	-36.92
Domestic commodity sales (DC)	30.59	-3.79	-12.35	-20.69	-28.87	-36.92

* For quantities, Base values are in bn. 1990 Rp
** From base values
*** inf = infinite change from zero base

Table 5.4. Macro results, rice productivity decline

	Base values*	Rice productivity de				
		5%	10%	15%	20%	25%
Percent change in real:						
GDP	209.0	-0.3	-1.3	-2.3	-3.4	-4.3
Private consumption	128.6	-0.7	-0.7	-0.8	-1.0	-1.1
Investment	55.6	0.8	-0.3	-1.4	-2.6	-3.7
Government demand	15.1	-1.6	-11.0	-20.0	-28.8	-37.5
Exports	57.4	0.0	1.8	3.7	5.7	7.6
Imports	-47.7	0.0	2.1	4.5	6.9	9.2
Exchange rate**	1.7	-0.5	0.1	1.0	1.9	2.8

* Base values are in bn 1990 Rp
** The real exchange rate is defined as the nominal exchange rate deflated by the producer price index (a weighted average of prices of sold domestically with the weights being the share of each sector in the value of total domestic sales of domestic output domestic output).

Rice Productivity Improvement: Experiment 2

When rice productivity improves, the fall in the producer price of rice prompts Bulog intervention to maintain the 5% price band. Tables 5.5, 5.6, and 5.7 present the results of this policy experiment. Similar to the productivity decline experiment, Table 5.5 shows the impact of a favorable productivity shock in the rice market on the government accounts, Table 5.6 provides detailed results for the rice sector, and Table 5.7 lists the aggregate effects.

This experiment is the reverse of the first one, but the results are not perfectly symmetrical. In this case, Bulog operations will be reversed. Instead of selling rice to reduce excess demand, Bulog will have to purchase it to reduce excess supply. Production of rice increases by 39% under a 25% increase in productivity (Table 5.6). Instead of importing rice to support its sales, Bulog will export surplus rice in excess of its stocking needs. Given that import prices of rice are much higher than export prices, when Bulog intervenes by selling rice on the world market, the export earnings are less than the corresponding import costs for the same amount of rice when Bulog imported rice in the first experiment. Table 5.5, shows how Bulog purchases and exports increase as rice productivity improves.

Bulog operations lose money (see the first two rows of Table 5.5) – more than under the productivity decline scenario. To support the domestic price, Bulog purchases rice at the support price and sells at a lower price to world markets. After a 5% productivity improvement, Bulog starts exporting, which causes a real appreciation of the exchange rate and changes in the structure of production. Total government revenue falls, largely because indirect tax revenue falls. The shift in the structure of production is towards goods with lower indirect tax rates (*e.g.*, agriculture). The result is that, with productivity increases, the government deficit increases (government savings fall in the expenditure account).

The asymmetry of response between experiments 1 and 2 is shown by the exchange rate effect (Table 5.7). In the first experiment, the exchange rate depreciates by 2.8% with productivity decline of 25%, while in the second the exchange rate appreciates by only 2.5% when productivity increases 25%. The difference is due to the fact that the export price of rice is well below the import price. Increased exports generate smaller increase in earnings, and less exchange rate appreciation is required to generate the additional imports financed by the export earnings.

Rice Productivity Improvement Without Bulog Intervention: Experiment 3

This experiment is the same as Experiment 2 except that there is no Bulog intervention. Prices are free to adjust to changed market conditions. Note that the

Table 5.5. Government accounts, rice productivity improvement* (BN. 1990 RP)

	Base values	Rice productivity improvement 5%	10%	15%	20%	25%
Expenditure						
BULOG imports / (exports)	0.00	0.00	(0.99)	(2.20)	(3.39)	(4.57)
BULOG purchases / (sales)	0.00	0.13	1.53	2.90	4.28	5.68
Fertilizer subsidy	0.00	0.00	0.00	0.00	0.00	0.00
Government consumption	15.07	15.21	15.09	14.97	14.84	14.72
Government savings	10.24	10.27	9.55	9.07	8.56	8.02
Government transfers	5.72	5.72	5.72	5.72	5.72	5.72
Total Expenditures	31.04	31.34	30.90	30.46	30.02	29.58
-						
Revenue						
Consumption tax / subsidy	0.00	0.00	0.00	0.00	0.00	0.00
Enterprise tax	21.75	21.94	21.72	21.48	21.24	21.00
Foreign borrowing	-4.09	-4.12	-4.08	-4.03	-3.98	-3.93
Household tax	2.02	2.03	2.03	2.03	2.03	2.02
Indirect taxes	8.25	8.35	8.11	7.87	7.63	7.39
Tariff revenue	3.11	3.13	3.12	3.11	3.10	3.09
Total Revenue	31.04	31.34	30.90	30.46	30.02	29.58

* 5% variation in producer and consumer prices is allowed
3.5 % stocking capacity for BULOG

Table 5.6. Rice prices and quantities, rice productivity improvement

	Base values*	Rice productivity improvement				
		5%	10%	15%	20%	25%
Percent change in prices**:						
Domestic price of exports (Pe)	0.85	0.78	-0.30	-1.54	-2.79	-4.04
Domestic price of imports (Pm)	1.15	0.78	-0.30	-1.54	-2.79	-4.04
Average output price (Px)	0.99	-5.00	-5.00	-5.00	-5.00	-5.00
Price of composite good (Pq)	0.99	-4.82	-4.84	-4.87	-4.90	-4.93
Domestic activity goods price (Pda)	0.99	-5.00	-5.00	-5.00	-5.00	-5.00
Domestic commodity goods price (Pdc)	0.99	-4.82	-4.85	-4.87	-4.90	-4.93
Consumption price of composite good (Pc)	0.99	-4.82	-4.84	-4.87	-4.90	-4.93
Percent change in quantities**:						
Exports (E)	0.00	0.00	inf***	inf	inf	inf
Imports (M)	0.01	0.00	0.00	0.00	0.00	0.00
Domestic output (X)	30.14	3.36	12.09	20.81	29.64	38.56
Composite goods supply (Q)	31.05	3.35	12.08	20.80	29.63	38.57
Domestic activity sales (DA)	30.14	3.36	12.09	20.81	29.64	38.57
Domestic commodity sales (DC)	31.03	3.36	12.09	20.81	29.64	38.57

* For quantities, Base values are in bn. 1990 Rp

** From base values

*** inf = infinite change from zero base

Table 5.7. Macro results, rice productivity improvement

	Base values*	Rice productivity improvement				
		5%	10%	15%	20%	25%
Percent change in real:						
GDP	209.0	0.3	1.1	2.0	3.0	3.9
Private consumption	128.6	0.8	0.6	0.5	0.5	0.5
Investment	55.6	-0.8	0.0	1.0	2.0	3.0
Government demand	15.1	0.9	10.6	20.2	29.9	39.7
Exports	57.4	-0.0	0.5	1.1	1.8	2.5
Imports	-47.7	-0.0	0.6	1.3	2.2	3.0
Exchange rate**	1.7	0.4	-0.2	-1.0	-1.7	-2.5

* Base values are in bn 1990 Rp

** The real exchange rate is defined as the nominal exchange rate deflated by the producer price index (a weighted average of prices of domestic sold domestically with the weights being the share of each sector in the value of total domestic sales of domestic output).

domestic market is assumed to absorb all the increased supply of rice.[22] The results, focusing on the differences from experiment 2, are shown in Figures 5.1, 5.2, and 5.3. Figure 5.1 show what happens to agricultural and non-agricultural production. With Bulog intervention, the rice sector draws resources (capital and labor) away from other sectors, forcing more resources into agriculture than the free market would justify. For example, with a 25% increase in productivity, rice output increases by 17% (not tabulated), compared to 39% with Bulog intervention (Table 5.6). Also, without Bulog intervention, government revenue increases (not tabulated), while in the Bulog case government revenue falls.

Figure 5.2 shows the change in agriculture and non-agriculture imports imports. With Bulog intervention, the exchange rate appreciates. Without Bulog intervention, there is no increase in rice exports and a slight depreciation of the exchange rate, as increased income leads to higher demand for imports. The difference is that, with Bulog intervention, all imports rise and there is displacement of domestic non-agricultural production – the Dutch disease. The same effect is seen Figure 5.3, which shows the comparative effects on exports. They mirror the import effects except that, of course, agricultural exports (which include Bulog rice exports) rise while non-agricultural exports fall.

Figure 5.4 shows the differential impact of experiments 1 and 2 on the structure of agricultural production. The effect of Bulog intervention is dramatic, keeping agricultural resources in rice that would otherwise move to other crops, especially high-value crops such as fruits and vegetables. Other crops are also affected significantly.

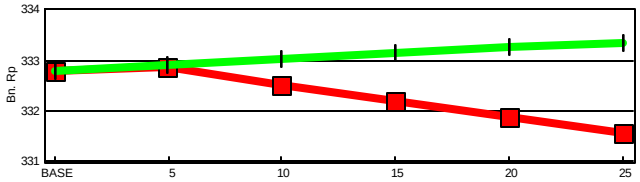
Table 5.8 compare changes in GDP deflators with and without Bulog intervention with a 25% increase in rice productivity. With base values equal to 100 and the consumer price index being our numeraire, there is no effect on consumption deflators. With Bulog intervention, consumers are relatively worse off as the deflators for all non-consumption categories fall relative to consumer goods. Without Bulog intervention, the effects are reversed. The prices of non-consumer goods rise relative to consumer goods, so consumers are much better off.

Table 5.9 gives more detail on the changes in the real and nominal value added shares with a 25% rice productivity improvement with and without Bulog. Bulog operations do not allow large price changes, as evident from Table 5.8, such that the gains from the rice productivity improvement are less spread to other sectors of the economy. Without Bulog, part of the productivity gain is spread across the rest of the economy as output increase and associated productivity gain leads to lower rice prices - nominal share of rice falls while real share rises. In other words, the impact of Bulog intervention on the real share of value added is favorable only to the rice sector. Without Bulog intervention, gains from rice productivity improvement spread across the Indonesian economy.

[22]In fact, the domestic price falls below the export price after the third step (15% productivity increase). At that point, the free market should start exporting. The last two steps thus overstate the displacement of resources out of rice.

Figure 5.1.

Change in the value of non-agricultural production with rice productivity improvement



Change in the value of agricultural production with rice productivity improvement

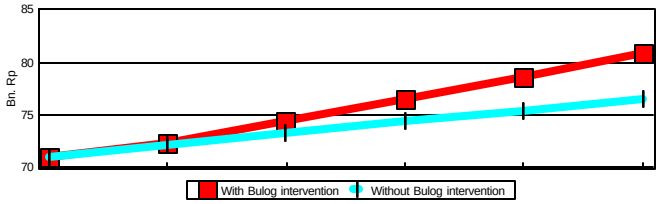
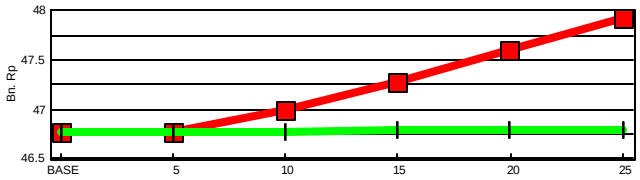


Figure 5.2.

Change in the value of non-agricultural imports with rice productivity improvement



Change in the value of agricultural imports with rice productivity improvement

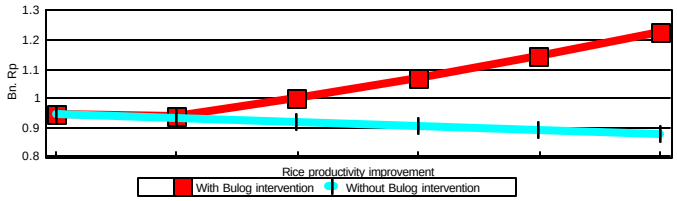
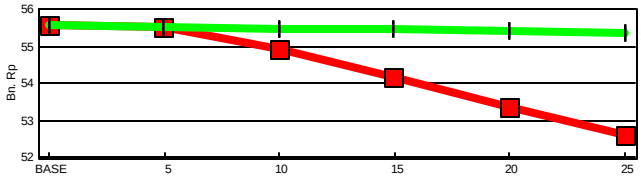


Figure 5.3

Change in the value of non-agricultural exports with rice productivity improvement



Change in the value of agricultural exports with rice productivity improvement

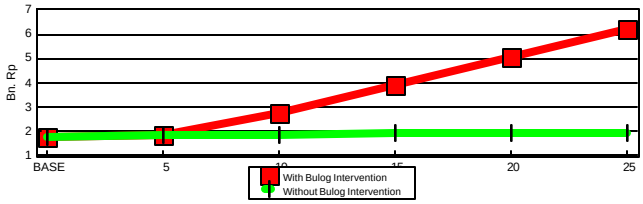
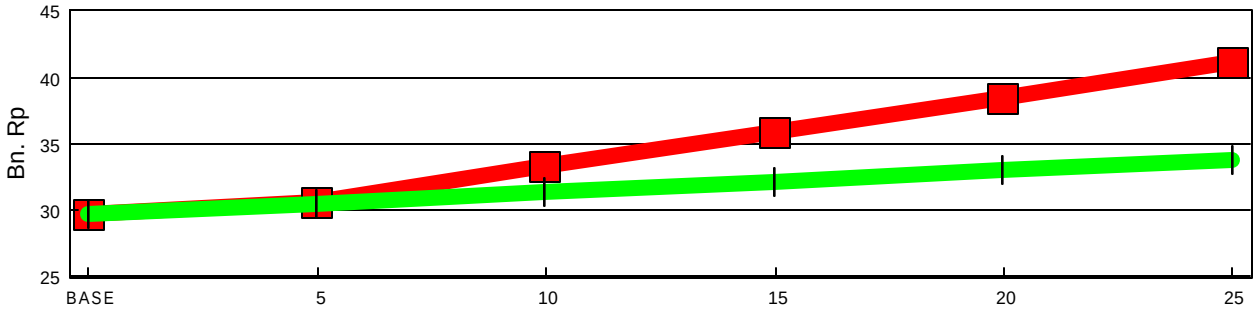
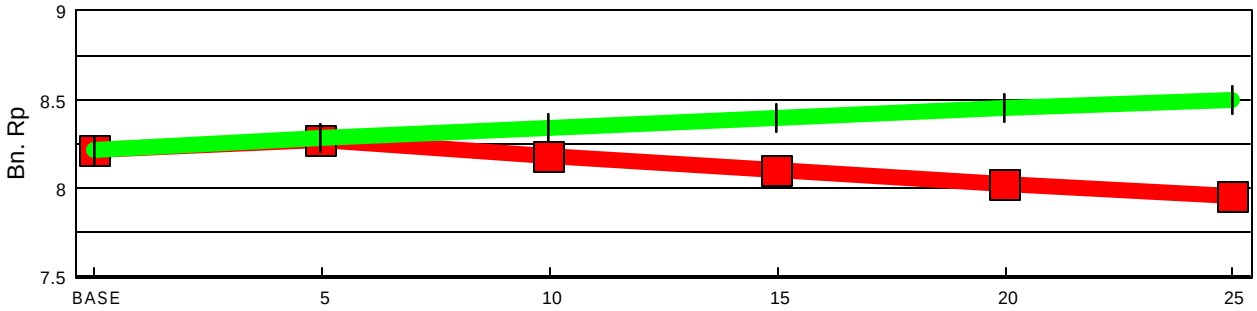


Figure 5.4.

Change in the value of rice production with rice productivity improvement



Change in the value of Fruit and Vegetables production with rice productivity improvement



Change in the value of other agriculture production with rice productivity improvement

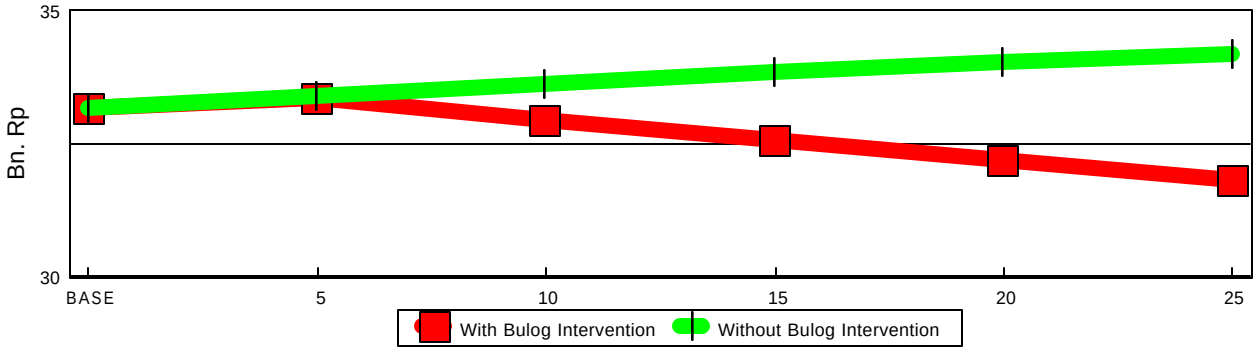


Table 5.8. GDP deflators with and without Bulog intervention with a 25% improvement in rice productivity

	GDP Deflators		
	Base	With Bulog	ithout Bulog
Consumption	100	100	100
Investment	100	97	104
Government	100	97	105
Exports	100	96	104
Imports	100	96	104
GDP	100	99	101

Table 5.9. Changes in real and nominal value added shares with a 25% rice productivity improvement (%)

	Base shares (%)		Shares with Bulog (%)		Shares without Bulog (%)	
	Nominal	Real	Nominal	Real	Nominal	Real
Agriculture						
Rice	6.6	6.7	8.7	9.1	5.4	7.5
Fruits and Vegetables	3.7	3.7	4.0	3.5	3.6	3.8
Other crops	5.9	5.9	6.2	5.5	5.9	6.1
Livestock	2.3	2.3	2.5	2.3	2.4	2.4
Forestry	1.7	1.7	1.5	1.6	1.7	1.7
Fishery	1.8	1.8	1.9	1.8	1.9	1.9
Consumer goods	9.4	9.5	8.8	9.0	9.6	9.5
Intermediate capital goods	22.7	22.5	21.5	21.8	22.8	22.0
Services	45.4	45.5	44.4	45.2	46.3	45.0
Total	100	100	100	100	100	100

6. Conclusion

Indonesia has a long history of intervention in agricultural markets, especially rice. The goal of price and farm income stabilization has justified extensive intervention and the creation of Bulog, which buys and sells on the domestic market to maintain the price within a specified band and is the sole agent for buying and selling rice on international markets. Bulog also maintains buffer stocks within a specified band, and operates in the world market when necessary to achieve its target stocks, exporting or importing as necessary.

Starting from an agricultural-focused computable general equilibrium (CGE) model of Indonesia, we have modeled Bulog's behavior using a mixed complementarity approach that allows the specification of inequalities and shifts of policy regime as prices and/or stocks move within specified bands. We have used this model to explore the impact on the Indonesian economy of changes in the productivity of rice production under different assumptions about the operation of Bulog. Our empirical results support a few conclusions.

Bulog operations have significant impact on government accounts and macro variables. Policy intervention in the rice market reverberates throughout the Indonesian economy, which is not surprising given that rice production accounts for about 7% of GDP (in 1990). The links between rice and the rest of agriculture, and between agricultural and non-agricultural sectors, are important.

If Bulog operates to maintain the rice price when there are significant increases in rice productivity, the results are:

- Rice production goes up dramatically, and the price support scheme attracts more resources into rice production. Instead of releasing resources to other high-value agricultural uses (*e.g.*, production of fruits and vegetables), the policy draws resources away from them. The result is an inefficient allocation of resources within the agriculture sector and the rest of the economy..

- With increased rice production, Bulog operations lead to significant subsidized rice exports. The result is an appreciation of the real exchange rate, which leads to increased imports and a bias against other exports, especially of non-agricultural products. The result is an inefficient allocation of resources between agriculture and non-agriculture sectors.

- The prices of non-consumer goods (intermediate and capital goods) fall relative to the prices of consumer goods, especially food. Consumers are relatively worse off.

- The price support program is expensive and strains the government accounts, even if the administrative cost of operating the program are ignored.

Without Bulog intervention, productivity increases in rice lead to different results:

- Rice output rises, but by significantly less. Resources are released from the rice sector to other higher-value agricultural and non-agricultural uses. The benefits of the productivity increase are spread across the economy, following market linkages.

- The price of rice falls to the world price. The relative prices of consumer goods fall, and consumers are better off.

- There is some depreciation of the real exchange rate and no bias against non-agricultural exports.

- Government revenue increases as increased non-agricultural output generates increased tax revenue.

While the model does not capture the benefits of stabilizing prices in terms of reducing income variability, it does capture and quantify the effects of the price support policies on resource allocation, trade, relative prices, and the government budget. While rice is undoubtedly less important to Indonesia than it was 25 years ago, it is still an important sector, with many direct and indirect linkages to the rest of the economy. A general equilibrium perspective is useful in analyzing any policy changes regarding agriculture in general and the rice sector in particular.

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Appendix 1

Supplementary Tables

Table A.1.1. Production and quantity in Bulog market operations for paddy and rice, 1969 - 1995

Year	Domestic Production Paddy 000 ton	Domestic Production Rice 000 ton	Domestic Procure Rice 000 ton	D. procure of rice as % of total production	Net import Rice 000 ton	BULOG Stock * rice 000 ton	Total available rice 000 ton	Imported Rice as % of To.sup	B. Stock Rice as % of To.sup	BULOG Sales* rice 000 ton	BULOG sales as % of T.ava 000 ton
1969		12814	204	2%	604	516	12391	5%	4%	1062.14	9%
1970		13747	493	4%	956	262	13059	7%	2%	1180.94	9%
1971		14357	617	4%	503	530	13424	4%	4%	1118.58	8%
1972		13791	160	1%	748	531	13523	6%	4%	1271.31	9%
1973	21481	14607	263	2%	1639	168	14374	11%	1%	1490.87	10%
1974	22464	15276	530	3%	1058	579	14538	7%	4%	1319.94	9%
1975	22331	15185	539	4%	669	847	14451	5%	6%	1324.17	9%
1976	23301	15845	392	2%	1293	731	15743	8%	5%	1874.62	12%
1977	23347	16284	424	3%	1989	541	16724	12%	3%	2491.83	15%
1978	25772	17525	866	5%	1833	462	16992	11%	3%	2085.68	12%
1979	26293	17872	331	2%	1914	1075	18290	10%	6%	2536.57	14%
1980	29652	20163	1585	8%	2004	783	19267	10%	4%	2704.98	14%
1981	32774	22286	2014	9%	525	1667	20033	3%	8%	1989.67	10%
1982	33584	22837	2045	9%	300	2217	21404	1%	10%	2895.86	14%
1983	35303	24006	868	4%	1160	1666	22844	5%	7%	2106.27	9%
1984	38136	25933	2505	10%	375	1588	22537	2%	7%	1713.87	8%
1985	39033	26542	2030	8%	-405	2754	23512		12%	1654.32	7%
1986	39727	27014	1509	6%	-241	2725	24669		11%	1865.32	8%
1987	40078	27253	1359	5%	5	2128	25155	0%	8%	1975.86	8%
1988	41666	28340	1334	5%	6	1516	26571	0%	6%	2110.45	8%
1989	44779	29072	2575	9%	273	746	25039	1%	3%	1711.36	7%
1990	45179	29366	1270	4%	43	1883	26956	0%	7%	1812.23	7%
1991	44688	29047	1430	5%	-301	1384	26340	-1%	5%	1628.34	6%
1992	48240	31356	2565	8%	561	885	27600	2%	3%	1945.91	7%
1993	48181	31318	1963	6%	-564	2065	28095	-2%	7%		
1994	46245				680						
1995					3014						

Source: Statistik BULOG (1969-1991) & (1983-1993)

* Beginning year stock

BULOG sales for year t = BULOG stock for year t + BULOG purchase for year t + BULOG import for year t - BULOG stock for year t+1

Table A.1.2. Production and quantity in Bulog market operations for sugar, 1970 - 1994

Year	Domestic Production 000 ton	Area Ha	Yield Ton per Ha	Import 000 ton	BULOG Stock 000 ton	Total Supply 000 ton	Import as % of tot sup	BULOG Stock as % of tot sup
1970	727	121715	6.0	128	223	907	14%	25%
1971	833	126384	6.6	162	171	826	20%	21%
1972	895	148710	6.0	2	340	956	0%	36%
1973	819	169509	4.8	207	281	1043	20%	27%
1974	1029	176775	5.8	211	264	1130	19%	23%
1975	1037	179828	5.8	89	374	1173	8%	32%
1976	1060	208902	5.1	187	328	1289	15%	25%
1977	1123	234492	4.8	294	286	1466	20%	20%
1978	1161	248101	4.7	587	236	1555	38%	15%
1979	1292	343496	3.8	492	428	1628	30%	26%
1980	1310	316063	4.1	416	584	2003	21%	29%
1981	1243	346188	3.6	705	307	1756	40%	17%
1982	1620	363320	4.5	603	499	1591	38%	31%
1983	1653	384373	4.3	159	1130	1992	8%	57%
1984	1714	342008	5.0	0	950	1679	0%	57%
1985	1730	340229	5.1	1	985	1908	0%	52%
1986	1979	325703	6.1	25	808	1861	1%	43%
1987	2118	334918	6.3	142	953	2263	6%	42%
1988	1889	365529	5.2	124	953	2299	5%	41%
1989	1999	357752	5.6	330	672	2256	15%	30%
1990	2126	363968	5.8	279	731	2307	12%	32%
1991	2260	396304	5.7	307	746	2771	11%	27%
1992	2306	404062	5.7	317	786	2434	13%	32%
1993	2482	453734	5.5	237	975	2392	10%	41%
1994	2452	492633	5.0					

Source: Statictik BULOG (1969-1991) & (1983-1993)

Table A.1.3. Production and quantity in Bulog market operations for soybean, 1970 - 1994

Year	Domestic production 000 ton	Area harvested	Yield Ton per Ha	Export 000 ton	Import 000 ton	BULOG Stock 000 ton	BULOG Purchase 000 ton	Total Supply 000 tons
1970	498	694732	0.72	4	0			494
1971	516	679625	0.76	0.73	0.3			515
1972	518	697500	0.74	3	0.2			515
1973	541	750506	0.72	36	0.1			505
1974	589	753499	0.78	4	0.2			585
1975	590	751689	0.78	0.03	18			594
1976	522	646280	0.81	0.55	172	14		682
1977	523	646278	0.81	0.01	89	25		607
1978	617	732941	0.84	0	130	29		734
1979	680	784018	0.87	2	177	43	0.09	858
1980	653	731995	0.89	0	194	41	5.5	877
1981	704	810095	0.87	0	361	11	3.6	1023
1982	521	607710	0.86	0.01	362	52	1.8	928
1983	554	639776	0.87	0.02	391	7	0	927
1984	769	858854	0.90	0	400	24	0	1142
1985	870	896220	0.97	0	330	52	0	1171
1986	1227	1253767	0.98	0	343	81	0	1585
1987	1161	1100565	1.05	0	349	66	0	1518
1988	1270	1177360	1.08	0	586	58	0	1875
1989	1315	1197996	1.10	0	410	69	0	1684
1990	1487	1338100	1.11	0	457	139	0	2006
1991	1555	1552979	1.00	0	526	96	0	2093
1992	1881	1664182	1.13		557	128		
1993	1709	1470206	1.16		649	135		
1994	1573	1356580	1.16					

Source: Statistik BULOG (1969-1991) & (1983-1993)

Table A.1.4. Paddy and rice prices, 1969 -1995

Year	Floor Pr Paddy Rp/kg	ent procurement Price Paddy KUD Rp/kg	Paddy Non KUD Rp/kg	Rice KUD Rp/kg	Rice Non KUD Rp/kg	Avg Producer Paddy Rp/Kg	Avg Producer Rice Rp/Kg	Avg Consumer Rice Rp/Kg	Margin% Floor & Consume	Margin% producer (rice)& consumer	Nominal exchange rate Rp/US$	Rice Bangkok fob US$/MT	Rice Bangkok fob Rp000/MT	Ceiling Pr Rice Rp/kg	Margin % RNR Rp/kg	Magin % RNP Rp/kg
1969	20.9			37	37			42.6	32%					50	35.1	
1970	20.9			37	37		42	46.8	45%	10%	363			50	35.1	
1971	20.9			37	37		41	45.4	41%	11%	392			50	35.1	
1972	20.9			37	37		49	49.4	54%	1%	415			50	35.1	
1973	30.4			52	52	42	77	83.4	78%	8%	415			75	44.2	
1974	41.8	41.8	41.8	69	69	51	87	100.4	56%	15%	415	459.2	190.6	100	46.0	55.5
1975	58.5	59.0	59.0	97	97	62	102	111.0	23%	8%	415	312.9	129.9	120	23.7	32.2
1976	68.5	69.5	69.5	108	108	76	124	128.5	22%	4%	415	222.5	92.3	125	15.7	16.9
1977	71.0	72.0	72.0	110	110	79	128	132.6	21%	3%	415	237.3	98.5	127	15.5	14.7
1978	75.0	77.5	77.5	120	120	82	133	140.5	22%	5%	442	335.3	148.2	140	17.2	17.4
1979	95.0	100.0	98.0	158	156	107	166	170.3	17%	2%	623	308.5	192.2	179	14.7	18.7
1980	105.0	111.0	108.0	175	172	125	189	198.4	23%	5%	627	395.1	247.7	225	30.8	35.4
1981	120.0	128.0	123.0	195	191	134	212	226.2	23%	7%	632	417.3	263.7	235	23.0	24.2
1982	135.0	146.0	139.5	214	210	150	230	254.9	23%	11%	661	250.9	165.8	218	3.8	1.6
1983	145.0	156.0	152.0	238	233	172	275	304.2	36%	11%	909	246.6	224.2	320	37.3	36.8
1984	165.0	177.7	177.7	270	264	183	285	331.0	30%	16%	1026	235.2	241.3	350	32.6	28.0
1985	175.0	187.7	182.7	285	279	190	289	322.1	20%	12%	1111	198.1	220.1	350	25.4	24.5
1986	175.0	187.7	182.7	285	264	168	0	345.2	28%		1283	172.1	220.8	370	40.2	31.6
1987	190.0	202.7	197.7	313	307	187	0	386.9	32%		1644	202.4	332.7	450	46.6	48.0
1988	210.0	222.7	217.7	344	338	223	423	469.2	45%	11%	1686	283.2	477.5	490	45.0	46.3
1989	250.0	262.7	257.7	405	399	249	446	486.6	27%	9%	1770	296.5	524.8	530	32.8	33.7
1990	270.0	282.7	277.7	436	430	260	467	525.2	26%	13%	1843	254.0	468.1	537	24.9	25.7
1991	295.0	310.0	305.0	480	474	294	517	562.0	24%	9%	1950	244.1	476.0			
1992	330.0	346.0	341.0	536	530	281	545	603.7	19%	11%	2030	235.2	477.5			
1993	340.0	356.0	351.0	551	545	280	542	592.1	13%	9%	2087	215.6	450.0			
1994	360.0	376.0	371.0	592	586						2161					
1995	400.0	416.0	411.0	657	652											

Source: Statistik BULOG (1969-1991) & (1969-1991)

Table A.1.5. Soybean prices

Year	Floor	Avg Producer	Avg Consumer	World fob	World fob
	Rp/kg	Rp/Kg	Rp/Kg	US$/MT	Rp000/MT
1977				267.7	111.1
1978				252.3	111.5
1979	210		288.6	270.8	168.7
1980	240	284.4	334.5	268.6	168.4
1981	270	321.0	377.7	267.4	169.0
1982	280	345.4	406.3	230.2	152.2
1983	280	393.3	478.0	265.5	241.3
1984	300	459.0	531.9	258.0	264.7
1985	300	469.0	568.8	206.4	229.3
1986	300	515.6	633.7	199.5	256.0
1987	300	610.3	728.9	200.7	330.0
1988	325	665.1	834.3	294.2	496.0
1989	370	667.8	835.4	261.7	463.2
1990	400	705.1	969.6	218.8	403.2
1991	500	766.2	1060.1	221.7	432.3
1992		837.5	1077.2	224.6	455.9
1993		816.5	1166.7	262.8	548.5

Source: Statistik BULOG (1969-1991) & (1969-1991)

Table A.1.6. Cane Sugar prices, 1970 - 1993

Year	Ex-factory price Rp/Kg	Floor pr rice Rp/kg	Floor pr paddy Rp/kg	Ratio rice&sugar	Ratio paddy&sug	Avg Consumer Rp/Kg	London fob US$/MT	London fob Rp000/MT
1970						78.6	89.1	32.3
1971						104.7	110.1	43.2
1972						108.9	159.6	66.2
1973						134.2	213.3	88.5
1974						149.4	689.7	286.2
1975						178.1	433.9	180.1
1976	109.1	108.0	68.5	1.01	1.59	196.9	250.7	104.0
1977	134.3	110.0	71.0	1.22	1.89	208.8	214.1	88.9
1978	155.6	119.5	75.0	1.30	2.07	229.2	204.2	90.2
1979	188.0	146.0	95.0	1.29	1.98	268.4	240.9	150.1
1980	225.5	175.0	105.0	1.29	2.15	334.5	685.2	429.6
1981	350.0	195.0	120.0	1.79	2.92	491.5	450.7	284.8
1982	350.0	210.0	135.0	1.67	2.59	551.4	260.1	171.9
1983	350.0	233.0	145.0	1.50	2.41	572.1	252.0	229.0
1984	400.0	264.0	165.0	1.52	2.42	617.4	169.6	174.0
1985	425.0	279.0	175.0	1.52	2.43	650.0	148.7	165.3
1986	465.0	279.0	175.0	1.67	2.66	664.3	185.2	237.6
1987	467.5	307.0	190.0	1.52	2.46	705.2	192.0	315.6
1988	514.3	338.0	210.0	1.52	2.45	776.3	262.0	441.8
1989	600.0	399.0	250.0	1.50	2.40	892.1	317.9	562.7
1990	650.0	430.0	270.0	1.51	2.41	1041.4	310.5	572.2
1991	708.0	474.0	295.0	1.49	2.40	1124.6	231.1	450.6
1992	795.0	520.0	330.0	1.53	2.41	1229.8	232.6	472.1
1993	795.0	520.0	330.0	1.53	2.41	1284.8	259.9	542.4

Source: CASER-P3GI(1996)
Statistik BULOG (1969-1991) & (1983-1993)

Appendix 2

The AG-CGE Model:

GAMS code

Appendix 2: The AG-CGE Model

This appendix presents the Ag-CGE model in the format of the software in which the program was written, GAMS. GAMS stands for " General Algebraic Modeling system" and the software is described in Brooke, Kendrick and Meeraus (1988) . For ease of exposition, table A.2.1 is equivalent to table 4.1 and lists the definitions of the model indices, parameters, and variables as have been declared in GAMS syntax. Also only the sets, parameters, variables, and equations are presented in this appendix. Data, parameter initialization, and table printing code is omitted.

GAMS statement are case insensitive. However, we use a few notataion conventions to improve readability:

1. Variables are all in upper case.
2. Variable names with a suffix 0 represent base-year values and are specified as parameters in the model.
3. Parameters are all in lower case
4. Sets are all in upper case.

In the GAMS language:

- Parameters are treated as constants in the model and are defined in separate "PARAMETER" statements.
- "SUM" is the summation operator, sigma.
- "PRO" is the product operator, pi.
- "$" introduces a conditional "if" statement.
- The suffix ".FX" indicates a fixed variable.
- The suffix ".L" indicates the level or solution value of a variable.
- The suffix ".LO" and ".UP" indicate the lower and upper bounds, respectively of a variable.
- An asterisk "*" in the first column indicates a comment. Alternative treatments in the model Code are shown commented out.
- A subset is denoted by the subset name followed by the name of the larger set in parentheses. In statements, the subset name is used by itself.
- An "ALIAS" statement is used to give another name to a previously declared set. - A semicolon (;) terminates a GAMS statement.
- Items between slashes (/) are data or set elements.

Table A.2.1. Definition of Model Indices, parameters, and Variables

i, j	Sectors	Rice	Furniture
		Soybeans	Textiles
		Maize	Paper
		Cassava	Fertilizer
		Vegetables and fruits	Chemical
		Other	Petroleum Refinery
		Rubber	Cement
		Sugarcane	Steel
		Coconut	Other manufacturing
		Palmoil	Construction
		Other	Electricity, gas, and water
		Livestock	Trade
		Forestry	Restaurants and hotels
		Fishery	Transportation and communication
		Oil	Services
		Mining	Public administration
		Food Processing	Other services
iag	Agricultural Sectors	Rice	Sugarcane
		Soybeans	Coconut
		Maize	Palmoil
		Cassava	Other non-food crops
		Vegetables and fruits	Livestock
		Other food crops	Forestry
		Rubber	Fishery
iagn	Non-agricultural Sectors (iag + iagn = i)		
IE	Export sectors		
IE1	Export sectors with CET function		
IE2	Export sectors with no CET function		
IE2A	Export price fixed to domestic price and exports E adjusts		
IE2B	Export price free and exports E is fixed		
IED	Sectors with export demand equation		
IEDN	Sectors with no export demand equation		
IEN	Non export sectors		
IM	Import Sectors		
IMN	Non Import Sectors		
MQRN	mport rationed sectors		
F	Factors of production	Agriculture Rural Paid labor	
		Agriculture Urban Paid labor	
		Agriculture Rural Unpaid labor	
		Agriculture Urban Unpaid l	
		Rural Production & Transpı	
		Urban Production & Transprt & Manual	
		Rural Clerical & Sales & Se	
		Urban Clerical & Sales & S	
		Rural Prof & Tech & Supervisor	
		Urban Prof & Tech & Supe	
		Land	
		Capital	
ITOP	d consumption sector		
ITARG	Target price sectors	Rice	
IESET	Non CET sectors	Rice	

Table A.2.1. (cont.)

Parameters

A	AC(i)	Armington function shift parameter
	AD2(i)	CES shift parameter
	ALPHA2(i,f)	CES factor share parameter
	ALPHA(i,f)	Cobb Douglas factor share parameter
	AT(i)	CET function shift parameter
	A(i,j)	Input-output coefficients
B	B(i,j)	Capital composition matrix
C	CWTS(i)	Consumer price weights
D	DELTA(i)	Armington function share parameter
	DEPR(i)	Depreciation rates
	DSTR(i)	Ratio of inventory investment to gross output
E	ECON(I)	Export demand constant
	ESR0	Enterprise savings ratio
	ETA(i)	Export demand price elasticirty
	ETR0	Enterprise tax rate
	EXRB	Base exchange rate
F	FMAP(hh,f)	Factors to household map
G	GAMMA(i)	CET functiom share parameter
	GLES(I)	Government consumption shares
K	KSHR(i)	Shares of investment by sector of destination
M	MAKE(i,j)	Make matrix coefficients
P	PVB(i)	Base value added price
	PWMB(i)	Base import price
	PWM(I)	World market price of imports (in dollars)
	PWSE(i)	World price of export substitutes
	PWTS(i)	Price index weights
	PXB(i)	Base output price
R	RHOC(i)	Armington function exponent
	RHOP(i)	CES production function exponent
	RHOT(i)	CET function exponent
S	SREMIT(hh)	Remittance shares
	STRANS(hh)	Government transfer shares
	SYENTH(hh)	Share of enterprise income to households
	SYENT(f)	Enterprise shares of factor income
	SYTR(hh)	Share of household income transferred to other households
T	TC(i)	Consumption tax (+) or subsidy (-) rates
	TE(i)	Tax (+) or subsidy (-) rates on exports
	TH(hh)	Household tax rate
	TM20(i)	Initial values of import premium rates
	TMB(i)	Base tariff rate
	TM(i)	Tariff rates on imports
	TXB(i)	Base indirect tax
	TX(i)	Indirect tax rates
Y	YMAP(hh,hh)	household to households map

Variables

B	BULOGE(i)	Bulog exports
	BULOGM(i)	Bulog imports
	BULOGP(i)	Bulog purchases
	BULOGS(i)	Bulog sales
	BULSTK(i)	Bulog stocks
C	CD(i)	Final demand for private consumption
	CH(hh)	Household consumption
	CONTAX	Consumption tax revenue
D	DA(i)	Domestic activity sales
	DC(i)	Domesrtic commodity sales
	DEPREC	Total depreciation expenditure
	DK(i)	Volume of investment by sector of destination
	DST(i)	Inventory investment by sector
E	ENTSAV	Enterprise savings
	ENTTAX	Enterprise tax revenue
	ENTTF	Enterprise transfers abroad
	ESR	Enterprise savings rate
	ETR	Enterprise tax rate
	EXPTAX	Export subsidy payments
	EXR	Exchange rate (RP per $)
	E(i)	Exports
F	FBOR	Government foreign borrowing
	FDSC(i,f)	Factor demand by sector
	FLABTF	Labor transfers abroad
	FSAV	Net foreign savings
	FS(f)	Factor supply
	FXDINV	Fixed capital investment
G	GDPVA	Value added in market prices GDP
	GDTOT	Total volume of government consumption
	GD(i)	Final demand for government consumption
	GOVGDP	Government to GDP ratio
	GOVSAV	Government savings
	GOVTH	Government transfers to households
	GR	Government revenue
H	HHSAV	Total household savings
	HHTAX	Household tax revenue
I	ID(i)	Final demand for productive investment
	INDTAX	Indirect tax revenue
	INT(i)	Intermediates uses
	INVEST	Total investment
	INVGDP	Investment to GDP ratio
M	MINIMAND	Walras law minimand
	MPS(hh)	Marginal propensity to save by household type
	M(i)	Imports
P	PC(i)	Consumption price of composite goods
	PDA(I)	Domestic activity goods price
	PDC(i)	Domestic commodiy goods price
	PE(i)	Domestic price of exports
	PINDCON	Consumer price index
	PINDEX	Producer price index
	PK(i)	Price of capital goods by sector of destination
	PM(i)	Domestic price of imports
	PQ(i)	Price of composite good
	PREMY	Premium income
	PV(i)	Value added price
	PWE(I)	World price of exports
	PX(i)	Average output price
Q	Q(i)	Composite goods supply
R	REMIT	Remittances
	REMITENT	Enterprise remittances
	RGDP	Real GDP
S	SAVING	Total savings
	SPC(i)	Variable subsidy
T	TARIFF	Tariff revenue
	TM2(i)	Import premium
W	WALRAS1	Slack variable for savings investment equation
	WFDIST(i,f)	Factor price sectoral proportionality ratios
	WF(f)	Average factor price
X	X(i)	Domestic output
Y	YENT	Enterprise income
	YFCTR(f)	Factor income
	YH(hh)	Household income

Model GAMS statement:

```
$TITLE Indonesia CASER/IFPRI INDO-AG-CGE Model, 34 sectors 5/96
$OFFSYMLIST OFFSYMXREF OFFUPPER
*############ Indonesia AG-CGE Model  ############################

* Programmed by Sherman Robinson and Moataz El-Said
*          International Food Policy Research Institute
*          Washington, DC
* in collaboration with staff from
*          Center for Agro-Economic Research (CASER),
*          Bogor, Indonesia
* Version of December 1996
* Data are from the 1990 SAM, with further disaggregation.
* Investment is split between fixed investment and inventory accumulation
* The model includes:
*  (1) CES production functions.
*  (2) LES demand system.
*  (3) MCP specification of Bulog price support behavior
*      with price band and Bulog purchases/sales.
*  (4) MCP specification of Bulog import/export behavior to maintain
*      stocks within targeted band.
*  (5) MCP specification of fertilizer price floor, using price subsidy.
* MCP versions must be solved with PATH or MILES solvers.
* Based on Brazil model by S. Robinson and A. Cattaneo, version of 4/96
* Data read in from complete SAM
* Model structure based on USDA/ERS GDP Version, June 1989
* Original programming by: S. Robinson, K. Hanson, and M. Kilkenny.
*
*
* Include files used:
*          INDOSAM34.dat    SAM with 34 sectors
*          ELSTAF6.DAT      Elasticity values
*          LES.INC          Linear Expenditure System specification
*          LOADSOL3.INC     Table printing and loading
*          LOADGDP5.INC     Table printing and loading
*
*####################### SET DECLARATION ############################

*## for SAM
SETS
 ISAM                categories
                     / ACTIVITY, COMMDTY, CAP, LAB, LND, HOUSEHOLDS
                     ENTERPRS, GOVT, CAPACC, ROW, TOTALSAM / ;

 ISAM1(isam)      / TOTALSAM /;
 ISAM2(isam) ;
 ALIAS(isam2,isam3);
 ISAM2(isam) = NOT isam1(isam) ;
 PARAMETER SAM(isam,isam) SOCIAL ACCOUNTING MATRIX ;


SETS

INSAM2               SAM entries     /

          AG-PD-RUR          Agriculture Rural Paid labor
          AG-PD-URB          Agriculture Urban Paid labor
          AG-UN-RUR          Agriculture Rural Unpaid labor
          AG-UN-URB          Agriculture Urban Unpaid labor
          PRODRUR            Rural Production & Transprt & Manual
          PROD-URB           Urban Production & Transprt & Manual
          CLER-RUR           Rural Clerical & Sales & Services
          CLER-URB           Urban Clerical & Sales & Services
          PROF-RUR           Rural Prof & Tech & Supervisor
          PROF-URB           Urban Prof & Tech & Supervisor
          LAND               Land
          CAPITAL            Capital
          AG-WRKR            Agriculture Employees
          FARMER-SML         Small Farmers
          FARMER-MED         Medium Farmers
          FARMER-LRG         Large Farmers
          RUR-LOW            Rural Lower Level non agriculture
          RUR-HIGH           Rural Higher Level non agriculture
          URB-LOW            Urban Lower Level non agriculture
          URB-HIGH           Urban Higher Level non agriculture
          ENT                Enterprises
          GOV                Government
          RICE               Rice
          SOYBEANS           Soybeans
          MAIZE              Maize
          CASSAVA            Cassava
          VEGFRUT            Vegtables and fruits
          O-FOOD             Other food
          RUBBER             Rubber
          SUGARCAN           Sugarcane
          COCONUT            Coconut
          PALMOIL            Palm oil
          O-NONFOD           Other nonfood
          LIVESTCK           Livestock
```

FORESTRY	Forestry
FISHERY	Fishery
OIL	Crude oil natural gas and geo thermal mining
MINING	Coal and metal ore minning and other mining
FOODPROC	Food processing
FURN	Manufacture of bamboo wood and rattan products
TEXTILES	Yarn spinning and manufacture of textiles
PAPER	Manufacture of paper paper products and cardboard
FERTLZR	Manufacture of fertilizer and pesticides
CHEMICAL	Manufacture of chemicals
PET-REF	Petroleum refinery
CEMENT	Cement and nonmetallic mineral products
STEEL	Basic iron and steel
O-MANUF	other manufacturing
CONST	construction
ELGASWAT	Electricity gas and water
TRADE	Trade
REST-HOT	Retaurants and hotels
TRAN-COM	Transportation and communication
SERVICES	financial real estate and business services
PUBADMIN	General government and Defense Other social services
OTH-SERV	Other services
KACCOUNT	Capital account
INDTAX	Indirect taxes
TARIFF	Tariffs
ROW	Rest of the world
Total	
gdpsum /	

IS(insam2) Productive Sectors Plus

/ RICE, SOYBEANS, MAIZE, CASSAVA, VEGFRUT, O-FOOD, RUBBER, SUGARCAN, COCONUT, PALMOIL, O-NONFOD, LIVESTCK, FORESTRY, FISHERY, OIL, MINING, FOODPROC, FURN, TEXTILES, PAPER, FERTLZR, CHEMICAL, PET-REF, CEMENT, STEEL, O-MANUF, CONST, ELGASWAT, TRADE, REST-HOT, TRAN-COM, SERVICES, PUBADMIN, OTH-SERV, TARIFF, total, gdpsum /

I(is) Productive Sectors

/ RICE, SOYBEANS, MAIZE, CASSAVA, VEGFRUT, O-FOOD, RUBBER, SUGARCAN, COCONUT, PALMOIL, O-NONFOD, LIVESTCK, FORESTRY, FISHERY, OIL, MINING, FOODPROC, FURN, TEXTILES, PAPER, FERTLZR, CHEMICAL, PET-REF, CEMENT, STEEL, O-MANUF, CONST, ELGASWAT, TRADE, REST-HOT, TRAN-COM, SERVICES, PUBADMIN, OTH-SERV /

ACTIV(insam2)[23] Activities /
ACRICE
ACSOYBEANS
ACMAIZE
ACCASSAVA
ACVEGFRUT
ACO-FOOD
ACRUBBER
ACSUGARCAN
ACCOCONUT
ACPALMOIL
ACO-NONFOD
ACLIVESTCK
ACFORESTRY
ACFISHERY
ACOIL
ACMINING
ACFOODPROC
ACFURN
ACTEXTILES
ACPAPER
ACFERTLZR
ACCHEMICAL
ACPET-REF
ACCEMENT
ACSTEEL
ACO-MANUF
ACCONST
ACELGASWAT
ACTRADE
ACREST-HOT
ACTRAN-COM
ACSERVICES
ACPUBADMIN
ACOTH-SERV /

IAGACT(activ) Agricultural activities /
ACRICE

[23] AC = activities and CM =commodities

```
            ACSOYBEANS
            ACMAIZE
            ACCASSAVA
            ACVEGFRUT
            ACO-FOOD
            ACRUBBER
            ACSUGARCAN
            ACCOCONUT
            ACPALMOIL
            ACO-NONFOD    /

COMM(insam2)     Commodities   /
            CMRICE
            CMSOYBEANS
            CMMAIZE
            CMCASSAVA
            CMVEGFRUT
            CMO-FOOD
            CMRUBBER
            CMSUGARCAN
            CMCOCONUT
            CMPALMOIL
            CMO-NONFOD
            CMLIVESTCK
            CMFORESTRY
            CMFISHERY
            CMOIL
            CMMINING
            CMFOODPROC
            CMFURN
            CMTEXTILES
            CMPAPER
            CMFERTLZR
            CMCHEMICAL
            CMPET-REF
            CMCEMENT
            CMSTEEL
            CMO-MANUF
            CMCONST
            CMELGASWAT
            CMTRADE
            CMREST-HOT
            CMTRAN-COM
            CMSERVICES
            CMPUBADMIN
            CMOTH-SERV       /
```

```
FCT(insam2)                 Factors of production   /
            AG-PD-RUR               Agriculture Rural Paid labor
            AG-PD-URB               Agriculture Urban Paid labor
            AG-UN-RUR               Agriculture Rural Unpaid labor
            AG-UN-URB               Agriculture Urban Unpaid labor
            PRODRUR                 Rural Production & Transprt & Manual
            PROD-URB                Urban Production & Transprt & Manual
            CLER-RUR                Rural Clerical & Sales & Services
            CLER-URB                Urban Clerical & Sales & Services
            PROF-RUR                Rural Prof & Tech & Supervisor
            PROF-URB                Urban Prof & Tech & Supervisor
            LAND                    Land
            CAPITAL                 Capital    /

LAB(fct)              Labor      /
            AG-PD-RUR               Agriculture Rural Paid labor
            AG-PD-URB               Agriculture Urban Paid labor
            AG-UN-RUR               Agriculture Rural Unpaid labor
            AG-UN-URB               Agriculture Urban Unpaid labor
            PRODRUR                 Rural Production & Transprt & Manual
            PROD-URB                Urban Production & Transprt & Manual
            CLER-RUR                Rural Clerical & Sales & Services
            CLER-URB                Urban Clerical & Sales & Services
            PROF-RUR                Rural Prof & Tech & Supervisor
            PROF-URB                Urban Prof & Tech & Supervisor     /

CAP(fct)                    Capital
            / CAPITAL  /

LAND(fct)                   Land

            /  Land   /


INS(insam2)                 Institutions    /
            AG-WRKR                 Agriculture Employees
            FARMER-SML              Small Farmers
            FARMER-MED              Medium Farmers
            FARMER-LRG              Large Farmers
            RUR-LOW                 Rural Lower Level non agriculture
            RUR-HIGH                Rural Higher Level non agriculture
            URB-LOW                 Urban Lower Level non agriculture
            URB-HIGH                Urban Higher Level non agriculture
            ENT                     Enterprises   /
```

```
HHLD(insam2)            Households   /
        AG-WRKR                 Agriculture Employees
        FARMER-SML              Small Farmers
        FARMER-MED              Medium Farmers
        FARMER-LRG              Large Farmers
        RUR-LOW                 Rural Lower Level non agriculture
        RUR-HIGH                Rural Higher Level non agriculture
        URB-LOW                 Urban Lower Level non agriculture
        URB-HIGH                Urban Higher Level non agriculture    /

ALIAS(insam2,insam3) ;


* The household and factor names are referred to explicitly below.
* If changed, they must also be changed where referenced.
* The household names are explicitly referenced only in the
* calibration section; factor names appear in equation as well.

*## SUBSETS DEFINED BELOW: "DEFINE INDEXES"

 IAG(I)                 Agricultural sectors   /
                                RICE
                                SOYBEANS
                                MAIZE
                                CASSAVA
                                VEGFRUT
                                O-FOOD
                                RUBBER
                                SUGARCAN
                                COCONUT
                                PALMOIL
                                O-NONFOD
                                LIVESTCK
                                FORESTRY
                                FISHERY    /

 IAGN(I)  Non agricultural sectors

 MAN(I)   Manufacturing sectors

 MQR(i)   Sectors with rationed imports

 IE(I)          Export sectors
 IE1(i)         Export sectors with CET function
 IE2(i)         Export sectors with no CET function
 IE2A(i)        Export price fixed to domestic price and E adjusts
 IE2B(i)        Export price free and E is fixed
 IED(I)         Sectors with export demand equation
 IEDN(I)        Sectors with no export demand equation
 IEN(I)         Non export sectors

 IM(I)          Import Sectors
 IMN(I)         Non Import Sectors
 MQRN(i) Non import rationed sectors

 ITOP(i)   Subsidized consumption sector
                        / FERTLZR /  ;

 mqr(i)  = no ;

ALIAS(I,J,JJ) ;
ALIAS(hhld,hh,hhh) ;
ALIAS(fct,f,iff)  ;
ALIAS(Lab,L);

*######################### PARAMETER DECLARATION ######################

 PARAMETERS

*### READ IN PARAMETERS

*## READ IN FOR INITIALIZATION OF VARIABLES

 ENTTAX0        ENTERPRISE TAX REVENUE
 ENTSAV0        ENTERPRISE SAVINGS
 ENTTF0         ENTERPRISE TRANSFERS ABROAD
 E0(i)          EXPORTS
 GD0(i)         GOVT DEMAND
 CD0(i)         CONSUMPTION DEMAND
 ID0(i)         FIXED INVESTMENT
 EXR0           EXCHANGE RATE
 FSAV0          NET FOREIGN SAVINGS
 FBOR0          GOVERNMENT FOREIGN BORROWING
 REMIT0         REMITTANCES
 GDTOT0         TOTAL VOLUME OF GOVERNMENT CONSUMPTION
 GOVTH0         GOVERNMENT TRANSFERS TO HOUSEHOLDS
 FLABTF0        LABOR TRANSFERS ABROAD
 GOVSAV0        GOVERNMENT SAVINGS
 HHSAV0         HOUSEHOLD SAVINGS
 HHTAX0         HOUSEHOLD TAX REVENUE
 INVEST0        TOTAL INVESTMENT
 M0(i)          IMPORTS
```

```
MPS0(hh)                HOUSEHOLD MARGINAL PROPENSITY TO SAVE
PC0(i)                  CONSUMER PRICE OF COMPOSITE GOOD
PDA0(i)                 DOMESTIC ACTIVITY GOODS PRICE
PDC0(i)                 DOMESTIC COMMDITY GOODS PRICE
PE0(i)                  DOMESTIC PRICE OF EXPORTS
PINDEX0                 GDP DEFLATOR
PM0(i)                  DOMESTIC PRICE OF IMPORTS
X0(i)                   DOMESTIC OUTPUT VOLUME
DST0(i)                 INVENTORY INVESTMENT BY SECTOR

*# READ IN TABLE FOR INITIALIZATION OF VARIABLES (NEED NOT BE DECLARED)
* TABLE FCTRES(i,f) FACTOR DEMAND BY SECTOR
* TABLE FCTRY(i,f)   FACTOR INCOME BY SECTOR

*## READ IN PARAMETERS AS RATES, SHARES, ELASTICITIES
DEPR(i)                 DEPRECIATION RATES
DSTR(i)                 RATIO OF INVENTORY INVESTMENT TO GROSS OUTPUT
ETA(i)                  EXPORT DEMAND PRICE ELASTICITY
GLES(I)                 GOVERNMENT CONSUMPTION SHARES
KSHR(i)                 SHARES OF INVESTMENT BY SECTOR OF DESTINATION
RHOC(i)                 ARMINGTON FUNCTION EXPONENT
RHOT(i)                 CET FUNCTION EXPONENT
RHOP(i)                 CES production function exponent
SIGMAP(i)               CES production function elasticity
TC(i)                   CONSUMPTION TAX (+) OR SUBSIDY (-) RATES
TE(i)                   TAX (+) OR SUBSIDY (-) RATES ON EXPORTS
TH(hh)                  HOUSEHOLD TAX RATE
SREMIT(hh)              REMMITANCE SHARES
strans(hh)              govt transfer shares
ymap(hh,hh)             household to households map
fmap(hh,f)              factors to households map
sytr(hh)                Share of YH transferred to other households
syenth(hh)              Share of enterprise income to households
syent(f)                Enterprise shares of factor income
TM(i)                   TARIFF RATES ON IMPORTS
TM20(i)                 Initial values of import premium rates
TX(i)                   INDIRECT TAX RATES

*## IO, MAKE, CAPITAL COMPOSITION
B(i,j)                  Capital composition matrix
A(i,j)                  Input-output coefficients
MAKEF(i,j)              Make Matrix FLOWS
MAKE(i,j)               Make Matrix COEFFICIENTS
;

Parameter
MVAL(i)                 Rationed imports   ;

*### COMPUTED PARAMETERS FROM READ IN DATA (CALIBRATION)

*## COMPUTED PARAMETERS FOR INITIALIZATION OF VARIABLES
PARAMETER

DEPREC0                 TOTAL DEPRECIATION EXPENDITURE
INDTAX0                 Indirect taxes
EXPTAX0                 Export subsidies
TARIFF0                 Tariffs
PREMY0                  Import premium
DEPREC0                 Depreciation
DA0(i)                  DOMESTIC ACTIVITY SALES VOLUME
DC0(i)                  DOMESTIC COMMODITY SALES VOLUME
FD0(f)                  FACTOR DEMAND AGGREGATE
FS0(f)                  FACTOR SUPPLY AGGREGATE
INT0(i)                 INTERMEDIATE INPUT DEMAND
PK0(i)                  CAPITAL GOODS PRICE BY SECTOR OF DESTINATION
PQ0(i)                  PRICE OF COMPOSITE GOOD
PV0(i)                  VALUE ADDED PRICE BY SECTOR
PWM(I)                  WORLD MARKET PRICE OF IMPORTS (IN DOLLARS)
PWM0(i)                 BASE WORLD MARKET PRICE OF IMPORTS (IN DOLLARS)
PWE0(i)                 WORLD PRICE OF EXPORTS
PWSE(i)                 WORLD PRICE OF EXPORT SUBSTITUTES
PX0(i)                  AVERAGE OUTPUT PRICE
Q0(i)                   COMPOSITE GOOD SUPPLY VOLUME
VAR0(i)                 VALUE ADDED RATE BY SECTOR
WFDIST0(i,f)            FACTOR PRICE SECTORAL PROPORTIONALITY CONSTANTS
WF0(f)                  FACTOR PRICE AGGREGATE AVERAGE
YFCTR0(f)               FACTOR INCOME SUMMED OVER SECTOR
YFSECT0(i)              FACTOR INCOME BY SECTOR
YH0(hh)                 HOUSEHOLD INCOME
CH0(hh)                 Household consumption
CHSECT0(i,hh)           Household consumption by sector
YENT0                   Enterprise income
REMITENT0               foreign remittances to institutions

*## COMPUTED PARAMETERS AS RATES, SHARES
AC(i)                   ARMINGTON FUNCTION SHIFT PARAMETER
AD(i)                   Cobb Douglas shift parameter
AD2(i)                  CES shift parameter
ALPHA(i,f)              Cobb Douglas FACTOR SHARE PARAMETER
ALPHA2(i,f)             CES factor share parameter
AT(i)                   CET FUNCTION SHIFT PARAMETER
DELTA(i)                ARMINGTON FUNCTION SHARE PARAMETER
```

```
 ECON(I)                EXPORT DEMAND CONSTANT
 ESR0                   ENTERPRISE SAVINGS RATIO
 ETR0                   ENTERPRISE TAX RATE
 GAMMA(i)               CET FUNCTION SHARE PARAMETER
 PWTS(i)                PRICE INDEX WEIGHTS
 cwts(i)                Consumer price weights
 QD(i)                  DUMMY VARIABLE FOR COMPUTING AD(i)
 RMD(i)                 RATIO OF IMPORTS TO DOMESTIC SALES
 SUMSH                  SUM OF SHARE CORRECTION PARAMETER
 SUMHHSH(hh)            SUM OF SHARE FOR HH CLES
 SUMIMSH(i)             SUM OF SHARE FOR B
 pqb(i)                 Base composite price
 pxb(i)                 Base output price
 pweb(i)                Base export price
 pwmb(i)                Base import price
 exrb                   Base exchange rate
 pvb(i)                 Base value added price
 teb(i)                 Base export tax
 txb(i)                 Base indirect tax
 tmb(i)                 Base tariff rate
          ;

PARAMETERS
 AMAT(i,j)              INPUT-OUTPUT FLOWS
 FCTRY(i,f)             FACTOR INCOME BY SECTOR
 FCTRES(i,f)            FACTOR DEMAND BY SECTOR
 CLES(i,hh)             PRIVATE CONSUMPTION
 HHPAR(*,hh)            MISCELLANEOUS HOUSEHOLD PARAMETERS
 SECTRES(*,i)           SECTORAL QUANTITIES AND PRICES
 FACSER(*,f)            EXPORT AND IMPORT OF FACTOR SERVICES
 TAXR(*,i)              SECTORAL TAXES
 PARM(*,i)              MISCELLANEOUS PARAMETERS
 SCALRES(*)             MACRO TOTALS AND OTHER SCALARS
 ELASTICITY(*,I)        ELASTICITIES
;

*#### DEFINE INDEXES BASED ON READ IN DATA
 IAGN(i)          = not IAG(i);
 IE(i)            = yes$E0(i);
*IED(i)           = yes$ETA(i);
 IED(i)           = no ;
 IEDN(i)          = not IED(i);
 IEN(i)           = not IE(i);
 IM(i)            = yes$M0(i);
 IMN(i)           = not IM(i);
 MQRN(i)          = not mqr(i) ;
```

```
*SR Define subsets of IE for CET and non CET sectors.
*ITARG sectors will have imports/exports set by Bulog
*and hence will not have domestic price of exports tied
*to world price. Their normal exports, E(itarg) are set exogenously.
*Note that ie2(i) = ie2A(i) union itarg(i) = i$(ie2a(i) and itarg(i)).
*If an itarg sector is non-cet, then it must be a fixed E sector since
*its exports will be set separately by Bulog. That is, itarg must be a
*subset of ie2b if it is a subset of ie2.

 SET ITARG(I)       Target price sectors
                            /RICE/
    IESET(I)        Non CET sectors
                            /RICE/ ;

*  ieset(i)                       = no ;
   IE2(ie)$ieset(ie)              = yes ;
   IE2A(ie2)$(not itarg(ie2))     = yes ;
   IE2B(ie2)$(not ie2a(ie2))      = yes ;
   IE1(ie)                        = not ie2(ie) ;

 display ie, ien, ie1, ie2, ie2a, ie2b, itarg, ied, iedn, im, imn, mqrn, mqr   ;



 Parameter
 pcup(i)
 pxtarg(i)              target producer price
 dpxtarg(i)             target price band
 pctarg(i)              target consumer price
 dpctarg(i)             target price band
 stk0(i)                target stock
 dstk(i)                target band on stock          ;

*#################### VARIABLE DECLARATION ##########################

*## PRICE BLOCK
   EXR                  EXCHANGE RATE (RP per $)
   PDA(I)               DOMESTIC ACTIVITY GOODS PRICE
   PDC(i)               DOMESTIC COMMDITY GOODS PRICE
   PE(i)                DOMESTIC PRICE OF EXPORTS
   PINDEX               PRODUCER PRICES INDEX
   PINDCON              Consumer price index
   PK(i)                PRICE OF CAPITAL GOODS BY SECTOR OF DESTINATION
   PM(i)                DOMESTIC PRICE OF IMPORTS
   PQ(i)                PRICE OF COMPOSITE GOODS
   PC(i)                CONSUMPTION PRICE OF COMPOSITE GOODS
```

PV(i) VALUE ADDED PRICE
PWE(I) WORLD PRICE OF EXPORTS
PX(i) AVERAGE OUTPUT PRICE

*## PRODUCTION BLOCK
DA(i) DOMESTIC ACTIVITY SALES
DC(i) DOMESTIC COMMODITY SALES
E(i) EXPORTS
M(i) IMPORTS
Q(i) COMPOSITE GOODS SUPPLY
X(i) DOMESTIC OUTPUT

*## FACTOR BLOCK
FDSC(i,f) FACTOR DEMAND BY SECTOR
FS(f) FACTOR SUPPLY
WF(f) AVERAGE FACTOR PRICE
WFDIST(i,f) FACTOR PRICE SECTORAL PROPORTIONALITY RATIOS
YFCTR(f) FACTOR INCOME

*## INCOME AND EXPENDITURE BLOCK
CD(i) FINAL DEMAND FOR PRIVATE CONSUMPTION
DEPREC TOTAL DEPRECIATION EXPENDITURE
DK(i) VOLUME OF INVESTMENT BY SECTOR OF DESTINATION
DST(i) INVENTORY INVESTMENT BY SECTOR
BULOGP(i) Bulog purchases
BULOGS(i) Bulog sales
BULOGE(i) Bulog exports
BULOGM(i) Bulog imports
BULSTK(i) Bulog stocks
ENTSAV ENTERPRISE SAVINGS
ENTTAX ENTERPRISE TAX REVENUE
ENTTF ENTERPRISE TRANSFERS ABROAD
FLABTF LABOR TRANSFERS ABROAD
FSAV NET FOREIGN SAVINGS
FBOR GOVERNMENT FOREIGN BORROWING
FXDINV FIXED CAPITAL INVESTMENT
GD(i) FINAL DEMAND FOR GOVERNMENT CONSUMPTION
GDTOT TOTAL VOLUME OF GOVERNMENT CONSUMPTION
GOVSAV GOVERNMENT SAVINGS
GOVTH GOVERNMENT TRANSFERS TO HOUSEHOLDS
GR GOVERNMENT REVENUE
HHSAV TOTAL HOUSEHOLD SAVINGS
ID(i) FINAL DEMAND FOR PRODUCTIVE INVESTMENT
INDTAX INDIRECT TAX REVENUE
CONTAX CONSUMPTION TAX REVENUE
INT(i) INTERMEDIATES USES
INVEST TOTAL INVESTMENT
WALRAS1 SLACK VARIABLE FOR SAVINGS INVESTMENT EQUATION
MPS(hh) MARGINAL PROPENSITY TO SAVE BY HOUSEHOLD TYPE
ESR Enterprise savings rate
ETR Enterprise tax rate
EXPTAX EXPORT SUBSIDY PAYMENTS
SAVING TOTAL SAVINGS
TARIFF TARIFF REVENUE
HHTAX HOUSEHOLD TAX REVENUE
YH(hh) HOUSEHOLD INCOME
CH(hh) Household consumption
YENT Enterprise income
REMIT REMITTANCES
REMITENT Enterprise remittances

*## GDP CALCULATIONS
RGDP REAL GDP
GDPVA VALUE ADDED IN MARKET PRICES GDP
GOVGDP GOVERNMENT TO GDP RATIO
INVGDP INVESTMENT TO GDP RATIO
MINIMAND Walras law minimand

*SR PREMIUM RATIONING OF IMPORTS
TM2(i) Import premium

PREMY Premium income

*SR subsidy to maintain price ceiling for fertilizer
SPC(i) Variable subsidy
;

*##################### EQUATION DECLARATION ############################

*## PRICE BLOCK
PMDEF(i) Definition of domestic import prices
PEDEF(i) Definition of domestic export prices
PDDEF(i) Definition of prices of domestic Commodity-Activity
ABSORPTION(i) Value of domestic sales
SALES(i) Value of domestic output
PCDEF(i) Definition of consumption price of composite good
PCTOP(i) Upper limit on consumer price
PXLOW(i) Lower limit on output price
PXTOP(i) Upper limit on output price
STKEQ(i) Stock equation
STKUP(i) Upper bound on stocks

```
   STKLO(i)              Lower bound on stocks
   ACTP(i)               Definition of Activity prices
   PKDEF(i)              Definition of  Capital goods price
   PINDEXDEF             Definition of general price level
   PINDCONDEF            Definition of consumer price index


*## PRODUCTION BLOCK
   ACTIVITY(i)           Production function
   PROFITMAX(i,f)        First order conditions for profit maximization
   INTEQ(i)              Total intermediate uses
   MAKEEQ(i)             Make matrix (commodities buy activities off the diagonal)
   CET(I)                CET function
   CET3(i)               Non CET function
   CET2(i)               Domestic sales for non-traded sectors
   ESUPPLY(i)            Export supply
   EPRICE(i)             Export price when no CET function
   EDEMAND(i)            Export demand functions
   ARMINGTON(I)          COMPOSITE GOOD AGGREGATION FUNCTION
   ARMINGTON2(i)         COMPOSITE GOOD AGG. FOR NONTRADED SECTORS
   COSTMIN(i)            F.O.C. for cost minimization of Composite good

*## INCOME BLOCK
   YFDEF(f)              Factor income
   ENTY2                 Capital income
   YHDEF(hh)             SINGLE HOUSEHOLD INCOME
   HHCONDEF(hh)          Household income
   TARIFFDEF             TARIFF REVENUE
   IMPREM                Import premium
   CONTAXDEF             CONSUMPTON TAX EQUATION
   INDTAXDEF             INDIRECT TAXES ON DOMESTIC PRODUCTION
   EXPTAXDEF             EXPORT SUBSIDY PAYMENTS
   ETAX                  ENTERPRISE TAX
   HHTAXDEF              TOTAL HOUSEHOLD TAXES COLLECTED BY GOVT.
   DEPREQ                DEPRECIATION EXPENDITURE
   HHSAVEQ               HOUSEHOLD SAVINGS
   GREQ                  GOVERNMENT REVENUE
   ESAVE                 ENTERPRISE SAVINGS
   TOTSAV                TOTAL SAVINGS

*## EXPENDITURE BLOCK
   CDEQ(i)               PRIVATE CONSUMPTION BEHAVIOR
   GDEQI(i)              GOVT CONSUMPTION OF COMMODITIES
   GRUSE                 GOVERNMENT SAVINGS
*  DSTEQ(i)              INVENTORY INVESTMENT
   FIXEDINV              FIXED INVESTMENT NET OF INVENTORY
   PRODINV(i)            INVESTMENT BY SECTOR OF DESTINATION
   IEQ(i)                INVESTMENT BY SECTOR OF ORIGIN

*## MARKET CLEARING
   EQUIL(i)              GOODS MARKET EQUILIBRIUM
   FMEQUIL(f)            FACTOR MARKET EQUILIBRIUM
   CAEQ                  CURRENT ACCOUNT BALANCE (Bill Rp)
   WALRAS                SAVINGS INVESTMENT EQUILIBRIUM

*## GROSS NATIONAL PRODUCT
   GDPY                  Total value added including indirect tax
   GDPR                  REAL GDP
   GOVSHR                GOVERNMENT TO GDP SHARE
   INVSHR                INVESTMENT TO GDP SHARE
   OBJECT                Walras minimand
       ;


*######################### EQUATION ASSIGNMENT  ########################

*## PRICE BLOCK

 PMDEF(im)..             PM(im)  =E= PWM(im)*EXR*(1 + TM(im) + TM2(im)) ;

 PEDEF(ie)..             PE(ie)  =E= PWE(ie)*EXR*(1 - TE(ie)) ;

 PDDEF(j)..              PDC(j) =E= SUM(i, MAKE(i,j)*PDA(i)) ;

 ABSORPTION(i)..         PQ(i)*Q(i) =E= PDC(i)*DC(i) + (PM(i)*M(i))$im(i) ;

 SALES(i)..              PX(i)*X(i) =E= PDA(i)*DA(i) + (PE(i)*E(i))$ie(i) ;

 PCDEF(i)..              PC(i)   =E= PQ(i) * (1 + TC(i) - SPC(i)) ;

 PCTOP(itop)..           (PCUP(itop) - PC(itop)) =G= 0;

 PXLOW(itarg)..          (PX(itarg) - PXTARG(itarg) + DPXTARG(itarg)) =G= 0 ;

 PXTOP(itarg)..          (PCTARG(itarg) + DPCTARG(itarg) - PC(itarg)) =G= 0 ;

 STKEQ(itarg)..          BULSTK(itarg) =E= STK0(itarg) + BULOGP(itarg)
                         - BULOGS(itarg) + BULOGM(itarg) - BULOGE(itarg) ;

 STKUP(itarg)..          STK0(itarg) + DSTK(itarg) =G= BULSTK(itarg) ;

 STKLO(itarg).           BULSTK(itarg) =G= STK0(itarg) - DSTK(itarg) ;
```

```
ACTP(i)..               PV(i)   =E= PX(i)*(1.0 - TX(i)) - SUM(j,a(j,i)*PC(j)) ;

PKDEF(i)..              PK(i)   =E= SUM(J, PC(j)*b(j,i)) ;

*PINDEXDEF..            PINDEX  =E= GDPVA/RGDP ;

PINDEXDEF..             PINDEX  =E= SUM(i, pwts(i)*PX(i)) ;

PINDCONDEF..            PINDCON =E= SUM(i, cwts(i)*PC(i)) ;



*## PRODUCTION BLOCK

ACTIVITY(i)..           X(i) =E= AD2(i)*( SUM(f$alpha2(i,f),
                        ALPHA2(i,f)*FDSC(i,f)**(-RHOP(i))) )**(-1/RHOP(i)) ;

PROFITMAX(i,f)$WFDIST0(i,f)..
                        WF(f)*WFDIST(i,f) =E=
                        PV(i)*AD2(i)*(SUM(fct$alpha2(i,fct), ALPHA2(i,fct)*FDSC(i,fct)
                         **(-RHOP(i))))**((-1/RHOP(i)) - 1)
                        *ALPHA2(i,f)*FDSC(i,f)**(-RHOP(i)-1);

INTEQ(i)..              INT(i)  =E= SUM(J, A(i,j)*X(j));

MAKEEQ(i)..             DA(i) =E= SUM(j, MAKE(i,j)*DC(j)) ;

CET(ie1)..              X(ie1)  =E= AT(ie1)*(GAMMA(ie1)*E(ie1)**RHOT(ie1) +
                        (1-GAMMA(ie1))*DA(ie1)**RHOT(ie1))**(1/RHOT(ie1)) ;

CET3(ie2)..             X(ie2)  =E= E(ie2) + DA(ie2) ;

CET2(ien)..             X(ien) =E= DA(ien) ;

ESUPPLY(ie1)..          E(ie1) =E= DA(ie1)*((PE(ie1)/PDA(ie1))*((1 - GAMMA(ie1))
                        /GAMMA(ie1)))**(1/(RHOT(ie1)-1)) ;

EPRICE(ie2a)..          PDA(ie2a) =E= pe(ie2a) ;

EDEMAND(ied)..          E(ied)  =E= ECON(ied)*((PWE(ied)/PWSE(ied))**(-ETA(ied))) ;

ARMINGTON(im)..         Q(im)  =E= AC(im)*(DELTA(im)*M(im)**(-RHOC(im)) +
                        (1 - DELTA(im))*DC(im)**(-RHOC(im)))**(-1/RHOC(im)) ;

ARMINGTON2(imn)..       Q(imn) =E= DC(imn) ;

COSTMIN(im)..           M(im)/DC(im) =E= ((PDC(im)/PM(im))*(DELTA(im)/
                        (1 - DELTA(im))))**(1/(1 + RHOC(im))) ;

*## INCOME BLOCK

YFDEF(f)..              YFCTR(f) =E= SUM(i, WF(f)*WFDIST(i,f)*FDSC(i,f)) ;

ENTY2..                 YENT   =E= SUM(f, syent(f)*YFCTR(f)) + REMITENT*EXR
                        + PREMY ;

YHDEF(hh)..             YH(hh) =E=  SUM(f, FMAP(hh,f)*(1-syent(f))*YFCTR(f))
                        + sremit(hh)*(REMIT - FLABTF)*EXR + strans(hh)*GOVTH
                        + SUM(hhh, ymap(hh,hhh)*sytr(hhh)*YH(hhh))
                        + syenth(hh)*(YENT - ENTTAX - ENTSAV - ENTTF*EXR) ;

HHCONDEF(hh)..          CH(hh) =E= YH(hh)*(1-th(hh))*(1-mps(hh))
                        - SUM(hhh, ymap(hhh,hh))*sytr(hh)*YH(hh) ;

TARIFFDEF..             TARIFF =E= SUM(im, TM(im)*M(im)*PWM(im))*EXR ;

IMPREM..                PREMY  =E= SUM(im, TM2(im)*M(im)*PWM(im))*EXR ;

CONTAXDEF..             CONTAX =E= SUM(i, (TC(i)-SPC(i))*PQ(i)*Q(i) );

INDTAXDEF..             INDTAX =E= SUM(i, TX(i)*PX(i)*X(i)) ;

EXPTAXDEF..             EXPTAX =E= SUM(ie, TE(ie)*E(ie)*PWE(ie))*EXR ;

HHTAXDEF..              HHTAX  =E= SUM(hh, TH(hh)*YH(hh)) ;

DEPREQ..                DEPREC =E= SUM(i, DEPR(i)*PK(i)*FDSC(i,"capital")) ;

ETAX..                  ENTTAX =E= ETR*YENT ;

ESAVE..                 ENTSAV =E= ESR*YENT ;

HHSAVEQ..               HHSAV  =E= SUM(hh, MPS(hh)*YH(hh)*(1 - TH(hh))) ;

GREQ..                  GR     =E= TARIFF + CONTAX + INDTAX + HHTAX + FBOR*EXR +
                        ENTTAX + EXPTAX ;

TOTSAV..                SAVING =E= HHSAV + GOVSAV + DEPREC + FSAV*EXR + ENTSA
```

```
*## EXPENDITURE BLOCK

*SR LES system, Stone-Geary utility
 CDEQ(I)..          PC(i)*CD(i) =E= SUM(hh, PC(i)*gammah(i,hh) +
                    betah(i,hh)*(CH(hh) - SUM(j, PC(j)*gammah(j,hh)))) ;

 GDEQI(I)..         GD(i)  =E= GLES(i)*GDTOT + BULOGP(i) - BULOGS(i) ;

 GRUSE..            GR     =E= SUM(i, PC(i)*GD(i)) + GOVSAV + GOVTH
                    + SUM(itarg, BULOGE(itarg)*EXR*PWE(itarg))
                     - SUM(itarg, BULOGM(itarg)*EXR*PWM(itarg)) ;

 FIXEDINV..         FXDINV =E= INVEST - SUM(i, DST(i)*PC(i)) ;

 PRODINV(I)..       PK(i)*DK(i) =E= KSHR(i)*FXDINV ;

 IEQ(I)..           ID(i)  =E= SUM(J, B(i,j)*DK(j));


*## MARKET CLEARING

 EQUIL(I)..         Q(i)   =E= INT(i) + CD(i) + GD(i) + ID(i) + DST(i) ;

 FMEQUIL(f)..       SUM(i, FDSC(i,f)) =E= FS(f) ;

 CAEQ..             SUM(im, PWM(im)*M(im)) + SUM(itarg, BULOGM(itarg)*PWM(itarg))
                    =E= SUM(ie, PWE(ie)*E(ie)) +  FSAV
                    + FBOR + REMIT - ENTTF - FLABTF + REMITENT
                    + SUM(itarg, BULOGE(itarg)*PWE(itarg)) ;

 WALRAS..           SAVING =E= INVEST + WALRAS1 ;


*## GROSS NATIONAL PRODUCT

 GDPY..             GDPVA =E= SUM(i,PV(i)*X(i)) + INDTAX + TARIFF + CONTAX ;

 GDPR..             RGDP  =E= SUM(i, (pvb(i)+txb(i)*pxb(i))*X(i)
                    +  tmb(i)*exrb*pwmb(i)*M(i)) ;

 GOVSHR..           GOVGDP =E= SUM(i, pc(i)*gd(i)) / gdpva ;

 INVSHR..           INVGDP =E= SUM(i, pc(i)*id(i)) / gdpva ;

 OBJECT..           minimand =E= walras1*walras1 ;

*#### ADDITIONAL RESTRICTIONS CORRESPONDING TO EQUATIONS
*# PMDEF, PEDEF, EDEMAND, ESUPPLY, COSTMIN, AND PROFITMAX
*# FOR NON-TRADED SECTORS AND SECTORS WITH FIXED WORLD EXPORT PRICES

 PM.FX(imn)         = PM0(imn) ;
 PE.FX(ien)         = PE0(ien) ;
 PWE.FX(iedn)       = PWE.L(iedn) ;
 E.FX(ien)          = 0;
 M.FX(imn)          = 0;
 TM2.FX(mqrn)       = 0.0 ;
 FDSC.FX(i,f)$(WFDIST0(i,f) EQ 0) = 0 ;

*############################## MODEL CLOSURE ################################

*## NUMERAIRE PRICE INDEX
*In this case, the producer or consume price index

*PINDEX.FX           = PINDEX.L ;
 PINDCON.FX         = PINDCON.L ;

*## FOREIGN EXCHANGE MARKET CLOSURE
* In this version, the balance of trade (current account balance) is fixed exogenously;
* EXR is the equilibrating variable.

   EXR.FX           = EXR.L ;
*  FSAV.FX          = FSAV.L ;
   FBOR.FX          = FBOR.L ;
   REMIT.FX         = REMIT.L ;
*  REMITINS.FX(ins) = REMITINS.L(ins) ;
   REMITENT.FX      = REMITENT.L ;
   FLABTF.FX        = FLABTF.L ;
   ENTTF.FX         = ENTTF.L  ;

   TM2.FX(mqr)      = 0.0 ;


*## INVESTMENT-SAVINGS CLOSURE
* This version specifies neoclassical closure.  Aggregate investment is determined by aggregate
* savings; the model is savings driven.

   MPS.FX(hh)       = MPS.L(hh) ;
```

```
   esr.fx                       = esr.l ;
*  INVEST.FX                    = INVEST.L ;
   DST.FX(l)                    = DST0(i) ;

*## EXOGENOUS GOVT EXPENDITURE
*## AND GOVT CLOSURE RULE
* Real government spending (GDTOT) is fixed exogenously.  The government deficit (GOVSAV)
* is determined residually;

   GDTOT.FX                     = GDTOT.L ;
*   GOVGDP.FX                   = GOVGDP.L ;
*  GOVSAV.FX                    = GOVSAV.L ;
   GOVTH.FX                     = GOVTH.L ;
   ETR.FX             = ETR.L ;
*  GR.FX                        = GR.L ;

 *## FACTOR MARKET CLOSURE
* Capital stocks in this version are fixed.  Commented equations in capital  stock section allow
* mobile capital version to be chosen. Commented equations in the labor blocks allow a version
*  with fixed wage for each labor type, with total employment endogenous.

   FS.FX(f)                     = FS.L(f) ;
   WFDIST.FX(i,f)               = WFDIST.L(i,f) ;

*SR fix "land" in forestry, livestock, and fisheries
  SET
            inoncrp(l)
                     /livestck, forestry, fishery / ;

            FDSC.FX(inoncrp,"land")       = FDSC.L(inoncrp,"land") ;
            WFDIST.LO(inoncrp,"land")   = -inf ;
             WFDIST.UP(inoncrp,"land")  = +inf ;


*### MININIG SECTOR OUTPUT FIXED
*SR Fix output of mining sector
   FDSC.FX("mining",f)                    = FDSC.L("mining",f) ;
   WFDIST.LO("mining",f)      = -inf ;
   WFDIST.UP("mining",f)      = +inf ;

*### CONSUMPTION SUBSIDY to maintain PC ceiling for fertilizer
*### Bulog purchases to maintain PX floor for Rice

* SR  This specification requires MCP solvers, PATH or MILES, and associating SPC, BULOGP,
* and BULOGS with inequality equations.To eliminate this behavior, reset itop and itarg sets and
* fix SPC, BULOGP, and BULOGS to zero. Model can then be solve with standard programming
* solvers, MINOS or CONOPT.

   SPC.FX(i)$(not itop(l))              = 0.0 ;
   SPC.LO(itop)                         = 0.0 ;
   BULOGS.FX(i)$(not itarg(l))          = 0.0 ;
   BULOGP.FX(i)$(not itarg(l))= 0.0 ;
   BULOGM.FX(i)$(not itarg(l)           = 0.0 ;
   BULOGE.FX(i)$(not itarg(l))= 0.0 ;
   BULOGP.LO(itarg)                     = 0.0 ;
   BULOGS.LO(itarg)                     = 0.0 ;
   BULOGM.LO(itarg)                     = 0.0 ;
   BULOGE.LO(itarg)                     = 0.0 ;

* For rice, assume perfect transformability but no price link.
* In that case, exports must be set exogenously.
* See Eprice and CET3 equations. Note that itarg = ie2$(not ie2a(ie2))

* E.FX(ie2)$(not ie2a(ie2))            = E.L(ie2) ;
  E.FX(ie2b)                           = E.L(ie2b) ;

display ie2b, e.l, exr.l;

 OPTIONS ITERLIM=1000,LIMROW=0,LIMCOL=0,SOLPRINT=OFF;

 MODEL INDO2
                  /ALL/ ;

 Model INDO3  /
                  PMDEF
                  PEDEF
                  PDDEF
                  ABSORPTION
                  SALES
                  PCDEF
                  PCTOP.SPC
                  PXLOW.BULOGP
                  PXTOP.BULOGS
                  STKEQ
                  STKUP.BULOGE
                  STKLO.BULOGM
                  ACTP
                  PKDEF
                  PINDEXDEF
                  PINDCONDEF
```

```
ACTIVITY
PROFITMAX
INTEQ
MAKEEQ
CET
CET3
CET2
ESUPPLY
EPRICE
EDEMAND
ARMINGTON
ARMINGTON2
COSTMIN
YFDEF
ENTY2
YHDEF
HHCONDEF
TARIFFDEF
IMPREM
CONTAXDEF
INDTAXDEF
EXPTAXDEF
ETAX
HHTAXDEF
DEPREQ
HHSAVEQ
GREQ
ESAVE
TOTSAV
CDEQ
GDEQI
GRUSE
FIXEDINV
PRODINV
IEQ
EQUIL
FMEQUIL
CAEQ
WALRAS
GDPY
 GDPR
GOVSHR
INVSHR
OBJECT  /            ;
```

```
 indo2.optfile         = 1 ;
 indo2.holdfixed       = 1 ;
 indo3.holdfixed       = 1 ;


OPTION limrow      =0 ;
OPTION MCP         =PATH;
OPTION NLP         =MINOS5 ;


               SOLVE INDO3 USING MCP

*SR initialize base prices for GDP calculations
 pqb(i)     = pq.l(i) ;
 pxb(i)     = px.l(i) ;
 exrb       = exr.l ;
 pweb(i)    = pwe.l(i) ;
 pwmb(i)    = pwm(i) ;
 pvb(i)     = pv.l(i) ;
 txb(i)     = tx(i) ;
 tmb(i)     = tm(i) ;

*############################ END OF MODEL ############################
```

Appendix 3

The Disaggregated SAM

Appendix 3: Disaggregated SAM

The data used for the AG-CGE model, presented in Appendix 2, rely almost entirely on Social Accounting Matrices. The SAM underlying the current model is for 1990. Some accounts in the original SAM published by BPS have been grouped together while others have been dis-aggregated in a manner reflecting the purpose of this paper. This appendix present the different elements of the Indonesian SAM captured by the AG-CGE model, and describes the steps followed to dis-aggregate activities and commodities, in particular the agriculture sector dis-aggregation.

Elements of the Indonesian SAM

In principle, a SAM can be tailored to satisfy the purpose for constructing it within boundary of data constraints. There is no specific rule to follow in determining the size of the matrix, but we can identify a set of blocks common to almost all SAMs. Table A.3.1 shows these blocks as pertaining to the Indonesian SAM with equal number of accounts across a row and down a column. Interaction between a row account and a column account is indicated by the relevant cell in the table. For example value added is the return to the "Factors" row and is the payment of the "Activity" column, and similarly for other cells. Table A.3.2 is the dis-aggregated SAM with a total of 94 accounts. The correspondence between the two tables (A.3.1 and A.3.2) is as follows :

Table A.3.1	Table A.3.2
Factors	Accounts 1 - 12
Households	Accounts 13 - 20
Enterprise	Account 21
Government	Account 22
Activities	Accounts 23 - 56
Commodities	Accounts 57 - 90
Capital	Account 91
Indirect tax	Account 92
Tariffs	Account 93
World	Account 94

Activity / Commodity Dis-aggregation

The initial SAM published by BPS accounted for 22 productive sectors, of which 5 sectors accounted for agricultural activity / commodity. These were :

1. Farm Food Crops
2. Farm Non Food Crops
3. Livestock and Products
4. Forestry and Hunting
5. Fishery, Drying and Salting of Fish

Apparently, such level of dis-aggregation is insufficient for the purposes of the current model, and further detailed information about the Indonesian agricultural sector is needed. Using the 1990 Input-Output table for Indonesia which provide dis-aggregated information for 161 sectors, the current SAM (Table A.3.2) accounts for 34 productive sectors. Of the 34 sectors the agriculture sector is composed of 14 sectors. Farm Food Crops has been dis-aggregated into:

1. *Rice*
2. *Soybeans*
3. *Maize*
4. *Cassava*
5. *Vegetables and Fruits*
6. *Other*

Farm Non Food Crops dis-aggregated into:

7. *Rubber*
8. *Sugarcane*
9. *Coconut*
10. *Oil Palm*
11. *Other*

and

12. *Livestock and Products*
13. *Forestry and Hunting*
14. *Fishery, Drying and Salting of Fish*

remained at the same level of dis-aggregation.

Table A.3.1. A descriptive Social Accounting Matrix for Indonesia

Receipts	Expenditures or Outlays: Factors	Activity	Commodity	Households	Enterprise	Government	Capital	Ind. Tax	Tariffs	World	Row Total
Factors		Value added									Factor returns
Activity			Domestic sales							Exports	Producer Sales Revenue
Commodity		Intermediate demand		Private consumption		Gov't consumption	Investment				Total Domestic sales
Households	Allocation matrix			Inter-HH transfers		Gov't transfers				Remittances	HH. Income
Enterprise					Inter-Ent. transfers					transfers	corporate income
Government				Direct tax	Direct tax			Ind. tax	Tariffs	Transfers	government revenue
Capital Account				Private savings	Ent. savings	Gov't savings				Foerign savings	Total savings
Ind. Tax		Indirect tax									Ind. tax revenue
Tariffs			Tariffs								Tariff revenue
World			Imports		Transfers						foreign income
Column Total	Factor expenditures	Producer costs	Total absorption	HH. expenditures	Corporate expenditures	Gov't expenditures	Total investment	Ind. Tax	Tariff	Foreign expenditures	

Table A.3.2. Social Accounting Matrix For Indonesia: 199((BILLIONS OF 1990 RP)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		AG-PD-RUR	AG-PD-URB	AG-UN-RUR	AG-UN-URB	PRODRUR	PROD-URB	CLER-RUR	CLER-URB	PROF-RUR	PROF-URB	LAND	CAPITAL	AG-WRKR	FARMER-SML	FARMER-MED	FARMER-LRG
1	AG-PD-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	AG-PD-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	AG-UN-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	AG-UN-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	PRODRUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	PROD-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	CLER-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	CLER-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	PROF-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	PROF-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	LAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	CAPITAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	AG-WRKR	2,793.76	746.61	65.72	4.64	324.66	175.71	100.81	71.48	8.28	6.31	511.56	1322.90	0	27.46	3.83	17.15
14	FARMER-SML	1,089.16	133.96	8,024.66	539.31	2,274.41	739.55	848.77	372.65	94.1	44.75	6332.39	5890.55	20.19	0	7.15	41.99
15	FARMER-MED	227.83	12.25	3,058.88	88.91	633.08	80.5	238.58	44.07	48.64	6.19	1479.96	1374.74	5.25	12.20	0	15.47
16	FARMER-LRG	466.69	58.62	4,508.07	223.34	834.28	179.65	326.07	121.13	66.87	13.88	1793.12	1836.70	4.79	17.48	2.43	0
17	RUR-LOW	535.29	0	412.36	0	2114.96	0	2277.52	0	162.34	0	659.99	3221.38	56.05	187.75	62.84	112.82
18	RUR-HIGH	923.86	0.00	1,454.75	0.00	6,667.19	0	6596.88	0	1918.18	0	2448.86	3663.31	0.05	0.09	0.01	0.26
19	URB-LOW	0	274.77	0	56.8	0	4859.76	0	6673.06	0	422.8	662.07	8019.12	19.46	65.57	9.05	39.68
20	URB-HIGH	0	151.81	0.00	58.75	0.00	6838.71	0	17796.49	0	4134.01	65.59	10526.63	0.01	0.01	0.00	0.06
21	ENT	0	0	0	0	0	0	0	0	0	0	0	54761.15	0	0	0	0
22	GOV	0	0	0	0	0	0	0	0	0	0	0	0	48.86	428.03	102.54	136.00
23	ACRICE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	ACSOYBEANS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	ACMAIZE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	ACCASSAVA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	ACVEGFRUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	ACO-FOOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	ACRUBBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	ACSUGARCAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	ACCOCONUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	ACPALMOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	ACO-NONFOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	ACLIVESTCK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	ACFORESTRY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	ACFISHERY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	ACOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	ACMINING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	ACFOODPROC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	ACFURN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	ACTEXTILES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	ACPAPER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43	ACFERTLZR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	ACCHEMICAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	ACPET-REF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	ACCEMENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	ACSTEEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	ACO-MANUF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	ACCONST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	ACELGASWAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	ACTRADE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	ACREST-HOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	ACTRAN-COM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	ACSERVICES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	ACPUBADMIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	ACOTH-SERV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57	CMRICE	0	0	0	0	0	0	0	0	0	0	0	0	446.45	3755.09	935.61	1195.80
58	CMSOYBEANS	0	0	0	0	0	0	0	0	0	0	0	0	26.086	97.219	24.314	32.652
59	CMMAIZE	0	0	0	0	0	0	0	0	0	0	0	0	75.653	281.948	70.513	94.693
60	CMCASSAVA	0	0	0	0	0	0	0	0	0	0	0	0	139.470	519.784	129.995	174.572
61	CMVEGFRUT	0	0	0	0	0	0	0	0	0	0	0	0	601.133	2240.337	560.295	752.427
62	CMO-FOOD	0	0	0	0	0	0	0	0	0	0	0	0	141.398	526.972	131.793	176.986
63	CMRUBBER	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000	0.000
64	CMSUGARCAN	0	0	0	0	0	0	0	0	0	0	0	0	0.141	0.392	0.101	0.135
65	CMCOCONUT	0	0	0	0	0	0	0	0	0	0	0	0	75.099	209.050	54.042	72.035
66	CMPALMOIL	0	0	0	0	0	0	0	0	0	0	0	0	0.000	0.000	0.000	0.000
67	CMO-NONFOD	0	0	0	0	0	0	0	0	0	0	0	0	79.940	222.528	57.526	76.679
68	CMLIVESTCK	0	0	0	0	0	0	0	0	0	0	0	0	304.93	867.12	259.23	459.91
69	CMFORESTRY	0	0	0	0	0	0	0	0	0	0	0	0	57.71	167.61	36.96	41.10
70	CMFISHERY	0	0	0	0	0	0	0	0	0	0	0	0	362.26	983.83	274.06	433.66
71	CMOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72	CMMINING	0	0	0	0	0	0	0	0	0	0	0	0	0.10	0.39	0.12	0.14
73	CMFOODPROC	0	0	0	0	0	0	0	0	0	0	0	0	542.62	4564.04	1137.17	1453.41
74	CMFURN	0	0	0	0	0	0	0	0	0	0	0	0	29.64	73.52	18.81	30.78
75	CMTEXTILES	0	0	0	0	0	0	0	0	0	0	0	0	265.94	710.70	194.79	307.38
76	CMPAPER	0	0	0	0	0	0	0	0	0	0	0	0	58.607	196.250	39.827	40.348
77	CMFERTLZR	0	0	0	0	0	0	0	0	0	0	0	0	15.506	43.701	9.069	13.353
78	CMCHEMICAL	0	0	0	0	0	0	0	0	0	0	0	0	270.037	761.064	157.941	232.548
79	CMPET-REF	0	0	0	0	0	0	0	0	0	0	0	0	195.181	550.092	114.159	168.085
80	CMCEMENT	0	0	0	0	0	0	0	0	0	0	0	0	32.323	91.098	18.905	27.836
81	CMSTEEL	0	0	0	0	0	0	0	0	0	0	0	0	0.001	0.003	0.001	0.001
82	CMO-MANUF	0	0	0	0	0	0	0	0	0	0	0	0	428.264	1044.581	264.738	543.959
83	CMCONST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
84	CMELGASWAT	0	0	0	0	0	0	0	0	0	0	0	0	45.88	108.39	25.09	29.88
85	CMTRADE	0	0	0	0	0	0	0	0	0	0	0	0	3.58	13.03	2.69	3.98
86	CMREST-HOT	0	0	0	0	0	0	0	0	0	0	0	0	794.88	2661.77	540.46	548.49
87	CMTRAN-COM	0	0	0	0	0	0	0	0	0	0	0	0	149.93	494.21	100.03	151.1
88	CMSERVICES	0	0	0	0	0	0	0	0	0	0	0	0	393.25	1244	369.56	343.38
89	CMPUBADMIN	0	0	0	0	0	0	0	0	0	0	0	0	408.70	2,546.67	545.17	669.24
90	CMOTH-SERV	0	0	0	0	0	0	0	0	0	0	0	0	251.20	733.78	173.36	290.05
91	KACCOUNT	0	0	0	0	0	0	0	0	0	0	0	0	555	1,999	1,316	3,616
92	INDTAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93	TARIFF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
94	ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tot -Col	6,036.59	1,378.03	17,524.44	971.75	12,848.58	12,873.88	10,388.63	25,078.88	2,298.41	4,627.94	13,953.54	90,616.48	6,905.12	28,447.02	7,749.76	12,344.30
	Tot-Row	6,036.59	1,378.03	17,524.44	971.75	12,848.58	12,873.88	10,388.63	25,078.88	2,298.41	4,627.94	13,953.54	90,616.48	6,905.12	28,447.02	7,749.76	12,344.30
		AG-PD-RUR	AG-PD-URB	AG-UN-RUR	AG-UN-URB	PRODRUR	PROD-URB	CLER-RUR	CLER-URB	PROF-RUR	PROF-URB	LAND	CAPITAL	AG-WRKR	FARMER-SML	FARMER-MED	FARMER-LRG
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
		RUR-LOW	RUR-HIGH	URB-LOW	URB-HIGH	ENT	GOV	ACRICE	ACSOYBEANS	ACMAIZE	ACCASSAVA	ACVEGFRUT	ACO-FOOD	ACRUBBER	ACSUGARCAN	ACCOCONUT	ACPALMOIL
1	AG-PD-RUR	0	0	0	0	0	0	1548.784	122.815	169.879	235.169	900.317	234.852	147.838	151.315	242.460	172.542
2	AG-PD-URB	0	0	0	0	0	0	367.786	29.165	40.341	55.845	213.796	55.770	22.901	23.440	37.559	26.728
3	AG-UN-RUR	0	0	0	0	0	0	6631.029	525.826	727.328	1006.861	3854.655	1005.505	274.194	280.643	449.688	320.011
4	AG-UN-URB	0	0	0	0	0	0	367.078	29.108	40.263	55.737	213.385	55.662	8.655	8.858	14.194	10.101
5	PRODRUR	0	0	0	0	0	0	276.781	0.950	1.314	1.819	6.965	1.817	28.962	29.643	47.499	33.801
6	PROD-URB	0	0	0	0	0	0	166.733	0.086	0.119	0.164	0.629	0.164	4.083	4.179	6.697	4.766
7	CLER-RUR	0	0	0	0	0	0	10.381	0.218	0.301	0.417	1.597	0.417	3.053	3.125	5.008	3.564
8	CLER-URB	0	0	0	0	0	0	19.876	0.056	0.078	0.107	0.411	0.107	1.183	1.211	1.940	1.381
9	PROF-RUR	0	0	0	0	0	0	3.378	0.062	0.086	0.119	0.457	0.119	0.365	0.373	0.598	0.426
10	PROF-URB	0	0	0	0	0	0	8.282	0.044	0.061	0.084	0.322	0.084	0.210	0.215	0.345	0.245
11	LAND	0	0	0	0	0	0	3379.423	267.981	370.674	513.134	1964.478	512.443	149.220	152.730	244.727	174.155
12	CAPITAL	0	0	0	0	0	0	958.872	0.522	0.722	0.999	3.826	0.998	20.066	20.538	32.908	23.419
13	AG-WRKR	22.65	114.64	58.37	92.06	13.31	227.42	0	0	0	0	0	0	0	0	0	0
14	FARMER-SML	48.45	215.02	160.77	247.07	49.61	1,161.24	0	0	0	0	0	0	0	0	0	0
15	FARMER-MED	27.05	164.81	25.72	43.51	61.50	0.20	0	0	0	0	0	0	0	0	0	0
16	FARMER-LRG	14.41	71.57	34.97	53.52	66.60	0.11	0	0	0	0	0	0	0	0	0	0
17	RUR-LOW	0	788.51	449.66	673.92	47.99	832.51	0	0	0	0	0	0	0	0	0	0
18	RUR-HIGH	0.34	0	2.19	1.80	0.45	1,281.30	0	0	0	0	0	0	0	0	0	0
19	URB-LOW	68.81	275.31	0	231.53	3.13	1,348.35	0	0	0	0	0	0	0	0	0	0
20	URB-HIGH	0.01	0.39	0.05	0	0.15	872.24	0	0	0	0	0	0	0	0	0	0
21	ENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	GOV	192.90	309.17	403.23	377.07	23,059.05	0	0	0	0	0	0	0	0	0	0	0
23	ACRICE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	ACSOYBEANS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	ACMAIZE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	ACCASSAVA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	ACVEGFRUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	ACO-FOOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	ACRUBBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	ACSUGARCAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	ACCOCONUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	ACPALMOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	ACO-NONFOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	ACLIVESTCK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	ACFORESTRY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	ACFISHERY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	ACOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	ACMINING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	ACFOODPROC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	ACFURN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	ACTEXTILES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	ACPAPER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43	ACFERTLZR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	ACCHEMICAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	ACPET-REF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	ACCEMENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	ACSTEEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	ACO-MANUF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	ACCONST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	ACELGASWAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	ACTRADE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	ACREST-HOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	ACTRAN-COM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	ACSERVICES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	ACPUBADMIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	ACOTH-SERV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57	CMRICE	839.77	3031.11	1382.87	3492.80	0	0	14121.212	0	0	0	0	0	0	0	0	0
58	CMSOYBEANS	39.885	54.102	51.114	70.332	0	0	0	69.571	0	0	0	0	0	0	0	0
59	CMMAIZE	115.671	156.904	148.236	203.972	0	0	0	0	35.134	0	0		0	0	0	0
60	CMCASSAVA	213.245	289.259	273.280	376.032	0	0	0	0	0	20.208	0	0	0	0	0	0
61	CMVEGFRUT	919.115	1246.746	1177.872	1620.750	0	0	0	0	0	0	144.087	0.02	0	0	0	0
62	CMO-FOOD	216.194	293.259	277.059	381.233	0	0	0				1.765	98.593	0	0	0	0
63	CMRUBBER	0.000	0.000	0.000	0.000	0	0	0	0	0	0		0	25.79	0	0	0
64	CMSUGARCAN	0.134	0.241	0.205	0.169	0	0	0	0	0	0	0	0	0	71.601	0	0
65	CMCOCONUT	71.673	128.740	109.227	89.956	0	0	0	0	0	0	2.059	0	0	0	5.123	0
66	CMPALMOIL	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	5.061
67	CMO-NONFOD	76.293	137.039	116.268	95.755	0	21.202	15.505	2.783	10.123	2.513	0.181	2.595	1.009	0.015	10.194	0.046
68	CMLIVESTCK	485.68	1,010.58	987.93	610.62	0	0.322	25.32	2.535	19.911	12.925	46.181	11.581	0.01	0.005	0.815	1.484
69	CMFORESTRY	93.11	43.63	51.4	40.87	0	0	2.942	1.154	0.744	0.54	0.212	1.43	1.491	0.08	2.1	0.649
70	CMFISHERY	560.52	529.65	720.23	643.24	0	0	0	0	0	0	0	0	0	0	0	0
71	CMOIL	0	0	0	0.00	0	0	0	0	0	0	0	0	0	0	0	0
72	CMMINING	0.19	0.13	0.15	0.18	0	0	0	0	0	0	0	0	0	0	0	0
73	CMFOODPROC	1020.67	3684.09	1680.79	4245.24	0	0	0	0	0	0	0	0	0	0	0.98	2.75
74	CMFURN	27.48	69.44	76.44	109.34	0	4.153	0	0	0.255	0.309	16.484	0.417	0.538	0	0.481	1.338
75	CMTEXTILES	436.83	721.01	636.07	2,332.53	0	93.251	54.099	0	0	0.904	16.045	1.609	2.421	0.094	7.112	0.467
76	CMPAPER	99.364	103.394	107.159	125.958	0	303.421	0.862	1.09	1.128	0	1.512	0.088	0.746	0.153	1.293	5.421
77	CMFERTLZR	18.165	26.071	33.581	19.095	0	35.833	1029.177	65.934	109.633	38.038	285.954	97.007	33.615	91.104	13.99	131.1
78	CMCHEMICAL	316.353	454.025	584.816	332.548	0	197.337	0.088	0	0	0	0.668	0.01	82.585	0.028	0.083	0.231
79	CMPET-REF	228.658	328.167	422.701	240.364	0	212.974	62.201	0.145	0.166	0.096	12.202	0.302	13.372	5.387	2.939	18.769
80	CMCEMENT	37.867	54.346	70.002	39.806	0	55.933	0	0	0	0	0	0	0.523	0	0	0.352
81	CMSTEEL	0.001	0.002	0.003	0.001	0	0	0	0	0	0	0	0	0	0	0	0
82	CMO-MANUF	471.391	1594.695	822.258	2914.548	0	732.437	57.672	2.747	7.418	5.962	20.896	4.176	21.958	15.109	15.641	25.748
83	CMCONST	0	0	0	0	0	584.479	12.545	2.726	5.327	0	5.23	4.634	9.755	14.395	17.767	19.835
84	CMELGASWAT	91.55	102.84	336.24	622.04	0	179.246	9.683	0	0	0	0	0	0.208	0.028	1.025	1.879
85	CMTRADE	24.37	24.17	63.16	50.35	0	48.643	2.586	0	0	0	0	0	0	0	0	0
86	CMREST-HOT	1411.46	1690.45	1674.91	2248.4	0	971.098	7.315	0	4.5	0	1.153	4.727	1.889	0.505	3.658	1.163
87	CMTRAN-COM	962.2	976.47	2266.16	1999.11	0	662.423	28.613	1.3	6.466	1.115	5.825	3.081	22.492	5.412	10.192	6.622
88	CMSERVICES	865.41	1333.53	2741.33	3559.22	0	637.576	329.944	11.496	20.438	7.372	4.25	12.088	28.939	27.869	5.101	20.304
89	CMPUBADMIN	902.36	560.95	1514.91	1,732.56	0	10,175.009	0.242	0	0	0	0.865	0	0.026	0.067	0.176	0
90	CMOTH-SERV	384.44	785.70	1331.58	2,599.13	0	587.440	31.629	3.39	7.336	9.264	3.991	3.717	14.689	2.569	8.315	40.709
91	KACCOUNT	1,727	3,789	2,756	8,328	19,668	12,010	0	0	0	0	0	0	0	0	0	0
92	INDTAX	0	0	0	0	0	0	141.966	10.003	20.679	12.197	43.298	8.348	9.491	14.186	2.437	7.643
93	TARIFF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
94	ROW	0	0	0	0	7519.83	0	0	0	0	0	0	0	0	0	0	0
	Tot -Col	13,031.26	25,159.52	23,548.98	40,844.91	50,489.13	33,236.14	29,672.01	1,151.71	1,600.42	1,981.90	7,773.70	2,122.36	932.28	924.88	1,193.05	1,062.71
	Tot-Row	13,031.26	25,159.52	23,548.98	40,844.91	50,489.13	33,236.14	29,672.01	1,151.71	1,600.42	1,981.90	7,773.70	2,122.36	932.28	924.88	1,193.05	1,062.71
		RUR-LOW	RUR-HIGH	URB-LOW	URB-HIGH	ENT	GOV	ACRICE	ACSOYBEANS	ACMAIZE	ACCASSAVA	ACVEGFRUT	ACO-FOOD	ACRUBBER	ACSUGARCAN	ACCOCONUT	ACPALMOIL
		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
		ACO-NONFO	ACLIVESTCK	CFORESTR	ACFISHERY	ACOIL	ACMINING	CFOODPRO	ACFURN	CTEXTILES	ACPAPER	ACFERTLZR	CCHEMICAL	ACPET-REF	ACCEMENT	ACSTEEL	ACO-MANUF
1	AG-PD-RUR	572.178	877.46	282.28	378.70	0	0	0	0	0	0	0	0	0	0	0	0
2	AG-PD-URB	88.635	139.44	48.30	228.32	0	0	0	0	0	0	0	0	0	0	0	0
3	AG-UN-RUR	1061.211	588.43	252.83	546.23	0	0	0	0	0	0	0	0	0	0	0	0
4	AG-UN-URB	33.497	30.50	8.25	96.46	0	0	0	0	0	0	0	0	0	0	0	0
5	PRODRUR	112.091	6.17	83.63	4.86	305.316	878.631	1326.789	915.873	701.23	107.958	159.036	146.567	645.264	86.419	164.043	498.509
6	PROD-URB	15.803	0.98	10.169	2.819	466.219	186.663	829.997	1008.185	955.816	351.933	78.128	72.003	316.993	42.454	80.588	1343.838
7	CLER-RUR	11.818	1.602	53.551	1.177	34.681	8.752	38.245	11.241	6.723	8.887	7.940	7.317	32.215	4.314	8.190	37.745
8	CLER-URB	4.579	0.446	26.834	3.43	174.009	23.389	96.046	87.814	149.86	103.229	119.371	110.012	484.330	64.865	123.130	455.785
9	PROF-RUR	1.412	0.279	7.365	2.236	10.002	1.692	12.992	4.624	2.455	1.248	2.710	2.498	10.996	1.473	2.795	6.320
10	PROF-URB	0.814	0.279	6.607	2.336	99.175	11.237	38.725	51.253	56.415	30.887	21.921	20.202	88.940	11.912	22.611	127.563
11	LAND	577.528	2597.5	1108.37	1941.18	0.000	0.000	0.000	0	0	0	0	0	0	0	0	0
12	CAPITAL	77.660	99.48	1068.53	328.80	19838.586	3351.214	4771.480	1846.215	2574.65	872.888	1390.105	1281.116	5640.131	755.369	1433.872	4097.229
13	AG-WRKR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	FARMER-SML	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	FARMER-MED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	FARMER-LRG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	RUR-LOW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	RUR-HIGH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	URB-LOW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	URB-HIGH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	ENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	GOV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	ACRICE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	ACSOYBEANS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	ACMAIZE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	ACCASSAVA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	ACVEGFRUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	ACO-FOOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	ACRUBBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	ACSUGARCAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	ACCOCONUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	ACPALMOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	ACO-NONFOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	ACLIVESTCK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	ACFORESTRY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	ACFISHERY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	ACOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	ACMINING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	ACFOODPROC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	ACFURN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	ACTEXTILES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	ACPAPER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43	ACFERTLZR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	ACCHEMICAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	ACPET-REF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	ACCEMENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	ACSTEEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	ACO-MANUF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	ACCONST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	ACELGASWAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	ACTRADE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	ACREST-HOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	ACTRAN-COM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	ACSERVICES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	ACPUBADMIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	ACOTH-SERV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57	CMRICE	0	153.206	0	4.091	0	0	243.83	0	0	0.957	0	1.998	0	0.689	0	0
58	CMSOYBEANS	0	4.579	0	0	0	0	871.318	0	0	0	0	0	0	0	0	0
59	CMMAIZE	0	12.188	0	0.692	0	0	521.684	0	0	0	0	0	0	0	0	0
60	CMCASSAVA	0	6.909	0	0.366	0	0	210.29	0	0	0	0	0	0	0	0	0
61	CMVEGFRUT	1.817	9.91	0	0.279	0	0	72.193	0	0	0	0	3.537	0	0	0	0
62	CMO-FOOD	0	6.929	0	0.063	0	0	330.42	0	0	0	0	0.101	0	0	0	0
63	CMRUBBER	0	0	0	0	0	0	0	0	0.321	0	0	2.382	0	0	0	887.685
64	CMSUGARCAN	0	58.166	0	0	0	0	825.14	0	0	0	0	0	0	0	0	0
65	CMCOCONUT	0	0	0	0	0	0	387.706	0.237	0.017	0	1.389	0.287	0	0	0	2.109
66	CMPALMOIL	0	0	0	0	0	0	702.411	0	0	0	0	67.123	0	0	0	0
67	CMO-NONFOD	216.656	17.43	0	0	0	0	1615.49	0.359	66.251	0	0.129	62.887	0.133	0	0	5.245
68	CMLIVESTCK	8.918	2589.133	0	0.364	0	0	130.12	0	95.703	0	0	0.857	0	0.66	0	9.695
69	CMFORESTRY	6.686	12.923	17.989	23.135	0	5.975	15.01	2810.772	4.496	16.657	0.529	10.119	0	11.03	0	4.734
70	CMFISHERY	0	1.188	0	439.847	0	0	948.722	0	0	0	0	0.028	0	0	0	0.06
71	CMOIL	0	0	0	0	64.644	0	0	0	0	5.366	75.564	0	10383.32	36.642	37.5	0
72	CMMINING	0	0.051	0	15.839	0.628	85.434	9.474	0.232	0.005	11.499	147.754	50.994	1.552	731.39	490.849	0.883
73	CMFOODPROC	4.267	1261.949	0	106.119	0	0	3128.13	66.234	14.372	6.488	0.011	64.869	0	0	0	0.945
74	CMFURN	9.267	8.84	0	14.696	0	4.548	11.273	642.661	28.88	6.203	1.306	9.094	0.934	3.863	0.018	96.733
75	CMTEXTILES	10.779	3.118	2.561	31.661	57.099	4.879	22.541	27.189	6260.545	1.815	11.862	5.587	0.481	2.559	0.121	193.911
76	CMPAPER	3.348	2.463	15.651	3.597	4.052	6.371	465.895	9.772	47.232	1788.506	53.295	75.949	2.573	88.952	0.737	53.699
77	CMFERTLZR	238.501	0.015	0	10.326	0.01	0.063	3.077	0.227	0.007	0.04	11.729	2.718	0.385	1.152	0.047	0.266
78	CMCHEMICAL	0.326	88.145	2.619	4.892	132.935	152.079	176.629	287.425	1843.951	307.901	1008.881	2597.477	59.989	135.756	175.541	1861.594
79	CMPET-REF	15.238	66.781	106.003	267.59	101.588	181.773	236.063	207.606	318.48	161.557	70.361	66.71	347.65	192.633	246.301	214.516
80	CMCEMENT	1.168	0.874	0.576	0.569	0	0.434	25.48	3.01	12.607	0.444	0.024	85.805	1.779	82.604	12.525	82.858
81	CMSTEEL	0	0	0.614	0.656	2.456	0	5.67	0.972	0.68	0.575	0	3.251	0.666	0.222	1664.444	2335.078
82	CMO-MANUF	31.552	28.887	129.211	110.859	183.855	218.085	276.025	121.994	216.766	21.333	76.42	130.126	228.559	18.64	72.268	8204.104
83	CMCONST	24.81	21.819	41.686	14.176	149.753	50.151	42.037	17.477	17.656	3.615	0.327	18.994	47.738	12.696	4.336	28.074
84	CMELGASWAT	3.335	28.695	6.139	4.551	3.057	6.04	89.626	39.886	146.655	78.709	11.802	75.933	63	102.213	191.431	112.731
85	CMTRADE	0.123	2.463	0.903	0	5.251	0.808	24.998	14.255	7.606	5.807	5.764	5.62	3.024	5.967	8.928	20.87
86	CMREST-HOT	3.606	4.583	23.824	12.676	140.594	39.022	81.631	156.403	37.322	19.356	22.867	37.321	127.24	37.282	65.607	73.216
87	CMTRAN-COM	9.213	26.089	27.495	4.169	102.087	112.609	267.257	191.348	101.677	67.318	59.201	123.825	79.325	79.173	81.377	236.893
88	CMSERVICES	31.222	49.894	59.551	69.392	884.979	62.757	394.158	216.654	289.462	110.568	66.027	218.478	221.894	94.7	128.031	349.009
89	CMPUBADMIN	3.679	2.826	0	5.216	6.513	1.181	15.365	2.242	12.22	19.722	2.76	33.519	7.472	6.914	1.411	13.488
90	CMOTH-SERV	20.54	15.709	82.89	7.427	144.156	70.125	479.254	118.394	12.203	84.489	10.993	14.643	177.975	7.658	178.462	158.914
91	KACCOUNT	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
92	INDTAX	26.002	81.311	35.28	23.756	33.802	210.637	2928.922	169.823	191.44	127.511	-1118.567	222.964	76.692	107.146	79.24	756.95
93	TARIFF	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
94	ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tot -Col	3,228.28	8,909.63	3,509.71	4,713.56	22,945.45	5,674.55	22,672.11	9,030.38	14,173.70	4,323.47	2,299.64	5,632.91	19,051.25	2,727.35	5,274.40	22,271.25
	Tot-Row	3,228.28	8,909.63	3,509.71	4,713.56	22,945.45	5,674.55	22,672.11	9,030.38	14,173.70	4,323.47	2,299.64	5,632.91	19,051.25	2,727.35	5,274.40	22,271.25
		ACO-NONFO	ACLIVESTCK	CFORESTR	ACFISHERY	ACOIL	ACMINING	CFOODPRO	ACFURN	CTEXTILES	ACPAPER	ACFERTLZR	CCHEMICAL	ACPET-REF	ACCEMENT	ACSTEEL	ACO-MANUF
		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48

		49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
		ACCONST	ACELGASWA	ACTRADE	ACREST-HO	ACTRAN-CO	ACSERVICES	ACPUBADMI	ACOTH-SERV	CMRICE	CMSOYBEANS	CMMAIZE	CMCASSAVA	CMVEGFRUT	CMO-FOOD	CMRUBBER	MSUGARCA
1	AG-PD-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	AG-PD-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	AG-UN-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	AG-UN-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	PRODRUR	2609.403	23.60	56.76	14.339	1308.126	17.519	365.26	1,881.63	0	0	0	0	0	0	0	0
6	PROD-URB	2872.408	229.71	160.691	33.964	1681.704	226.494	536.721	1181.981	0	0	0	0	0	0	0	0
7	CLER-RUR	31.997	12.617	6988.06	441.102	139.323	415.986	1878.222	178.844	0	0	0	0	0	0	0	0
8	CLER-URB	250.190	95.765	11002.973	1430.474	668.383	3146.446	6087.79	343.38	0	0	0	0	0	0	0	0
9	PROF-RUR	13.147	10.459	2.27	1.94	9.222	11.832	2046.539	125.92	0	0	0	0	0	0	0	0
10	PROF-URB	146.023	46.933	90.635	21.798	111.234	372.923	3097.039	140.585	0	0	0	0	0	0	0	0
11	LAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	CAPITAL	5260.025	1050.01	6863.78	4356.13	7364.3	11658.08	1526.56	2047.40	0	0	0	0	0	0	0	0
13	AG-WRKR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	FARMER-SML	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	FARMER-MED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	FARMER-LRG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	RUR-LOW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	RUR-HIGH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	URB-LOW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	URB-HIGH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	ENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	GOV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	ACRICE	0	0	0	0	0	0	0	0	29668.076	0	0	0	0	0	0	0
24	ACSOYBEANS	0	0	0	0	0	0	0	0	0	1151.707	0	0	0	0	0	0
25	ACMAIZE	0	0	0	0	0	0	0	0	0	0	1568.285	0	0	0	0	0
26	ACCASSAVA	0	0	0	0	0	0	0	0	0	0	0	1981.900	0	0	0	0
27	ACVEGFRUT	0	0	0	0	0	0	0	0	0	0	0	0	7754.721	0	0	0
28	ACO-FOOD	0	0	0	0	0	0	0	0	0	0	0	0	0	1950.526	0	0
29	ACRUBBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	862.709	0
30	ACSUGARCAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	924.764
31	ACCOCONUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	ACPALMOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	ACO-NONFOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	ACLIVESTCK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	ACFORESTRY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	ACFISHERY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	ACOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	ACMINING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	ACFOODPROC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	ACFURN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	ACTEXTILES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	ACPAPER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43	ACFERTLZR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	ACCHEMICAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	ACPET-REF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	ACCEMENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	ACSTEEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	ACO-MANUF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	ACCONST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	ACELGASWAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	ACTRADE	0	0	0	0	0	0	0	0	728.344	31.309	134.871	241.133	1879.571	395.731	39.973	47.945
52	ACREST-HOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	ACTRAN-COM	0	0	0	0	0	0	0	0	152.802	10.915	30.578	147.974	161.924	111.974	20.88	2.475
54	ACSERVICES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	ACPUBADMIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	ACOTH-SERV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57	CMRICE	71.108	0	0.105	784.523	3.491	0	56.179	0	0	0	0	0	0	0	0	0
58	CMSOYBEANS	0	0	0	10.172	0	0	0.3	0	0	0	0	0	0	0	0	0
59	CMMAIZE	0	0	0	14.065	0.02	0	4.01	0	0	0	0	0	0	0	0	0
60	CMCASSAVA	0	0	0	13.799	0	0	2.356	0	0	0	0	0	0	0	0	0
61	CMVEGFRUT	0	0	0.4	459.077	0	0	55.921	0	0	0	0	0	0	0	0	0
62	CMO-FOOD	1.263	0	0	119.073	0.538	0	9.483	0	0	0	0	0	0	0	0	0
63	CMRUBBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
64	CMSUGARCAN	0	0	0	7.97	0	0	0	0	0	0	0	0	0	0	0	0
65	CMCOCONUT	0	0	0.12	67.46	0.026	0	2.236	0	0	0	0	0	0	0	0	0
66	CMPALMOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
67	CMO-NONFOD	1.02	0	0	77.864	0.421	0.011	4.5	0	0	0	0	0	0	0	0	0
68	CMLIVESTCK	0	0	0	1873.086	3.929	0	65.178	0	0	0	0	0	0	0	0	0
69	CMFORESTRY	833.178	0	0.11	26.092	0.225	0	1.206	2.879	0	0	0	0	0	0	0	0
70	CMFISHERY	0	0	0	497.378	1.246	0	18.598	0	0	0	0	0	0	0	0	0
71	CMOIL	0	199.786	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72	CMMINING	3429.128	351.929	0.09	0.039	0.150	0	8.252	0	0	0	0	0	0	0	0	0
73	CMFOODPROC	0	0	5.595	1914.502	24.348	2.411	140.105	0.4	0	0	0	0	0	0	0	0
74	CMFURN	3423.157	0	43.32	5.695	0.615	0.122	4.953	10.902	0	0	0	0	0	0	0	0
75	CMTEXTILES	43.954	1.22	86.389	63.07	18.998	8.565	43.303	216.152	0	0	0	0	0	0	0	0
76	CMPAPER	104.352	16.685	435.856	90.865	109.61	379.564	645.37	34.776	0	0	0	0	0	0	0	0
77	CMFERTLZR	0	0	0.495	7.94	0.087	4.052	1.31	2.97	0	0	0	0	0	0	0	0
78	CMCHEMICAL	313.781	46.832	39.582	52.676	17.138	39.36	586.488	171.648	0	0	0	0	0	0	0	0
79	CMPET-REF	3093.764	1245.652	540.485	342.442	2538.644	61.517	73.999	324.846	0	0	0	0	0	0	0	0
80	CMCEMENT	3589.957	1.5	6.973	39.396	3.752	2.885	3.045	10.841	0	0	0	0	0	0	0	0
81	CMSTEEL	3657.903	0	0	0	0.49	0	0.243	113.459	0	0	0	0	0	0	0	0
82	CMO-MANUF	7354.151	316.822	231.225	118.614	601.94	292.69	163.19	3907.407	0	0	0	0	0	0	0	0
83	CMCONST	59.403	59.156	369.077	135.64	165.67	931.571	108.084	52.628	0	0	0	0	0	0	0	0
84	CMELGASWAT	19.073	668.495	386.057	387.965	72.384	144.827	94.489	216.016	0	0	0	0	0	0	0	0
85	CMTRADE	0	0.008	31925.19	3.37	1139.412	1.559	0.949	0.993	0	0	0	0	0	0	0	0
86	CMREST-HOT	157.803	2.45	379.039	42.582	239.725	287.998	47.485	29.352	0	0	0	0	0	0	0	0
87	CMTRAN-COM	80.258	11.992	1081.665	169.371	9003.9	393.279	51.783	110.653	0	0	0	0	0	0	0	0
88	CMSERVICES	833.082	46.568	1590.793	450.304	1040.836	2085.988	182.199	317.158	0	0	0	0	0	0	0	0
89	CMPUBADMIN	18.915	2.5	33.513	43.618	46.695	148.397	367.866	5.896	0	0	0	0	0	0	0	0
90	CMOTH-SERV	27.227	46.953	409.56	55.813	1762.381	262.697	65.795	68.199	0	0	0	0	0	0	0	0
91	KACCOUNT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
92	INDTAX	612.042	19.419	2505.628	613.197	254.673	553.85	194.382	228.123		0	0	0	0	0	0	0
93	TARIFF	0	0	0	0	0	0	0	0	0.004	0.004	0.001	0	15.916	0.338	0.004	0
94	ROW	0	0	0	0	0	0	0	0	25.989	271.444	3.15		53.778	304.447	1.064	
	Tot -Col	38,907.71	4,507.06	65,236.43	14,787.41	28,333.64	21,450.62	18,541.39	11,725.04	30,575.22	1,465.38	1,736.89	2,371.01	9,865.91	2,763.02	924.63	975.18
	Tot-Row	38,907.71	4,507.06	65,236.43	14,787.41	28,333.64	21,450.62	18,541.39	11,725.04	30,575.22	1,465.38	1,736.89	2,371.01	9,865.92	2,763.02	924.63	975.18
		ACCONST	ACELGASWA	ACTRADE	ACREST-HO	ACTRAN-CO	ACSERVICES	ACPUBADMI	ACOTH-SERV	CMRICE	CMSOYBEANS	CMMAIZE	CMCASSAVA	CMVEGFRUT	CMO-FOOD	CMRUBBER	MSUGARCA
		49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

		65	66	67	68	69	70	71	71	72	73	74	75	76	77	78	79
		CMCOCONUT	CMPALMOIL	CMO-NONFO	CMLIVESTCK	CMFORESTR	CMFISHERY	CMOIL	CMMINING	CMFOODPRO	CMFURN	CMTEXTILES	CMPAPER	CMFERTLZR	CMCHEMICAL	CMPETFERT	CMPET-REF
1	AG-PD-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	AG-PD-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	AG-UN-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	AG-UN-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	PRODRUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	PROD-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	CLER-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	CLER-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	PROF-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	PROF-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	LAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	CAPITAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	AG-WRKR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	FARMER-SML	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	FARMER-MED	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	FARMER-LRG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	RUR-LOW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	RUR-HIGH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	URB-LOW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	URB-HIGH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	ENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	GOV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	ACRICE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	ACSOYBEANS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	ACMAIZE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	ACCASSAVA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	ACVEGFRUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	ACO-FOOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	ACRUBBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	ACSUGARCAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	ACCOCONUT	1189.587	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	ACPALMOIL	0	724.015	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	ACO-NONFOD	0	0	2554.594	0	0	0	0	0	0	0	0	0	0	0	0	0
34	ACLIVESTCK	0	0	0	8877.396	0	0	0	0	0	0	0	0	0	0	0	0
35	ACFORESTRY	0	0	0	0	3418.395	0	0	0	0	0	0	0	0	0	0	0
36	ACFISHERY	0	0	0	0	0	4368.953	0	0	0	0	0	0	0	0	0	0
37	ACOIL	0	0	0	0	0	0	11271.527	0	0	0	0	0	0	0	0	0
38	ACMINING	0	0	0	0	0	0	0	3998.678	0	0	0	0	0	0	0	0
39	ACFOODPROC	0	0	0	0	0	0	0	0	18611.152	0	0	0	0	0	0	0
40	ACFURN	0	0	0	0	0	0	0	0	0	2408.975	0	0	0	0	0	0
41	ACTEXTILES	0	0	0	0	0	0	0	0	0	0	8205.025	0	0	0	0	0
42	ACPAPER	0	0	0	0	0	0	0	0	0	0	0	3890.4573	0	0	0	0
43	ACFERTLZR	0	0	0	0	0	0	0	0	0	0	0	0	1898.54	0	0	0
44	ACCHEMICAL	0	0	0	0	0	0	0	0	0	0	0	0	0	4767.149	0	0
45	ACPET-REF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9368.88	0
46	ACCEMENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2280.147
47	ACSTEEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	ACO-MANUF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	ACCONST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	ACELGASWAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	ACTRADE	87.583	25.95	392.853	886.756	677.428	1823.584	0	810.449	4388.484	1947.582	1499.785	582.178	24.644	2073.58	1992.573	852.929
52	ACREST-HOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	ACTRAN-COM	55.099	26.161	49.895	118.161	237.23	195.842	0	333.103	731.577	342.422	521.211	343.003	145.169	658.37	1433.83	340.962
54	ACSERVICES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	ACPUBADMIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	ACOTH-SERV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57	CMRICE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58	CMSOYBEANS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59	CMMAIZE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	CMCASSAVA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61	CMVEGFRUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	CMO-FOOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
63	CMRUBBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
64	CMSUGARCAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	CMCOCONUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
66	CMPALMOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
67	CMO-NONFOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
68	CMLIVESTCK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69	CMFORESTRY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	CMFISHERY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71	CMOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72	CMMINING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
73	CMFOODPROC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
74	CMFURN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75	CMTEXTILES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
76	CMPAPER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
77	CMFERTLZR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78	CMCHEMICAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79	CMPET-REF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	CMCEMENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81	CMSTEEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82	CMO-MANUF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
83	CMCONST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
84	CMELGASWAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	CMTRADE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
86	CMREST-HOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
87	CMTRAN-COM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88	CMSERVICES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
89	CMPUBADMIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	CMOTH-SERV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
91	KACCOUNT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
92	INDTAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93	TARIFF	0.004	0.001	0.484	0.257	0.082	0.023	0.085	3.508	24.574	1.343	226.981	132.438	5.133	237.124	34.197	79.932
94	ROW	0.243	0.532	103.69	60.015	31.502	1.765	2175.88	391.364	1276.664	37.771	2599.684	748.999	239.928	6659.325	1418.873	926.009
	Tot -Col	1,332.52	776.66	3,101.52	9,942.59	4,364.64	6,390.17	13,447.49	5,537.10	25,032.45	4,738.09	13,052.69	5,697.08	2,313.41	14,395.55	14,248.39	4,479.98
	Tot-Row	1,332.52	776.66	3,101.52	9,942.59	4,364.64	6,390.17	13,447.49	5,537.10	25,032.45	4,738.09	13,052.69	5,697.08	2,313.41	14,395.55	14,248.39	4,479.98
		CMCOCONUT	CMPALMOIL	CMO-NONFO	CMLIVESTCK	CMFORESTR	CMFISHERY	CMOIL	CMMINING	CMFOODPRO	CMFURN	CMTEXTILES	CMPAPER	CMFERTLZR	CMCHEMICAL	CMPETFERT	CMPET-REF
		65	66	67	68	69	70	71	71	72	73	74	75	76	77	78	79

		80	81	82	83	84	85	86	87	88	89	90	91	92	93	
		CMSTEEL	CMO-MANUF	CMCONST	MELGASWA	CMTRADE	CMREST-HOT	MTRAN-COM	CMSERVICES	CMPUBADMI	CMOTH-SERV	KACCOUNT	NDTAX	TARIFF	ROW	
1	AG-PD-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,036.59
2	AG-PD-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,378.03
3	AG-UN-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17,524.44
4	AG-UN-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	971.75
5	PRODRUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12,848.58
6	PROD-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12,873.88
7	CLER-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10,388.63
8	CLER-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25,078.88
9	PROF-RUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,298.43
10	PROF-URB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,627.94
11	LAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13,953.54
12	CAPITAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90,616.48
13	AG-WRKR	0	0	0	0	0	0	0	0	0	0	0	0	0	195.79	6,905.12
14	FARMER-SML	0	0	0	0	0	0	0	0	0	0	0	0	0	111.27	28,447.02
15	FARMER-MED	0	0	0	0	0	0	0	0	0	0	0	0	0	100.42	7,749.76
16	FARMER-LRG	0	0	0	0	0	0	0	0	0	0	0	0	0	165	12,344.30
17	RUR-LOW	0	0	0	0	0	0	0	0	0	0	0	0	0	435.37	13,031.26
18	RUR-HIGH	0	0	0	0	0	0	0	0	0	0	0	0	0	200	25,159.52
19	URB-LOW	0	0	0	0	0	0	0	0	0	0	0	0	0	519.71	23,548.98
20	URB-HIGH	0	0	0	0	0	0	0	0	0	0	0	0	0	400	40,844.91
21	ENT	0	0	0	0	0	0	0	0	0	0	0	0	0	-4272.02	50,489.13
22	GOV	0	0	0	0	0	0	0	0	0	0	0	9204.471	3064.94	-4090.121	33,236.14
23	ACRICE	0	0	0	0	0	0	0	0	0	0	0	0	0	3.929	29,672.01
24	ACSOYBEANS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,151.71
25	ACMAIZE	0	0	0	0	0	0	0	0	0	0	0	0	0	32.139	1,600.42
26	ACCASSAVA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,981.90
27	ACVEGFRUT	0	0	0	0	0	0	0	0	0	0	0	0	0	18.974	7,773.70
28	ACO-FOOD	0	0	0	0	0	0	0	0	0	0	0	0	0	171.835	2,122.36
29	ACRUBBER	0	0	0	0	0	0	0	0	0	0	0	0	0	69.569	932.28
30	ACSUGARCAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0.114	924.88
31	ACCOCONUT	0	0	0	0	0	0	0	0	0	0	0	0	0	3.459	1,193.09
32	ACPALMOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	338.693	1,062.71
33	ACO-NONFOD	0	0	0	0	0	0	0	0	0	0	0	0	0	673.685	3,228.28
34	ACLIVESTCK	0	0	0	0	0	0	0	0	0	0	0	0	0	32.236	8,909.63
35	ACFORESTRY	0	0	0	0	0	0	0	0	0	0	0	0	0	91.316	3,509.71
36	ACFISHERY	0	0	0	0	0	0	0	0	0	0	0	0	0	344.605	4,713.56
37	ACOIL	0	0	0	0	0	0	0	0	0	0	0	0	0	11673.92	22,945.45
38	ACMINING	0	0	0	0	0	0	0	0	0	0	0	0	0	1675.871	5,674.55
39	ACFOODPROC	0	0	0	0	0	0	0	0	0	0	0	0	0	4060.962	22,672.11
40	ACFURN	0	0	0	0	0	0	0	0	0	0	0	0	0	6621.402	9,030.38
41	ACTEXTILES	0	0	0	0	0	0	0	0	0	0	0	0	0	5968.679	14,173.70
42	ACPAPER	0	0	0	0	0	0	0	0	0	0	0	0	0	433.008	4,323.47
43	ACFERTLZR	0	0	0	0	0	0	0	0	0	0	0	0	0	401.1	2,299.64
44	ACCHEMICAL	0	0	0	0	0	0	0	0	0	0	0	0	0	865.762	5,632.91
45	ACPET-REF	0	0	0	0	0	0	0	0	0	0	0	0	0	9682.371	19,051.25
46	ACCEMENT	0	0	0	0	0	0	0	0	0	0	0	0	0	447.2	2,727.35
47	ACSTEEL	3782.677	0	0	0	0	0	0	0	0	0	0	0	0	1491.727	5,274.40
48	ACO-MANUF	0	18485.6987	0	0	0	0	0	0	0	0	0	0	0	3785.549	22,271.25
49	ACCONST	0	0	38907.712	0	0	0	0	0	0	0	0	0	0	0	38,907.71
50	ACELGASWAT	0	0	0	4507.063	0	0	0	0	0	0	0	0	0	0	4,507.06
51	ACTRADE	1096.281	8139.238	0	0	34214.104	0	0	0	0	0	0	0	0	221.575	65,236.43
52	ACREST-HOT	0	0	0	0	0	13676.426	0	0	0	0	0	0	0	1110.979	14,787.41
53	ACTRAN-COM	345.104	2791.11	0	0	-1055.297	0	19,193.76	0	0	0	0	0	0	887.406	28,333.64
54	ACSERVICES	0	0	0	0	0	0	0	19593.212	0	0	0	0	0	1857.411	21,450.62
55	ACPUBADMIN	0	0	0	0	0	0	0	0	18271.713	0	0	0	0	269.679	18,541.39
56	ACOTH-SERV	0	0	0	0	0	0	0	0	0	11671.48	0	0	0	53.558	11,725.04
57	CMRICE	0	0	0	0	0	0	0	0	0	0	54.337	0	0	0	30,575.22
58	CMSOYBEANS	0	0	0	0	0	0	0	0	0	0	113.735	0	0	0	1,465.38
59	CMMAIZE	0	0	0	0	0	0	0	0	0	0	1.502	0	0	0	1,736.89
60	CMCASSAVA	0	0	0	0	0	0	0	0	0	0	1.445	0	0	0	2,371.01
61	CMVEGFRUT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,865.92
62	CMO-FOOD	0	0	0	0	0	0	0	0	0	0	49.896	0	0	0	2,763.02
63	CMRUBBER	0	0	0	0	0	0	0	0	0	0	8.452	0	0	0	924.63
64	CMSUGARCAN	0	0	0	0	0	0	0	0	0	0	10.79	0	0	0	975.18
65	CMCOCONUT	0	0	0	0	0	0	0	0	0	0	53.925	0	0	0	1,332.52
66	CMPALMOIL	0	0	0	0	0	0	0	0	0	0	2.064	0	0	0	776.66
67	CMO-NONFOD	0	0	0	0	0	0	0	0	0	0	104.924	0	0	0	3,101.52
68	CMLIVESTCK	0	0	0	0	0	0	0	0	0	0	57.853	0	0	0	9,942.59
69	CMFORESTRY	0	0	0	0	0	0	0	0	0	0	17.16	0	0	0	4,364.64
70	CMFISHERY	0	0	0	0	0	0	0	0	0	0	-24.35	0	0	0	6,390.17
71	CMOIL	0	0	0	0	0	0	0	0	0	0	2644.67	0	0	0	13,447.49
72	CMMINING	0	0	0	0	0	0	0	0	0	0	199.53	0	0	0	5,537.10
73	CMFOODPROC	0	0	0	0	0	0	0	0	0	0	-40.065	0	0	0	25,032.45
74	CMFURN	0	0	0	0	0	0	0	0	0	0	-48.41	0	0	0	4,738.09
75	CMTEXTILES	0	0	0	0	0	0	0	0	0	0	153.074	0	0	0	13,052.69
76	CMPAPER	0	0	0	0	0	0	0	0	0	0	171.283	0	0	0	5,697.08
77	CMFERTLZR	0	0	0	0	0	0	0	0	0	0	-81.928	0	0	0	2,313.41
78	CMCHEMICAL	0	0	0	0	0	0	0	0	0	0	901.539	0	0	0	14,395.55
79	CMPET-REF	0	0	0	0	0	0	0	0	0	0	650.194	0	0	0	14,248.35
80	CMCEMENT	0	0	0	0	0	0	0	0	0	0	81.882	0	0	0	4,479.98
81	CMSTEEL	0	0	0	0	0	0	0	0	0	0	212.052	0	0	0	7,999.45
82	CMO-MANUF	0	0	0	0	0	0	0	0	0	0	22536.113	0	0	0	54,585.03
83	CMCONST	0	0	0	0	0	0	0	0	0	0	35854.445	0	0	0	38,907.71
84	CMELGASWAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,507.09
85	CMTRADE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33,420.43
86	CMREST-HOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14,635.81
87	CMTRAN-COM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20,324.71
88	CMSERVICES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21,748.76
89	CMPUBADMIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19,858.87
90	CMOTH-SERV	0	0	0	0	0	0	0	0	0	0	1103.839	0	0	0	12,648.59
91	KACCOUNT	0	0	0	0	0	0	0	0	0	0	0	0	0	9026.491	64,789.99
92	INDTAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,204.47
93	TARIFF	184.098	2105.871	0	0.001	0	0	0	0.016	0.069	12.46	0	0	0	0	3,064.95
94	ROW	2591.285	23063.115		0.024	261.618	959.386	1130.95	2155.533	1587.091	964.645	0	0	0	0	57,565.59
	Tot -Col	7,999.45	54,585.03	38,907.71	4,507.09	33,420.43	14,635.81	20,324.71	21,748.76	19,858.87	12,648.59	64,789.99	9,204.47	3,064.94	57,565.62	
	Tot-Row	7,999.45	54,585.03	38,907.71	4,507.09	33,420.43	14,635.81	20,324.71	21,748.76	19,858.87	12,648.59	64,789.99	9,204.47	3,064.95	57,565.59	
		CMSTEEL	CMO-MANUF	CMCONST	MELGASWA	CMTRADE	CMREST-HOT	MTRAN-COM	CMSERVICES	CMPUBADMI	CMOTH-SERV	KACCOUNT	NDTAX	TARIFF	ROW	
		80	81	82	83	84	85	86	87	88	89	90	91	92	93	

Notation:

AC	Activities
CM	Commodities

Other Abbreviation in Aphabetical Order

AG-PD-RUR	Rural paid agriculture labor
AG-PD-URB	Urban paid agriculture labor
AG-UN-RUR	Rural unpaid agriculture labor
AG-UN-URB	Urban unpaid agriculture labor
AG-WRKR	Agriculture worker household
CAPITAL	Capital
CASSAVA	Cassava
CEMENT	Manufacture of cement
CHEMICAL	Manufacture of basic chemicals, plastics, and medicines
CLER-RUR	Rural clerical, sales and services labor
CLER-URB	Urban clerical, sales and services labor
COCONUT	Coconut
CONST	Construction
ELGASWAT	Electricity, gas and water
ENT	Companies
FARMER-LRG	Large farmer household (based on land ownership)
FARMER-MED	Mediuml farmer household
FARMER-SML	Small farmer household
FERTLZR	Manufacture of fertilizer
FISHERY	Fishery
FOODPROC	Food Processing
FORESTRY	Forestry and hunting
FURN	Manufacture of bamboo wood and rattan products
GOV	Government
INDTAX	Indirect taxes
KACCOUNT	Capital account
LAND	Land
LIVESTCK	Livestock and livestock products
MAIZE	Maize
MINING	Coal, metal ore, other mining and quarrying
O-FOOD	Other food crops
OIL	Crude oil, natural gas and geothermal mining
O-MANUF	Other manufacturing
O-NONFOD	Other agriculture
OTH-SERV	Other services
PALMOIL	Oil Palm
PAPER	Manufacture of paper, paper products and cardboard
PET-REF	Petroleum refinery
PRODRUR	Rural Production, transport equipment operator and manual
PROD-URB	Urban Production, transport equipment operator and manua
PROF-RUR	Rural professional and managerial labor
PROF-URB	Urban professional and managerial labor
PUBADMIN	Public Administration
REST-HOT	Resaurants, hotel and lodging places
RICE	Paddy and rice milling
ROW	Rest of the world
RUBBER	Rubber
RUR-HIGH	Rural higher level; non agricultural households
RUR-LOW	Rural lower level; non agricultural households
SERVICES	financial, real state and business services
SOYBEANS	Soybeans
STEEL	Manufacture of basic iron and steel
SUGARCAN	Sugarcane
TARIFF	Tariffs
TEXTILES	Manufacture of textiles and wearing apparels
TRADE	Trade
TRAN-COM	Transportation and communication
URB-HIGH	Urban higher level; non agricultural households
URB-LOW	Urban lower level; non agricultural households
VEGFRUT	Vegtables and fruits

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