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Constructing a 2001 Social Accounting Matrix of Tajikistan

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ABSTRACT

The paper documents constructing a 2001 social accounting matrix for Tajikistan in order to develop a model of the country. As necessary and reliable statistics are difficult to obtain for compiling a social accounting matrix, alternative techniques and approaches have been used to extend, create and calculate the data set. A consistent and balanced 2001 social accounting matrix has been achieved using Kuroda's Method. The constructed 2001 social accounting matrix consists of 74 accounts with 27 commodities accounts, 27 activities accounts, 2 factors of production, 3 institutions, 11 tax accounts, 1 non-tax payments account, 1 subsidies account, 1 capital account and 1 rest of the world account. As construction of a social accounting matrix for Tajikistan has not yet received attention in the literature this paper will fill that gap.

Keywords: Social Accounting Matrix, Input Output Table, Kuroda's Method.

JEL Classification: C60, C67, C81

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1. Introduction

This paper focuses on constructing a 2001 social accounting matrix (SAM) for Tajikistan. A SAM is a matrix of the accounts of production, factors and institutions with rows representing income and columns representing expenditure. As social accounting matrices are mirrors of an economy, they provide benefits such as statistical, analytical and databases for modeling and policy simulation. The purpose of constructing a 2001 SAM is to develop a model of Tajikistan.

When the decision was made to construct a 2001 SAM for Tajikistan, searches were conducted to find the necessary statistics. The results of these searches show how difficult it is to obtain all the necessary data. First, most statistical sources did not have data on Tajikistan. Second, as a main provider of the country's statistics the State Statistical Committee of Tajikistan (SSCT) did not have a website and its publications were not available from libraries outside the country. Consequently, almost all data was collected during fieldwork on request from the SSCT, Ministry of Finance of the Republic of Tajikistan (MFRT) and National Bank of Tajikistan (NBT).

In the absence of reliable statistics for a country in transition from a planned to a market-based economy like Tajikistan, other useful alternative approaches have been used to derive and create necessary statistics. For instance, the paper shows how to extend an inter-industry consumption matrix, distribute taxes and subsidies to industries, and map and calculate exports and imports of goods and services by industry. Applying these approaches enabled a 2001 input output table (IOT) of Tajikistan to be compiled, which is necessary for constructing a 2001 SAM. An input output table is a matrix of national accounts that shows the flow of income (expenditures) among the different sectors and institutions of an economy in a given year. A 2001 IOT is an industry-by-industry IOT with 27 sectors of production and services. Once a raw 2001 IOT was compiled, Kuroda's Method was used to balance it.

A 2001 SAM of Tajikistan has been constructed based on the compiled 2001 IOT and other relevant statistics. The compiled 2001 SAM of Tajikistan consists of 74 accounts

with 27 sectors of production, 2 factors of production, 3 institutions, 11 tax accounts, 1 non-tax payments account, 1 subsidies account, 1 capital account and 1 rest of the world account. The compiled 2001 SAM has also been balanced using Kuroda's Method.

The paper is structured as follows. Section 2 gives a brief general description of a social accounting matrix. Section 3 provides a theoretical structure of a 2001 macro social accounting matrix of Tajikistan. Section 4 discusses an empirical 2001 macro social accounting matrix of Tajikistan. Section 5 explains the construction of a 2001 input output table of Tajikistan. Subsection 5.1 gives a schematic structure of a 2001 input output table of Tajikistan. Subsection 5.2 documents compiling a 2001 input output table of Tajikistan. Subsection 5.3 balances a 2001 input output table of Tajikistan using Kuroda's Method. Section 6 explains an empirical 2001 micro social accounting matrix of Tajikistan. Section 7 summarizes the key findings of the paper.

2. A brief description of a social accounting matrix

A social accounting matrix is a matrix of accounts of production (activities and commodities), factors and institutions (households, enterprises, government and the rest of the world) with rows representing income (receipts, revenue or incomings) and columns representing costs (outlays, expenditures or outgoings). A SAM delivers comprehensive information about the production and institutions of an economy and their interrelationships in a given year.

A SAM provides an establishment of links between national accounts (production and services, their final use for consumption, investment, exports and imports), social accounts (distribution of income and redistribution of income generated by production process among different types of households) and financial accounts (financial flows, namely allocation and holding of financial assets by different institutions). Therefore, a SAM can be called a national, social and financial accounting matrix and reflects a country's national, social and financial accounts in a given year.

Richard Stone and his team constructed the first SAM for the UK in the 1960s for the purpose of multisectoral modeling (Pyatt and Round 1985). In the 1970s, SAMs were constructed for many developing countries. In the 1980s, design, construction and use of a SAM gained a greater importance with many countries' researchers and institutions. This led to inclusion of a SAM for the first time in the System of National Accounts 1993 published by the United Nations. The United Nations (1993) has given a separate chapter (chapter XX) to a SAM. Currently, there is a growing focus on construction and use of a SAM in the literature².

A SAM has several advantages. First, it gives a clear picture of the economic, social and financial structures of an economy. Second, it serves as an input for static and general equilibrium modeling and simulating the effects of policy (or events) on an economy. Third, it eliminates any data inconsistencies existing among different sources of data. Sen (1996) points out that "a SAM is a way of logical arrangement of statistical information concerning income flows in a country's economy within a particular time period".

Although United Nations (1993) gives a standardized and general structure of a SAM, its structure differs depending on the goals of constructors, requirements of users, objectives of policymakers and availability of data. For example, if the goal of a researcher is to determine the impact of trade liberalization on manufacturing industry, the SAM needs to include as many manufacturing products as possible. If the goal is to look at the effects of poverty on different social groups it is necessary to include as many types of households as possible. In the case where a country enters a regional free trade agreement, a policy maker may wish to know how this influences the domestic economy, making it necessary to include as many trade partners as possible.

According to the degree of aggregation, a SAM can be divided into two parts-macro and micro. It is clear that a macro SAM classifies its accounts (entries) in an aggregated macro level and a micro SAM in a more disaggregated micro level. It is always

² See Round (2003) for discussion of constructing SAMs for development policy analysis, and Nielsen (2002), Li (2002) and Chulu and Wobst (2001) for country specific SAMs.

convenient to first construct a macro SAM then a micro SAM by disaggregating the former.

3. A theoretical structure of a 2001 macro SAM of Tajikistan

The International Food Policy Research Institute (IFPRI) is one of the main sources for country social accounting matrices datasets. It focuses mainly on analysis of sustainable policies for the food needs of developing countries. Research at IFPRI covers various issues related to low-income countries, such as growth and development, poverty alleviation, management of natural resources, etc. Although the IFPRI has social accounting matrices for many countries in its database³, it does not yet have one for Tajikistan. The author's search revealed no one has yet constructed a SAM for Tajikistan, making this paper a considerable contribution to the existing literature.

In constructing a SAM, data come from input output tables, national accounting statistics, household surveys on income and expenditure, balance of payments, surveys on depository money banking and surveys on non-banking financial institutions. National accounting statistics, balance of payments and surveys on depository money banking are relatively easy to obtain for Tajikistan. Although household surveys on income and expenditure can also be found, they are in a form not suitable for a SAM. A survey on non-banking financial institutions cannot be obtained in Tajikistan as the SSCT does not conduct these.

Making an appropriate choice for a suitable year to be used in constructing a SAM for Tajikistan was necessary and 2001 was chosen as an appropriate year based on the following:

- ◆ A 2001 was the latest year for which the majority of necessary statistics were available.
- ◆ Tajikistan gained an independent monetary policy following the introduction of its first national currency in 1995.

³ See www.ifpri.org

Table 3. A theoretical structure of a 2001 macro SAM of Tajikistan

	Activities	Commodities	Factors	Households	Enterprises	Indirect taxes	Direct taxes	Subsidies	Nontax payment	Government	S-I	RoW	Total
Activities		Sales											Domestic production
Commodities	Intermediate consumption			Private consumption						Government consumption	Investment expenditure	Exports (FOB)	Domestic demand
Factors	Value added at factor cost												Factors income
Households			Labor Income		Social security, transfers					Transfers		Remittances	Households income
Enterprises			Capital Income							Interest payments		Grant and transfer from RoW	Enterprises income
Indirect taxes		Indirect taxes											Indirect tax revenue
Direct taxes				Income taxes	Corporate taxes								Direct tax revenue
Subsidies		Subsidies											Subsidies revenue
Nontax payments					Nontax payments								Nontax revenue
Government						Indirect taxes	Income, corporate taxes	Subsidies	Nontax revenue	Domestic grants		Foreign grants	Government revenue
Svg-Inv (S-I)					Enterprises savings					Government savings		Capital inflows	Savings
Rest of the world (RoW)		Imports (CIF)		Transfers to RoW	Payments to RoW					Payments to RoW			Foreign exchange outflows
Total	Cost of production	Commodity supply	VA at factor Cost	Households expenditures	Enterprises expenditures	Indirect taxes Exp-res	Direct taxes exp-res	Subsidies exp-res	Nontax exp-res	Government expenditures	Investments	Forex inflows	

- ◆ Inflation of 12.5 percent in 2001 was the second lowest inflation rate over the period 1995-2003 (Table 1 in the Appendix).
- ◆ Real GDP growth of 10.2 percent in 2001 was the highest real GDP growth over the period 1991-2003 (Table 1 in the Appendix).
- ◆ The budget surplus of 0.2 percent of GDP in 2001 was the first over the period 1995-2003 (Table 1 in the Appendix) and the current account deficit of 7.1 percent of GDP in 2001 looks reasonable compared with the other years (Table 1 in the Appendix).
- ◆ Structural change in the economy was less dramatic in 2001. For example, the share of manufacturing industry to GDP fell significantly from 32.8 percent in 1993 to 20.1 percent in 1998, but increased slightly to 22.6 percent in 2001 (Table 2 in the Appendix).

The purpose of constructing a 2001 SAM of Tajikistan is to create a database in a G-Cubed model in order to develop a model of Tajikistan⁴. A theoretical structure of a 2001 macro SAM of Tajikistan (Table 3) has been organized. It is a 12 by 12 square matrix that has 5 broad accounts and 32 non-zero entries. A broad classification of these 5 accounts is given in Table 4. First, a production account, which consists of activities and commodities accounts. Second, a factors account that includes labor and capital factors. Third, a domestic institutions account that involves households, enterprises and current government accounts. Fourth, a combined capital⁵ account, which appears as a “savings-investments (S-I)” account in the 2001 macro SAM. A final fifth account is the rest of the world⁶.

⁴ The G-Cubed is a multi-country, multi-sector intertemporal general equilibrium model that extends the dynamic macroeconomic modeling method of the MSG2 model with a more disaggregated, econometrically estimated and intertemporal general equilibrium of the United State’s economy (McKibbin and Wilcoxon 1995).

⁵ Combined in the sense that it includes capital of households, enterprises, government and foreign institutions.

⁶ The rest of the world includes all accounts mentioned in the first, third and fourth groups of accounts, but in terms of foreign countries.

Table 4. A broad classification of accounts in a 2001 macro SAM of Tajikistan

Accounts	Components
1. Production	Activities and commodities
2. Factors	Labor and capital
3. Domestic institutions	Households, enterprises and government
4. Capital account	Combines capital accounts of both domestic and foreign institutions
5. The rest of the world	Includes production, factors and institutions in rows 1, 3 and 4, respectively, but in terms of foreign countries

It is straightforward to read the 2001 macro SAM of Tajikistan. As shown in the first row of Table 3, activities produce commodities for sale creating domestic production. In the second row, commodities are used as an input by activities, consumed by households and government, and purchased by investors and foreigners (or consumed by foreign consumers) creating demand for domestic production. From the third row it can be seen that factors of production (labor and capital) receive payments made by production activities, creating factors income.

As illustrated in the fourth row, households get income from factors, social security transfers and other income from enterprises, transfers (subsidies) from government and remittances (transfers) from the rest of the world. Similarly, in the fifth row, enterprises receive income from factors of production, interest payments from government and grant (transfers) from the rest of the world. The sixth row records indirect taxes, raising revenue from commodities account. In the seventh row, direct taxes receive revenue from households and enterprises. The eighth row shows subsidies paid by commodities and the ninth row demonstrates non-tax payments made by enterprises.

The tenth row represents current government revenues collected from accounts such as indirect and direct taxes, non-tax revenue, and domestic and foreign grants. Savings-investment balance (or combined capital account) appears in the eleventh row of Table 3. This account benefits mainly from the savings of enterprises, government and foreign

sectors. The last row shows the receipts of the rest of the world that come from imports into Tajikistan, and transfers of households, enterprises and government to the rest of the world.

Since a SAM represents transactions among different economic accounts, it gains the main feature of the double accounting rule. According to the double accounting rule, each transaction must appear in one party's account as an asset/liability and in the other party's account (or parties' accounts) as a liability/asset and hence, must balance the accounts of all participating parties, i.e., the Walras' Law holds for a SAM. According to this Law, if $(k - 1)$ accounts are balanced the k -th account must balance. Therefore, the total value of each row must be equal to the total value of its corresponding column. In terms of Table 3 this means, for example, the total value of the "commodities" row must be equal to the total value of the "commodities" column, and so forth for all other rows and columns in the table.

4. An empirical 2001 macro SAM of Tajikistan

An empirical 2001 macro SAM of Tajikistan is a square matrix that consists of 12 rows and columns, excluding a total row and a total column (Table 5). Because of the double entry characteristics of the accounts mentioned earlier, each cell explains the magnitude of two accounts: one in a row and the other in a column of the matrix. In the description of cells the notation of "row-column" is used. For example, a notation of "activities-commodities" corresponds to the cell at the intersection point of "activities" in the row and "commodities" in the column of the empirical 2001 macro SAM.

All numbers in cells are in thousands of somoni⁷. Data have been collected mainly from the publications of the SSCT, MFRT, NBT and the International Monetary Fund (IMF). A description of each cell of the empirical 2001 macro SAM of Tajikistan (Table 5) is provided below⁸.

⁷ Somoni is the Tajikistan national currency that replaced the old Tajik Ruble on October 30, 2000.

⁸ Cells are described in order according to the order of their calculated values and then their appearance.

Intermediate consumption (“commodities-activities”) is 2388519.5. The figure comes from Table 2.14 of SSCT (2003a) at page 33. Intermediate consumption is input used by production activities to produce goods and services. Thus, this is a receipt for a commodities’ account and a payment for an activities’ account.

Value-added at factor cost (“factors-activities”) is 2298516.3. The number is taken from Table 2.22 of SSCT (2003a) at page 41. Total value added is the sum of the value of labor and capital. This is an income received by factors and payment made by activities.

Sales (“activities-commodities”) are equal to 4687035.8. This is a total column of “activities”. In other words, this is a total of domestic production which is equal to the sum of intermediate consumption and value added at factor cost.

Indirect taxes (“indirect taxes-commodities”) that are paid by commodities are 236425.4. This number was taken from MFRT (2002) and an unpublished Table “Taxes and subsidies in 2001” of the SSCT.

Subsidies (“subsidies-activities”) are 6120.6. The figure comes from Table 2.28 of SSCT (2003a) at page 47.

Imports (CIF) (“the rest of the world-commodities”) are 1753726.1. This is receipts for the rest of the world account and payments for the commodities account. Data for imports come from an unpublished table “Balance of exports and imports of goods and services” of the SSCT. This is a sum of 687.5 mln USD imports of goods and 51.7 mln USD imports of services converted into somoni by applying the average annual exchange rate of 2.3725 somoni per USD. This exchange rate has been used in the conversion of numbers throughout this paper.

Table 5. An empirical 2001 macro SAM of Tajikistan (thousands somoni)

		1	2	3	4	5	6
		Acti-Vities	Commo-dities	Factors	House-Holds	Enter-prises	Indirect taxes
1	Activities		4687035.8				
2	Commodities	2388519.5			1918449.4		
3	Factors	2298516.3					
4	Households			620428.0		1105249.7	
5	Enterprises			1678088.3			
6	Indirect taxes		236425.4				
7	Direct taxes				40485.9	34840.6	
8	Subsidies		-6120.6				
9	Nontax paym					65786.3	
10	Government						236425.4
11	Svg-Inv (S-I)					265446.6	
12	Rest of world		1753726.1		799.3	446192.9	
13	Total	4687035.8	6671066.7	2298516.3	1959734.6	1917516.1	236425.4

Continuation of Table 5

		7	8	9	10	11	12	13
		Direct Taxes	Subsi dies	Nontax payments	Govern-Ment	S-I	RoW	Total
1	Activities							4687035.8
2	Commodities				241338.0	419816.2	1702943.6	6671066.7
3	Factors							2298516.3
4	Households				48052.9		186004.0	1959734.6
5	Enterprises				59592.5		179835.3	1917516.1
6	Indirect taxes							236425.4
7	Direct taxes							75326.5
8	Subsidies							-6120.6
9	Nontax paym							65786.3
10	Government	75326.5	-6120.6	65786.3	485.2		4254.5	376157.3
11	Svg-Inv (S-I)				2529.6		151840.0	419816.2
12	Rest of world				24159.1			2224877.4
13	Total	75326.5	-6120.6	65786.3	376157.3	419816.2	2224877.4	

Private consumption (“commodities-households”) is 1918449.4. The source is Table 2.25 of SSCT (2003a) at page 44. This is a sum of 1870650.0 households consumption, 22609.0 consumption of noncommercial financial organizations serving households and 25190.4 statistical discrepancies⁹. The statistical discrepancy is the difference between two methods of GDP-the production and expenditure based methods. This discrepancy emerges as a result of converting GDP from the production based into the expenditure based approach.

Government consumption (“commodities-government”) is 241338.0, which is a payment made by government and income received by the commodities account. This was taken from Table 2.25 of SSCT (2003a) at page 44.

Investment expenditure (“commodities-S-I”) is 419816.2. The source is Table 2.25 of SSCT (2003a) at page 44. This is the sum of 233450.6 gross fixed capital formation and 186365.6 changes in inventories. Investment expenditures include private, enterprises and government investments. This is the amount invested in physical capital.

Exports (FOB) (“commodities-the rest of the world”) is 1702943.6. This is a receipt received by the commodities sector and payment made by the foreign sector. As for imports, the above data for exports comes from an unpublished table “Balance of exports and imports of goods and services” of the SSCT. This number has been found by summing up 651.5 mln USD exports of goods and 66.2 mln USD exports of services and converting the result from USD into somoni. The average annual exchange rate of 2.3725 somoni per USD has been used for conversion.

Labor income (“households-factors”) is 620428.0. In general it is all kinds of production-linked income received by households and paid by factors of production. Tables 2.22 and 2.28 of SSCT (2003a) were used to calculate this figure. This is compensation to labor

⁹ Nielson (2002) included statistical discrepancies for Vietnam in household consumption based on the fact that the Government Statistics Office of Vietnam added it to the account of “compensation to labor”.

such as wages and salaries and social insurance transfers of 600089.7 in Table 2.22 of SSCT (2003a) and other factors of 20338.2. The number of 20338.2 has been calculated by multiplying 0.27 with total other factors of 75326.5 taken from Table 2.22 of SSCT (2003a). The 27 percent is the ratio of labor to total value added without other factors.

Capital income (“enterprises-factors”) is equal to 1678088.3, and is received by enterprises and paid by factors of production. The figure has been derived from Tables 2.22 and 2.28 of SSCT (2003a). This is factor income paid to capital of 1623100.0 in Table 2.22 and other factors of 54988.3. The number of 54988.3 has been calculated through multiplying 0.73 by total other factors of 75326.5 taken from Table 2.22 of SSCT (2003a). The 73 percent is the ratio of capital to total value added without other factors.

Government transfers to households (“households-government”) are 48052.9. The source is MFRT (2002) where it is shown as social insurance and social protection.

Interest payments (“enterprises-government”) are 59592.5. This is from 52808.4 transfers from government to enterprises plus 6784.1 payments made by government to enterprises for holding domestic government debt. The source of 52808.4 is an unpublished table “Taxes and subsidies in 2001” of the SSCT. The number of 6784.1 has been obtained from MFRT (2002).

Remittances (“households-RoW”) are 186004.0. Until mid 2001, there was still a 30 percent tax¹⁰ in Tajikistan on foreign exchange transfers from abroad and therefore prior to mid 2001, Tajik labor immigrants abroad (namely in Russia, Kazakhstan, Kyrgyzstan, Ukraine and others) transferred their income to Tajikistan mainly non-officially. Hence, either official data underestimate the real figure or it is hard to find official data on remittances. Because of this 78.4 mln USD remittances from abroad in 2002, equivalent

¹⁰ This tax was abolished in mid 2001 as a result of which foreign remittances transferred through the banking system have increased significantly compared to the pre 2001 period. For example, in 2003 remittances accounted for about 750 million US dollars (www.rferl.org/newsline/2-tca.asp?po=y). This was a news bulletin of Radio Free Europe/Radio Liberty on 30 April 2004.

to 186004.0 thousands somoni, was chosen (as in calculation of exports and imports the exchange rate of 2.3725 somoni per USD has been used for conversion). The number for 2002 was chosen because the officially recorded 4.2 mln USD remittances in 2001 are likely underestimated. The source for remittances is Balance of Payments Division of the NBT.

Grants and transfers from abroad to enterprises (“enterprises-RoW”) are 179835.3 from Table “Current Transfers” at page 60 of Balance of Payments of Tajikistan in 2001 (NBT 2002). The figure is shown as 75799.9 thousands USD and has been converted into somoni using the exchange rate of 2.3725 somoni per USD.

Social security transfers and other grants (“households-enterprises”) are 1105249.7. This is a residual of 1959734.6 (total column of “households”), 620428.0 (labor income), 48052.9 (government transfers to households) and 186004.0 (labor remittances from abroad).

Direct taxes (“direct taxes-households”) paid by households and direct taxes paid by enterprises (“direct taxes-enterprises”) are equal to 40485.9 and 34840.6, respectively. The sources for all these types of taxes are MFRT (2002) and an unpublished table “Taxes and subsidies in 2001” of the SSCT.

Non-tax payments (“non-tax payments-enterprises”) of 65786.3 come from MFRT (2002). This is equal to 30442.3 non-tax revenue plus 39598.5 social payments.

Transfers of households to the rest of the world (“S-I-households”) are 799.3 from the Balance of Payments of Tajikistan in 2001 (NBT 2002).

Indirect taxes government revenue (“government-indirect taxes”) is equal to 236425.4. This is a total value of the row “indirect taxes”.

Direct taxes government revenue (“government-direct taxes”) is equal to 75326.5. This is a total value of the row “direct taxes”.

Subsidies government negative tax revenue (“government-subsidies”) is equal to a negative of 6120.6. This is a total value of the row “subsidies”.

Non-tax government revenue (“government-non-tax payments”) is 65786.3, which is a total value of the row “non-tax payments”.

Domestic grants (“government-government”) are 485.2 from MFRT (2002). This is an interstate grant given to the central government.

Foreign grants (“government-RoW”) are equal to 4254.5. This is from MFRT (2002) at page 5.

Government savings (“S-I-government”) are 2529.6 from MFRT (2002).

Foreign savings or capital inflows (“S-I-RoW”) are 151840.0 from IMF (2003). The amount of 64.0 mln USD has been converted into somoni using the exchange rate of 2.3725 somoni per USD.

Enterprises savings (“S-I-enterprises”) are 265446.6. This has been calculated as a residual of 419816.2 (total domestic investment), 2529.6 (government savings) and 151840.0 (foreign savings).

Transfers of enterprises to the rest of the world are equal to 446192.9. This is 1917516.1 (total row of “enterprises”) minus 1105249.7 (social security transfers and other grants), 34840.6 (direct taxes paid by enterprises), 65786.3 (non-tax payments made by enterprises) and 265446.6 (enterprises savings).

Table 6. Balance sheets of selected national accounts of Tajikistan in 2001
(thousands somoni)

<u>Goods and services account</u>	Supply		Use
Sales	4687035.8	Intermediate consumption	2388519.5
Imports of goods and services	1753726.1	Final consumption	2159787.4
Indirect taxes	236425.4	Gross capital formation	233450.6
Subsidies	-6120.6	Changes in stock	186365.6
		Exports of goods and services	1702943.6
Total: supply	6671066.7	Total: Use	6671066.7

<u>Production account</u>	Supply		Use
Sales	4687035.8	Intermediate consumption	2388519.5
Indirect taxes	236425.4	GDP	2528821.1
Subsidies	-6120.6		
Total: Supply.	4917340.6	Total: Use.	4917340.6

<u>GDP</u>	Income		Expenditures
GDP at factor cost	2298516.3	Private consumption	1918449.4
Indirect taxes	236425.4	Government consumption	241338.0
Subsidies	-6120.6	Investment expenditures	419816.2
		Exports of goods & services	1702943.6
		Imports of goods & services	-1753726.1
Total: GDP	2528821.1	Total: GDP	2528821.1

<u>GNP</u>	Income		Expenditures
GDP	2528821.1	Private consumption	1918449.4
Factor income from abroad	-471151.3	Government consumption	241338.0
Current transfers from abroad	370093.8	Domestic savings	267976.2
Total: GNP	2427763.6	Total: GNP	2427763.6

<u>Capital account</u>	Income		Expenditures
Domestic savings	267976.2	Gross capital formation,	
Foreign savings	151840.0	including stock changes	419816.2
Total:	419816.2	Total:	419816.2

<u>Government budget</u>	Income		Expenditures
Tax revenue	311751.9	Consumption	241338
Non-tax revenue	65786.3	Subsidies	6120.6
Domestic grants	485.2	Domestic transfers	108130.6
Foreign grants	4254.5	Foreign transfers	24159.1
		Savings	2529.6
Total:	382277.9	Total:	382277.9

Government payments to the rest of the world (“RoW-government”) are 24159.1. This was calculated as a residual of 376157.3 (total row of “government”) minus 241338.0 (government consumption), 48052.9 (transfers to households), 59592.5 (transfers to enterprises), 485.2 (domestic grants) and 2529.6 (government savings).

Finally, as mentioned earlier in the empirical 2001 macro SAM of Tajikistan (Table 5), the total value of each row equals the total value of its corresponding column. The balance sheets of selected national accounts are shown in Table 6. All accounts in Table 6 have been derived from the empirical macro SAM of Tajikistan shown in Table 5. The balance sheets of these selected national accounts are balanced, indicating a consistent 2001 empirical macro SAM of Tajikistan.

A 2001 micro SAM can now be constructed by disaggregating the already compiled 2001 macro SAM. Each non-zero cell of the 2001 macro SAM of Tajikistan should be disaggregated from 1×1 dimension into $m \times n$ dimension, where m and n represent number of rows and columns of the 2001 micro SAM, respectively. In order to do this, a 2001 IOT of the country is necessary, because the main disaggregated accounts in the 2001 micro SAM come from a 2001 IOT. As a 2001 IOT is absent in the literature, its construction is necessary.

5. Constructing a 2001 input output table of Tajikistan

5.1 A schematic structure of a 2001 input output table of Tajikistan

An input output table is a matrix of national accounts that shows the flow of income (expenditures) among different sectors and institutions of the economy in a given year. “They [input output tables] provide a detailed analysis of the process of production and the use of goods and services (products) and the income generated in that production” (United Nations 1993:343).

The main features of an IOT can be discussed in terms of Table 7. Across rows industries receive income (or supply goods and services) and across columns they make payments (or use goods and services). It can be seen that along the first row of Table 7 production

sector 1 receives income from production sectors 1 through n, households, government, gross capital formation, changes in stock and exports, and so forth for all other production sectors up to row m. A total of production sectors in row IC constitutes a total intermediate consumption at basic prices.

Table 7. A schematic form of a 2001 input output table of Tajikistan

		EXPENDITURES (USE)										
INCOME (SUPPLY)		1	2	...	n	IC	H	G	GCF	CHS	E	TS*
	1	11	12	...	1n	IC1	H1	G1	GCF1	CHS1	E1	TS1
	2	21	22	...	2n	IC2	H2	G2	GCF2	CHS2	E2	TS2
	...	...	...	...	...	...	...	...	...	...	...	...
	m	m1	m2	...	mn	ICm	Hm	Gm	GCFm	CHSm	Em	TSm
	=IC	IC1	IC2	...	ICn							IC
	+IT	IT1	IT2	...	ITn							IT
	-S	S1	S2	...	Sn							S
	=CP	CP1	CP2	...	CPn							CP
	DT	DT1	DT2	...	DTn							DT
	VA=WS+PI	VA1	VA2	...	VA _n							VA
	WS	WS1	WS2	...	WS _n							WS
	PI	PI1	PI2	...	PI _n							PI
	M	M1	M2	...	M _n							TM
	TU=CP+DT+VA+M	TU1	TU2	...	TU _n	TIC	TH	TG	TGCF	TCHS	TE	TU=TS

* TS=IC+H+GCF+CHS+E

Abbreviations-a) Columns: IC-intermediate consumption (total), H-households consumption, G-government consumption, GCF-gross capital formation, CHS-changes in stock, E-exports of goods and services and TS-total supply; b) Down rows: IC-intermediate consumption (total) at basic prices, IT-indirect taxes, S-subsidies, CP-Intermediate consumption at purchasers' prices, DT-direct taxes, VA-value added at basic prices, WS-wages and salaries, PI-gross profits and gross mixed income, M-imports of goods and services and TU-total use. In the Table 1 $m = n = 27$.

Indirect taxes, subsidies and direct taxes in rows IT, S, and DT, respectively, obtain income from production sectors 1 through n. Adding indirect taxes to and subtracting subsidies from intermediate consumption at basic prices gives intermediate consumption at purchasers' prices in row CP. In rows WS and PI, wages and salaries and gross profits and gross mixed income, respectively, gain from payments made by production sectors 1 through n. A sum of these two accounts creates value added at factor cost at basic prices in row VA. Domestic buyers also pay foreigners for their imports in row M. Intermediate

consumption at purchasers' prices plus direct taxes plus value added at factor cost plus imports gives a total use at market prices, which is shown in the last row of Table 1.

In the first column of Table 7, production sector 1 makes payments to production sectors 1 through m for purchasing inputs, pays indirect and direct taxes to government, wages and salaries to labor factor, profits and income to capital factor, and makes payment to foreign producers for purchasing goods and services, and receives subsidies from government. The same explanation is applicable to all other production sectors up to sector n. Summing up all sectors of production from 1 to n implies a total intermediate consumption in column IC.

Households and government in columns H and G, respectively, pay to production sectors 1 through m for their consumption. Similarly, gross capital formation and changes in stock in columns GCF and CHS, respectively, make expenditures to sectors of production, hence creating investment. The remaining output is purchased by foreigners in row E. Total supply in the last column is equal to a sum of intermediate consumption (IC), private consumption (H), government consumption (G), gross capital formation (GCF), changes in stock (CHS) and exports (E). A total value of each row up to order m in Table 7 must then be equal to a total value of its corresponding column up to order n. If this holds a total use must also be equal to a total supply of economy as shown in the intersection cell of total rows and total columns, i.e., the last right hand side cell of Table 7.

5.2 Compiling a 2001 input output table of Tajikistan

In constructing an IOT, data comes from national statistics, household surveys on income and expenditure, government budgets and balance of trade. When an attempt was made to collect the necessary information for constructing an IOT of Tajikistan it became clear that Tajikistan does not currently have input output tables. The only officially published input output table available for Tajikistan is for 1993¹¹, which is not appropriate for the purpose of this study because:

¹¹ This is published by the SSCT only for internal use.

- ◆ Tajikistan did not have a national currency in 1993 and hence an independent monetary policy.
- ◆ The country experienced negative real GDP growth of 11 percent, hyperinflation of 7343.7 percent, a high fiscal deficit of 23.4 percent of GDP and a current account deficit of 30.7 percent of GDP in 1993 (Table 1 in the Appendix).
- ◆ Economic reforms, particularly price liberalization, trade liberalization and privatization led to significant structural change after 1993.

These reasons make 1993 problematic for constructing a model of Tajikistan that can be used for current policy analysis. In addition, the 1993 IOT was based on the Soviet Union system of accounting, which was different from the System of National Accounts 1993 that is published by the United Nations (1993). A 1993 IOT had only a material sphere¹² that included manufacturing, construction, agriculture and forestry, mining, transport, communication, trade, storage, material and technical support, and other sectors of the material sphere including information and technology. It did not have the following (non-material sphere) services: (a) residential and communal services, (b) health, fitness and social security, (c) education, (d) culture and arts, (e) science and scientific services, (f) finance, credit and insurance, (g) management, defense and policing, and (h) public organizations. The material sphere did purchase inputs from this non-material sphere, but these purchases were included in value added. On the other hand, while the non-material sphere made payments to the material sphere, they were not considered as an input to the non-material sphere, and were instead treated as redistribution of value added.

All these issues together with the main reasons highlighted earlier, make the 1993 IOT irrelevant for constructing a 2001 IOT and SAM for Tajikistan. Fortunately, there was an unpublished manually written IOT for 1995 in Tajikistan. A 1995 IOT was a 17×27 industry by industry matrix that did not have imports classification by industries. Although the 1995 IOT was not completed, it has been constructed according to the 1993 System of National Accounts. Hence, mainly based on the 1995 unpublished IOT of

¹² Material and non-material sphere are from the Soviet Union's classification of sectors.

Tajikistan a 2001 IOT has been constructed and used to compile a 2001 micro SAM of Tajikistan. Documentation is provided later.

One of the richest world sources in terms of a multi-country input output database is the Global Trade Analysis Project (GTAP). The GTAP is a project which runs quantitative analysis of many global economic issues including multilateral trade, greenhouse gas emissions, and the spillover effects of domestic policies internationally. Although the GTAP has input output tables for 87 countries in its 6-th database version, it does not have an IOT of Tajikistan¹³.

As in the 2001 macro SAM of Tajikistan, all numbers in the cells of a 2001 IOT are in thousands of somoni. Data have been collected from the publications of mainly the SSCT and MFRT. A description of the 2001 IOT of Tajikistan is provided below¹⁴.

Interaction of industries is shown in Table 7 in a matrix with $m \times n$ dimension called an intermediate consumption matrix. This matrix shows how much each industry requires the production of other industries as inputs in order to produce its own output. An intermediate consumption matrix has been disaggregated into 27 sectors of production (Table 8) of which the first 11 sectors belong to the manufacturing sector. Intermediate consumption of financial intermediation measured indirectly in the amount of 3699.2 has been added to the intermediate consumption of finance, credit and insurance.

The following methodology has been used to construct an intermediate consumption matrix for 2001. First, from the 1995 IOT a coefficient matrix of intermediate consumption has been calculated using a total row of intermediate consumption for the same year as a denominator (Table 9). Next, a total row of intermediate consumption

¹³ See the GTAP's website at www.gtap.agecon.purdue.edu

¹⁴ Cells are described in order according to first, the order of their calculated values then their appearance.

Table 8. Sectoral classification of a 2001 IOT and 2001 SAM of Tajikistan

#	Sectors	Commodities	Name	#	Activities
1	Elec	Celec	Electricity	28	Aelec
2	Petr	Cpetr	Petroleum	29	Apetr
3	Bmet	Cbmet	Black metallurgy	30	Abmet
4	Cmet	Ccmet	Colour metallurgy	31	Acmet
5	Chem	Cchem	Chemical products	32	Achem
6	Mach	Cmach	Machine	33	Amach
7	Wdpp	Cwdpp	Woods and papers	34	Awdpp
8	Ctmt	Cctmt	Construction materials, including glasses	35	Actmt
9	Lmnf	Clmnf	Products of light manufacturing	36	Almnf
10	Fmnf	Cfmnf	Food manufacturing	37	Afmnf
11	Omnf	Comnf	Other manufacturing	38	Aomnf
12	Cons	Ccons	Construction	39	Acons
13	Agfr	Cagfr	Agriculture and forestry	40	Aagfr
14	Tran	Ctran	Transport	41	Atran
15	Comm	Ccomm	Communication	42	Acomm
16	Tsts	Ctsts	Trade, storage and material and technical support	43	Atsts
17	Itsr	Citsr	IT service	44	Aitsr
18	Ospr	Cospr	Other sectors of production	45	Aospr
19	Mnng	Cmnng	Mining	46	Amnng
20	Rscs	Crscs	Residential and communal services	47	Arscs
21	Hfss	Chfss	Health, fitness and soc. Security	48	Ahfss
22	Educ	Ceduc	Education	49	Aeduc
23	Cuar	Ccuar	Culture and arts	50	Acuar
24	Scss	Csscs	Science and scientific services	51	Asscs
25	Fnci	Cfnci	Finance, credit and insurance	52	Afnci
26	Mgdp	Cmgdp	Management, defence and policing	53	Amgdp
27	Pbor	Cpbor	Public organizations	54	Apbor
55		Labr	Labor		
56		Capl	Capital		
57		Hsld	Households		
58		Ents	Enterprises		
59		VAT	Value added tax		
60		Excs	Excises		
61		Imtf	Import tariffs		
62		Extf	Export tariffs		
63		Stdt	State duties		
64		Prtx	Property tax		
65		Ldtx	Land tax		
66		Trtx	Transport tax		
67		Intx	Income tax		
68		Pftx	Profit tax		
69		Ottx	Other taxes		
70		Subs	Subsidies		
71		Ntxp	Nontax payments		
72		Govt	Government		
73		Sviv	Saving-Investment (S-I)		
74		Row	Rest of the world		

matrix for 2001 has been found from Table 2.14 of SSCT (2003a) at page 33 (the last row of Table 9). Then an intermediate consumption matrix for 2001 has been calculated multiplying the 1995 coefficient matrix of intermediate consumption by the corresponding total row of 2001 intermediate consumption.

The 1995 IOT had all 27 sectors along columns, but did not have 27 sectors down the rows, because 11 sectors of manufacturing were shown in one row under “total manufacturing”. Consequently, up to this point, the constructed 2001 intermediate consumption matrix had a 17×27 dimension and needed to be extended to a square matrix of 27×27 dimension. For this purpose, shares of each of the 11 sectors of manufacturing to total manufacturing output in 2001 have been calculated (the last column of Table 10). Table “The Structure of Economic Industries” at page 14 of SSCT (2003b) has been used to find the shares of the 11 manufacturing sectors to total manufacturing output in 2001. Intermediate consumption for 2001 has then been found for all these manufacturing sectors (Table 10) through multiplying the share coefficients by the value of the intermediate consumption of total manufacturing shown in the last row of Table 10.

For some sectors the results of Table 10 do not make economic sense so that own judgment has been applied for corrections. For example, electricity does not use chemical products as its input and hence, 414.3 of chemistry have been removed to the row “other manufacturing”. As manufacturing of electricity, petrol, black metallurgy, machinery, woods and paper, and construction materials do not use food as an input, numbers of 6252.8, 87.7, 7849.9, 537.9, 30.5 and 587.9 respectively, in the row “food manufacturing” have been transformed to the row “other manufacturing” for all these sectors. For color metallurgy, the number for food manufacturing of 104615.2 has been distributed to electricity and petroleum at 50000 and 54615.2, respectively, as color metallurgy consumes mainly electricity and petrol. For example, the Tajik Aluminum Plant, which falls into manufacturing of color metallurgy, consumes about 40 percent of the country’s electricity.

Table 9. Share coefficients of intermediate matrix of the 1995 IOT for Tajikistan (continued)

	1	2	3	4	5	6	7	8	9	10	11		12	13
	Elec	Petr	Bmet	Cmet	Chem	Mach	Wdpp	Ctmt	Lmnf	Fmnf	Omnf	Ttmnf	Cons	Agfr
Ttmnf	0.44525	0.20287	0.67036	0.99367	0.42667	0.27663	0.28214	0.22675	0.73154	0.60886	0.36037	0.56556	0.51674	0.60623
Cons	0.02087	0.03821	0.18707	0.00094	0.02666	0.10136	0.19118	0.50709	0.00423	0.00179	0.00233	0.04337	0.03124	0.00012
Agfr	0.13731	0.29052	0.04583	0.00220	0.41111	0.34576	0.05491	0.07374	0.17562	0.23412	0.44857	0.19669	0.01899	0.37659
Tran	0.02190	0.21607	0.00933	0.00051	0.05083	0.06253	0.00981	0.01926	0.00373	0.00032	0.00423	0.03683	0.11539	0.00084
Comm	0.10648	0.00775	0.00000	0.00030	0.00209	0.01284	0.00695	0.00149	0.00172	0.00041	0.00309	0.01737	0.05430	0.00000
Tsts	0.02657	0.02610	0.00200	0.00004	0.00880	0.03704	0.07971	0.02100	0.02355	0.02695	0.02551	0.01978	0.06424	0.00313
Itsr	0.00003	0.00002	0.00000	0.00002	0.00002	0.00010	0.00000	0.00005	0.00000	0.00002	0.00000	0.00002	0.00000	0.00000
Ospr	0.00286	0.00095	0.00017	0.00040	0.00142	0.00263	0.01003	0.00045	0.00067	0.00023	0.00086	0.00126	0.00092	0.00002
Mnng	0.00181	0.00185	0.01033	0.00065	0.00125	0.00557	0.00673	0.01941	0.00022	0.00029	0.00075	0.00223	0.00000	0.00001
Rscs	0.10969	0.09573	0.06391	0.00022	0.01738	0.04511	0.02800	0.07001	0.00647	0.01657	0.02867	0.03874	0.10318	0.00027
Hfss	0.01122	0.00564	0.00133	0.00022	0.01039	0.00982	0.01676	0.00881	0.00611	0.01887	0.01636	0.00851	0.04752	0.00067
Educ	0.03326	0.00460	0.00117	0.00040	0.01817	0.01296	0.01731	0.01572	0.00694	0.02903	0.02275	0.01444	0.00315	0.00219
Cuar	0.00657	0.00608	0.00025	0.00008	0.00359	0.00256	0.00342	0.00309	0.00137	0.00573	0.00448	0.00338	0.00271	0.00055
Sess	0.00025	0.00023	0.00042	0.00001	0.00030	0.00058	0.00044	0.00020	0.00003	0.00002	0.00011	0.00017	0.00678	0.00000
Fnci	0.05915	0.07284	0.00567	0.00029	0.00502	0.06261	0.18875	0.02508	0.02962	0.04310	0.06265	0.03715	0.03483	0.00864
Mgdp	0.01415	0.02704	0.00175	0.00006	0.01489	0.01894	0.09625	0.00547	0.00707	0.01154	0.01697	0.01267	0.00000	0.00056
Pbor	0.00261	0.00349	0.00042	0.00001	0.00142	0.00296	0.00761	0.00239	0.00112	0.00217	0.00230	0.00183	0.00000	0.00017
TIC*	84598.5	2603.0	70542.1	634228.1	14316.7	11713.6	650.8	15618.2	165292.4	216051.4	85899.7	1301514.5	102622.3	461005.2

*-Total intermediate consumption in 2001 (thousands somoni)

Ttmnf-total manufacturing

Table 9. Share coefficients of intermediate matrix of the 1995 IOT for Tajikistan

	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	Tran	Comm	Tsts	Itsr	Ospr	Mnng	Rscs	Hfss	Educ	Cuar	Scss	Fnci	Mgdp	Pbor
Ttmnf	0.24528	0.56640	0.57454	0.18484	0.14707	0.60000	0.14000	0.17301	0.21000	0.10004	0.30435	0.26901	0.10399	0.55145
Cons	0.05507	0.02130	0.03013	0.02327	0.01960	0.10000	0.01000	0.00400	0.01000	0.00000	0.00000	0.01400	0.00300	0.00000
Agfr	0.12422	0.10904	0.09246	0.08112	0.18776	0.20000	0.09000	0.03800	0.01000	0.00000	0.00000	0.49701	0.19398	0.00000
Tran	0.03270	0.00730	0.02670	0.09176	0.15657	0.10000	0.02000	0.00400	0.01000	0.00000	0.19876	0.01900	0.01800	0.07792
Comm	0.01823	0.01769	0.00545	0.02327	0.02769	0.00000	0.01000	0.00200	0.00000	0.00000	0.09938	0.00900	0.00600	0.02598
Tsts	0.05043	0.11573	0.02957	0.17287	0.06379	0.00000	0.01000	0.00000	0.00000	0.00000	0.00000	0.01700	0.02400	0.08592
Itsr	0.00045	0.00018	0.00029	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Ospr	0.01650	0.01698	0.01691	0.02926	0.01780	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00400	0.00200	0.19780
Mnng	0.00020	0.00053	0.00018	0.00000	0.00210	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00100	0.00000	0.00000
Rscs	0.05481	0.00053	0.02004	0.03524	0.06159	0.00000	0.22000	0.01700	0.00000	0.00000	0.09938	0.00800	0.00600	0.02598
Hfss	0.02638	0.00906	0.04614	0.01729	0.02769	0.00000	0.03000	0.26101	0.23000	0.20009	0.09938	0.02200	0.00000	0.00899
Educ	0.00762	0.00035	0.00421	0.01729	0.04749	0.00000	0.08000	0.02300	0.49999	0.49979	0.00000	0.02100	0.00000	0.00899
Cuar	0.00134	0.00018	0.00204	0.00598	0.00930	0.00000	0.00000	0.00900	0.03000	0.20009	0.00000	0.00000	0.00000	0.00000
Scss	0.00611	0.00026	0.00164	0.00598	0.00040	0.00000	0.00000	0.00200	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Fnci	0.22563	0.09681	0.14156	0.17287	0.18736	0.00000	0.37001	0.26097	0.00000	0.00000	0.09938	0.10298	0.64003	0.01699
Mgdp	0.13375	0.03459	0.00614	0.13298	0.03449	0.00000	0.02000	0.20601	0.00000	0.00000	0.09938	0.01500	0.00300	0.00000
Pbor	0.00126	0.00308	0.00200	0.00598	0.00930	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00100	0.00000	0.00000
TIC*	45839.9	19645.7	151414.0	137.4	4764.4	1787.5	117196.7	20078.1	50194.2	7172.9	2686.7	23014.4	74578.2	4867.4

Table 10. Disaggregating the manufacturing sector of a 2001 SAM for Tajikistan /1

	1	2	3	4	5	6	7	8	9	10
	Elec	Petr	Bmet	Cmet	Chem	Mach	Wdpp	Ctmt	Lmnf	Fmnf
Elec	2448.4	34.3	3073.8	40963.8	397.1	210.6	11.9	230.2	7859.7	8550.4
Petr	75.3	1.1	94.6	1260.4	12.2	6.5	0.4	7.1	241.8	263.1
Bmet	2041.6	28.6	2563.0	34157.5	331.1	175.6	10.0	191.9	6553.8	7129.7
Cmet	18355.5	257.3	23043.8	307102.3	2976.7	1579.0	89.5	1725.7	58923.4	64101.8
Chem	414.3	5.8	520.2	6932.3	67.2	35.6	2.0	39.0	1330.1	1447.0
Mach	339.0	4.8	425.6	5671.9	55.0	29.2	1.7	31.9	1088.3	1183.9
Wdpp	18.8	0.3	23.6	315.1	3.1	1.6	0.1	1.8	60.5	65.8
Ctmt	452.0	6.3	567.5	7562.5	73.3	38.9	2.2	42.5	1451.0	1578.5
Lmnf	4783.8	67.1	6005.7	80036.9	775.8	411.5	23.3	449.8	15356.6	16706.2
Fmnf	6252.8	87.7	7849.9	104615.2	1014.0	537.9	30.5	587.9	20072.4	21836.5
Omnf	2486.1	34.9	3121.1	41594.0	403.2	213.9	12.1	233.7	7980.6	8682.0
Ttmnf*	37667.6	528.2	47288.8	630211.9	6108.7	3240.3	183.7	3541.5	120918.2	131544.9

Continuation of Table 10

	11	12	13	14	15	16	17	18	19	20
	Omnf	Cons	Agfr	Tran	Comm	Tsts	Itsr	Ospr	Ggsv	Rscs
Elec	2012.2	3446.9	18165.9	730.8	723.3	5654.5	1.7	45.5	69.7	1066.5
Petr	61.9	106.1	558.9	22.5	22.3	174.0	0.1	1.4	2.1	32.8
Bmet	1677.8	2874.2	15147.5	609.4	603.1	4715.0	1.4	38.0	58.1	889.3
Cmet	15085.0	25840.9	136188.1	5479.0	5422.3	42391.5	12.4	341.5	522.6	7995.2
Chem	340.5	583.3	3074.2	123.7	122.4	956.9	0.3	7.7	11.8	180.5
Mach	278.6	477.3	2515.3	101.2	100.1	782.9	0.2	6.3	9.7	147.7
Wdpp	15.5	26.5	139.7	5.6	5.6	43.5	0.0	0.4	0.5	8.2
Ctmt	371.5	636.3	3353.7	134.9	133.5	1043.9	0.3	8.4	12.9	196.9
Lmnf	3931.4	6734.7	35493.3	1427.9	1413.2	11048.1	3.2	89.0	136.2	2083.7
Fmnf	5138.7	8802.8	46392.8	1866.4	1847.1	14440.8	4.2	116.3	178.0	2723.6
Omnf	2043.1	3499.9	18445.3	742.1	734.4	5741.5	1.7	46.2	70.8	1082.9
Ttmnf*	30956.2	53028.9	279474.7	11243.5	11127.3	86992.6	25.5	700.7	1072.4	16407.3

Continuation of Table 10

	21	22	23	24	25	26	27	
	Hfss	Educ	Cuar	Scss	Fnci	Mgdp	Pbor	Shares to tmnf
Elec	225.8	685.2	46.6	53.2	337.7	504.1	174.5	0.0650
Petr	6.9	21.1	1.4	1.6	10.4	15.5	5.4	0.0020
Bmet	188.3	571.3	38.9	44.3	281.6	420.3	145.5	0.0542
Cmet	1692.7	5136.5	349.7	398.5	2532.0	3779.2	1308.0	0.4873
Chem	38.2	115.9	7.9	9.0	57.2	85.3	29.5	0.0110
Mach	31.3	94.9	6.5	7.4	46.8	69.8	24.2	0.0090
Wdpp	1.7	5.3	0.4	0.4	2.6	3.9	1.3	0.0005
Ctmt	41.7	126.5	8.6	9.8	62.4	93.1	32.2	0.0120
Lmnf	441.1	1338.7	91.1	103.8	659.9	984.9	340.9	0.1270
Fmnf	576.6	1749.8	119.1	135.7	862.5	1287.4	445.6	0.1660
Omnf	229.3	695.7	47.4	54.0	342.9	511.9	177.2	0.0660
Ttmnf*	3473.6	10540.9	717.6	817.7	5196.0	7755.4	2684.3	

/1 Numbers are in thousands somoni

*Tmnf-total manufacturing

Indirect taxes include value added taxes (VAT), excises, import tariffs, export tariffs and state duties. By definition indirect taxes are those taxpayers do not pay directly, since someone else passes these on to them. Direct taxes include property tax, land tax, transport tax, income tax, profit tax and other taxes. All taxes and subsidies originally come from the 2001 State Budget of the Republic of Tajikistan (MFRT 2002). However, in the 2001 State Budget, taxes and subsidies are not classified by commodities, which is not suitable for compiling a 2001 IOT of Tajikistan.

Fortunately, the SSCT classifies all types of taxes and subsidies by activities and records them in an unpublished Table “Taxes and subsidies in 2001”. This Table is filled in by the SSCT from enterprises reports called “A Report on Main Indicators of Financial Activities of Enterprises (Organizations)”. These reports are usually not perfect, and share some errors and inconsistencies, so the use of this Table does not guarantee a consistent data set. However, in the absence of more accurate data, the Table can serve as a good approximation and has been used to compile a 2001 IOT of Tajikistan.

In the SSCT classification, the manufacturing sector is again shown only in one row as a total which is not suitable for a 2001 IOT that has 11 manufacturing sectors. For this reason, the same methodology used in expanding an intermediate consumption matrix mentioned earlier has been applied to calculate the tax payments and subsidies of these 11 manufacturing sectors.

Value added at factor cost involves wages and salaries and gross profits and gross mixed income. Table 2.22 of SSCT (2003a) is used to obtain wages and salaries, gross profits and gross mixed income for all sectors of a 2001 IOT except for the 11 manufacturing sectors mentioned earlier. These 11 manufacturing sectors were shown only in Table 2.22 in one row under “total manufacturing”. Hence, as for intermediate consumption mentioned earlier, wages and salaries, gross profits and gross mixed income for these 11 manufacturing sectors have been calculated using the same approach. The value added of minus 3699.2 of financial intermediation measured indirectly has been added to finance, credit and insurance.

Table 11. A 1995 coefficient matrix of final consumption and investment

	Housholds consumption	Government consumption	Gross capital formation	Changes in stock
Elec	0.00418	0.05890	0.00000	0.00000
Petr	0.01056	0.01782	0.00000	0.03012
Bmet	0.00055	0.00066	0.00000	0.00000
Cmet	0.00009	0.00100	0.00000	0.00000
Chem	0.02094	0.01759	0.00000	0.00552
Mach	0.06291	0.00098	0.32433	0.03085
Wdpp	0.01848	0.00234	0.01137	0.01040
Ctmt	0.01182	0.00200	0.00000	0.01343
Lmnf	0.15782	0.01535	0.04061	0.04499
Fmnf	0.18556	0.04249	0.04847	0.06185
Omnf	0.01893	0.00314	0.01431	0.01386
Cons	0.00000	0.00000	0.27931	0.21717
Agfr	0.23124	0.38696	0.28117	0.57132
Tran	0.00104	0.00676	0.00000	0.00000
Comm	0.01021	0.04159	0.00000	0.00000
Tsts	0.00383	0.00739	0.00000	0.00000
Itsr	0.00006	0.00050	0.00000	0.00000
Ospr	0.00012	0.00112	0.00043	0.00049
Mnng	0.00000	0.00000	0.00000	0.00000
Rscs	0.05082	0.05239	0.00000	0.00000
Hfss	0.02738	0.05232	0.00000	0.00000
Educ	0.05081	0.13654	0.00000	0.00000
Cuar	0.00865	0.01553	0.00000	0.00000
Scss	0.00023	0.00000	0.00000	0.00000
Fnci	0.10247	0.08659	0.00000	0.00000
Mgdp	0.02045	0.03152	0.00000	0.00000
Pbor	0.00084	0.01851	0.00000	0.00000
Total*	1918449.4	241338.0	233450.6	186365.6

*- Total values are for 2001 in thousands somoni

While private consumption data usually come from household surveys, it is only possible to get household surveys on income and expenditure for Tajikistan in a different way. The survey on income and expenditure that the SSCT reports has only 5 disaggregated components of expenditure (expenditure for food, nonfood, alcohol, personal services and tax payments). Household surveys with such a classification were not applicable to a 2001 IOT of Tajikistan. Therefore, private consumption has been calculated using share

coefficients of the unpublished 1995 IOT of Tajikistan (Table 11) subject to 2001 total private consumption.

It was also not possible to get data on government consumption. Hence, government consumption has been calculated applying share coefficients of the unpublished 1995 IOT of Tajikistan (Table 11) subject to 2001 total government consumption.

Data on gross capital formation and changes in stock that the SSCT publishes are not disaggregated by sectors of production. Thus, gross capital formation and changes in stock have been found using share coefficients of the unpublished 1995 IOT of Tajikistan (Table 11) subject to 2001 total gross capital formation and changes in stock, respectively.

The SSCT publishes exports by groups of products. However, it does not classify them by industries that appear in a 2001 IOT. As a result, it is difficult to match exports of products with exports of the industries in a 2001 IOT. For example, in the Table “Exports of the Republic of Tajikistan by groups of goods” of SSCT (2002), exports of mineral products have been given, but this does not perfectly represent exports of mineral products. Electro energy and other products that have nothing to do with mineral products fall into this category. Therefore, as much as possible, exports of products have been matched with exports of industries. Mapping and calculating exports of goods and services are shown in Table 12. For calculating exports of goods Tables “Exports of the Republic of Tajikistan by groups of goods” and “Exports of main kinds of manufacturing, raw materials and consumable products from the Republic of Tajikistan” in SSCT (2002) have been used. Exports of services have been found from the Table “Exports of international services by groups” of SSCT (2002).

For most goods and services, sectoral mapping and calculating exports are relatively easily understood. For those that create confusion explanations will be provided. Since mineral products include electricity, 78.5 exports of electricity have been subtracted from total exports of mineral products that are 80.9 shown in the first and fifth rows of Table

12, respectively. For the exports of black metallurgy, 397.3 exports of aluminum has been separated from total export of 399.9 nonreal metals and transferred to exports of color metallurgy, as aluminum falls into the sector of color metallurgy (Table 12). The difference between mineral products and electricity has been added to exports of chemical products as it is believed the remainder belongs to chemical products.

As for exports the SSCT publishes imports by groups of products and does not classify them by industries that appear in a 2001 IOT. Again it is difficult to match imports of products with imports of industries that are in a 2001 IOT. For example, in the Table “Imports of the Republic of Tajikistan by groups of goods” in SSCT (2002), imports of mineral products have been given, but this does not perfectly represent imports of mineral products. Electro energy, petrol, natural gas, cocks and other products that have nothing to do with mineral products all fall into this category. Therefore, such confusion has been taken into account in mapping and calculating imports of products by sectors. Mapping and calculating imports of goods and services are shown in Table 13. For calculating imports of goods Tables “Imports of the Republic of Tajikistan by groups of goods” and “Imports of main kinds of manufacturing, raw materials and consumable products into the Republic of Tajikistan” in SSCT (2002) have been used. Imports of services have been found from Table “Imports of international services by groups” of SSCT (2002).

For most goods and services sectoral mapping and calculating imports are clear, but for others they are not. Hence, explanations will be provided for those which create confusion. Since mineral products include electricity, natural gas, petroleum and cocks, 98.3 imports of electricity, and 117.0 imports of natural gas, petroleum and cocks have been subtracted from total imports of mineral products that are 258.6 shown in the first, second and fifth row of Table 13, respectively. For the imports of chemical products, 184.0 imports of alumina has been separated from total imports of 234.0 chemical products and transferred to imports of color metallurgy, as alumina falls into the sector of color metallurgy (Table 13). The difference between mineral products, electricity, petrol, natural gas and cocks has been added to the imports of chemical products as it is assumed the remainder belongs to chemical products.

Table 12. Mapping and calculating exports of goods and services of Tajikistan in 2001 *

Sectors	Mapping exports of goods and services #	mln USD	thousands somon
Elec	Electricity /2	78.50	186241.25
Petr	Services for transportation of natural gas (6.6) /3	6.60	15658.50
Bmet	2.6 (nonreal metals of 399.9 /1 minus aluminum of 397.3 /2)	2.60	6168.50
Cmet	Aluminum (397.3) /2, precious metals (22.6)/1	419.90	996212.75
Chem	Chemical products (5.4) /1, plus 2.4 (difference between mineral products of 80.9 /1 and electricity of 78.5 /2)	7.80	18505.50
Mach	Machines, technical innovations, spare parts (2.5) /1	2.50	5931.25
Wdpp	Paper products (0.2) /1	0.20	474.50
Ctmt		0.00	0.00
Lmnf	Plastic products (0.1), leather products (0.4), textile products (104.3), shoes and hat products (0.1), optical, musical products, watches (0.0) /1	104.90	248875.25
Fmnf	Products of food manufacturing, alcohol and nonalcohol drinks, cigarettes (8.8), vegetable oil and animal oil (0.0) /1	8.80	20878.00
Omnf	Other manufacturing products (0.2) /1, other nonclassified goods (0.2)	0.40	949.00
Cons		0.00	0.00
Agfr	Live animals and products of husbandary (0.1), vegetable products (18.1) /1	18.20	43179.50
Tran	Exports of transports (7.7)/1, freight delivering services (2.16), expenditures of transports companies (0.251), passengers transportation (10.4), leasing vehicles with crew (4.141), leasing vehicles without crew (2.163), transports commissions and payment services (0.322), airways services (0.431), railways services (35.5) /3	63.07	149633.58
Comm	Services of TV programs (2.8), post offices (0.068), telephones (0.237)/3	3.11	7378.48
Tsts		0.00	0.00
Its		0.00	0.00
Ospr	Hotel services (0.826), tourism services (0.03) /3	0.86	2040.35
Mnng		0.00	0.00
Rscs		0.00	0.00
Hfss		0.00	0.00
Educ	Educational services/3	0.28	664.30
Cuar		0.00	0.00
Scss		0.00	0.00
Fnci		0.00	0.00
Mgdp		0.00	0.00
Pbor		0.00	0.00
Total	Total exports of goods and services	717.72	1702790.71
	of which: exports of goods	651.5	
	Exports of services	66.2	

*Data are from SSCT(2002) "Annual 2002 Statistics of the Republic of Tajikistan"

#Numbers in parenthesis are in mln USD

/1 Table "Exports of the Republic of Tajikistan by groups of goods" in SSCT(2002) at page 270

/2 Table "Exports of main kinds of manufacturing, raw materials and consumable products from the Republic of Tajikistan" in SSCT(2002) at page 273

/3 Table "Exports of international services by groups" in SSCT(2002) at page 292

Table 13. Mapping and calculating imports of goods and services of Tajikistan in 2001 *

Sectors	Mapping imports of goods and services #	mln USD	thousands somoni
Elec	Electricity /2	98.30	233216.75
Petr	Natural gas (26.7), petroleum (78.3), coals (12) /2	117.00	277582.50
Bmet	Nonferrous metals (12.7)/1	12.70	30130.75
Cmet	Alumina/2	184.00	436540.00
Chem	Chemical products (234) minus alumina (184) plus 41.5 (difference between 258.6 of mineral products and 98.3 of electricity and 117 of petrol, natural gas and coals)/1	91.70	217558.25
Mach	Machines, technical innovations, spare parts/1	37.00	87782.50
Wdpp	Wood products (7.9), paper products (9.1) /1	17.00	40332.50
Ctmt	Stones and cement products/1	6.50	15421.25
Lmnf	Plastic products (9.6), leather products (0.1), textile products (9.7), shoes and hat products (2.8), optical and musical products, watches (3.2) /1	25.40	60261.50
Fmnf	Products of food manufacturing, alcohol and nonalcohol drinks, and cigarettes (10.6), vegetable oil and animal oil (7.4) /1	18.00	42705.00
Omnf	Other manufacturing products (4.7), other nonclassified goods (1.5)/1	6.20	14709.50
Cons	Expenditures of consumer groups (0.17), construction services (2.7)/3	2.87	6809.08
Agfr	Live animals and products of husbandry (0.9), vegetable products (40) /1	40.90	97035.25
Tran	Imports of transports (32.8)/1, airway services (1), expenditures of transport companies (0.35), transports leasing with crew (0.88), leasing transports without crew (0.77), transports commission and payments for transport services (36.4), purchases of petrol for transports (3.83), expenditures for storage and delivering freights and ports services (5), railway services (0.0034), tourism services (0.09) /3	81.12	192457.20
Comm	Post offices services (0.053), telephones services (0.251), consultancy services (0.049)/3	0.35	830.38
Tsts		0.00	0.00
Itsr		0.00	0.00
Ospr	Other services (0.049)/3, residuals (0.1) from balancing result	0.15	355.88
Mnng		0.00	0.00
Rscs		0.00	0.00
Hfss		0.00	0.00
Educ		0.00	0.00
Cuar		0.00	0.00
Scss		0.00	0.00
Fnci		0.00	0.00
Mgdp		0.00	0.00
Pbor		0.00	0.00
Total	Total imports of goods and services	739.19	1753728.29
	of which: imports of goods	687.5	
	Imports of services	51.7	

*Data are from SSCT(2002) "Annual 2002 Statistics of the Republic of Tajikistan"

#Numbers in parenthesis are in mln USD

/1 Table "Imports of the Republic of Tajikistan by groups of goods" in SSCT (2002) at page 271

/2 Table "Imports of main kinds of manufacturing, raw materials and consumable products into the Republic of Tajikistan" in SSCT (2002) at page 277

/3 Table "Imports of international services by groups" in SSCT (2002) at page 294

5.3 Balancing a 2001 input output table of Tajikistan using Kuroda's Method

Since data in input output tables come from different sources of statistics they are not free of inconsistencies. Such inconsistencies have been discovered during compiling a 2001 IOT of Tajikistan. In addition constructing a 2001 IOT of Tajikistan mainly uses share coefficients of a 1995 IOT and that certainly gives rise to inconsistencies. These share coefficients represent technological structures of sectors of the economy and they vary from time to time, especially as Tajikistan switched from a planned-based to a market-based economy in 1991. Also compared to a 1995 IOT, 11 sectors have been created and included in a 2001 IOT as a result of disaggregating the manufacturing sector. All these might have contributed to inconsistency in a 2001 IOT. Therefore, Kuroda's Method¹⁵ has been applied to balance a raw 2001 IOT.

Kuroda is a method used to produce consistent and balanced input output tables or any other kinds of matrices. "It [Kuroda] belongs to the class of algorithms discussed by Bacharach (1970) and has been used extensively by Kuroda (1988) and Wilcoxon (1988)" (Wilcoxon 1989:1). A brief explanation of Kuroda's Method is provided here from Wilcoxon (1989). For a detailed explanation readers are referred to Wilcoxon (1988, 1989). Notations of Wilcoxon (1989) have been used for convenience.

Let X^0 be a raw matrix with $n \times m$ dimension, r_{ij} and c_{ij} be the shares of each element to the total raw matrix respectively, where

$$r_{ij} = \frac{X_{ij}^0}{\sum_{j=1}^m X_{ij}^0} \text{ and } c_{ij} = \frac{X_{ij}^0}{\sum_{i=1}^n X_{ij}^0}$$

Then optimization problem is given by the following function that captures the measure of distance between a desired matrix and a raw matrix:

¹⁵ There are other methods for balancing an IOT and SAM, such as the RAS and Cross Entropy methods. For discussion of these methods see Fotana, Lemelin and Cockburn (2002), Robinson, Cattaneo and El-Said (2000, 1998) and Robinson and El-Said (2000, 1997). For other approaches see Lahr and Mesnard (2003) and Penate and Penate (2003).

$$Q = \frac{1}{2} \sum_{i=1}^n \sum_{j=1}^m \left[\frac{X_{ij}}{R_i} - r_{ij} \right]^2 w_{ij} + \frac{1}{2} \sum_{i=1}^n \sum_{j=1}^m \left[\frac{X_{ij}}{C_j} - c_{ij} \right]^2 v_{ij}, \text{ where } w_{ij} = \frac{1}{r_{ij}^2} \text{ and } v_{ij} = \frac{1}{c_{ij}^2} \text{ are}$$

sets of weights. Optimization can now be solved by minimizing this distance subject to the following constraints:

$$R_i = \sum_{j=1}^m X_{ij} \text{ and } C_j = \sum_{i=1}^n X_{ij}$$

The solution of this optimization problem gives a desired balanced matrix that is consistent with the targeted rows and columns.

Kuroda's Method requires a target (desired) row and target column to be specified. First a target column for 27 production sectors has been determined by summing up intermediate consumption at purchasers' prices, direct taxes, value added at factor cost and imports that gives a total use at market prices, which is shown in the last row of Table 14. Then a target row for 27 production sectors has been found by symmetry from the already determined target column for 27 production sectors. For all other accounts a target row and a target column are their total corresponding values as explained earlier. The final result of a target row and a target column is shown in Table 14. A consistent and balanced 2001 IOT of Tajikistan has been achieved by applying Kuroda's Method (Table 14). This can now be used to compile a 2001 micro SAM.

Table 14. A 2001 Input Output Table of Tajikistan (thousands somoni) (continued)

Sectors	Elec	Petr	Bmet	Cmet	Chem	Mach	Wdpp	Ctmt	Lmnf	Fmnf	Omnf
Elec	2464.2	34.6	3111.8	88358.9	400.1	212.2	12.0	231.8	7861.6	8404.2	2031.5
Petr	90.9	1.3	114.4	192060.8	14.7	7.8	0.5	8.6	293.6	319.4	74.7
Bmet	2459.5	33.2	3134.8	64846.8	386.8	204.5	11.6	223.5	8503.1	9198.1	2013.8
Cmet	16041.7	227.8	20917.6	224571.1	2630.4	1396.5	79.2	1520.3	48905.5	46639.4	13469.7
Chem	0.0	7.0	642.4	11364.6	80.9	42.8	2.4	46.9	1706.7	1860.1	416.3
Mach	193.8	2.7	243.4	3161.3	31.5	16.7	1.0	18.3	619.9	673.0	159.4
Wdpp	18.7	0.3	23.4	312.6	3.1	1.6	0.1	1.8	60.1	65.4	15.4
Ctmt	424.5	5.9	533.1	6725.9	69.0	36.6	2.1	40.0	1351.6	1464.6	349.3
Lmnf	2325.9	33.0	2931.4	31645.1	381.1	202.3	11.5	221.0	7235.9	7688.2	1921.9
Fmnf	0.0	0.0	0.0	0.0	795.8	0.0	0.0	0.0	14338.5	14868.7	3984.1
Omnf	8446.5	116.8	10277.6	34115.5	383.9	714.9	40.6	779.5	7372.3	7865.9	1939.2
Cons	2026.0	113.9	15914.3	679.5	436.9	1361.2	142.4	8981.1	799.9	442.0	229.3
Agfr	11495.3	784.5	3341.2	1446.3	5975.5	4143.9	37.1	1189.3	26135.9	34939.8	35852.1
Tran	2523.6	696.1	822.5	395.1	912.3	918.7	7.6	364.3	764.9	81.9	443.5
Comm	9562.1	21.5	0.0	200.1	31.8	159.7	4.8	24.8	302.3	93.9	281.8
Tsts	14323.8	83.8	198.6	32.5	172.8	909.5	62.1	605.4	39857.9	85995.1	13681.0
Its	1.4	0.0	0.0	7.3	0.1	0.8	0.0	0.5	0.0	2.1	0.0
Ospr	331.6	3.0	14.3	345.6	24.7	37.7	7.9	8.5	141.3	60.7	92.9
Mnng	147.8	4.6	694.4	393.8	17.3	63.0	4.3	291.1	34.9	60.1	62.5
Rscs	10007.1	275.0	4972.5	151.1	274.7	582.8	20.1	1200.6	1178.0	3880.6	2713.2
Hfss	525.8	8.2	52.5	76.4	83.0	64.2	6.1	76.8	559.5	2183.3	776.5
Educ	2503.6	10.8	74.4	226.5	234.8	137.1	10.2	221.5	1029.2	5396.6	1751.3
Cuar	373.4	10.7	11.9	34.8	34.8	20.3	1.5	32.7	153.5	819.3	259.7
Scss	26.7	0.7	38.7	7.0	5.2	8.3	0.4	3.8	5.1	4.0	11.4
Fnci	767.8	29.4	62.0	28.3	11.2	113.6	19.0	60.7	751.0	1407.4	826.5
Mgdp	1473.4	84.6	148.5	47.9	256.9	267.4	75.2	102.7	1435.2	3126.3	1808.3
Pbor	257.5	10.3	33.6	6.5	23.1	40.0	5.7	42.6	214.3	555.8	229.3
Equals TIC	88812.5	2599.9	68309.1	661241.4	13672.4	11664.4	565.2	16297.8	171611.9	238096.1	85394.6
Plus IndTx	6745.5	207.2	5690.9	50137.8	1144.0	936.0	52.0	1244.1	13078.1	16467.7	6915.8
Less subsidies	-26.5	-0.8	-22.1	-199.1	-4.5	-3.7	-0.2	-4.9	-51.9	-67.8	-27.0
Equals CP	95531.5	2806.3	73977.9	711180.1	14812.0	12596.7	617.0	17537.0	184638.1	254495.9	92283.4
DirTx	3194.5	98.3	2678.2	23964.7	540.9	442.5	24.6	589.1	6223.2	7997.8	3258.5
VA =WS+PI	33217.5	1048.5	28832.9	212149.6	5747.2	4705.6	262.3	6206.1	62144.4	70354.8	34773.7
WS	8497.3	264.2	7201.2	59846.3	1451.1	1187.6	66.1	1576.5	16317.7	20218.4	8734.4
PI	24720.2	784.3	21631.7	152303.3	4296.0	3518.0	196.2	4629.5	45826.7	50136.4	26039.3
Imports	229903.9	277586.4	31899.8	453578.8	218226.7	87848.0	40418.1	14836.2	58580.2	38359.0	15000.3
Total use=CP+ DirTx+VA +Imports	361847.4	281539.5	137388.8	1400873.1	239326.7	105592.8	41322.0	39168.4	311585.8	371207.5	145316.0

TIC-total intermediate consumption, IndTx-indirect taxes

DirTx-direct taxes, CP-Consumption at purchasers' prices

VA-value added at purchasers' prices, WS-wages and salaries

PI-gross profits and gross mixed income, GSF-gross capital formation

CHS-changes in stock

*Total supply=TIC+Hsld+Govt+GCF+CHS+Exports

Table 14. A 2001 Input Output Table of Tajikistan (thousands somoni) (continued)

Sectors	Cons	Agfr	Tran	Comm	Tsts	Its	Ospr	Ggsv	Rscs	Hfss	Educ	Cuar
Elec	3289.8	18666.4	736.2	728.6	5716.4	1.7	45.9	70.4	1079.7	228.1	691.9	47.0
Petr	128.0	686.6	27.1	26.9	210.9	0.1	1.7	2.5	39.6	8.3	25.4	1.7
Bmet	3342.4	23014.3	715.5	707.9	5983.8	1.6	44.2	67.7	1054.8	220.0	671.8	45.3
Cmet	14685.1	132798.1	4831.6	4777.9	37969.8	11.1	303.6	471.6	7282.5	1523.5	4599.9	312.7
Chem	712.6	4313.3	149.4	147.8	1208.1	0.4	9.2	14.2	219.0	46.0	140.0	9.5
Mach	271.5	1426.9	57.9	57.3	447.0	0.1	3.6	5.6	84.6	17.9	54.3	3.7
Wdpp	26.3	138.8	5.6	5.6	43.2	0.0	0.4	0.5	8.1	1.7	5.3	0.4
Ctmt	591.4	3096.3	127.0	125.7	977.0	0.3	7.9	12.2	185.4	39.3	119.1	8.1
Lmnf	3067.8	16471.7	700.2	692.9	5322.8	1.6	43.8	67.2	1026.1	217.5	658.3	44.9
Fmnf	5941.5	31436.3	1459.1	1443.8	10815.1	3.3	91.8	141.1	2144.3	455.9	1375.2	94.1
Omnf	3131.7	16949.5	705.6	698.2	5396.3	1.6	44.1	67.7	1033.6	219.0	663.1	45.2
Cons	3483.9	61.1	2900.4	479.0	5290.9	3.7	107.0	206.4	1352.2	92.0	576.0	0.0
Agfr	1951.0	100921.2	5782.4	2208.1	13939.4	11.7	940.4	377.3	11068.1	798.9	522.3	0.0
Tran	23658.3	471.8	1990.2	171.8	6389.6	15.3	951.9	217.2	3352.2	95.8	620.1	0.0
Comm	5400.1	0.0	888.3	369.3	878.1	3.4	140.5	0.0	1252.7	42.7	0.0	0.0
Tsts	108203.1	6470.0	15071.6	14618.6	52079.0	28.2	546.8	0.0	4507.2	0.0	0.0	0.0
Its	0.0	0.8	12.9	2.3	26.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ospr	119.3	10.5	1306.3	478.6	7631.6	4.9	107.2	0.0	0.0	0.0	0.0	0.0
Mnng	0.0	6.0	9.0	10.1	26.4	0.0	9.7	0.0	0.0	0.0	0.0	0.0
Rscs	9341.2	135.7	2756.6	11.5	3337.2	5.3	325.3	0.0	30573.4	378.3	0.0	0.0
Hfss	2484.7	172.3	668.5	99.3	3683.9	1.3	73.7	0.0	1925.0	2908.1	5954.6	815.7
Educ	290.6	910.6	315.1	6.2	573.9	2.2	204.9	0.0	8382.1	418.3	21240.3	3522.4
Cuar	187.4	171.1	41.7	2.4	208.5	0.5	30.0	0.0	0.0	122.4	997.4	981.8
Scss	2732.1	1.4	645.7	6.3	542.4	1.0	2.3	0.0	0.0	54.7	0.0	0.0
Fnci	543.0	613.6	1568.1	293.8	3188.5	3.7	138.7	0.0	6432.4	815.7	0.0	0.0
Mgdp	0.0	313.3	8316.4	827.0	1138.6	22.6	198.5	0.0	2995.4	5721.9	0.0	0.0
Pbor	0.0	88.9	66.6	69.4	356.0	0.8	50.9	0.0	0.0	0.0	0.0	0.0
Equals TIC	193582.9	359346.5	51855.0	29066.2	173380.4	126.4	4424.0	1721.7	85998.5	14426.0	38915.1	5932.6
Plus												
IndTx	3692.4	52258.7	60896.8	1869.1	11004.1	0.0	1572.3	425.4	1983.3	0.0	0.0	0.0
Less												
subsidies	0.0	-248.2	-2208.1	-267.6	-80.0	0.0	-22.2	-446.1	-1609.1	0.0	0.0	-132.3
Equals CP	197275.3	411357.0	110543.8	30667.7	184304.5	126.4	5974.1	1701.0	86372.6	14426.0	38915.1	5800.3
DirTx	2031.4	11503.7	7375.7	1310.9	1378.0	0.0	1597.8	180.2	761.2	0.0	0.0	0.0
VA												
=WS+PI	10921.8	757085.9	72937.2	13020.8	463220.2	46.0	6158.1	1493.0	138266.2	36321.4	115948.2	10074.5
WS	15526.0	217519.8	34570.0	7392.6	69540.8	92.7	1877.5	850.9	16054.1	10536.2	61098.8	4570.0
PI	-4604.3	539566.1	38367.2	5628.3	393679.4	-46.7	4280.6	642.1	122212.0	25785.2	54849.4	5504.5
Imports	0.0	6881.2	96250.4	183164.9	831.1	0.0	0.0	361.2	0.0	0.0	0.0	0.0
Total use=CP+DirTx+VA+Imports	210228.4	1186827.7	287107.1	228164.4	649733.8	172.4	13730.0	3735.5	225400.0	50747.4	154863.3	15874.8

Table 14. A 2001 Input Output Table of Tajikistan (thousands somoni)

Sectors	Scss	Fnci	Mgdp	Pbor	TIC	Hsld	Govt	GCF	CHS	Exports	Total supply*
Elec	53.8	341.4	511.2	175.2	145506.7	8365.0	15208.2	0.0	0.0	192767.6	361847.4
Petr	1.9	12.5	18.7	6.5	194185.4	44203.5	6075.3	0.0	8177.9	28897.4	281539.5
Bmet	51.6	329.8	494.9	168.8	127930.1	1259.1	186.8	0.0	0.0	8012.8	137388.8
Cmet	359.9	2288.3	3481.2	1130.7	593227.1	158.7	214.3	0.0	0.0	807273.1	1400873.1
Chem	10.8	68.9	103.0	35.4	23357.7	164033.6	6387.0	0.0	1307.5	44241.0	239326.7
Mach	4.2	26.8	40.0	13.9	7636.4	54648.6	135.3	36625.6	3238.3	3308.7	105592.8
Wdpp	0.4	2.6	3.9	1.3	746.5	34991.0	561.4	2633.8	1918.8	470.6	41322.0
Ctmt	9.2	58.8	87.8	30.3	16478.7	19903.4	455.0	0.0	2331.3	0.0	39168.4
Lmnf	51.3	325.5	487.1	167.0	83943.0	159974.4	1825.5	4664.6	4098.5	57079.9	311585.8
Fmnf	107.6	682.0	1022.6	348.1	91548.8	238729.8	8050.0	8836.0	8885.1	15157.8	371207.5
Omnf	51.6	327.6	490.2	168.3	102045.9	35996.2	722.1	3190.7	2458.7	902.3	145316.0
Cons	0.0	310.5	256.9	0.0	46246.6	0.0	0.0	107827.0	56154.9	0.0	210228.4
Agfr	0.0	10580.7	17027.3	0.0	291469.7	623422.8	104710.4	69545.0	97679.7	0.0	1186827.7
Tran	690.0	449.8	1804.8	457.6	49266.7	2780.1	2211.7	0.0	0.0	232848.6	287107.1
Comm	288.4	185.0	478.5	134.0	20743.7	22849.0	11208.6	0.0	0.0	173363.2	228164.4
Tsts	0.0	609.1	9550.3	854.6	368460.9	135530.8	9448.7	0.0	0.0	136293.3	649733.8
Its	0.0	0.0	0.0	0.0	54.4	56.2	61.8	0.0	0.0	0.0	172.4
Ospr	0.0	97.3	195.3	1770.6	12789.6	320.7	377.0	128.0	114.7	0.0	13730.0
Mnng	0.0	18.7	0.0	0.0	1853.7	0.0	0.0	0.0	0.0	1881.8	3735.5
Rscs	299.7	170.8	496.8	139.2	73226.7	137699.5	14473.9	0.0	0.0	0.0	225400.0
Hfss	150.3	237.1	0.0	24.4	23611.4	20585.8	6550.2	0.0	0.0	0.0	50747.4
Educ	0.0	367.1	0.0	39.5	47869.2	78299.7	28694.4	0.0	0.0	0.0	154863.3
Cuar	0.0	0.0	0.0	0.0	4496.0	8529.9	2403.4	0.0	0.0	445.4	15874.8
Scss	0.0	0.0	0.0	0.0	4097.1	1288.5	0.0	0.0	0.0	0.0	5385.6
Fnci	41.5	883.6	7730.9	12.8	26343.2	24446.7	3173.8	0.0	0.0	0.0	53963.7
Mgdp	328.7	351.1	270.8	0.0	29310.7	98281.2	11056.3	0.0	0.0	0.0	138648.3
Pbor	0.0	22.2	0.0	0.0	2073.7	2095.5	7147.0	0.0	0.0	0.0	11316.2
Equals TIC	2501.1	18747.3	44552.1	5678.2							2388519.4
Plus IndTx	75.7	28.5	0.0	0.0							236425.4
Less subsidies	0.0	0.0	-642.2	-56.3							-6120.6
Equals CP	2576.8	18775.8	43909.9	5621.9							2618824.2
DirTx	71.1	104.3	0.0	0.0							75326.5
VA =WS+PI	2737.7	35083.6	94738.4	5694.3							2223189.8
WS	1219.0	14211.4	19432.8	236.2							600089.8
PI	1518.7	20872.2	75305.6	5458.1							1623100.0
Imports	0.0	0.0	0.0	0.0							1753726.1
Total use=CP+ DirTx+VA +Imports	5385.6	53963.7	138648.3	11316.2	2388519.4	1918449.4	241338.0	233450.6	186365.6	1702943.6	6671066.6

6. An empirical 2001 micro SAM of Tajikistan

The 2001 micro SAM of Tajikistan has been constructed by disaggregating the 2001 macro SAM and using the 2001 IOT. For instance, a cell of intermediate consumption “commodities-activities” has been converted from 1×1 dimension in the 2001 macro SAM into 27×27 dimension in the 2001 micro SAM. As a result of such disaggregating a 21×21 macro SAM has been converted into a 74×74 micro SAM of Tajikistan. A sectoral classification of the 2001 micro SAM is given in Table 8. The documentation of a 2001 micro SAM of Tajikistan (Table 15 in the Appendix) is provided below.

Intermediate consumption in the 2001 micro SAM of Tajikistan is a matrix with a 27×27 dimension. This matrix is a core part of the 2001 micro SAM. The matrix comes from the 2001 IOT of Tajikistan. The result is shown in the 2001 micro SAM of Tajikistan, which covers rows 28-54 and columns 1-27.

Value added at factor cost has been disaggregated into labour and capital and has a 2×27 dimension, covering rows 55-56 and columns 1-27. This comes from the 2001 IOT of Tajikistan. In the 2001 IOT the labour factor is shown as wages and salaries and the capital factor as gross profit and gross mixed income. In addition, Table 2.22 of SSCT (2003a) is used to distribute other factors across labor and capital factors for all sectors of the 2001 SAM¹⁶. For such a distribution shares of 27 percent and 73 percent have been applied to labour and capital, respectively. These are the ratios of labour and capital to total value added as mentioned earlier.

Sales for each sector are a total column of activities for that sector found by symmetry. The result is a diagonal matrix of 27×27 dimension in a micro SAM of Tajikistan.

Indirect taxes have been split into VAT, excises, import and export tariffs, and state duties. The explanation of indirect taxes is given below.

¹⁶ Nielson (2002) used a similar approach.

Total VAT (“VAT-commodities”) that is 103385.2 was taken from MFRT (2002) and distribution of this number among different kinds of industries was taken from an unpublished table “Taxes and subsidies in 2001” of the SSCT. This is a tax paid by the commodities account and received by the VAT account.

Excises (“excises-commodities”) are 15675.6, and comes from MFRT (2002) and their classifications by commodities from an unpublished Table “Taxes and subsidies in 2001” of the SSCT.

Import tariffs (“import tariffs-commodities”) are equal to 46012.4. The source is MFRT (2002) and an unpublished table “Taxes and subsidies in 2001” of the SSCT for their classifications by industries. Import tariffs for each sector of production have been adjusted in accordance with total values of indirect taxes reported in SSCT (2003a) for each sector. For example, imports tariffs were 9.9 for IT services in the table of “Taxes and subsidies in 2001” of the SSCT, but in SSCT (2003a) total indirect taxes for IT services are shown as zero. Thus a zero value has been allocated here for imports tariffs of IT services.

Export tariffs (“export tariffs-commodities”) are 67849.2. The source is MFRT (2002) and an unpublished table “Taxes and subsidies in 2001” of the SSCT for their classifications by industries. In the MFRT (2002), this number is shown as sales taxes on aluminum, cotton and retail trade. To the best of the author’s knowledge these are export tax receipts in Tajikistan.

State duties (“state duties-commodities”) are 3503.0, and comes from MFRT (2002) and an unpublished table “Taxes and subsidies in 2001” of the SSCT for their classifications by industries. State duties for each sector of production have also been adjusted in accordance with total values of indirect taxes reported in SSCT (2003a) for each sector.

Once all kinds of indirect taxes have been distributed to production sectors a raw indirect taxes matrix with a 5×27 dimension has been achieved. This matrix has then been

balanced using Kuroda's Method. In applying Kuroda's Method it is always necessary to determine a target row and a target column. For a target row of indirect taxes the total values of the 5 kinds of indirect taxes explained earlier have been used. For a target column of this matrix total indirect taxes of 27 production sectors published in Table 2.28 of SSCT (2003a) have been used. The result of Kuroda's Method for an indirect taxes matrix is shown in Table 16.

Subsidies ("subsidies" commodities") are equal to negative 6120.6. The distribution of this number to production sectors comes from the 2001 IOT of Tajikistan.

A direct taxes account has been split into property tax, land tax, transport tax, income tax, profit tax and other taxes. Their explanations appear below.

Property taxes paid by households ("property taxes-households") and property taxes paid by enterprises ("property taxes-enterprises") are equal to 916.7 and 4380.6, respectively. Land tax paid by households ("land tax-households") and land tax paid by enterprises ("land tax-enterprises") are 1366.0 and 8207.6, respectively. Transport tax paid by households ("transport tax-households") and transport tax paid by enterprises ("transport tax-enterprises") are equal to 493.8 and 740.8, respectively. Because the proportion of total transport tax paid by households and enterprises is not shown, a further assumption has been made. Total transport tax of 1234.6 has been split between households and enterprises at 40 percent and 60 percent, respectively. The source of all these taxes is MFRT (2002) and an unpublished table "Taxes and subsidies in 2001" of the SSCT that has classifications by industries.

Income tax ("income tax-households") is 33024.1 from MFRT (2002) and an unpublished table "Taxes and subsidies in 2001" of the SSCT. Income tax is paid mainly by employees, and so has been included in the cell "income tax-households". However, according to the accounting practice of the SSCT this tax is shown as if it is paid by activities. This is because employees work for these activities.

Table 16. The results of Kuroda's Method for indirect taxes (thousands somoni)

	1	2	3	4	5	6	7	8	9	10	11	12	13
	Celec	Cpetr	Cbmet	Ccmet	Cchem	Cmach	Cwdpp	Cctmt	Clmnf	Cfmnf	Comnf	Ccons	Cagfr
VAT	1843.9	57.3	1552.8	14372.2	310.7	254.2	14.1	338.1	3601.5	4562.5	1889.7	3641.3	7052.6
Excs	601.1	18.6	504.7	4629.6	101.5	83.0	4.6	110.4	1174.1	1500.4	614.3	17.6	565.0
Imtf	2851.9	89.5	2410.6	21568.0	482.7	394.9	21.9	524.6	5536.2	6932.2	2929.7	33.5	198.1
Extf	1310.5	41.7	1106.9	8528.9	225.7	184.8	10.3	245.5	2497.3	3127.7	1341.0	0.0	44312.9
Stdtd	138.1	0.0	115.8	1039.1	23.4	19.2	1.1	25.4	269.1	344.8	141.0	0.0	130.1
Total	6745.5	207.2	5690.9	50137.8	1144.0	936.0	52.0	1244.1	13078.1	16467.7	6915.8	3692.4	52258.7

Continuation of Table 16

	16	17	18	19	20	21	22	23	24	25	26	27	28
	Ctsts	Citsr	Cospr	Cmnng	Crscs	Chfss	Ceduc	Ccuar	Cscss	Cfnci	Cmgdp	Cpbor	Total
VAT	3082.7	0.0	1521.5	286.7	1971.5	0.0	0.0	0.0	75.2	28.5	0.0	0.0	103385.2
Excs	1849.8	0.0	35.4	138.7	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15675.6
Imtf	748.1	0.0	15.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	46012.4
Extf	4915.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	67849.2
Stdtd	407.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3503.0
Total	11004.1	0.0	1572.3	425.4	1983.3	0.0	0.0	0.0	75.7	28.5	0.0	0.0	236425.4

Profit tax (“profit tax-enterprises”) is 14483.7, and comes from MFRT (2002) and an unpublished table “Taxes and subsidies in 2001” of the SSCT. Profit tax is paid by enterprises, and so has been included in the cell “profit tax-enterprises”. However, according to the accounting practice of the SSCT this tax is shown as if it is paid by activities. This is because enterprises belong to these activities.

Other taxes (“other taxes-enterprises”) are 11713.2. Again it is difficult to classify these taxes by taxpayers and hence they were distributed to households and enterprises using the former share estimate of 40 percent and 60 percent, respectively.

Private consumption has been taken from the 2001 IOT of Tajikistan. The result is a private consumption matrix with a 27×1 dimension.

Government consumption has been compiled from the 2001 IOT of Tajikistan. The result is a government consumption matrix with a 27×1 dimension.

Investment expenditures were found using the 2001 IOT of Tajikistan. Investment expenditures are a sum of gross capital formation and changes in stock found in the 2001 IOT of Tajikistan. The result is an investment expenditures matrix with a 27×1 dimension.

Exports of goods and services have been taken from the 2001 IOT of Tajikistan. As a result an exports matrix of 27×1 dimension has been achieved.

Imports of goods and services have been compiled from the 2001 IOT of Tajikistan. The result is an imports matrix with a 1×27 dimension.

VAT government revenue (“government-VAT”) is equal to 103385.2. This is a total value of the row “VAT”.

Excises government revenue (“government-excises”) is 15675.6 and is a total value of the row “excises”.

Import tariffs government revenue (“government-import tariffs”) is equal to 46012.4. This is a total value of the row “import tariffs”.

Export tariffs government revenue (“government-export tariffs”) is equal to 67849.2. This is a total value of the row “export tariffs”.

State duties government revenue (“government-state duties”) is 3503.0. This is a total value of the row “state duties”.

Property tax government revenue (“government-property tax”) is equal to 5297.3. This is a total value of the row “property tax”.

Land tax government revenue (“government-land tax”) is equal to 9573.6. This is a total value of the row “land tax”.

Transport tax government revenue (“government-transport tax”) is equal to 1234.6. This is a total value of the row “transport tax”.

Income tax government revenue (“government-income tax”) is equal to 33024.1. This is a total value of the row “income taxes”.

Profit tax government revenue (“government-profit tax”) is 14483.7. This is a total value of the row “profit tax”.

Other taxes government revenue (“government-other taxes”) is equal to 11713.2. This is a total value of the row “other taxes”.

The remaining cells have been transferred directly from the 2001 macro SAM into the 2001 micro SAM and are not repeated here. Like the 2001 IOT of Tajikistan, the compiled 2001 micro SAM of the country has been balanced with Kuroda's Method. As a result, a consistent and balanced 2001 micro SAM of Tajikistan has been achieved (Table 15 in the Appendix).

7. Conclusion

This paper documents a 2001 SAM of Tajikistan. The main purpose of constructing a 2001 SAM of Tajikistan is to develop a model of the country. Given the unavailability of data, a fieldtrip to Tajikistan helped considerably in obtaining the necessary statistics to construct a 2001 SAM. For compiling a 2001 micro SAM, a 2001 IOT has been constructed with 27 sectors of production and services. National accounts, namely intermediate consumption, final consumption, investment expenditures, exports and imports, taxes and subsidies on production and imports, and value added at factor costs were compiled for these 27 sectors. This gave a raw 2001 IOT of Tajikistan. Kuroda's Method was then used to achieve a balanced 2001 IOT of the country.

A 2001 SAM of Tajikistan has been constructed based mainly on the compiled 2001 macro SAM, 2001 IOT and other relevant data. A 2001 SAM of Tajikistan takes most data from a 2001 IOT of the country. In addition, other accounts such as households, enterprises, government and capital accounts have been added. As a result a 2001 SAM of Tajikistan with 74 sectors of economy has been achieved.

An IOT has not previously been constructed for Tajikistan and a SAM for Tajikistan was also missing in the databases of international research institutions. Hence, constructing a 2001 SAM of Tajikistan will become a considerable contribution to the existing literature. Moreover, the different techniques and approaches for creation and calculation of data set used in this paper can be applied to constructing an IOT and SAM for other transition countries, which like Tajikistan have similar problems with lack of statistics.

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Table 1. Tajikistan: Selected Macroeconomic Indicators 1/

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Nominal GDP (mln Somoni)	0.7	7.0	20.2	64.8	308.5	632.0	1025.2	1345.0	1806.7	2512.1	3345.0	4758.0
Real GDP (mln Somoni, 2001=100)*	3139.2	2793.9	2265.9	1982.6	1895.4	1927.6	2029.8	2104.9	2279.6	2512.1	2740.7	3686.2
Real GDP growth (%)	-29.0	-11.0	-18.9	-12.5	-4.4	1.7	5.3	3.7	8.3	10.2	9.1	10.2
GDP deflator index (2001=100)*	0.022	0.251	0.891	3.268	16.276	32.787	50.508	63.899	79.256	100.000	122.049	129.076
Inflation rate (GDP deflator, %, 2001=100)*		1023.6	255.8	266.6	398.0	101.4	54.1	26.5	24.0	26.2	22.0	5.8
Inflation rate (CPI,%)	1363.8	7343.7	1.1	2131.9	40.6	163.6	2.7	30.1	60.6	12.5	14.5	13.8
Broad Money growth (excl. foreign deposits)	678.6	1483.9	115.9	318.5	142.6	117.2	18.8	29.3	48.4	31.5	38.8	
Exchange Rate (Somoni/\$US),EoP 2/	0.00415	0.01247	0.0355	0.288	0.334	0.747	0.977	1.436	2.200	2.510	3.000	2.963
Gross Reserves (in months of imports)		0.003	0.0014	0.0045	0.3	0.6	1.5	1.7	2.1	1.9	1.8	
Budget revenue/GDP (%)	26.6	27.1	44.5	34	12.1	12.1	11.2	12.5	12.1	13.6	18.6	
Budget expenditures/GDP (%)	57.8	52.1	55	45	17.9	15.5	13.9	14.9	12.6	13.5	17.8	
Budget Deficit/Surplus (% of GDP)	-30.5	-23.4	-5.4	-11.9	-5.8	-3.3	-2.7	-2.4	-0.5	0.2	0.8	
Current Account Balance (% of GDP)	-18	-30.7	-20.5	-14.6	-7.3	-5.2	-8.3	-3.4	-6.5	-7.1	-2.7	
External Debt (% of GDP)	75	92	134	84	84	108	90	118	128	99		
M2/NGDP (%)				20.5	8.3	8.6	6.9	6.8	8.3	7.9	8.2	
Average Explmp/GDP (%)*		85.7	90.7	96.4	99.0	96.2	90.4	98.1	97.2	92.2	100.7	

Source: IMF(1998, 2000, 2003), www.nbt.tj

1/ Monetary variables were in Russian Ruble until May 10,1995 and in Tajik Ruble thereafter until November 30, 2000, but in the Table they have been converted into somoni

2/ EoP stands for the end of period

*-the author's own calculation

Table 2. Tajikistan: Sectoral distribution of GDP (in % of GDP)

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Agriculture	21	19.1	15.3	27.7	27.1	24.9	25.4	27	26.7
Manufacturing	32.8	22.1	35.3	25.7	19.7	20.1	21.7	23.9	22.6
Trade	3.3	13	13	14.6	10.2	22.1	19.7	18.3	19.3
Nonmaterial sphere	19.4	11.4	17.4	22.8	18.4	15.6	12.4	13.7	13.3
Transport	1.3	2.3	2.5	4	1.4	4.2	7.4	4.9	4.5
Construction	9	10.4	3.2	2.6	2.1	3.9	5.4	3.4	4.1
Others	13.2	21.7	13.3	2.6	21.1	9.2	8	8.8	9.5

Source: IMF(1998, 2003), SSCT(2002)

Table 15. A 2001 micro SAM of Tajikistan (thousands somoni)

			1	2	3	4	5	6	7	8	9	10	11
			A C T I										
			Aelec	Apetr	Abmet	Acmet	Achem	Amach	Awdpp	Actmt	Almnf	Afmnf	Aomnf
1	A C T I V I T I E S	Aelec											
2		Apetr											
3		Abmet											
4		Acmet											
5		Achem											
6		Amach											
7		Awdpp											
8		Actmt											
9		Almnf											
10		Afmnf											
11		Aomnf											
12		Acons											
13		Aagfr											
14		Atran											
15		Acomm											
16		Atsts											
17		Aitsr											
18		Aospr											
19		Amnng											
20		Arses											
21		Ahfss											
22		Aeduc											
23		Acuar											
24		Ascsc											
25		Afnci											
26		Amgdp											
27		Apbor											
28	C O M O D I T I E S	Celec	2464.2	34.6	3111.8	88358.9	400.1	212.2	12.0	231.8	7861.6	8404.2	2031.5
29		Cpetr	90.9	1.3	114.4	192060.8	14.7	7.8	0.5	8.6	293.6	319.4	74.7
30		Cbmet	2459.5	33.2	3134.8	64846.8	386.8	204.5	11.6	223.5	8503.1	9198.1	2013.8
31		Ccmet	16041.7	227.8	20917.6	224571.1	2630.4	1396.5	79.2	1520.3	48905.5	46639.4	13469.7
32		Cchem	0.0	7.0	642.4	11364.6	80.9	42.8	2.4	46.9	1706.7	1860.1	416.3
33		Cmach	193.8	2.7	243.4	3161.3	31.5	16.7	1.0	18.3	619.9	673.0	159.4
34		Cwdpp	18.7	0.3	23.4	312.6	3.1	1.6	0.1	1.8	60.1	65.4	15.4
35		Cctmt	424.5	5.9	533.1	6725.9	69.0	36.6	2.1	40.0	1351.6	1464.6	349.3
36		Clmnf	2325.9	33.0	2931.4	31645.1	381.1	202.3	11.5	221.0	7235.9	7688.2	1921.9
37		Cfmnf	0.0	0.0	0.0	0.0	795.8	0.0	0.0	0.0	14338.5	14868.7	3984.1
38		Comnf	8446.5	116.8	10277.6	34115.5	383.9	714.9	40.6	779.5	7372.3	7865.9	1939.2
39		Ccons	2026.0	113.9	15914.3	679.5	436.9	1361.2	142.4	8981.1	799.9	442.0	229.3
40		Cagfr	11495.3	784.5	3341.2	1446.3	5975.5	4143.9	37.1	1189.3	26135.9	34939.8	35852.1
41		Ctran	2523.6	696.1	822.5	395.1	912.3	918.7	7.6	364.3	764.9	81.9	443.5
42		Ccomm	9562.1	21.5	0.0	200.1	31.8	159.7	4.8	24.8	302.3	93.9	281.8
43		Ctsts	14323.8	83.8	198.6	32.5	172.8	909.5	62.1	605.4	39857.9	85995.1	13681.0
44		Citsr	1.4	0.0	0.0	7.3	0.1	0.8	0.0	0.5	0.0	2.1	0.0
45		Cospr	331.6	3.0	14.3	345.6	24.7	37.7	7.9	8.5	141.3	60.7	92.9

			1	2	3	4	5	6	7	8	9	10	11
46		Cmnng	147.8	4.6	694.4	393.8	17.3	63.0	4.3	291.1	34.9	60.1	62.5
47		Crscs	10007.1	275.0	4972.5	151.1	274.7	582.8	20.1	1200.6	1178.0	3880.6	2713.2
48		Chfss	525.8	8.2	52.5	76.4	83.0	64.2	6.1	76.8	559.5	2183.3	776.5
49		Ceduc	2503.6	10.8	74.4	226.5	234.8	137.1	10.2	221.5	1029.2	5396.6	1751.3
50		Ccuar	373.4	10.7	11.9	34.8	34.8	20.3	1.5	32.7	153.5	819.3	259.7
51		Cscss	26.7	0.7	38.7	7.0	5.2	8.3	0.4	3.8	5.1	4.0	11.4
52		Cfnci	767.8	29.4	62.0	28.3	11.2	113.6	19.0	60.7	751.0	1407.4	826.5
53		Cmgdp	1473.4	84.6	148.5	47.9	256.9	267.4	75.2	102.7	1435.2	3126.3	1808.3
54		Cpbor	257.5	10.3	33.6	6.5	23.1	40.0	5.7	42.6	214.3	555.8	229.3
55	FAC-	Labr	9359.8	290.8	7924.3	66316.7	1597.2	1307.1	72.7	1735.6	17998.0	22377.8	9614.2
56	TORS	Capl	27052.2	856.0	23586.8	169797.5	4690.9	3841.0	214.1	5059.6	50369.6	55974.8	28418.1
57	HSLD	Hsld											
58	ENTS	Ents											
59	INDI-	VAT											
60	RECT	Excs											
61	T	Imtf											
62	A	Extf											
63	X	Stdtd											
64	DI-	Prtx											
65	RECT	Ldtx											
66		Trtx											
67	T	Intx											
68	A	Pftx											
69	X	Ottx											
70	SBS	Subs											
71	NTXP	Ntxp											
72	GOVT	Govt											
73	S-I	Sviv											
74	ROW	Row											
75		Total	125224.5	3746.7	99820.2	897355.7	19960.5	16812.5	852.1	23093.0	239979.4	316448.7	123426.9

Table 15. A 2001 micro SAM of Tajikistan (thousands somoni) (cont.)

	12	13	14	15	16	17	18	19	20	21	22	23	24
	V	I	T	I	E	S							
	Acons	Aagfr	Atran	Acomm	Atsts	Aitsr	Aospr	Amnng	Arses	Ahfss	Aeduc	Acuar	Ascss
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	3289.8	18666.4	736.2	728.6	5716.4	1.7	45.9	70.4	1079.7	228.1	691.9	47.0	53.8
29	128.0	686.6	27.1	26.9	210.9	0.1	1.7	2.5	39.6	8.3	25.4	1.7	1.9
30	3342.4	23014.3	715.5	707.9	5983.8	1.6	44.2	67.7	1054.8	220.0	671.8	45.3	51.6
31	14685.1	132798.1	4831.6	4777.9	37969.8	11.1	303.6	471.6	7282.5	1523.5	4599.9	312.7	359.9
32	712.6	4313.3	149.4	147.8	1208.1	0.4	9.2	14.2	219.0	46.0	140.0	9.5	10.8
33	271.5	1426.9	57.9	57.3	447.0	0.1	3.6	5.6	84.6	17.9	54.3	3.7	4.2
34	26.3	138.8	5.6	5.6	43.2	0.0	0.4	0.5	8.1	1.7	5.3	0.4	0.4
35	591.4	3096.3	127.0	125.7	977.0	0.3	7.9	12.2	185.4	39.3	119.1	8.1	9.2
36	3067.8	16471.7	700.2	692.9	5322.8	1.6	43.8	67.2	1026.1	217.5	658.3	44.9	51.3
37	5941.5	31436.3	1459.1	1443.8	10815.1	3.3	91.8	141.1	2144.3	455.9	1375.2	94.1	107.6
38	3131.7	16949.5	705.6	698.2	5396.3	1.6	44.1	67.7	1033.6	219.0	663.1	45.2	51.6
39	3483.9	61.1	2900.4	479.0	5290.9	3.7	107.0	206.4	1352.2	92.0	576.0	0.0	0.0
40	1951.0	100921.2	5782.4	2208.1	13939.4	11.7	940.4	377.3	11068.1	798.9	522.3	0.0	0.0
41	23658.3	471.8	1990.2	171.8	6389.6	15.3	951.9	217.2	3352.2	95.8	620.1	0.0	690.0
42	5400.1	0.0	888.3	369.3	878.1	3.4	140.5	0.0	1252.7	42.7	0.0	0.0	288.4
43	108203.1	6470.0	15071.6	14618.6	52079.0	28.2	546.8	0.0	4507.2	0.0	0.0	0.0	0.0
44	0.0	0.8	12.9	2.3	26.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	119.3	10.5	1306.3	478.6	7631.6	4.9	107.2	0.0	0.0	0.0	0.0	0.0	0.0

	12	13	14	15	16	17	18	19	20	21	22	23	24
46	0.0	6.0	9.0	10.1	26.4	0.0	9.7	0.0	0.0	0.0	0.0	0.0	0.0
47	9341.2	135.7	2756.6	11.5	3337.2	5.3	325.3	0.0	30573.4	378.3	0.0	0.0	299.7
48	2484.7	172.3	668.5	99.3	3683.9	1.3	73.7	0.0	1925.0	2908.1	5954.6	815.7	150.3
49	290.6	910.6	315.1	6.2	573.9	2.2	204.9	0.0	8382.1	418.3	21240.3	3522.4	0.0
50	187.4	171.1	41.7	2.4	208.5	0.5	30.0	0.0	0.0	122.4	997.4	981.8	0.0
51	2732.1	1.4	645.7	6.3	542.4	1.0	2.3	0.0	0.0	54.7	0.0	0.0	0.0
52	543.0	613.6	1568.1	293.8	3188.5	3.7	138.7	0.0	6432.4	815.7	0.0	0.0	41.5
53	0.0	313.3	8316.4	827.0	1138.6	22.6	198.5	0.0	2995.4	5721.9	0.0	0.0	328.7
54	0.0	88.9	66.6	69.4	356.0	0.8	50.9	0.0	0.0	0.0	0.0	0.0	0.0
55	16074.5	220625.8	36561.5	7746.5	69912.9	92.7	2308.9	899.6	16259.6	10536.2	61098.8	4570.0	1238.2
56	-3121.4	547963.8	43751.5	6585.2	394685.3	-46.7	5447.0	773.6	122767.7	25785.2	54849.4	5504.5	1570.6
57													
58													
59													
60													
61													
62													
63													
64													
65													
66													
67													
68													
69													
70													
71													
72													
73													
74													
75	206536.0	1127936.0	132168.0	43398.0	637978.6	172.4	12179.9	3394.9	225025.8	50747.4	154863.3	16007.1	5309.9

Table 15. A 2001 micro SAM of Tajikistan (thousands somoni) (cont.)

	25	26	27	28	29	30	31	32	33	34	35	36	37
				C O M O D I T I E									
	Afnci	Amgdp	Apbor	Celec	Cpetr	Cbmet	Ccmet	Cchem	Cmach	Cwdpp	Cctmt	Clmnf	Cfmnf
1	125224.5												
2	3746.7												
3	99820.2												
4	897355.7												
5	19960.5												
6	16812.5												
7	852.1												
8	23093.0												
9	239979.4												
10	316448.7												
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28	341.4	511.2	175.2										
29	12.5	18.7	6.5										
30	329.8	494.9	168.8										
31	2288.3	3481.2	1130.7										
32	68.9	103.0	35.4										
33	26.8	40.0	13.9										
34	2.6	3.9	1.3										
35	58.8	87.8	30.3										
36	325.5	487.1	167.0										
37	682.0	1022.6	348.1										
38	327.6	490.2	168.3										
39	310.5	256.9	0.0										
40	10580.7	17027.3	0.0										
41	449.8	1804.8	457.6										
42	185.0	478.5	134.0										
43	609.1	9550.3	854.6										
44	0.0	0.0	0.0										
45	97.3	195.3	1770.6										

	25	26	27	28	29	30	31	32	33	34	35	36	37
46	18.7	0.0	0.0										
47	170.8	496.8	139.2										
48	237.1	0.0	24.4										
49	367.1	0.0	39.5										
50	0.0	0.0	0.0										
51	0.0	0.0	0.0										
52	883.6	7730.9	12.8										
53	351.1	270.8	0.0										
54	22.2	0.0	0.0										
55	14239.6	19432.8	236.2										
56	20948.3	75305.6	5458.1										
57													
58													
59				1843.9	57.3	1552.8	14372.2	310.7	254.2	14.1	338.1	3601.5	4562.5
60				601.1	18.6	504.7	4629.6	101.5	83.0	4.6	110.4	1174.1	1500.4
61				2851.9	89.5	2410.6	21568.0	482.7	394.9	21.9	524.6	5536.2	6932.2
62				1310.5	41.7	1106.9	8528.9	225.7	184.8	10.3	245.5	2497.3	3127.7
63				138.1	0.0	115.8	1039.1	23.4	19.2	1.1	25.4	269.1	344.8
64													
65													
66													
67													
68													
69													
70				-26.5	-0.8	-22.1	-199.1	-4.5	-3.7	-0.2	-4.9	-51.9	-67.8
71													
72													
73													
74				229903.9	277586.4	31899.8	453578.8	218226.7	87848.0	40418.1	14836.2	58580.2	38359.0
75	53935.2	139290.5	11372.5	361847.4	281539.5	137388.8	1400873.1	239326.7	105592.8	41322.0	39168.4	311585.8	371207.5

Table 15. A 2001 micro SAM of Tajikistan (thousands somoni) (cont.)

	38	39	40	41	42	43	44	45	46	47	48	49	50
S													
	Comnf	Ccons	Cagfr	Ctran	Ccomm	Ctsts	Citsr	Cospr	Cmnng	Crscs	Chfss	Ceduc	Ccuar
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11	123426.9												
12		206536.0											
13			1127936.0										
14				132168.0									
15					43398.0								
16						637978.6							
17							172.4						
18								12179.9					
19									3394.9				
20										225025.8			
21											50747.4		
22												154863.3	
23													16007.1
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													
41													
42													
43													
44													
45													

	38	39	40	41	42	43	44	45	46	47	48	49	50
46													
47													
48													
49													
50													
51													
52													
53													
54													
55													
56													
57													
58													
59	1889.7	3641.3	7052.6	55072.7	1855.6	3082.7	0.0	1521.5	286.7	1971.5	0.0	0.0	0.0
60	614.3	17.6	565.0	3707.3	7.8	1849.8	0.0	35.4	138.7	11.8	0.0	0.0	0.0
61	2929.7	33.5	198.1	1268.7	5.7	748.1	0.0	15.5	0.0	0.0	0.0	0.0	0.0
62	1341.0	0.0	44312.9	0.0	0.0	4915.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
63	141.0	0.0	130.1	848.1	0.0	407.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
64													
65													
66													
67													
68													
69													
70	-27.0	0.0	-248.2	-2208.1	-267.6	-80.0	0.0	-22.2	-446.1	-1609.1	0.0	0.0	-132.3
71													
72													
73													
74	15000.3	0.0	6881.2	96250.4	183164.9	831.1	0.0	0.0	361.2	0.0	0.0	0.0	0.0
75	145316.0	210228.4	1186827.7	287107.1	228164.4	649733.8	172.4	13730.0	3735.5	225400.0	50747.4	154863.3	15874.8

Table 15. A 2001 micro SAM of Tajikistan (thousands somoni) (cont.)

	51	52	53	54	55	56	57	58	59	60	61	62	63
					FAC	TORS	HSLD	ENTS	INDI	RECT	TAX		
	Cscss	Cfnci	Cmgdp	Cpbor	Labr	Capl	Hsld	Ents	VAT	Excs	Imtf	Extf	Stdtd
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24	5309.9												
25		53935.2											
26			139290.5										
27				11372.5									
28							8365.0						
29							44203.5						
30							1259.1						
31							158.7						
32							164033.6						
33							54648.6						
34							34991.0						
35							19903.4						
36							159974.4						
37							238729.8						
38							35996.2						
39							0.0						
40							623422.8						
41							2780.1						
42							22849.0						
43							135530.8						
44							56.2						
45							320.7						

	51	52	53	54	55	56	57	58	59	60	61	62	63
46							0.0						
47							137699.5						
48							20585.8						
49							78299.7						
50							8529.9						
51							1288.5						
52							24446.7						
53							98281.2						
54							2095.5						
55													
56													
57					620428.0			1105249.7					
58					1678088.3								
59	75.2	28.5	0.0	0.0									
60	0.0	0.0	0.0	0.0									
61	0.5	0.0	0.0	0.0									
62	0.0	0.0	0.0	0.0									
63	0.0	0.0	0.0	0.0									
64							916.7	4380.6					
65							1366.0	8207.6					
66							493.8	740.8					
67							33024.1						
68								14483.7					
69							4685.3	7027.9					
70	0.0	0.0	-642.2	-56.3									
71								65786.3					
72									103385.2	15675.6	46012.4	67849.2	3503.0
73								265446.6					
74	0.0	0.0	0.0	0.0			799.3	446192.9					
75	5385.6	53963.7	138648.3	11316.2	620428.0	1678088.3	1959734.6	1917516.1	103385.2	15675.6	46012.4	67849.2	3503.0

Table 15. A 2001 micro SAM of Tajikistan (thousands somoni)

	64	65	66	67	68	69	70	71	72	73	74	75
	DI	RE	CT	TAX			SBS	NTXP	GOVT	S-I	ROW	
	Prtx	Ldtx	Trtx	Intx	Pftx	Ottx	Subs	Ntxp	Govt	Sviv	Row	Total
1												125224.5
2												3746.7
3												99820.2
4												897355.7
5												19960.5
6												16812.5
7												852.1
8												23093.0
9												239979.4
10												316448.7
11												123426.9
12												206536.0
13												1127936.0
14												132168.0
15												43398.0
16												637978.6
17												172.4
18												12179.9
19												3394.9
20												225025.8
21												50747.4
22												154863.3
23												16007.1
24												5309.9
25												53935.2
26												139290.5
27												11372.5
28									15208.2	0.0	192767.6	361847.4
29									6075.3	8177.9	28897.4	281539.5
30									186.8	0.0	8012.8	137388.8
31									214.3	0.0	807273.1	1400873.1
32									6387.0	1307.5	44241.0	239326.7
33									135.3	39863.9	3308.7	105592.8
34									561.4	4552.6	470.6	41322.0
35									455.0	2331.3	0.0	39168.4
36									1825.5	8763.1	57079.9	311585.8
37									8050.0	17721.1	15157.8	371207.5
38									722.1	5649.4	902.3	145316.0
39									0.0	163981.8	0.0	210228.4
40									104710.4	167224.8	0.0	1186827.7
41									2211.7	0.0	232848.6	287107.1
42									11208.6	0.0	173363.2	228164.4
43									9448.7	0.0	136293.3	649733.8
44									61.8	0.0	0.0	172.4
45									377.0	242.7	0.0	13730.0

	64	65	66	67	68	69	70	71	72	73	74	75
46									0.0	0.0	1881.8	3735.5
47									14473.9	0.0	0.0	225400.0
48									6550.2	0.0	0.0	50747.4
49									28694.4	0.0	0.0	154863.3
50									2403.4	0.0	445.4	15874.8
51									0.0	0.0	0.0	5385.6
52									3173.8	0.0	0.0	53963.7
53									11056.3	0.0	0.0	138648.3
54									7147.0	0.0	0.0	11316.2
55												620428.0
56												1678088.3
57									48052.9		186004.0	1959734.6
58									59592.5		179835.3	1917516.1
59												103385.2
60												15675.6
61												46012.4
62												67849.2
63												3503.0
64												5297.3
65												9573.6
66												1234.6
67												33024.1
68												14483.7
69												11713.2
70												-6120.6
71												65786.3
72	5297.3	9573.6	1234.6	33024.1	14483.7	11713.2	-6120.6	65786.3	485.2		4254.5	376157.3
73									2529.6		151840.0	419816.2
74									24159.1			2224877.4
75	5297.3	9573.6	1234.6	33024.1	14483.7	11713.2	-6120.6	65786.3	376157.3	419816.2	2224877.4	