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**Constructing a Social Accounting Matrix**  
**with a Distributional Focus –**  
**The Case of Bolivia**

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## **Constructing a Social Accounting Matrix with a Distributional Focus – The Case of Bolivia**

**Abstract:** This paper describes the construction of a Social Accounting Matrix (SAM) for Bolivia for the year 1997. Three distinctive features render the SAM a useful starting point for distributional analyses. First, production in the agricultural and services sector is split up into formal and informal activities to account for the fact that poverty is largely confined to the latter. Second, factor and household accounts exhibit a high level of disaggregation, thus permitting the monitoring of the factorial and personal income distribution. Finally, the SAM contains a detailed system of accumulation balances which reveals the distribution of assets among household groups.

**Keywords:** SAM, Structural Adjustment Programs, Poverty, Income Distribution, Bolivia.

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## CONTENTS

I.	THE ISSUE .....	1
II.	A SCHEMATIC SAM.....	2
III.	THE INPUT-OUTPUT TABLE.....	5
	1. Construction of the Input-Output Table for Bolivia .....	5
	2. Structural Characteristics of Supply and Demand .....	9
IV.	DISTRIBUTIONAL ASPECTS.....	15
	1. Distribution of Factor Income .....	16
	2. Redistribution of Income.....	23
	3. Structure of Household Demand.....	27
V.	ACCUMULATION BALANCES .....	31
	1. Saving and Investment.....	31
	2. Net Wealth.....	38
VI.	CONCLUDING REMARKS .....	41
	REFERENCES.....	43
	APPENDIX.....	44

## List of Tables

Table 1 —	Structure of the Social Accounting Matrix .....	3
Table 2 —	Share of Informal and Formal Activities in the Services Sectors .....	8
Table 3 —	Share of Traditional and Modern Activities in the Agricultural Sectors.....	9
Table 4 —	Structure of the Sectoral Use of Goods (Millions of Bolivianos and shares in percent).....	10
Table 5 —	Structure of Sectoral Production Costs (Millions of Bolivianos) .....	14
Table 6 —	Distribution of Income to Factors (Millions of Bolivianos) .....	19
Table 7 —	Distribution of Income from Factors to Institutions (Millions of Bolivianos) .....	21
Table 8 —	Employment and Average Monthly Income by Household Groups ...	22
Table 9 —	Redistribution Between Institutions (Millions of Bolivianos) .....	25
Table 10 —	Structure of Commodity Demand (Millions of Bolivianos) .....	28
Table 11 —	Sectoral Consumption Demand by Household Groups (Millions of Bolivianos) .....	30
Table 12 —	Saving and Investment by Institutions (Millions of Bolivianos) .....	32
Table 13 —	Composition of Investment by Household Groups (Millions of Bolivianos) .....	34
Table 14 —	Flow of Funds by Household Groups (Millions of Bolivianos).....	37
Table 15 —	Assets and Liabilities by Household Groups (Millions of Bolivianos) .....	40
Overview 1 –	Aggregation of Sectors of the Input-Output Table for the Social Accounting Matrix .....	7

## **I. THE ISSUE**

After 20 years of structural adjustment programs, there is an ongoing debate about their economic and social impact (for an overview, see Thiele and Wiebelt 2000). Evidence on the distributional consequences of adjustment measures is particularly scarce. Simulations in Computable General Equilibrium (CGE) models constitute one promising tool to fill this gap. As a base for running model simulations, extensive data sets have to be compiled. The objective of this paper is to present such a data set for one particular country, Bolivia, for the year 1997. The data are organized in a Social Accounting Matrix (SAM), which is the most convenient framework for keeping track of the circular flow of income and expenditures in an economy. Three distinctive features render the Bolivian SAM a useful starting point for distributional analyses. First, in the agricultural and services sector, production is split up into formal and informal activities. This is important because Bolivia has a large informal economy where poverty is widespread and where the response to structural adjustment measures is likely to differ from the formal economy. Second, a strong emphasis is put on monitoring the factorial and personal distribution of income via the distinction of 4 production factors and 6 household groups. Finally, detailed accumulation balances reveal the distribution of assets and indicate to which extent different household groups have access to the resources they need to finance investment in excess of their own savings. With these features, the SAM includes the

information necessary to analyze the main transmission mechanisms – changes in relative factor and commodity prices, changes in public redistribution, and changes in the returns on assets and the costs of liabilities – by which structural adjustment affects the well-being of households.

The paper is structured as follows. Chapter II provides a general overview of the components that make up the SAM. Chapter III describes the construction of the Input-Output Table around which the SAM is built, and discusses some main structural characteristics of the Bolivian economy which can be derived from the Input-Output Table. The distribution of income across factors and households is shown in Chapter IV. Chapter V deals with the accumulation of assets and liabilities by households. The paper closes with some concluding remarks.

## **II. A SCHEMATIC SAM**

A SAM describes in a coherent manner the various channels through which production is linked with income distribution, consumption, savings, investment and foreign trade. A schematic representation of the SAM structure chosen for Bolivia is given in Table 1. The Bolivian SAM consists of four different types of accounts. First, product supply and demand is described by a

Table 1 — Structure of the Social Accounting Matrix

		COMMODITIES	FACTORS	INSTITUTIONS (CURRENT)				INSTITUTIONS (CAPITAL)					TOTALS
				Government	Households	Companies	Rest of the World	Government	Households	Companies	Rest of the World	Financial Institutions	
C O M M O D I T I E S		INTERMEDIATE DEMAND		CONSUMPTION			EXPORTS	INVESTMENT				TOTAL DEMAND	
		DISTRIBUTION OF VALUE ADDED TO FACTORS					EXPORTS OF FACTOR SERVICES					TOTAL FACTOR INCOME	
C U R R E N T	Government	INDIRECT TAXES			DIRECT TAXES							TOTAL INCOME OF INSTITUTIONS	
	Households		DISTRIBUTION OF INCOME TO HOUSEHOLDS AND COMPANIES	TRANSFERS, INTEREST AND DIVIDENDS			TRANSFERS						
	Companies												
	Rest of the World	IMPORTS	IMPORTS OF FACTOR SERVICES	INTEREST ON DEBT								CURR. ACC. (DEBIT)	
C A P I T A L	Government			SAVINGS BY INSTITUTIONS				FLOWS OF FUNDS				TOTAL INVESTMENT FINANCE	
	Households												
	Companies												
	Rest of the World				EXT. SAV.								
	Financial Institutions												
<b>TOTALS</b>		TOTAL SUPPLY	DISTRIBUTED FACTOR INCOME	USE OF DISPOSABLE INCOME OF INSTITUTIONS			CURR. ACC. (CREDIT)	TOTAL INVESTMENT (FINANCIAL AND PHYSICAL)					

set of *commodity accounts*, where the row shows the cost components that add up to overall supply from domestic sources, plus imports, while the column lists the domestic demand components and exports. Second, *factor accounts* depict how value added is distributed to the domestic factors of production, and how this factor income is transformed into income accruing to the various institutional agents (government, households, companies, rest of the world) identified in the SAM. Third, *current accounts* show the sources from which institutions receive income, and the uses to which they put that income. Part of it is consumed, part is redistributed among the institutional agents themselves, and the remaining is saved. Among the institutional accounts are two important macroeconomic balances, namely the government budget and the current account of the balance of payments.

All in all, with slight variations in exposition, these first three kinds of accounts can be found in almost every SAM. The main peculiarity here lies in the level of disaggregation among commodities, factors, and institutions, which will be discussed in detail below. In conceptual terms, the *capital accounts*, which are required to establish the link between savings and investment, constitute the distinctive feature of the Bolivian SAM. In most existing SAMs, it is simply assumed that the savings of the different institutions are collected in a "savings pool" and then made available for investment, without any reference to the process of financial intermediation. Here, by contrast, all major flows of funds

occurring to match the positions of surplus units (institutions for which savings exceed investment) and deficit units are recorded. The explicit consideration of financial market transactions carries a number of advantages.<sup>1</sup> Viewed from the perspective of structural adjustment programs, the main advantage appears to be that in certain areas such as monetary policy the transmission that runs via the financial system can be analyzed.

### III. THE INPUT-OUTPUT TABLE

#### 1. Construction of the Input-Output Table for Bolivia

The Input-Output Table forms the core of the SAM as it describes the structure of the economy.<sup>2</sup> Based on the data for 35 sectors from the Instituto Nacional de Estadística (INE) (2001a) of Bolivia an aggregated Input-Output table with 13 sectors was constructed.<sup>3</sup> The chosen aggregation reflects the favored focus of the analysis and groups together activities with similar demand and supply

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<sup>1</sup> Vos (1991) provides a detailed account of these advantages.

<sup>2</sup> The Input-Output Table is derived through a calculation process using the technology matrix and the make matrix of an economy. For a detailed description of the matrices used in the SAM construction see Bulmer-Thomas (1982). For Bolivia, these matrices are provided by the Instituto Nacional de Estadística (INE) (2001a).

<sup>3</sup> The Bolivian statistics include an additional dummy sector 36, called *imputed bank service charge*, which was eliminated in order to construct a square (35x35) Input-Output table following a similar procedure to the one suggested in Lysy (1977: 9). Whereas Lysy allocates the values of the imputed bank service charge to the other sectors in proportion to each sector's value added, we allot this in proportion to the value added share of incorporated capital (see also Chapter IV), assuming that only sectors with a high share of incorporated capital demand a high share of the imputed bank services.

characteristics. As discussed later, the remaining 13 sectors differ quite significantly, e.g. in their trade shares and their dependency on intermediate products. The assignment of the 35 sectors of the Input-Output Table to the 13 sectors of the SAM is represented in Overview 1.

Most aggregated sectors are derived through the simple addition of the individual sectors. However, the composition of the service sectors and the agricultural sectors is more complex. For these two sectors, a disaggregation into informal and formal activities was considered necessary because most of the poorer people in Bolivia pursue informal activities, and because production characteristics (e.g. trade shares) differ between formal and informal activities. Informal activities are identified according to the value added share of unincorporated capital. A high share of unincorporated capital is assumed to reflect a high percentage of informal activity. The derived shares of informal activities for eight service sectors are given in Table 2 and range from 0 percent in *communications* to 65 percent in *trade*. For *transport and storage*, *financial services* and *company services* we assume that the share of formal activity is 100 percent. In *domestic services* wages account for all value added. Here, a modification is introduced: The complete sector is attributed to informal services.

Overview 1 — Aggregation of Sectors of the Input-Output Table for the Social Accounting Matrix

Sectors in the Social Accounting Matrix	Sectors in the Disaggregated Input-Output Table
1. Traditional Agriculture/ 2. Modern Agriculture	1. Non-industrialized crop production 2. Industrialized crop production 4. Livestock production 5. Timber production, hunting and fisheries
3. Coca Sector	3. Coca
4. Crude Oil and Natural Gas	6. Crude oil and natural gas
5. Mining	7. Mining
6. Consumer Goods	8. Meat and processed meat 9. Dairy products 10. Baking and grain mill products 11. Sugar and confectionary products 12. Other food products 13. Beverages 14. Processed tobacco 15. Textile, clothing and leather products 16. Wood and wood products 17. Paper and paper products
7. Intermediate Goods	18. Chemical products 19. Processed oil products 20. Non-metallic mineral products 21. Base metals 23. Other manufacturing
8. Capital Goods	22. Metallic products, machinery and equipment
9. Electricity, Gas and Water	24. Electricity, gas and water
10. Construction	25. Construction and public building activities
11. Informal Service Sector/ 12. Formal Service Sector	26. Trade 27. Transport and storage 28. Communication 29. Financial services 30. Company services 31. Property 32. Local, social and personal services 33. Restaurants and hotels 34. Domestic services
13. Public Sector	35. Public sector

Table 2 — Share of Informal and Formal Activities in the Services Sectors

Sector Number and Sector	Percentage Share of Informal Activity	Percentage Share of Formal Activity	Sector Share of all Service Sectors	Weighted Share of the Informal Activities	Weighted Share of the Formal Activities
	I	II	III	I * III	II * III
26. Trade	0.65	0.35	0.19	0.12	0.06
27. Transport and Storage	0.00	1.00	0.25	0.00	0.25
28. Communication	0.00	1.00	0.06	0.00	0.06
29. Financial Services	0.00	1.00	0.11	0.00	0.11
30. Company Services	0.00	1.00	0.10	0.00	0.10
31. Property	0.00	1.00	0.09	0.00	0.09
32. Local, Social and Personal Services	0.34	0.66	0.11	0.04	0.07
33. Restaurants and Hotels	0.29	0.71	0.08	0.02	0.06
34. Domestic Services	1.00	0.00	0.02	0.02	0.00
<b>Total</b>			<b>1.00</b>	<b>0.20</b>	<b>0.80</b>

Source: Calculated on the basis of Instituto Nacional de Estadística (INE) (2001a, 2001b).

Table 2 also presents each sector's percentage share of the total value added of the nine service sectors and the derived weighted share of the informal and formal activities. For all nine service sectors, informal services account on average for 20 percent of the activities.

A similar aggregation procedure using the value added share of unincorporated capital was performed for the division between traditional (informal) and modern (formal) agriculture. Table 3 gives the percentage share of traditional and modern activities in each agricultural sector, the weight of each agricultural sector (according to the value added) and the derived overall share of traditional and modern agricultural activities. 67 percent of the Bolivian agriculture is traditional, 33 percent is modern.

## 2. Structural Characteristics of Supply and Demand

From the 13-sector Input-Output Table, various indicators describing demand and supply in the Bolivian economy can readily be calculated. The structure of the sectoral use of goods is given in Table 4. This table shows for each sector the absolute values of the components that make up domestic absorption: intermediate demand, private consumption, government consumption and investment (which is the sum of fixed capital formation and inventories). Subtracting imports and tariffs from domestic absorption yields the domestic use of domestically produced goods. Adding to this exports results in the overall use of domestically produced goods.

Table 3 — Share of Traditional and Modern Activities in the Agricultural Sectors

Sector Number and Sector	Percentage Share of Traditional Activity	Percentage Share of Modern Activity	Sector Share of all Agricultural Sectors	Weighted Share of the Traditional Activities	Weighted Share of the Modern Activities
	I	II	III	I * III	II * III
1. Non-industrialized Crop Production	0.92	0.08	0.46	0.42	0.03
2. Industrialized Crop Production	0.32	0.68	0.21	0.07	0.14
4. Livestock Production	0.65	0.35	0.27	0.17	0.10
5. Timber Production, Hunting and Fisheries	0.16	0.84	0.06	0.01	0.05
<b>Total</b>			<b>1.00</b>	<b>0.67</b>	<b>0.33</b>

Source: Calculated on the basis of Instituto Nacional de Estadística (INE) (2001a, 2001b).

Table 4 — Structure of the Sectoral Use of Goods in Bolivia in 1997 (Millions of Bolivianos and shares in percent)

Sector No.	Sector	Sum	Final Private	Government	Investment	Domestic	Imports and	Domestic Use of	Exports	Overall Use of
		Intermediate Demand ID	Consumption + C	Consumption + G	+I (=CF+STA)	Absorption = Q	Tariffs -M (=IM+TAR)	Domestically Produced Goods = DD	+ X	Domestically Produced Goods = XD
(1)	Traditional Agriculture	3071	2147	0	-79	5140	413	4726	454	5180
(2)	Modern Agriculture	1716	322	0	171	2209	107	2102	714	2815
(3)	Coca Sector	1	77	0	0	78	0	78	327	405
(4)	Crude Oil and Natural Gas	1342	0	0	268	1611	0	1611	525	2136
(5)	Mining	940	0	0	-13	927	90	836	1587	2423
(6)	Consumer Goods	5307	9044	0	60	14411	2139	12272	2222	14493
(7)	Intermediate Goods	6280	2332	0	215	8827	3395	5432	1009	6441
(8)	Capital Goods	1305	1341	0	3841	6487	5592	894	56	951
(9)	Electricity, Gas and Water	794	994	0	0	1789	3	1785	2	1787
(10)	Construction	155	0	0	3330	3485	0	3485	0	3485
(11)	Informal Service Sectors	3367	3531	0	0	6897	220	6678	0	6678
(12)	Formal Service Sectors	8486	10791	0	382	19659	844	18815	1892	20707
(13)	Public Sector	47	533	5790	0	6370	9	6361	5	6366
	<b>Sum</b>	<b>32810</b>	<b>31113</b>	<b>5790</b>	<b>8176</b>	<b>77889</b>	<b>12813</b>	<b>65075</b>	<b>8791</b>	<b>73867</b>
		<b>Shares in Percent</b>								
		ID/Q	C/Q	G/Q	I/Q	Structure of Imports M/ΣM	M/Q	Structure of Exports E/ΣE	X/XD	Structure of Demand XD/ΣXD
(1)	Traditional Agriculture	59.76	41.77	0.00	-1.53	3.23	8.04	5.16	8.77	7.01
(2)	Modern Agriculture	77.68	14.58	0.00	7.75	0.84	4.85	8.12	25.34	3.81
(3)	Coca Sector	1.10	98.90	0.00	0.00	0.00	0.00	3.71	80.72	0.55
(4)	Crude Oil and Natural Gas	83.36	0.00	0.00	16.64	0.00	0.00	5.97	24.59	2.89
(5)	Mining	101.44	0.00	0.00	-1.44	0.70	9.73	18.05	65.48	3.28
(6)	Consumer Goods	36.82	62.76	0.00	0.42	16.70	14.85	25.27	15.33	19.62
(7)	Intermediate Goods	71.14	26.42	0.00	2.44	26.50	38.46	11.48	15.66	8.72
(8)	Capital Goods	20.12	20.67	0.00	59.21	43.64	86.21	0.64	5.94	1.29
(9)	Electricity, Gas and Water	44.40	55.60	0.00	0.00	0.03	0.18	0.02	0.10	2.42
(10)	Construction	4.45	0.00	0.00	95.55	0.00	0.00	0.00	0.00	4.72
(11)	Informal Service Sectors	48.81	51.19	0.00	0.00	1.72	3.19	0.00	0.00	9.04
(12)	Formal Service Sectors	43.16	54.89	0.00	1.95	6.59	4.29	21.52	9.14	29.03
(13)	Public Sector	0.73	8.37	90.89	0.00	0.07	0.14	0.06	0.08	8.62
	<b>Average/Sum</b>	<b>42.12</b>	<b>39.95</b>	<b>7.43</b>	<b>10.50</b>	<b>100.00</b>	<b>16.45</b>	<b>100.00</b>	<b>11.90</b>	<b>100.00</b>

Source: Own calculations based on INE (2001a).

An examination of the relative shares of the different components reveals an enormous variety among sectors. Intermediate demand accounts for 83 percent of domestic absorption for *crude oil and natural gas* whereas the share is only about 1 percent in the *public sector* and in the *coca sector*. Coca is the sector where final private consumption is with almost 99 percent the largest component of absorption. *Consumer goods* (63 percent) and *electricity, gas and water* (56 percent) are the sectors with the next highest share of private consumption. Government consumption is only a component of domestic absorption in the public sector. Investment is a decisive component of absorption for *construction* (almost 96 percent) and *capital goods* (59 percent). These structural characteristics are important determinants of the likely impact of structural adjustment. If, for example, investment is cut back as a result of fiscal consolidation, this will lead to a contraction of the construction and capital goods sector.

In foreign trade, overall imports correspond to 16 percent of domestic absorption, a moderate share for a small economy such as Bolivia. There are no imports of coca, crude oil and natural gas, and construction. However, for capital goods imports correspond to 86 percent, for intermediate goods to 38 percent and for consumer goods to almost 15 percent of domestic absorption. Table 4 also includes the import structure of the Bolivian economy. Almost 90 percent of all imports are directed to the three sectors capital goods (44 percent),

intermediate goods (27 percent) and consumer goods (17 percent). This concentration of imports on mainly three sectors has important implications for the distributional analysis of adjustment programs, since, for example, all economic policies that lead to a devaluation of the Boliviano will especially deteriorate the situation for these sectors. In particular, this is to be expected for capital goods where imports can barely be substituted by domestic production.

Exports account for about 12 percent of the overall use of domestic goods. As in the case of imports, this points to a rather low integration of the Bolivian economy into world markets. Very large shares are reported for coca (more than 80 percent) and mining (65 percent). The export ratio differs substantially between the informal and the formal agricultural sectors and underlines the necessity to distinguish between them: Whereas only less than 9 percent of traditional agriculture is exported, more than 25 percent of modern agriculture goes abroad.<sup>4</sup> The export structure shows that 76 percent of all exports stem from four sectors: Consumer goods (25 percent), formal services (22 percent), mining (18 percent) and intermediate goods (11 percent). Adjustment programs that lead to a devaluation of the currency will particularly ameliorate the export potential of these sectors. It is interesting to note that in the year 1997 crude oil

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<sup>4</sup> Since the export share of informal services is negligibly small, the exports of informal services are assigned as exports of formal services. The export share of formal services then amounts to 9 percent of the overall use of domestic goods.

and natural gas account for less than 6 percent of overall exports, a share that is likely to rise in the future with the expansion of natural gas production.

The overall demand structure of the Bolivian economy is also represented in Table 4. It shows that the demand for formal services (28 percent) and for consumer goods (20 percent) are quite important as a share of overall demand. The next three sectors (informal services, intermediate goods and public sector) have a share of around 9 percent each of overall demand. Coca accounts for only half of one percent of total demand, and for less than four percent of all exports. However, since it employs many smallholders (Section IV.1) and is regionally concentrated, a separate consideration of coca is justified, e.g. for the analysis of coca eradication programs.

Table 5 presents the structure of the sectoral production costs in Bolivia in 1997. For each of the 13 sectors the costs for intermediates and the factors of production are given as absolute values and as percentage shares.

Table 5 — Structure of Sectoral Production Costs in Bolivia in 1997 (Millions of Bolivianos and shares in percent)

	Traditional Agriculture	Modern Agriculture	Coca	Oil and Gas	Mining	Consumer Goods	Inter- mediate Goods	Capital Goods	Electricity, Gas and Water	Construc- tion	Informal Services	Formal Services	Public Sector	<b>Total</b>
Intermediate Goods	1305	940	27	663	592	9612	3333	313	635	2004	3699	7994	1693	32810
Factors of Production	3876	1842	377	825	1682	3920	1633	97	1034	1151	2978	11832	4669	35917
<b>Net Production</b>	<b>5180</b>	<b>2815</b>	<b>405</b>	<b>2136</b>	<b>2423</b>	<b>14493</b>	<b>6441</b>	<b>951</b>	<b>1787</b>	<b>3485</b>	<b>6678</b>	<b>20707</b>	<b>6366</b>	<b>73867</b>
	<b>Shares in Percent</b>													
Intermediate Goods	25.18	33.78	6.73	44.56	26.03	71.03	67.12	76.32	38.06	63.51	55.40	40.32	26.61	<b>47.74</b>
Factors of Production	74.82	66.22	93.27	55.44	73.97	28.97	32.88	23.68	61.94	36.49	44.60	59.68	73.39	<b>52.26</b>
<b>Net Production</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Source: Own calculations based on INE (2001a; 2001b).

This representation shows that coca (93 percent), traditional agriculture (75 percent), mining (74 percent) and the public sector (73 percent) are the sectors with the highest share of costs for the factors of production in the sectoral net production. The sectors capital goods (76 percent), consumer goods (71 percent) and intermediate goods (67 percent) are the sectors with the highest share of intermediate costs.

The production structure and the sectoral costs structure are of major importance for the examination of adjustment programs. Inflexible goods markets, that are typical for developing countries, imply that the adjustment processes have to take place via factor markets. Sectors with a high share of intermediate costs and a large import share (like capital goods) will not be very responsive to cost pressures. Sectors with a high share of costs for the production of factors (like coca and traditional agriculture) will be more flexible to pass cost pressure on to their factors. These effects are, in turn, very important for the distributional aspects of adjustment programs.

#### **IV. DISTRIBUTIONAL ASPECTS**

The reforms typically required in adjustment programs affect the real income position of households via four basic channels. First, most structural measures alter the use and remuneration of production factors and thus have an impact on

factor incomes that varies with factor endowments. Second, fiscal consolidation usually entails a reduction and/or restructuring of transfer payments to households. Third, a liberalization of the financial sector changes the returns on assets as well as the costs of liabilities. Fourth, microeconomic reforms such as cuts in food and energy subsidies lead to changes in relative consumer prices, thereby affecting the real income distribution as long as consumption patterns are not identical across households. The informational base the SAM provides for modeling these four channels will be discussed in the following.

## **1. Distribution of Factor Income**

The net value added created in the economy flows as a reward to the factors used in the production process. In order to obtain a rich enough picture of the resulting factorial income distribution, we extend the conventional breakdown of value added into labor and capital income by distinguishing four different production factors: *Skilled labor*, *unskilled labor*, *corporate capital*, and *unincorporated capital*. While the two labor categories correspond to the distinction between employees and workers made in Bolivian statistics, the two types of capital are characterized by different ownership structures. Corporate capital is owned by private and public enterprises and all corporate capital income is retained in these enterprises. Unincorporated capital, by contrast, belongs to households who also receive the respective factor income. This factor

income, in turn, comprises both profits distributed to owners of enterprises and mixed income earned by self-employed workers, the latter being a conglomerate of a return on investment and other components such as land rents.

Arriving at the distribution of income to these four factors involved several steps. Basic data for breaking down value added into its components were provided by INE (2001b) which calculated for 1998 the shares of wages, operating surpluses and mixed income in total value added. These data were adapted as follows. First, to obtain 1997 figures, it was assumed that the structure of value added did not change between 1997 and 1998. Then, wages were distributed between skilled and unskilled labor according to the information given in the 1997 employment survey (INE 1997). Finally, operating surpluses were split up into distributed profits and corporate capital income by taking the aggregate value of retained earnings given in the national accounts as total corporate capital income, and by assuming that both types of income have the same sectoral composition.

The factorial income distribution for the 13 production sectors that results from these calculations is shown in Table 6. A very diversified picture emerges. Traditional agriculture and informal services where, by assumption, only unincorporated capital is used as a production factor, account for the bulk of mixed income. Corporate capital income and distributed profits are highest in

formal services, a result that is partly owed to the large size of the sector. As a share of sectoral net value added, corporate capital income, for example, is much higher in both the oil and gas and the utilities sector. Skilled laborers earn most of their income either from providing formal services or from serving in the public administration, while unskilled workers receive a high share of their income from modern agriculture, manufacturing, construction and public services. Overall, with such a sectoral diversity of factor incomes, adjustment policies that induce structural change are likely to have a substantial impact on Bolivia's factorial income distribution.

Knowledge of the functional income distribution constitutes only a first step towards assessing a country's distributional situation. More direct insights can be gained by tracing the flow of income from factors to households. In doing so for Bolivia, we identify six different types of households: *smallholders*, *agricultural workers*, *employees*, *non-agricultural workers*, *urban informals*, and *employers*. The disaggregation is basically made along functional lines, i.e. households with similar factor endowments are lumped together. This is justified because factor income is the single-most important income source in Bolivia given the low degree of redistribution (see Section IV.2). Furthermore, workers and those involved in informal activities are disaggregated regionally as their consumption patterns tend to vary between regions (see Section IV.3).

Table 6 — Distribution of Income to Factors (Millions of Bolivianos)

	Traditional Agriculture	Modern Agriculture	Coca	Oil and Gas	Mining	Consumer Goods	Inter- mediate Goods	Capital Goods	Electricity, Gas and Water	Construc- tion	Informal Services	Formal Services	Public Sector	Total
Skilled Labor		122	23	279	82	440	207	14	228	222		3403	4242	<b>9261</b>
Unskilled Labor		486	94	142	270	624	278	23	27	311		215	427	<b>2895</b>
Corporate Capital		487	5	404	319	801	394	7	780	94		2548		<b>5839</b>
Unincorporated Capital														
Distributed Profits		748	7		490	1232	606	10		145		3918		<b>7156</b>
Mixed Income	3876		249		521	823	147	44		380	2978	1748		<b>10766</b>
<b>Total</b>	<b>3876</b>	<b>1842</b>	<b>377</b>	<b>825</b>	<b>1682</b>	<b>3920</b>	<b>1633</b>	<b>98</b>	<b>1034</b>	<b>1151</b>	<b>2978</b>	<b>11832</b>	<b>4669</b>	<b>35917</b>
<b>Shares (in Percent of Value Added)</b>														
Skilled Labor		0.07	0.06	0.34	0.05	0.11	0.13	0.14	0.22	0.19		0.29	0.91	<b>0.26</b>
Unskilled Labor		0.26	0.25	0.17	0.16	0.16	0.17	0.23	0.03	0.27		0.02	0.09	<b>0.08</b>
Corporate Capital		0.26	0.01	0.49	0.19	0.20	0.24	0.07	0.75	0.22		0.22		<b>0.16</b>
Unincorporated Capital														
Distributed Profits		0.41			0.29	0.31	0.37	0.10		0.13		0.33		<b>0.20</b>
Mixed Income	1.00		0.66		0.31	0.21	0.09	0.45		0.33	1.00	0.15		<b>0.30</b>
<b>Total</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
<b>Shares (in Percent of Factor Income)</b>														
Skilled Labor		0.01	0.00	0.03	0.01	0.05	0.02	0.00	0.03	0.02		0.37	0.46	<b>1.00</b>
Unskilled Labor		0.17	0.03	0.05	0.09	0.22	0.10	0.01	0.01	0.11		0.07	0.15	<b>1.00</b>
Corporate Capital		0.08	0.00	0.07	0.05	0.14	0.07	0.00	0.13	0.02		0.44		<b>1.00</b>
Unincorporated Capital														
Distributed Profits		0.11	0.00		0.07	0.17	0.09	0.00		0.02		0.55		<b>1.00</b>
Mixed Income	0.36		0.02		0.05	0.08	0.01	0.00		0.04	0.28	0.16		<b>1.00</b>
<b>Total</b>	<b>0.11</b>	<b>0.05</b>	<b>0.01</b>	<b>0.02</b>	<b>0.05</b>	<b>0.11</b>	<b>0.05</b>	<b>0.00</b>	<b>0.03</b>	<b>0.03</b>	<b>0.08</b>	<b>0.33</b>	<b>0.13</b>	<b>1.00</b>

Source: Own calculations based on INE (1997; 2001b).

Table 7 shows how income is distributed from the 4 production factors to the 6 household groups and to enterprises. 5 household groups obtain factor income from one single source: smallholders and urban informals only earn mixed income, agricultural and non-agricultural workers only unskilled labor income, and employees only skilled labor income. Employers are the sole exception as this group does not only include capital owners but also self-employed people with mixed income, such as providers of financial services, who cannot meaningfully be counted as informals.

What these income flows mean for the well-being of households is revealed by the average income figures presented in Table 8. Not surprisingly, it turns out that smallholders are worst off, followed by urban informals and the two categories of worker households. Incomes of employees and employers are substantially above the national average. As the by far richest household group, employers earn more than ten times the amount that goes to smallholders. Such a considerable range of income levels suggests that the classification chosen here has succeeded in isolating household groups with different living standards and thus provides a useful starting point for distributional analyses.

Table 7 — Distribution of Income from Factors to Institutions (Millions of Bolivianos)

	Skilled Labor	Unskilled Labor	Corporate Capital	Unincorporated Capital		Total
				Distributed profits	Mixed income	
Households						
Smallholder					4125	<b>4125</b>
Agricultural Workers		580				<b>580</b>
Employees	9321					<b>9321</b>
Non-Agricultural Workers		2315				<b>2315</b>
Urban Informals					4372	<b>4372</b>
Employers				7156	2269	<b>9425</b>
Private Enterprises			4373			<b>4373</b>
Public Enterprises			1466			<b>1466</b>
Government						
Rest of the World	28					<b>28</b>
<b>Total</b>	<b>9349</b>	<b>2895</b>	<b>5839</b>	<b>7156</b>	<b>10766</b>	<b>36005</b>

Source: Own calculations based on Table 6 and INE (2001a).

Table 8 — Employment and Average Monthly Income by Household Groups

	Smallholder	Agricultural Workers	Employees	Non-Agricultural Workers	Urban Informals	Employers	<b>Total</b>
Employment	1409313 <sup>a</sup>	66672	626368	296451	878203 <sup>a</sup>	292734	<b>3569741</b>
Income (Millions of Bolivianos)	4125	580	9321	2315	4372	9425	<b>30138</b>
Average Income per Month (Bolivianos)	244	725	1240	651	415	2683	<b>704</b>
<sup>a</sup> Including unpaid family workers.							

Source: Own calculations based on INE (1997) and Table 7.

## 2. Redistribution of Income

Various transactions taking place between institutions, such as government transfers to households and remittances from Bolivians living abroad, modify the factorial income distribution described above. In the SAM, the six household groups, the government, private and public enterprises, and the rest of the world are identified as participants in this process of redistribution. Financial institutions are assumed to act as mere intermediaries (see Section V.2). Their current transactions are allocated to the two kinds of enterprises. As a result, the institution ‘private enterprises’ does not only include private firms, but also commercial banks, insurance companies and pension funds, while the institution ‘public enterprises’ consists of state-owned and capitalized firms, the Central Bank, and other financial institutions such as development banks.

Table 9 shows the part of the inter-institutional transactions that involves the six household groups; a full description of the income flows between institutions is given in Appendix Table 1. It turns out that households as an aggregate have net receipts of about 2.5 billion Bolivianos. The most significant transactions recorded are public transfers (2.5 billion Bolivianos), government revenues (2 billion Bolivianos), interest receipts on deposits and dividends on equities (3.0 billion Bolivianos), and interest payments on loans (1.1 billion Bolivianos). Pensions and the corresponding contributions account for the bulk of the flows

from and to the government. Direct taxes and transfers, the classical means of public redistribution, only play a minor role, with 200 and 400 million Bolivianos, respectively, as do remittances, with less than 200 million Bolivianos.

Since there is no survey information available on the payments and receipts of different household groups, the disaggregation of the overall amounts had to be based on a number of assumptions, of which the most important are:

- (i) public pensions are confined to employees;
- (ii) only employers and employees hold equities and deposits in the private and public banking system;
- (iii) only employers and employees have access to private loans, while public loans are distributed to smallholders and informals;

Table 9 — Redistribution between Institutions (Millions of Bolivianos)

	Smallholders	Agricultural Workers	Employees	Non-Agricultural Workers	Urban Informals	Employers	Total
Receipts from							
Private Enterprises			1400			1423	<b>2823</b>
Public Enterprises			76			77	<b>153</b>
Government	74	11	2249	42	79		<b>2455</b>
Rest of the World	24	4	54	13	25	54	<b>174</b>
Payments to							
Private Enterprises			448			456	<b>904</b>
Public Enterprises	179				59		<b>239</b>
Government		4	1834	14		127	<b>1979</b>
Rest of the World							
Net Receipts	-81	11	1496	41	45	972	<b>2484</b>

Source: Own calculations based on National Account Data (INE, 2001a).

- (iv) smallholders and urban informals do not pay taxes;
- (v) all household groups receive remittances;
- (vi) all household groups except employers receive transfers from the government.

Based on these assumptions, overall flows were allocated among households in fixed proportions to their income levels. What comes out is that the bulk of redistribution involves employers and employees, while the poorer household groups are barely affected. Although this inevitably is a very stylized pattern, one can at least conclude that the redistribution process in Bolivia does not do much to correct for the disparities occurring in the primary income distribution. Poor households may not be totally excluded from formal social security and financial markets as assumed here, but their access definitely is very limited. Adding to this the low level of transfers, redistribution cannot be markedly progressive and thus is unlikely to constitute a major link between structural adjustment and the well-being of poor households.

### **3. Structure of Household Demand**

At given nominal factor and transfer incomes, the sectoral composition of private demand determines how the real income position of households might be affected by structural adjustment policies via changes in relative consumer prices. Since sectoral expenditures cannot be observed directly, the calculation of the demand vector for each household group had to proceed in two steps. First, consumption data from the national accounts were grouped into six commodity aggregates (see Table 10), and then disaggregated by household group combining information from the 1999 MECOVI survey (INE 2001c) and from Jemio (1993). Although the latter only identifies three types of households (rural, lower-income urban, upper-income urban), it had to be used here because the survey does not provide the necessary data for all relevant commodities. Due to lacking evidence, the shares spent on clothing and footwear and on consumer durables were set equal for the two rural households, for non-agricultural workers and informals, and for employees and employers, while expenditures on all services apart from transport were calculated residually. Second, the resulting commodity demand schedule was translated into a sectoral demand schedule employing a transformation matrix based on Jemio (1993).

Table 10 — Structure of Commodity Demand (Millions of Bolivianos)

Household Group \ Commodity	Smallholder	Agricultural Workers	Employees	Non-Agricultural Workers	Urban Informals	Employers	Total
Food, Beverages and Tobacco	0.512	0.504	0.295	0.419	0.396	0.272	<b>0.348</b>
Clothing and Footwear	0.055	0.055	0.048	0.049	0.049	0.048	<b>0.049</b>
Housing, Water and Energy	0.065	0.074	0.115	0.074	0.090	0.115	<b>0.100</b>
Consumer Durables	0.071	0.071	0.085	0.063	0.063	0.085	<b>0.077</b>
Transport	0.174	0.174	0.167	0.160	0.177	0.172	<b>0.171</b>
Other Services	0.123	0.123	0.291	0.235	0.224	0.310	<b>0.255</b>
<b>Total</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>	<b>1.000</b>

Source: Own calculations based on INE (2001c) and Jemio (1993).

In the commodity demand schedule shown in Table 10 two structural characteristics stand out. Food, beverages and tobacco are on much higher demand in poorer than in richer households and, among poorer households, rural spending exceeds urban spending. The mirror image can be observed with respect to services: wealthier people spend more than poorer people, and the urban poor more than the rural poor, on services such as health and education; only the budget shares allocated to transport are more or less equal across household groups, although the aggregate figures are likely to mask differences such as a move from public to private means of transportation with rising living standards.

This structure of demand carries over to the sectoral consumption pattern reported in Table 11. The share of the consumption basket devoted to the output of traditional agriculture, for instance, ranges from about 5 percent for employees and employers to more than 10 percent for smallholders, and services contribute between 30 percent (for smallholders) and 50 percent (for employers) to overall expenditures. In the case of services, the composition of demand also differs among households: the relative importance of informal services is highest in poor urban households, while rural households have to

Table 11 — Sectoral Consumption Demand by Household Groups (Millions of Bolivianos)

Household Group \ Sector	Smallholder	Agricultural Workers	Employees	Non-Agricultural Workers	Urban Informals	Employers	Total
Traditional Agriculture	519	62	542	197	343	484	<b>2147</b>
Modern Agriculture	49	7	95	32	55	84	<b>322</b>
Coca	33	5	7	8	15	9	<b>77</b>
Oil and Gas	0	0	0	0	0	0	<b>0</b>
Mining	0	0	0	0	0	0	<b>0</b>
Consumer Goods	1562	235	2668	818	1426	2336	<b>9044</b>
Intermediate Goods	290	44	839	141	289	729	<b>2332</b>
Capital Goods	167	25	482	81	166	422	<b>1344</b>
Electricity, Gas and Water	84	14	380	56	126	332	<b>991</b>
Construction	0	0	0	0	0	0	<b>0</b>
Informal Services	121	18	1175	371	694	1153	<b>3531</b>
Formal Services	1144	166	3989	642	1201	3659	<b>10800</b>
Public Sector	39	6	209	31	58	182	<b>526</b>
<b>Total</b>	<b>4008</b>	<b>581</b>	<b>10386</b>	<b>2379</b>	<b>4371</b>	<b>9389</b>	<b>31113</b>

Source: Own calculations based on Jemio (1993) and Table 10.

rely for the most part on formal services as they lack access to many of the services only provided by the urban informal economy. Overall, the structural variation in consumption seems to be large enough to constitute a potential mechanism through which adjustment measures can affect the distribution of income.

## **V. ACCUMULATION BALANCES**

This chapter deals with the part of income institutions retain for investment in physical and financial capital. It first discusses the savings and investment recorded for the year 1997 (section V.1), and then links these flows to the corresponding stocks which indicate the wealth of the different institutions (section V.2).

### **1. Saving and Investment**

At given factor incomes, inter-institutional transfers, and consumption expenditures, the amount saved by each domestic institution can be calculated residually from the accounting identity

$$(1) \quad \text{factor income} + \text{net transfers} = \text{consumption} + \text{savings}.$$

External savings are determined by the current account balance. As shown in Table 12, employers and employees dominate household savings. All other

household groups exhibit saving rates of around zero. Households and enterprises together account for about half of overall savings. The other half is contributed by the government and the rest of the world, reflecting that Bolivia in 1997 ran a budget surplus and a current account deficit.

Table 12 — Saving and Investment by Institutions (Millions of Bolivianos)

Institution	Saving	Investment	Saving-investment Balance
Households	1507	424	1083
Smallholders	35	-39	74
Agricultural Workers	10	6	4
Employees	431	268	163
Non-Agricultural Workers	-23	29	-52
Urban Informals	45	-29	74
Employers	1009	189	820
Private Enterprises	642	3418	-2777
Public Enterprises	2012	2247	-235
Government	1081	2086	-1004
Rest of the World	2933	0	2933
<b>Total</b>	<b>8176</b>	<b>8176</b>	<b>0</b>

Source: Own calculations based on INE (2001a).

Total savings determine the resources available for investment in physical capital. The institutional composition of this investment is documented in the national accounts, except for the different household groups. The breakdown of household investment had to rely on two assumptions: first, gross fixed capital formation, which includes the establishment of residential buildings, was

assumed to have the same distribution as the respective capital stocks (see below); second, aggregate inventories were distributed among smallholders, urban informals, and employers – i.e. among those household groups that are also producing units – taking shares in total mixed income as weights.

Compared to the government and enterprises, households do not invest much. For informals and smallholders, investment is even slightly negative as the reduction in inventories overcompensates positive fixed capital formation (Table 13). Furthermore, the investment projects households undertake are largely confined to construction; only employers utilize a non-negligible amount of capital goods.

The low investment levels realized by smallholders and informals point towards a possible persistence of poverty because for these household groups, who derive their income from self-employment, capital formation arguably is the most important means to raise living standards in the medium to long run. As a complement to private investment, capital expenditures by the government on public goods such as infrastructure may also have a considerable impact on the

Table 13 — Composition of Investment by Household Groups (Millions of Bolivianos)

Sector \ Household Group	Smallholder	Agricultural Workers	Employees	Non-Agricultural Workers	Urban Informals	Employers	Total
Modern Agriculture	16						<b>16</b>
Capital Goods	21				23	72	<b>116</b>
Construction	104	6	268	29	139	205	<b>751</b>
Formal Services	8				8	15	<b>31</b>
Gross Fixed Investment	149	6	268	29	170	292	<b>914</b>
Changes in Stocks	-188				-199	-103	<b>-490</b>
<b>Total</b>	<b>-39</b>	<b>6</b>	<b>268</b>	<b>29</b>	<b>-29</b>	<b>189</b>	<b>424</b>

Source: Own calculations based on INE (2001a, 2001c).

well-being of smallholders and informals. Hence, if public investment is cut back during adjustment, this constitutes another mechanism through which macroeconomic reforms may be transmitted to the household level.

While overall savings in the economy have to be equal to overall investment, this is not true for individual institutions. Here, saving-investment surpluses by households and the rest of the world correspond with deficits by enterprises and the government. These surpluses and deficits are balanced via the financial system. For each institution, the identity

$$(2) \quad \text{saving} - \text{investment} = \Delta \text{ assets} - \Delta \text{ liabilities} = \Delta \text{ net assets}$$

must hold, i.e. institutions with a saving-investment surplus accumulate (net) financial assets and thereby finance the deficits of the other institutions. Some of the financial transactions, for example the purchase of shares in enterprises, take place directly between institutions, while others involve one of the following financial intermediaries: the Central Bank, commercial banks, other financial institutions, and pension funds.

The matrix describing the flow of funds between all these economic agents replicates the structure of the matrix for 1998 given in Jemio (2001b). Since neither the existing case studies nor the Bolivian household surveys contain appropriate information about the financial transactions conducted by individual household groups, the disaggregation again produces a stylized picture. For

shares, deposits and loans, the same assumptions as in Section IV.2 were applied. In addition, it was assumed that only employees accumulate private pension rights, and that only employers hold foreign assets. Currency holdings were calculated residually so as to balance the flow-of-funds system.

The financial flows involving the six household groups are presented in Table 14; all other transactions can be found in Appendix Table 2. Savings allocated to pension funds, deposits in and loans from the commercial banking system, and foreign assets turn out to be the most significant items, which are all confined to the two richer household groups. The participation of poorer households in the financial system is low, both as creditors and debtors. From a distributional viewpoint, the most relevant feature emerging from the flow of funds is that smallholders and informals have very limited access to credit. This result may be somewhat overstated because in reality the two groups are likely to obtain at least some loans from commercial banks. Nevertheless, it seems reasonable to conclude that credit constraints – probably combined with a low saving capacity and other institutional factors not captured in the SAM – act as a break on investment by smallholders and informals.

Table 14 — Flow of Funds by Household Groups (Millions of Bolivianos)

Sector \ Household Group	Smallholder	Agricultural Workers	Employees	Non-Agricultural Workers	Urban Informals	Employers	Total
Change in Assets							
Private Enterprises			25			147	<b>172</b>
Central Bank	100	4	-5	-52	83	-164	<b>-34</b>
Commercial Banks			117			689	<b>806</b>
Other Financial Inst.			-3			-100	<b>-103</b>
Pension Funds			605				<b>605</b>
Rest of the World						831	<b>831</b>
Change in Liabilities							
Commercial Banks			575			582	<b>1157</b>
Other Financial Inst.	27				9		<b>36</b>
Change in Net Assets	74	4	163	-52	74	820	<b>1083</b>

Source: Own calculations based on Jemio (2001b).

## 2. Net Wealth

The flows just described link the stocks at the beginning to those at the end of 1997. Stocks can also be subject to revaluations over the year. In the highly dollarized Bolivian economy, such revaluations are assumed to be driven by exchange rate changes, with a depreciation of the Boliviano implying an appreciation of existing assets and liabilities and vice versa. For financial stocks, the accumulation process is described by

$$(3) \quad \text{assets}_t = \text{assets}_{t-1} + \Delta \text{ assets} + \text{revaluation of assets},$$

and

$$(4) \quad \text{liabilities}_t = \text{liabilities}_{t-1} + \Delta \text{ liabilities} + \text{revaluation of liabilities}.$$

A similar relationship holds for physical capital:

$$(5) \quad \text{capital stock}_t = \text{capital stock}_{t-1} + \text{investment} - \text{depreciation} + \text{capital gains}.$$

From equations (3) to (5), net wealth can be derived as

$$(6) \quad \text{net wealth}_t = \text{assets}_t - \text{liabilities}_t + \text{capital stock}_t.$$

A full account of these stock-flow relationships for all institutions is given in Appendix Table 2. Here we focus on the net wealth position of the different household groups, which is of particular interest from a distributional point of view. To arrive at the net wealth figures, end-of-period stocks at the aggregate

household level were first set equal to the beginning-of-period stocks for 1998 given in Jemio (2001b), and the beginning-of-period stocks were then derived by calculating backwards. The disaggregation of financial stocks was achieved by making the same assumptions as in Section V.1, except for currency holdings which were fixed at the same proportion of income for each household group. Physical capital was distributed among households using the information the MECOVI survey provides about fixed assets such as buildings and vehicles.

Table 15 shows the end-of-period stocks and the resulting net wealth. It turns out that physical capital is by far the dominating asset in the portfolio of Bolivians. This is even true for those two household groups (employers and employees) with the strongest links to the financial system. Just as the income distribution, the distribution of net wealth exhibits a clear distinction between the 4 poorer and the 2 richer household groups. The overall dispersion of net wealth is even higher than the dispersion of income, with an average employer's net assets exceeding those of an average smallholder by a factor of 15. Among the poorer households, smallholders and urban informals appear to be in a somewhat better position in terms of net wealth than in terms of income as they own relatively large physical capital stocks.

Table 15 — Assets and Liabilities by Household Groups (Millions of Bolivianos)<sup>a</sup>

Sector \ Household Group	Smallholder	Agricultural Workers	Employees	Non-Agricultural Workers	Urban Informals	Employers	Total
<b>Assets</b>							
Private Enterprises			746			754	<b>1500</b>
Central Bank	186	26	419	104	197	424	<b>1356</b>
Commercial Banks			4598			4650	<b>9248</b>
Other Financial Inst.			957			968	<b>1925</b>
Pension Funds			605				<b>605</b>
Rest of the World						1070	<b>1070</b>
Physical Capital	6909	297	12419	1356	7884	13521	<b>42386</b>
<b>Liabilities</b>							
Commercial Banks			4318			4366	<b>8684</b>
Other Financial Inst.	1915				638		<b>2553</b>
<b>Net Assets</b>	<b>5180</b>	<b>323</b>	<b>15427</b>	<b>1460</b>	<b>7442</b>	<b>17021</b>	<b>46853</b>
Average Net Assets (Bolivianos per occupied person)	3675	4842	24629	4927	8475	58144	
<sup>a</sup> End-of-period stocks.							

Source: Own calculations based on Jemio (2001b) and INE (2001c).

## **VI. CONCLUDING REMARKS**

This paper has described the construction of a Social Accounting Matrix (SAM) for Bolivia for the year 1997. The SAM displays a number of distributional features of the Bolivian economy, of which the most important are:

- (i) Smallholders and urban informals together account for about two thirds of the total labor force, but for less than a quarter of total income;
- (ii) the richest household group (employers) receives slightly more than ten times the income of the poorest household group (smallholders);
- (iii) disparities in the distribution of wealth are even somewhat wider, with employer's net assets exceeding those of smallholders by a factor of 15;
- (iv) the poor household groups are characterized by low savings, low investment, and a low participation in the financial system.

To arrive at a SAM that captures these distributional features in a consistent way, data from different sources – primarily the 1997 Input-Output table, the 1997 national accounts, and two household surveys for 1997 and 1999 – had to be reconciled. Moreover, various assumptions had to be made because at the given level of disaggregation not all the required information was available. The resulting data base is therefore in parts somewhat stylized, but it is still likely to

provide a reasonable approximation of the structural characteristics prevailing in Bolivia, rendering it a useful starting point for further analyses.

## REFERENCES

- Bulmer-Thomas, V (1982). *Input–Output Analysis in Developing Countries: Sources, Methods and Applications*. John Wiley & Sons, Chichester.
- INE (Instituto Nacional de Estadística) (1997). Encuesta Nacional de Empleo III: Noviembre 1997. La Paz.
- (2001a). Cuentas Nacionales 1988–1997. La Paz.
- (2001b). Bolivia: Valor Agregado Bruto A Sus Componentes Segun Actividad Economica 1998. La Paz. Unpublished Manuscript.
- (2001c). Encuesta Mecovi: Noviembre 1999. La Paz.
- Jemio, L.C. (1993). Micro- and Macroeconomic Adjustment in Bolivia (1970–89): A Neoliberalist Analysis of External Shocks, Adjustment and Stabilization Policies. PhD Dissertation, Institute of Social Studies. The Hague.
- (2001a). Macroeconomic Adjustment in Bolivia since the 1970s: Adjustment to What, By Whom, and How? Analytical Insights from a SAM Model. Kiel Working Paper 1031. Kiel.
- (2001b). *Debt, Crisis and Reform in Bolivia: Biting the Bullet*. Basingstoke, Hampshire.
- Lysy, F. (1977). Creating a Consistent Data Set for the Research Model of Malaysia. Unpublished Manuscript.
- Thiele, R., and M. Wiebelt (2000). Sind die Anpassungsprogramme von IWF und Weltbank gescheitert? Eine Bestandsaufnahme der Erfahrungen aus zwei Jahrzehnten. Kiel Institute of World Economics, Discussion Paper 357. Kiel.
- Vos, R. (1991). Social Accounting, Flow of Funds and Capital Accumulation. In: J.V. Alarcón, I. van Heemst, S. Keuning, W. de Ruijter, and R. Vos (Eds.), *The Social Accounting Framework: Concepts, Construction and Applications*. Aldershot.

Appendix Table 1 — Social Accounting Matrix for Bolivia 1997 (Millions of Bolivianos)

		Commodities														Factors						
		TA	MA	CS	OG	M	CG	IG	CAG	EGW	C	IS	FS	PS	Total	SL	UL	CC	UCDP	UCMI	Total	
		1	2	3	4	5	6	7	8	9	10	11	12	13	1-13	14	15	16	17	18	14-18	
Traditional Agriculture (TA)	1	413	135	0	0	3	2301	4	0	0	9	43	97	67	<b>3071</b>							
Modern Agriculture (MA)	2	92	83	0	0	16	1422	15	0	0	42	8	19	19	<b>1716</b>							
Coca Sector (CS)	3	0	0	0	0	0	0	1	0	0	0	0	0	0	<b>1</b>							
Crude Oil & Natural Gas (OG)	4	0	0	0	32	0	33	1190	0	83	0	1	2	1	<b>1342</b>							
Mining (M)	5	1	1	0	0	1	2	742	0	0	188	1	3	1	<b>940</b>							
Consumer Goods (CG)	6	161	90	1	10	50	2520	79	11	24	115	588	1370	286	<b>5307</b>							
Intermediate Goods (IG)	7	181	155	16	251	157	699	608	154	175	1196	714	1722	251	<b>6280</b>							
Capital Goods (CAG)	8	16	24	5	20	91	160	65	56	62	81	171	384	171	<b>1305</b>							
Electricity, Gas & Water (EGW)	9	2	3	0	29	50	156	118	6	13	8	106	219	85	<b>794</b>							
Construction (C)	10	0	0	0	0	0	0	2	0	8	0	4	137	2	<b>155</b>							
Informal Services (IS)	11	154	126	2	87	50	944	144	29	51	147	531	895	207	<b>3367</b>							
Formal Services (FS)	12	283	320	3	231	173	1365	363	57	219	218	1521	3133	600	<b>8486</b>							
Public Sector (PS)	13	1	2	0	2	1	10	2	0	1	1	10	14	3	<b>47</b>							
<b>Total</b>	<b>1-13</b>	<b>1305</b>	<b>940</b>	<b>27</b>	<b>663</b>	<b>592</b>	<b>9612</b>	<b>3333</b>	<b>313</b>	<b>635</b>	<b>2004</b>	<b>3699</b>	<b>7994</b>	<b>1693</b>	<b>32810</b>							
Skilled Labor (SL)	14		122	23	278	82	440	207	16	226	222		3408	4237	<b>9261</b>							
Unskilled Labor (UL)	15		486	94	142	270	624	278	23	27	311		215	427	<b>2895</b>							
Corporate Capital (CC)	16		486	4	404	319	801	394	7	780	94	0	2548	0	<b>5839</b>							
Unincorporated Capital (UC)																						
Distributed Profits (UCDP)	17		748	7		490	1232	606	10		145	0	3918	0	<b>7156</b>							
Mixed Income (UCMI)	18	3876		249		521	823	147	44		380	2978	1748		<b>10766</b>							
<b>Total</b>	<b>14-18</b>	<b>3876</b>	<b>1842</b>	<b>377</b>	<b>825</b>	<b>1682</b>	<b>3920</b>	<b>1633</b>	<b>99</b>	<b>1032</b>	<b>1151</b>	<b>2978</b>	<b>11837</b>	<b>4664</b>	<b>35917</b>							
Smallholder (SH)	19																			4125	<b>4125</b>	
Agricultural Workers (AW)	20																			580	<b>580</b>	
Employees (E)	21																			9321	<b>9321</b>	
Non-Agricultural Workers (NAW)	22																			2315	<b>2315</b>	
Urban Informals (UI)	23																				4372	<b>4372</b>
Employers (EM)	24																				7156	<b>7156</b>
Priv. Ent. (PE)	25																				4373	<b>4373</b>
Pub. Ent. (PUBE)	26																				1466	<b>1466</b>
Government (GOV)	27	16	37	0	648	150	1021	1617	906	118	329	0	881	5	<b>5727</b>							
<b>Total</b>	<b>19-27</b>	<b>16</b>	<b>37</b>	<b>0</b>	<b>648</b>	<b>150</b>	<b>1021</b>	<b>1617</b>	<b>906</b>	<b>118</b>	<b>329</b>	<b>0</b>	<b>881</b>	<b>5</b>	<b>5727</b>	<b>9321</b>	<b>2895</b>	<b>5839</b>	<b>7156</b>	<b>10766</b>	<b>35977</b>	

Appendix Table 1 continued

		Commodities														Factors					
		TA	MA	CS	OG	M	CG	IG	CAG	EGW	C	IS	FS	PS	Total	SL	UL	CC	UCDP	UCMI	Total
		1	2	3	4	5	6	7	8	9	10	11	12	13	1-13	14	15	16	17	18	14-18
Rest of World (RoW)	28	398	104	0	0	89	2079	3254	5230	0	0	220	852	0	<b>12226</b>	28					<b>28</b>
Imports		398	104	0	0	89	2079	3254	5230	0	0	220	852	0	<b>12226</b>						
Other																28					<b>28</b>
Changes in Stocks (STKA)	29																				
Smallholder (SH)	30																				
Agricultural Workers (AW)	31																				
Employees (E)	32																				
Non-Agricultural Workers (NAW)	33																				
Urban Informals (UI)	34																				
Employers (EM)	35																				
Priv. Ent. (PE)	36																				
Pub. Ent. (PUBE)	37																				
Government (GOV)	38																				
Central Bank (CB)	39																				
Commercial Banks (PB)	40																				
Other Fin. Inst. (OFI)	41																				
Pension Funds (PF)	42																				
Rest of World (RoW)	43																				
<b>Total</b>	<b>30-43</b>																				
<b>Total Expenditures</b>	<b>1-43</b>	<b>5594</b>	<b>2923</b>	<b>405</b>	<b>2136</b>	<b>2513</b>	<b>16632</b>	<b>9836</b>	<b>6548</b>	<b>1785</b>	<b>3485</b>	<b>6897</b>	<b>21564</b>	<b>6361</b>		<b>9349</b>	<b>2895</b>	<b>5839</b>	<b>7156</b>	<b>10766</b>	



Appendix Table 1 continued

		Institutions (Current)											Institutions (Capital)													Total Re-ceipts				
		SH	AW	E	NAW	UI	EM	PE	PUBE	GOV	Total	RoW	STKA	SH	AW	E	NAW	UI	EM	PE	PUBE	GOV	CB	PB	OFI		PF	RoW	Total	
		19	20	21	22	23	24	25	26	27	19-27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	30-43	1-43	
RoW	28							654	89	675	1418																		13672	
Imports																														
Other								654	89	675	1418																			
STKA	29													-188						-199	-103	578	189					276	276	
SM	30	35									35			0	0	0	0	0	0	0	0	0	0	0	27	0	0	27	62	
AW	31		10								10			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	
E	32			431							431			0	0	0	0	0	0	0	0	0	0	575	0	0	0	575	1006	
NAW	33				-23						-23			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-23	
UI	34					45					45			0	0	0	0	0	0	0	0	0	0	0	9	0	0	9	54	
EM	35						1009				1009			0	0	0	0	0	0	0	0	0	0	582	0	0	0	582	1590	
PE	36							641			641			0	0	25	0	0	147	0	-1	0	0	1226	-227	0	4293	5463	6104	
PUBE	37								2012		2012			0	0	0	0	0	0	105	0	0	0	0	0	0	10	115	2127	
GOV	38									1081	1081			0	0	0	0	0	0	0	0	0	0	-4	-186	-4	436	808	1050	2132
CB	39													100	4	-5	-52	83	-164	172	-121	64	0	309	-5	169	-428	125	125	
PB	40													0	0	117	0	0	689	1526	1	-18	145	26	61	0	703	3250	3250	
OFI	41													0	0	-3	0	0	-100	266	1	1	-28	-283	0	0	-2	-148	-148	
PF	42													0	0	605	0	0	0	0	0	0	0	0	0	0	0	605	605	
RoW	43											2933		0	0	0	0	0	831	617	0	0	12	1000	-9	0	0	2451	5384	
<b>Total</b>	<b>30-43</b>	<b>35</b>	<b>10</b>	<b>431</b>	<b>-23</b>	<b>45</b>	<b>1009</b>	<b>641</b>	<b>2012</b>	<b>1081</b>	<b>5242</b>	<b>2933</b>		<b>100</b>	<b>4</b>	<b>738</b>	<b>-52</b>	<b>83</b>	<b>1402</b>	<b>2686</b>	<b>-120</b>	<b>46</b>	<b>125</b>	<b>3250</b>	<b>-148</b>	<b>605</b>	<b>5384</b>	<b>14104</b>		
<b>Total Expenditure</b>	<b>1-43</b>	<b>4223</b>	<b>595</b>	<b>13100</b>	<b>2370</b>	<b>4476</b>	<b>10979</b>	<b>6050</b>	<b>2992</b>	<b>10511</b>		<b>13672</b>	<b>276</b>	<b>62</b>	<b>10</b>	<b>1006</b>	<b>-23</b>	<b>54</b>	<b>1590</b>	<b>6104</b>	<b>2127</b>	<b>2132</b>	<b>125</b>	<b>3250</b>	<b>-148</b>	<b>605</b>	<b>5384</b>			

Appendix Table 2— Accumulation Balances for Bolivia 1997 (Millions of Bolivianos)

		Institutions (Capital)														Total Liab. 1-14	Net Wealth
		SH 1	AW 2	E 3	NAW 4	UI 5	EM 6	PE 7	PUBE 8	GOV 9	CB 10	PB 11	OFI 12	PF 13	RoW 14		
SH	1	0	0	0	0	0	0	0	0	0	0	1821	0	0	1821	5108	
AW	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	308	
E	3	0	0	0	0	0	0	0	0	0	3609	0	0	0	3609	14696	
NAW	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1459	
UI	5	0	0	0	0	0	0	0	0	0	0	607	0	0	607	7301	
EM	6	0	0	0	0	0	0	0	0	0	3649	0	0	0	3649	15689	
PE	7	0	0	695	0	0	586	0	279	0	11577	1666	0	5485	20288	34452	
PUBE	8	0	0	0	0	0	0	1991	0	0	0	0	0	1784	3775	9087	
GOV	9	0	0	0	0	0	0	0	0	3326	1715	119	0	14810	19969	28458	
CB	10	82	22	409	151	110	567	607	514	3302	0	414	113	0	9971	2342	
PB	11	0	0	4307	0	0	3806	4745	25	133	2653	521	937	0	20181	2402	
OFI	12	0	0	919	0	0	1023	1032	4	8	54	906	0	46	3992	1534	
PF	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
RoW	14	0	0	0	0	0	218	371	0	0	6280	192	264	0	7324	21535	
Physical Capital	15	6847	286	11975	1308	7798	13140	45995	12040	44984	0	0	0	0	144372		
<b>Total Assets</b>	<b>1-15</b>	<b>6929</b>	<b>308</b>	<b>18305</b>	<b>1459</b>	<b>7908</b>	<b>19339</b>	<b>54740</b>	<b>12863</b>	<b>48427</b>	<b>12313</b>	<b>22584</b>	<b>5526</b>	<b>0</b>	<b>28859</b>		
TA	17	0	0	0	0	0	0	0	0	0							
MA	18	16	0	0	0	0	0	115	0	0							
CS	19	0	0	0	0	0	0	0	0	0							
OG	20	0	0	0	0	0	0	185	138	0							
M	21	0	0	0	0	0	0	0	0	0							
CG	22	0	0	0	0	0	0	0	0	0							
IG	23	0	0	0	0	0	0	136	0	0							
CAG	24	21	0	0	0	23	72	1879	1195	407							
EGW	25	0	0	0	0	0	0	0	0	0							
C	26	104	6	268	29	139	205	382	622	1574							
IS	27	0	0	0	0	0	0	0	0	0							
FS	28	8	0	0	0	9	15	143	104	105							
PS	29	0	0	0	0	0	0	0	0	0							
<b>Total Fixed Investment</b>	<b>17-29</b>	<b>149</b>	<b>6</b>	<b>268</b>	<b>29</b>	<b>170</b>	<b>292</b>	<b>2840</b>	<b>2059</b>	<b>2086</b>							
<b>STKA</b>	<b>30</b>	<b>-188</b>				<b>-199</b>	<b>-103</b>	<b>578</b>	<b>189</b>								
SH	31	0	0	0	0	0	0	0	0	0	0	27	0	0	27		
AW	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
EM	33	0	0	0	0	0	0	0	0	0	575	0	0	0	575		
NAW	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
UI	35	0	0	0	0	0	0	0	0	0	0	9	0	0	9		
E	36	0	0	0	0	0	0	0	0	0	582	0	0	0	582		
PE	37	0	0	25	0	0	147	0	-1	0	1226	-227	0	4293	5463		
PUBE	38	0	0	0	0	0	0	105	0	0	0	0	0	10	115		
GOV	39	0	0	0	0	0	0	0	0	0	-4	-186	-4	436	1050		
CB	40	100	4	-5	-52	83	-164	172	-121	64	0	309	-5	169	-428	125	
PB	41	0	0	117	0	0	689	1526	1	-18	145	26	61	0	703	3250	
OFI	42	0	0	-3	0	0	-100	266	1	1	-28	-283	0	0	-2	-148	
PF	43	0	0	605	0	0	0	0	0	0	0	0	0	0	605		
RoW	44	0	0	0	0	0	831	617	0	0	12	1000	-9	0	2451		
<b>Total Change in Assets</b>	<b>31-44</b>	<b>100</b>	<b>4</b>	<b>738</b>	<b>-52</b>	<b>83</b>	<b>1402</b>	<b>2686</b>	<b>-120</b>	<b>46</b>	<b>125</b>	<b>3250</b>	<b>-148</b>	<b>605</b>	<b>5384</b>	<b>14104</b>	

Appendix Table 2 continued

		Institutions (Capital)														Total Liab. 1-14	Net Wealth		
		SH	AW	E	NAW	UI	EM	PE	PUBE	GOV	CB	PB	OFI	PF	RoW				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14				
<b>Depreciation</b>	<b>45</b>	<b>137</b>	<b>6</b>	<b>239</b>	<b>26</b>	<b>156</b>	<b>263</b>	<b>920</b>	<b>241</b>	<b>900</b>									
SM	46	0	0	0	0	0	0	0	0	0	0	0	67	0	0			<b>67</b>	
AW	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0			<b>0</b>	
E	48	0	0	0	0	0	0	0	0	0	0	134	0	0	0			<b>134</b>	
NAW	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0			<b>0</b>	
UI	50	0	0	0	0	0	0	0	0	0	0	0	22	0	0			<b>22</b>	
E	51	0	0	0	0	0	0	0	0	0	0	135	0	0	0			<b>135</b>	
PE	52	0	0	26	0	0	22	0	10	0	0	396	62	0	203			<b>719</b>	
PUBE	53	0	0	0	0	0	0	64	0	0	0	0	0	0	62			<b>126</b>	
GOV	54	0	0	0	0	0	0	0	0	0	123	64	4	0	544			<b>734</b>	
CB	55	3	1	15	6	4	21	22	19	123	0	51	4	0	136			<b>405</b>	
PB	56	0	0	175	0	0	155	182	1	5	98	19	34	0	113			<b>782</b>	
OFI	57	0	0	41	0	0	46	38	0	0	3	44	0	0	1			<b>173</b>	
PF	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0			<b>0</b>	
RoW	59	0	0	0	0	0	22	15	0	0	234	7	10	0	0			<b>287</b>	
Physical Capital	60	238	10	416	45	271	456	1596	418	1561	0	0	0	0	0			<b>5010</b>	
<b>Total Revaluations</b>	<b>46-60</b>	<b>241</b>	<b>11</b>	<b>672</b>	<b>51</b>	<b>275</b>	<b>721</b>	<b>1916</b>	<b>448</b>	<b>1688</b>	<b>457</b>	<b>850</b>	<b>204</b>	<b>0</b>	<b>1059</b>			<b>8594</b>	
SM	61	0	0	0	0	0	0	0	0	0	0	0	1915	0	0			<b>1915</b>	<b>5180</b>
AW	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0			<b>0</b>	<b>323</b>
E	63	0	0	0	0	0	0	0	0	0	0	4318	0	0	0			<b>4318</b>	<b>15427</b>
NAW	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0			<b>0</b>	<b>1461</b>
UI	65	0	0	0	0	0	0	0	0	0	0	0	638	0	0			<b>638</b>	<b>7442</b>
E	66	0	0	0	0	0	0	0	0	0	0	4366	0	0	0			<b>4366</b>	<b>17021</b>
PE	67	0	0	746	0	0	754	0	289	0	0	13200	1500	0	9981			<b>26470</b>	<b>35371</b>
PUBE	68	0	0	0	0	0	0	2160	0	0	0	0	0	0	1856			<b>4016</b>	<b>11181</b>
GOV	69	0	0	0	0	0	0	0	0	0	3445	1593	119	436	16161			<b>21754</b>	<b>29594</b>
CB	70	186	26	419	104	197	424	801	412	3488	0	775	112	169	3389			<b>10502</b>	<b>2394</b>
PB	71	0	0	4598	0	0	4650	6453	27	120	2896	566	1033	0	3870			<b>24213</b>	<b>2471</b>
OFI	72	0	0	957	0	0	968	1336	5	9	29	667	0	0	46			<b>4017</b>	<b>1565</b>
PF	73	0	0	605	0	0	0	0	0	0	0	0	0	0	0			<b>605</b>	<b>0</b>
RoW	74	0	0	0	0	0	1070	1002	0	0	6526	1199	265	0	0			<b>10062</b>	<b>25241</b>
Physical Capital	75	6909	297	12419	1356	7884	13521	50089	14464	47731	0	0	0	0	0			<b>154670</b>	<b>0</b>
<b>Total Assets</b>	<b>61-75</b>	<b>7095</b>	<b>323</b>	<b>19745</b>	<b>1461</b>	<b>8081</b>	<b>21387</b>	<b>61841</b>	<b>15197</b>	<b>51348</b>	<b>12896</b>	<b>26684</b>	<b>5582</b>	<b>605</b>	<b>35303</b>				<b>154670</b>