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Macroeconomic Adjustment in Bolivia since the 1970s: Adjustment to What, By Whom, and How? Analytical Insights from a SAM Model

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Abstract:

This paper discusses alternative adjustment patterns in Bolivia over the last three decades using a SAM-based model that explicitly separates formal from informal activities, includes separate accumulation balance adjustments for different economic agents, differentiates closures by periods of time, and incorporates balances for all sectors of the economy. It is argued that both, fluctuating capital inflows and terms of trade as well as the stabilization policies and the structural reforms, affected different groups differently. Moreover, the various adjustment patterns followed by the groups have determined the direction of adjustment at the macroeconomic level. Thus, macroeconomic adjustment in Bolivia has been the outcome of sectoral adjustments and of the interactions among different agents through the diverse markets they operate in.

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1. INTRODUCTION

Macroeconomic adjustment in Bolivia has undergone drastical changes in the last three decades. In part, these changes were forced upon the country by changing external conditions, such as fluctuating terms of trade and limited access to foreign exchange, in part they can be traced back to changing internal conditions resulting from structural and institutional reforms. Four sub-periods can be identified: (i) the 1970s, when Bolivia benefited from a relatively abundant flow of foreign resources, (ii) the first half of the 1980s, when external flows through official channels were drastically reduced while unoffical foreign exchange earnings increased significantly, (iii) the second half of the 1980s, when the New Economic Policy (NEP) tried to stabilize and restructure the economy, and (iv) the 1990s, when structural reforms substantially modified the conditions for the development of the private sector.

The fluctuating pattern followed by capital inflows and by the country's terms of trade as well as the stabilization policies and structural reforms implemented, affected individual economic agents (i.e. government, public enterprises, private companies, households, and banks) differently. Very often, the policies were explicitly designed to change the behavioral rules of specific agents (e.g. the popular participation reform, the reforms of the financial system and the capitalization of public enterprises). The various adjustment patterns followed by these agents have determined the direction of adjustment at the macroeconomic level. Thus, macroeconomic adjustment in Bolivia, has been the outcome of sectoral adjustments and of the interactions among the different agents through the diverse markets they operate in.

The SAM model presented in this paper attempts to provide a detailed and plausible interpretation of macroeconomic adjustment in Bolivia:

- by explicitly separating formal from informal activities in the productive sector. This separation is crucial in the Bolivian case because the relative expansion or contraction of these activities have completely changed the structure of the economy in terms of income, investment, employment, fiscal revenues, foreign exchange earnings, capital exports, etc.
- by including separate accumulation balance adjustments for different economic agents (i.e. companies, households and government), which tend to be essentially different because they are ruled by different institutional settings (e.g. objectives, constraints in the different markets they face, bargaining power, access to finance, etc.).
- by differentiating closures with respect to periods of time that are defined according to prevailing external and internal conditions.

- By incorporating balances for all sectors of the economy (i.e. supply-demand balances, accumulation balances, and balances for the external and financial sectors): Therefore, macroeconomic equilibrium is obtained simultaneously through the interaction of all sectoral balances.

Section 2 provides a general explanation of the SAM framework, which is then used to characterise the structure of the Bolivian economy. The disaggregation introduced in the different accounts is explained. *Section 3* introduces the various balances that are crucial to explain macroeconomic adjustment. The balances are defined in algebraic terms. They are utilized in *section 4* to analyse and discuss sectoral and macroeconomic adjustment during four time periods (i.e. the 1970s, the first and second half of the 1980s, and the early 1990s. Finally, the most important conclusions are outlined in *section 5.*

2. THE SAM MODEL FOR THE BOLIVIAN ECONOMY

The SAM model is aimed at setting up a framework for the algebraic formulation of alternative hypotheses on adjustment in Bolivia since the 1970s. The degree of disaggregation does not go beyond what is strictly necessary in order to facilitate the algebraic formulation of the hypotheses. The main characteristics of the SAM model are: it differentiates adjustment mechanisms for various balances, it differentiates adjustment mechanisms over time, and it considers macroeconomic adjustment as being determined jointly by the interactions of different economic actors.

2.1 General Outline of the System

The basic structure of the SAM comprises the standard accounts categories reflecting general accounting procedures (Pyatt and Round 1984). Table 1 gives a schematic presentation of this structure. The first class of accounts identifies the receipts and expenditures of *Activities.* Receipts result from sales to other economic activities (i.e. intermediate demand) and to domestic and foreign institutions (i.e. consumption, investment, and exports). These receipts are balanced by expenditures or the costs of production for intermediates, factors of production (value added), indirect taxes and imported intermediate inputs. The *Factors* accounts show, in the row, the distribution of income to factors and, in the column, how this income is appropriated by the various institutions according to their factor endowments. The *Institutions Current* accounts show the sources and uses of current income by institutions. The rows contain 3 income categories: factor income, transfers among institutions (such as direct tax payments, social security payments, distributed profits), and net current transfers

from and interest payments to the rest of the world (ROW), respectively. The columns show how institutions allocate their incomes: expenditures on the consumption of locally produced and imported goods, outlays due to the redistributive processes, and savings. The *Institutions Capital* accounts presents the sources and uses of funds by institutions. The sources are displayed in the rows: own savings, credit from external sources and credit from the domestic financial system. The uses of funds by economic agents are shown in columns: they go to finance physical investment, the acquisition of external financial assets (i.e. capital exports, foreign exchange reserves and external debt payments), and the acquisition of domestic financial assets.

The transactions between the country and the *Rest of the World* are recorded in accounts 4 and 6. The current transactions are displayed in row and column 4. Row 4 shows receipts by the ROW due to imports and net factor payments. These are balanced by payments from the ROW in column 4. The origins of these payments are exports and current transfers to local institutions. The difference between receipts and payments constitutes the current account balance, and is shown as a transfer from the ROW current account to the ROW capital account as 'external savings'. The capital transactions with the ROW are displayed in account 6. Column 6 shows the total capital inflows received from the ROW. The uses made of these inflows appear in row 6. They go to finance the current account balance of payments deficit as well as the acquisition of external financial assets by economic agents and by financial institutions. Finally, the *Financial* accounts show the sources and uses of funds of financial institutions. The rows present the sources of these funds: total acquisition of financial assets by non-financial agents, total foreign credit, and total credit conceded among financial institutions. These totals are balanced by the uses made of these funds and are displayed in the columns: credit to non-financial institutions, and the acquisition of foreign financial assets.

2.2 Relevant Breakdown of Accounts

This section discusses the minimum breakdown in the SAM that is necessary to analyze adjustment issues in Bolivia. The choice of disaggregation must obviously depend on both its analytical value and on the availability of data to sustain it. The broad classes of accounts can be disaggregated into the following:

(a) Productive activities can be classified according to the sector in which they operate (agriculture, manufacturing, mining, etc.), according to the type of commodity they produce (tradables as opposed to nontradables), according to their technological or institutional characteristics (small-scale or large-scale, formal or informal, public or private, etc.) and/or according to the

type of market in which they operate (i.e. competitive flex-price market or oligopolistic fix-price market).

(b) The breakdown of income distribution across factors of production can differentiate income that remunerates the use of labour services (wages) from the income that pays for the use of capital by households and other institutions. Since these factor services are heterogeneous, separate accounts can be specified. For instance, capital can be disaggregated to distinguish ownership (private or public), or the legal status of the firm (formal or informal).

(c) The breakdown of institutions or economic actors can single out economically relevant individuals and institutions into groups related to functional categories of income distribution, i.e. households (including non-corporate enterprises), private (corporate) enterprises, public enterprises, and the government (central and local). Once the incomes received by these economic agents have been identified, their saving-investment patterns can be equally well distinguished within the SAM framework. Different economic actors tend to consume and save different proportions of their incomes. In some cases income is devoted to the consumption of necessities, while in others, the proportion consumed is small and the rest is used to finance imported luxuries. In addition, the proportion saved plus the additional capital transfers from other sectors are invested in different proportions by the various economic agents.

(d) Finally, the breakdown of the financial accounts can single out financial institutions according to their main institutional characteristics (i.e. the Central Bank, commercial banks, development banks, etc.).

In this section, the six account categories presented in section 2.1 are disaggregated into more detailed structures. The disaggregation chosen attempts to reflect the heterogeneous nature of the Bolivian economy that emerged from the debates on the country's macroeconomic behaviour over the last three decades. The main features that reflect the heterogeneous nature of the Bolivian economy are as follows:

- a segmented productive structure with a growing informal sector,
- a high level of dependence of the economy on the external sector,
- a high level of state participation in economic activity,
- a segmented financial system,
- differentiated accumulation behaviour for the various institutions and social groups,

– disparate access to credit by the various economic institutions and social groups.

The SAM is presented in Table 2. The disaggregations for each of the accounts are now discussed.

(i) Productive activities

All productive activities are grouped in two broad categories, formal and informal. The activities in the formal sector are those controlled by corporate (including state-owned) enterprises. The categories included here are: modern agriculture, mining, hydrocarbons, manufacturing, construction, electricity, modern services and government services. Their common characteristics are:

– They use relatively capital-intensive technology and wage labour.

– They operate in oligopolistic markets and therefore set prices through mark-ups over their costs of production.

– Production in these sectors is relatively more responsive to demand changes because there exist reserves of productive capacity.

– Corporate enterprises operate mostly in export activities (e.g. mining, oil, agro-industry).

The activities within the informal sector are: traditional agriculture, coca production and informal services in urban areas. The main characteristics that distinguish the informal sector are:

– They operate in relatively more competitive markets; depending on the level of buyer demand, prices therefore adjust in order to clear excess demand.

– Output responses to changes in aggregate demand in these sectors are quite limited because production is generally constrained by structural factors and bottlenecks.

(ii) Factors of production

Factors of production have been grouped into three categories: wage labour, corporate profits, and non-corporate profits by household-based firms in the informal sector:

(a) Wage labour may be differentiated by skill categories; the main sources of income are fixed wages.

(b) Corporate profits comprise those profits by companies and public firms within the formal sector.

(c) Non-corporate profits comprise incomes of small peasants in rural areas, and by small-scale producers and informal workers in urban areas.

(iii) Institutions

In the SAM, domestic institutions have been divided into three categories: companies, households, and government.

(a) Companies include private corporations and public enterprises.

(b) Households include the three household categories: rural, lower-income urban and upper-income urban.

(c) Government includes the central and local governments.

(iv) Financial accounts

This set of accounts shows the role of financial institutions as financial intermediaries. All the capital transactions among different economic actors are carried out through the financial system. The SAM distinguishes separate accounts for the Central Bank and for commercial banks.

2.3 Outline of the Model for the Bolivian Economy

The structure of the SAM appears in Table 2.

Column 1 shows the cost structure for formal activities. It comprises: wage payments (wb_fX_f), imported inputs ($eP^Ma_mX_f$) and corporate profits (R_f). Row 1 shows the allocation of total production by the formal sector, as follows: intermediate inputs, which are demanded by informal activities (P_faX_i); final consumption by households (P_fC_f) (e.g. agro-industrial products); final government consumption, which is concentrated in formally produced goods and services (P_fG); exports of mining, hydrocarbons and agro-industrial products (eP^EE_f), investment demand by households ($P_f(1-\Theta)I_h$), mostly for the construction of dwellings; and investment demand by government (P_fI_g), which is concentrated in capital goods produced domestically (e.g. the construction of infrastructure).

Column 2 shows the cost structure of informal activities: the acquisition of inputs produced by the formal sector (P_faX_i), and profits (R_i), which are the difference between the market value of total production and total input costs. The allocation of total production by informal activities appears in row 2: production from agriculture (staple foods), manufacturing (handicrafts) and informal services, consumed by households (P_iC_i) (this consumption also includes subsistence consumption by peasant households), exports by informal activities, mostly coca

and its by-products ($e_p P^E_i E_i$) and informal construction (self-construction), which constitutes the gross fixed capital formation for poor households ($P_i \theta I_h$).

Row 3 shows that wage incomes ($wb_f X_f$) originate from formal activities. Column 3 shows that those incomes are eventually received by households.

Row 4 shows that non-corporate profits (R_i) originate from informal activities. Column 4 indicates that households are the final recipients of those profits.

Row 5 shows that corporate profits (R_f) arise from formal activities. Column 5 shows the share of those profits that constitutes income for companies (ΓR_f); the other part, which comes from public enterprise operations, is appropriated by government ($(1-\Gamma)R_f$).

Row 6 indicates that the only source of income for companies is the corporate profit earnings resulting from private company operations (ΓR_f). Column 6 shows the use that companies make of their gross profits: tax payments to government ($t\Gamma R_f$), distributed profits to household owners of shares (DP), interest payments on the private external debt ($ei^* F_{pb}$), and the remaining constitutes retained profits which are company savings (S_c).

Row 7 shows the total sources of household incomes: wage earnings ($wb_f X_f$), non-corporate profit earnings (R_i) and the distributed profits from companies (DP). Column 7 shows the uses households make of these incomes. Part of them are used to finance consumption of food ($P_i C_i$), of goods and services produced by the formal sector ($P_f C_f$) and of imported consumption goods ($e_P P^M C_m$). The remainder constitutes household savings (S_h).

Row and column 8 display current government transactions. Row 8 shows government revenues: public enterprise profits ($(1-\Gamma)R_f$) and tax payments by companies ($t\Gamma R_f$). Column 8 indicates that these incomes go to finance government consumption ($P_f G$) and interest payments on the external public debt ($ei^*(F_g + F_{cb})$). The remainder comprises government savings (S_g).

Row and column 9 show the current transactions with the rest of the world. Row 9 shows the ROW's receipts from: import payments, i.e. intermediate imports ($eP^M a_m X_f$), imports of consumption goods ($e_P P^M C_m$) and of capital goods ($eP^M I_c$), and from interest payments on the public and private external debt, ($ei^*(F_g + F_{cb})$) and ($ei^* F_{pb}$), respectively. Payments from the ROW are shown in column 9. They comprise exports by formal activities ($eP^E_f E_f$), and by informal activities ($e_P P^E_{i,i} E_i$). The difference between payments to and payments from the rest of the world comprises external savings (S_e).

Row and column 10 display the accumulation balance for companies, that is, the equilibrium between companies' sources and uses of funds. Row 10 shows the sources of funds available to companies: own savings (S_c) and credit obtained

from commercial banks within the period ($\Delta L_{pb,c}$). The uses made of these funds appear in column 10: investment in imported capital goods such as machinery and equipment ($eP^{M}I_{c}$), and new deposits in commercial banks (ΔDep_{c}).

Row and column 11 show the accumulation balance for households. The sources of funds in row 11 consist of: own savings (S_{h}) and loans from commercial banks ($\Delta L_{pb,h}$). The uses of funds shown in column 11 include: household investment in capital goods produced by the formal sector ($P_{f}(1-\Theta)I_{h}$); household investment in goods produced within the same household (e.g. self-construction) ($P_{i}\Theta I_{h}$), to finance capital exports ($e^{P}\Delta CF_{h}$), changes in the stock of currency (ΔCu_{h}) and bank deposits (ΔDep_{h}) held by households.

Row and column 12 display the accumulation balance for the government. The sources of funds (row 12) are: the government's own savings (S_{g}), foreign credits obtained within the period ($e\Delta F_{g}$), new credit from the Central Bank ($\Delta L_{cb.g}$), and government's bonds (ΔB_{b}). The uses of these resources appear in column 12; they mostly comprise government investment in locally produced capital goods ($P_{f}I_{g}$) such as infrastructure.

Row and column 13 show the capital transactions with the rest of the world. Column 13 displays receipts from the ROW; they mostly comprise capital inflows received by the government ($e\Delta F_{g}$), by the Central Bank ($e\Delta F_{cb}$) and by commercial banks ($e\Delta F_{pb}$). The uses made of these resources appear along the row. Part of these flows goes to finance the country's current account deficit (S_{e}), another part is used to increase foreign exchange reserves in both the Central Bank ($e\Delta FR_{cb}$) and commercial banks ($e\Delta FR_{pb}$) and the remainder goes to finance capital exports by households ($e^{P}\Delta CF_{h}$).

Row and column 14 present the balance for the Central Bank. Row 14 shows the changes in Central Bank liabilities, which are equivalent to changes in the stock of high-powered money or the monetary base, and represent sources of funds for the Central Bank: currency (notes and coins) (ΔCu_{h}) demanded by households, external credits obtained by the Central Bank ($e\Delta F_{cb}$), and changes in the amount of domestic reserves maintained by commercial banks in the Central Bank (ΔRe_{pb}) to meet the demands of their customers for cash and payments made through cheques deposited in other banks. Reserves consist of notes and coins held by the banks - vault cash - and also of deposits held by the Central Bank. Column 14 shows the sources of changes in the stock of high-powered money: credit granted to the public sector within the period (i.e. both to the central government and to public enterprises) ($\Delta L_{cb.g}$), new loans to the private banking system ($\Delta L_{cb,pb}$) and changes in the amount of foreign exchange reserves ($e\Delta FR_{cb}$).

Finally, row and column 15 present the balance for commercial banks. Along the row there are the sources of funds for commercial banks, which are equivalent to the increases in the banks' liability position. These sources are: deposits made by companies (ΔDep_c) and by households (ΔDep_h), and credit obtained by commercial banks abroad ($e\Delta F_{pb}$) and from the Central Bank ($\Delta L_{cb.pb}$). Column 15 shows the changes in the asset position of the commercial banks, representing the uses made of the funds available. Part of these funds goes to finance credit to companies ($\Delta L_{pb.c}$), to households ($\Delta L_{pb.h}$) and to government (ΔB_g); the rest is used to increase foreign exchange reserves ($e\Delta FR_{pb}$) and domestic reserves (ΔRe_{pb}).

3. SECTORAL BALANCES

The SAM structure comprises all the macroeconomic balances required for a complete specification of the Bolivian economy: the accumulation balance for all domestic economic agents (i.e. companies, households and government), the supply-demand balances for all activities (formal and informal), the balances for financial institutions (the Central Bank and commercial banks), and the balance for the external sector.

Macroeconomic adjustment within the SAM model framework can be interpreted by first looking at adjustments in the individual balances at the microeconomic level. The way in which the overall accumulation balance of the economy adjusts thereafter, will be determined by the interaction and aggregation of individual accumulation balance adjustments.

The accumulation balances for households (equation 1), for companies (equation 2) and for government (equation 3) are obtained from rows and columns 10, 11 and 12 of Table 2, respectively. The accumulation balance for the Central Bank (equation 4) is obtained from row and column 14 and that for the private banks (equation 5) from row and column 15. Finally, the external balance (equation 6) is derived from row and column 13.

$$S_c + L_{pb.c} \equiv eP^M I_c + \Delta Dep_c \quad (1)$$

$$S_h + L_{pb.h} \equiv [(1-\theta)P_f + \theta P_i]I_h + \Delta Cu_h + \Delta Dep_h + e^P \Delta CF_h \quad (2)$$

$$S_g + e\Delta F_g + \Delta L_{cb.g} + \Delta B_g \equiv P_f I_g \quad (3)$$

$$\Delta Cu_h + e\Delta F_{cb} + \Delta Re_{pb} \equiv \Delta L_{cb.g} + e\Delta FR_{cb} + \Delta L_{cb.pb} \quad (4)$$

$$\Delta Dep_c + \Delta Dep_h + e\Delta F_{pb} + \Delta L_{cb.pb} \equiv \Delta L_{pb.c} + \Delta L_{pb.h} + \Delta B_g + e\Delta FR_{pb} + \Delta Re_{pb} \quad (5)$$

$$S_e + e^P \Delta CF_h + e\Delta FR_{cb} + e\Delta FR_{pb} \equiv e\Delta F_g + e\Delta F_{cb} + e\Delta F_{pb} \quad (6)$$

Adding the above equations gives:

$$S_c + S_h + S_g + S_e \equiv eP^M I_c + [(1-\theta)P_f + \theta P_i]I_h + P_f I_g \quad (7)$$

Rearranging (7) we obtain the standard accumulation balance for the whole economy:

$$[P_f I_g - S_g] + [((1-\theta)P_f+\theta P_i)I_h - S_h] + [eP^M I_c - S_c] \equiv e\Delta F \quad (8)$$

An important conclusion derived from equations (1) to (8) is that adjustment at the macroeconomic level can be derived from individual accumulation balance adjustments for all the socioeconomic agents and institutions of the economy at the microeconomic level. The same reasoning, however, cannot be applied the other way around; from an aggregate closure at the macroeconomic level, it is not always possible to ensure consistency in the closures at the microeconomic level. In fact, disaggregated analysis is the only way to obtain a plausible picture of how macroeconomic adjustment takes place in a developing economy.

The rest of this section concentrates on analysing the structure of each of the balances included in the SAM model. The aim is to identify all possible adjustment mechanisms for each of the balances. This will be particularly useful for the following section 4, where the most relevant adjustment mechanisms for each balance are discussed in light of the macroeconomic events observed in Bolivia during the 1970s, the early 1980s, the late 1980s, and the early 1990s.

3.1 Accumulation Balances

(i) Companies

As discussed above, the accumulation balance for companies is obtained from row and column 10 of the SAM; thus,

$$S_c + \Delta L_{pb.c} \equiv eP^M I_c + \Delta Dep_c \quad (9)$$

Corporate savings, on the other hand, are obtained from row and column 6 of the SAM:

$$S_c \equiv \Gamma R_f - [DP + t\Gamma R_f + ei^* F_{pb}] \quad (10)$$

Formal profits (R_f) are obtained from column 1:

$$R_f \equiv P_f X_f - [wb_f X_f + eP^M a_m X_f] \quad (11)$$

Taking prices in the formal sector (P_f) to be equal to the unit costs of production plus the mark-up (τ) obtained by companies:

$$P_f = (1+\tau)(wb_f + eP^M a_m) \quad (12)$$

Substituting (10) and (11) in (9), dividing the resulting equation by the capital stock of the economy valued at prices of formal sector output ($P_f K$) and rearranging, we obtain:

$$(1-z)(1-t)\Gamma\pi u_f - qi^* f_{pb} + \Delta l_{pb.c} = (1+\mu)qP^M g_c \quad (13)$$

where:

- t = tax rate on corporate profits
- z = share of corporate profits that is distributed to households
- π = share of corporate profits in the total value of formal sector output, ($\pi = \tau/(1+\tau)$)
- τ = mark-up profit rate obtained by companies
- g = (I/K) rate of growth of capital stock
- q = (e/P_f) ratio of the nominal exchange rate to the formal sector output price or the 'real exchange rate'
- u = (X/K) output-capital ratio as an indicator of capacity utilization
- f = (F/K) foreign capital inflows as a proportion of capital stock
- l = (L/K) bank credit available to the economic agent as a proportion of capital stock
- μ = [Dep_c)/I_c] desired balance sheet 'portfolio' of financial assets relative to investment
- Γ = proportion of corporate profits owed to private companies.

Equation (13) shows that if there is a disequilibrium between company savings and investment (e.g. $I_c > S_c$) adjustment will come through one or a combination of the following adjusting mechanisms:

(a) Corporate savings can increase. First, if they operate in oligopolistic markets, firms can increase savings by expanding their levels of activity when there is excess capacity (u_f) (the Keynesian case), or by fixing higher prices for their output so that the share of profits (π) in total income will be increased (the Kaldorian case). This latter case of course depends on the degree of market power which the firms have. Second, since firms in the formal sector also produce for export markets, they can try to influence the economic authorities to set a convenient exchange rate. However, since the formal sector output also depends on imported intermediate inputs, they can eventually ask for differentiated exchange rates, a higher rate for exports and a lower rate for imported inputs, in order to maximize profits.

(b) Companies are able to expand their availability of funds through bank loans. The access of companies to bank credit is facilitated because in Bolivia large enterprises are usually organized into groups associated with a bank that can guarantee the required liquidity on the basis of the profits of the group as a whole.

In summary, there are four possible adjusting variables that can bring adjustment to the accumulation balance for companies when there is disequilibrium between investment and savings. These mechanisms are: changes in the output of the formal sector (u_f); changes in the share of corporate profits in the gross value of formal sector output (π), changes in the level of credit obtained from commercial banks within the period ($\Delta l_{pb.c}$), and adjustments in the level of corporate investment (g_c).

(ii) Households

The accumulation balance for households is obtained from equation (2):

$$S_h + \Delta L_{pb.h} \equiv [(1-\theta)P_f + \theta P_i]I_h + \Delta Cu_h + \Delta Dep_h + e^P \Delta CF_h \qquad (14)$$

S_h can be expanded in terms of its fundamentals using row and column 7 in Table 2. Thus,

$$S_h \equiv [wb_f X_f + R_i + DP] - [P_f C_f + P_i C_i + e^P P^M C_m] \qquad (15)$$

Profits by household-based firms can also be written in terms of its basic components:

$$R_i \equiv P_iX_i + e^P P_i^E E_i - P_f a X_i \quad (16)$$

Based on stylized facts, we can define the following household consumption functions for commodities produced by formal activities (equation 17); by informal activities (equation 18), and those that are imported (equation 19):

$$P_f C_f = c[P_i(1 - ß) - P_f a)]X_i + \alpha(1 - \tau_i)\, e^P P_i^E E_i \quad (17)$$

$$P_i C_i = w b_f X_f + P_i ß X_i \quad (18)$$

$$e^P P^M C_m = c_m z(1 - t)\Gamma R_f + (1 - \alpha)(1 - \tau_i) e^P P_i^E E_i \quad (19)$$

(a) Wage incomes tend to be spent entirely on consumption. Consumption is mostly concentrated on the acquisition of staple foods (C_i).

(b) Peasant producers in the informal sector tend to use a large part (ß) of their production for their own consumption (C_i).

(c) Households consume a proportion c of their incomes arising from the sale of marketable surpluses.

(d) The propensity to consume out of distributed profits (c_m) tends to be very low. This type of consumption relates mostly to imported goods.

(e) Peasants working in the informal coca sector tend to spend their incomes on purchases of imported and domestic goods; the latter is mostly concentrated on goods produced by the formal sector. In order to simplify the model, the amount consumed by this peasant household group will be equal to the remaining surplus once intermediaries and merchants have secured for themselves a margin τ_i of total gross value of coca output.

Replacing (15)-(19) in (14), dividing the whole expression by the capital stock of the economy (K) valued at formal sector output prices (P_f) and rearranging, we restate it as:

$$[1 - (c + \delta)][p_i(1-ß) - a]u_i + [1-(c_m + \lambda)z(1 - t)\Gamma\pi u_f + \tau_i q_P P_i^E \varepsilon_i + \Delta l_{pb}$$

$$= [(1-\theta) + \theta p_i]g_h + q^P \Delta cf_{pb} \quad (20)$$

where:

p_i = (p_i/p_f) internal terms of trade between informal and formal activities

c = the propensity of households to consume out of non-corporate profit earnings

c_m = the propensity of households to consume out of distributed corporate profits

ß = the proportion of total informal output that is used for self-consumption within households

δ = $[\Delta Cu_h/(P_i(1\text{-}ß) - a)]$ coefficient between household demand for currency relative to monetary incomes arising from the sale of marketable informal output surpluses (excluding self-consumption)

λ = $[\Delta Dep_h/c_2DP]$ coefficient between household demand for bank deposits relative to their income from distributed profits

τ_i = profit margin obtained by intermediaries and merchants out of the total gross value of coca output

θ = share of household investment in goods produced within the same household (e.g. self-construction)

cf = (CF/K) capital exports relative to capital stock

ε_i = (E/K) coca exports as a proportion of total capital stock

P^E_i = international prices for coca exports.

Equation (20) outlines the balance between household investment and savings availability. Household investment comprises both physical capital (mostly house construction) and financial capital (in this case mostly used to finance capital exports).

In an unbalanced situation, adjustment is likely to come through one or a combination of the following variables:

(a) Households can finance their acquisition of financial and physical assets using their own savings from various sources of income such as non-corporate profits, distributed profits and coca earnings (as discussed before, there is no saving out of wage incomes) or borrowing from commercial banks.

(b) Savings out of non-corporate profits can increase through an expansion of output (u_i) or through higher prices (p_i) in the informal sector. However, unlike corporate profit-earners, non-corporate profit-earners have little

influence on their levels of income, which are largely determined by factors beyond their control. This is so because informal activities take place in competitive markets; therefore prices are set by market forces. In addition, production by peasants and informal urban firms tends to be extremely inelastic, so that production cannot be expanded as a means to achieve higher levels of income. Moreover, prices for inputs demanded within informal activities in the market tend to be fixed by companies that have oligopolistic positions in those markets.

(c) Household savings out of distributed profits can increase through an output expansion in formal activities (u_f); or by increasing the share of corporate profits in the gross value of formal sector output (π).

(d) Savings out of coca revenues can be increased when: the level of exports is increased, coca prices rise in international markets, the foreign exchange rate in the parallel market goes up, or merchants and intermediaries increase their mark-up and extract more surpluses from peasants.

(e) Finally, households can borrow from commercial banks. Available bank credit to households is set on the basis of factors such as expected ability to repay (or the value of collateral). Therefore, access to credit tends to be very limited ($\Delta l_{pb.h}$).

In summary, any imbalance between household savings and investment can be cleared through nine adjusting mechanisms: informal sector output (u_i), prices of informal output (p_i), the share of corporate profits (π), formal sector output (u_f), informal sector exports (ε_i), commercial bank credit obtained within the period ($\Delta l_{pb.h}$), household demand for physical investment (g_h) and for financial investment (Δcf_h) (capital exports); and finally, the value of the exchange rate in the parallel market (q^P).

(iii) Government

The accumulation balance for the government was outlined in equation (3):

$$S_g + e\Delta F_g + \Delta L_{cb.g} + \Delta B_g \equiv P_f I_g \qquad (21)$$

Government savings can be obtained from row and column 8 in Table 2:

$$S_g \equiv (1-\Gamma)R_f + t\Gamma R_f - P_f G + ei^*(F_g+F_{cb}) \qquad (22)$$

Replacing (22) in (21) and dividing the equation by ($P_f K$), we obtain:

$$[(1-\Gamma) + t\Gamma]\pi u_f + q(\Delta f_g - i^* f_g) + \Delta l_{cb.g} + \Delta b_g = \Omega + g_g \qquad (23)$$

where:

Ω = (G/K) government consumption as a proportion of capital stock.

According to equation (23), if government savings and investments are not balanced ex-ante, ex-post adjustment is likely to come through changes in the following variables:

(c) Formal sector output (u_f) and/or the share of corporate profits in the gross value of formal sector output (π) can increase so that the government's tax revenues and public sector profits can be increased.

(d) External borrowing can be increased (Δf_g).

(e) Domestic credit can be obtained from the Central Bank ($\Delta l_{cb,g}$).

(f) The government can issue bonds (Δb_g).

(g) Current expenditures can be reduced so that savings can be increased (Ω).

Therefore, the government's balance adjustment can take place through changes in the values of seven variables: formal sector output (u_f), the share of corporate profits (π), foreign borrowing (Δf_g), domestic borrowing from the Central Bank ($\Delta l_{cb,g}$), bonds issued to the private sector (Δb_g), the level of government expenditures (Ω), and finally, the level of government investment (g_g).

3.2 Financial Balances

(i) Commercial banks

The accumulation balance for the commercial banks was defined in equation (4):

$$\Delta Dep_c+\Delta Dep_h+e\Delta F_{pb}+\Delta L_{cb.pb} \equiv \Delta L_{pb.c}+\Delta L_{pb.h}+e\Delta FR_{pb}+\Delta Re_{pb} + \Delta B_g \qquad (24)$$

Using the notation and relationships already introduced, and dividing equation (24) by P_fK, yields

$$(1-r)[\mu qP^M g_c+\lambda z(1-t)\Gamma\pi u_f]+q(1-fr)\Delta f_{pb}+\Delta l_{cb.pb} = \Delta l_{pb.c}+\Delta l_{pb.h} + \Delta b_g \qquad (25)$$

where:

r = reserves-deposits ratio for commercial banks

fr = foreign reserves/external debt ratio for commercial banks.

Equation (25) shows the balance between the changes in the total assets and total liabilities of the commercial banks, which is equivalent to the balance between their total uses and total sources of funds. In a disequilibrium situation, adjustment can take place through several variables within this balance:

(a) Company demand for bank deposits may change. However, according to the specification of company demand for bank deposits within the model, this depends on the changes that occur in company investment demand (g_c).

(b) Holdings of bank deposits by households may change depending on the variables (u_f) and (π) that determine distributed profits.

(c) Commercial bank borrowing both from external sources (Δf_{pb}) and from the Central Bank ($\Delta l_{cb.pb}$) may vary.

(d) Finally, commercial banks can adjust the amount of credit available to companies ($\Delta l_{pb.c}$), to households ($\Delta l_{pb.h}$) and to the government (Δb_g).

In summary, there are eight variables that can bring adjustment to the balance for commercial banks: company investment (g_c), formal sector output (u_f), the share of corporate profits in the gross value of formal sector output (π), foreign credit to commercial banks (Δf_{pb}), Central Bank credit to commercial banks ($\Delta l_{cb,pb}$), commercial bank loans to companies ($\Delta l_{pb,c}$), to households ($\Delta l_{pb,h}$) and to the government (Δb_g).

(ii) The Central Bank

The accumulation balance for the Central Bank was defined in equation (5):

$$\Delta Cu_h + e\Delta F_{cb} + \Delta Re_{pb} \equiv \Delta L_{cb.c} + \Delta L_{cb.g} + e\Delta FR_{cb} + \Delta L_{cb.pb} \qquad (26)$$

Using the notation and relationships already introduced, and dividing equation (26) by P_fK, yields

$$\delta[p_i(1-ß)-a]u_i + r[\mu q P^M g_c + \lambda z \pi u_f] + q(\Delta f_{cb} - \Delta fr_{cb}) = \Delta l_{cb.g} + \Delta l_{cb.pb} \qquad (27)$$

Equation (27) shows balance for the Central Bank. In an ex-ante disequilibrium situation, ex-post adjustment can take place through changes in the values of the following variables:

(a) Currency demand out of the non-corporate profit incomes of households may change. As specified in the model, however, this may depend on the level of informal sector output (u_i) and on the prices at which the marketable surpluses of informal output are sold (p_i).

(b) To increase the reserves requirements of commercial banks, the Central Bank can manipulate (increase) the required reserves-deposits ratio as a policy variable (r). Required reserves can also increase through an expansion of bank deposits by companies and by households. These variables depend on corporate investment demand (g_c), on formal sector output (u_f) and on the share of corporate profits in the gross value of formal sector output (π).

(c) The Central Bank can resort to external borrowing (Δf_{cb}) or can reduce part of its foreign exchange reserves (Δfr_{cb}).

(d) Finally, the Central Bank can adjust the amount of credit available to the government ($\Delta l_{cb.g}$) and to commercial banks ($\Delta l_{cb.pb}$).

In summary, nine variables can bring adjustment to the balance for the Central Bank: prices (P_i) and output level (u_i) in the informal sector, corporate investment demand (g_c), formal sector output (u_f), the share of corporate profits in the gross value of formal sector output (π), foreign credit to the Central Bank (Δf_{cb}), the Central Bank's foreign exchange reserves (Δfr_{cb}), Central Bank loans to the government ($\Delta l_{cb.g}$) and to commercial banks ($\Delta l_{cb.pb}$).

3.3 External Balance

To move further in the specification of the SAM model, this section concentrates on the specification of the balance adjustment for the external sector. The balance was outlined in equation (6):

$$S_e + e^P\Delta CF_h + e\Delta FR_{cb} + e\Delta FR_{pb} \equiv e\Delta F_g + e\Delta F_{cb} + e\Delta F_{pb} \qquad (28)$$

Replacing S_e by its fundamentals we obtain

$$eP^M a_m X_f + ei^*(F_g+F_{cb}+F_{pb}) + eP^M I_c + e^P P^M C_m - (eP^E{}_f E_f + e^P P^E_i.E_i) +$$
$$e^P\Delta CF_h + e\Delta FR_{cb} + e\Delta FR_{pb} \equiv e\Delta F_g + e\Delta F_{cb} + e\Delta F_{pb} \qquad (29)$$

Using the notation and relationships already introduced, dividing the whole expression by P_fK and rearranging, we obtain

$$q[P^M(a_m u_f + g_c) + i^*(f_g+f_{cb}+f_{pb}) - P^E{}_f\varepsilon_f + \Delta fr_{cb} - (1-fr)\Delta f_{pb} - \Delta f_{cb} - \Delta f_g] +$$
$$q^P[(c_m z\pi u_f)/q^P - (1 - (1-\alpha)(1-\tau_i))P^E_i.\varepsilon_i + \Delta cf_h] = 0 \qquad (30)$$

The external balance, as presented in equation (30), comprises both official and unofficial transactions. In an ex-ante unbalanced situation, ex-post adjustment can take place through several adjusting mechanisms operating in the informal or parallel foreign exchange market. The transactions that take place in the official market, which appear in the upper part of equation (30), are:

(a) Levels of imports of intermediate and capital goods may vary. This will obviously depend on the levels of formal sector output (u_f) and on the level of corporate investment (g_c).

(b) Levels of formal sector exports can change (ε_f).

(c) Accumulation of foreign reserves by the banking system (Δfr_{cb}).

(d) Net capital inflows received by commercial banks (Δf_{pb}), the Central Bank (Δf_{cb}) and by the government (Δf_g).

In the lower part of equation (30) the unofficial transactions are valued at the parallel foreign exchange rate. These adjusting mechanisms are:

(a) Imports of consumption goods, which are defined within the model, depend on distributed profits from companies to households. Therefore they are conditioned by the levels of formal sector output (u_f) and of the share of corporate profits in the gross value of formal sector output (π).

(b) Coca exports can change (ε_i). This variable would affect export earnings as well as imports of consumer goods.

(c) The acquisition of foreign assets by households (capital exports) can also close the balance (Δcf_h).

(d) Finally, the value of the exchange rate in the parallel market can change in order to adjust the external balance as a whole (q^p).

In summary, there are 11 variables that can adjust the balance for the external sector: u_f, π, ε_f, ε_i, g_c, Δf_g, Δf_{cb}, Δf_{pb}, Δfr_{cb}, Δcf_h and q^p.

3.4 Supply-Demand Balances

Finally, for a complete specification of the whole macroeconomic system, we need to determine the adjustment for the supply-demand balance of all the economic activities included in the SAM model both formal and informal.

(i) The formal sector

The supply-demand balance for formal activities is obtained from row 1 in Table 2:

$$P_f X_f \equiv P_f a X_i + P_f C_{fh} + P_f G + e P_f^E E_f + P_f(1-\theta) I_h + P_f I_g \quad (31)$$

After dividing equation (31) by $P_f K$, replacing the already defined relationships and rearranging terms, we obtain

$$u_f = [a+c(p_i(1-ß) - a)]u_i + \alpha(1-\tau_{CO})q^P P_{CO}^E \varepsilon_{CO} + \Omega + qP_f^E \varepsilon_f + (1-\theta)g_h + g_g \quad (32)$$

Equation (32) says that total supply in formal activities must be equal to total demand. Any disequilibrium between supply and demand will be cleared through the following mechanisms.

(a) Formal sector output (u_f) may increase and accommodate to the level of demand.

(b) Informal sector output may change and reduce/increase the demand for intermediate inputs (u_i).

(c) Demand out of non-corporate profit earnings may vary if informal sector output (u_i) or relative prices (p_i) change.

(d) Demand arising from coca proceeds may vary if there is a change in coca export volumes (ε_i) and/or in the value of the exchange rate in the parallel market.

(e) Government demand can change (Ω).

(f) Exports of goods and services produced by formal activities can change (ε_f).

(g) Demand for capital goods produced by the formal sector can change if government and/or household investment demands vary.

In summary, there are nine variables that can adjust the supply-demand balance for the formal sector: u_f, p_i, u_i, ε_i, Ω, ε_f, g_h, g_g and q^P.

(ii) The informal sector

The supply-demand balance for informal activities is obtained from row 2 in Table 2:

$$P_iX_i + e^P P_i^E E_i \equiv P_iCi_h + e^P P_i^E E_i + P_iI_h \quad (33)$$

Inserting the already defined consumption functions into (33), dividing the whole expression by P_fK, and rearranging terms, we obtain

$$(1 - ß)u_i = [(1-\pi-qP^*a)u_f]/p_i + g_h \quad (34)$$

According to (34), if there is an excess demand in the informal sector demand-supply balance, adjustment will come through the following mechanisms:

(a) Informal sector output can change (u_i) and accommodate to the level of demand.

(b) Household consumption out of wage incomes can change as a result of: first, changes in the levels of informal sector output, which affect wage employment and therefore total wage incomes; second, an increase in the share of corporate profits in the gross value of formal sector output (π) due to a higher mark-up rate, will reduce real wages and therefore consumption; third, the same effect occurs when a devaluation of the official exchange rate (q) increases the share of imported intermediates in the gross value of formal sector output; and fourth, an increase in the price of informal sector output (p_i) reduces demand in real terms.

(c) Finally, adjustment can take place through changes in household demand for capital goods produced within the informal sector (g_h) (e.g. self-construction).

In summary, there are five variables that tend to adjust the supply-demand balance for the informal sector: u_i, u_f, g_h, π and p_i.

4. MACROECONOMIC ADJUSTMENT IN BOLIVIA WITHIN THE SAM MODEL

In the previous section, the overall structure of the SAM model for the Bolivian economy was specified. The structure of the eight balance equations was outlined and the possible adjusting variables for each balance were identified. In total, 25 adjusting variables were distinguished as possible closures for the eight balances that make up the model. Therefore, 17 variables still need to be specified: (i) exogenous variables, (ii) those variables determined through specific behaviourial equations, (iii) policy variables, and (iv) model constraints. In this way the system will be fully determined with an equal number of balances and closures.

The aim of this section is to identify the most relevant closures within the SAM model over the last three decades. As discussed in the Introduction, adjustment in the Bolivian economy has tended to vary from period to period as a result of external shocks and domestic policies. Four sub-periods were clearly identified: (i) the 1970s, when the country benefited from a relatively abundant flow of foreign resources; (ii) the first half of the 1980s, when external flows through official channels were drastically reduced while unofficial foreign exchange earnings increased significantly; (iii) the second half of the 1980s, when the country's economic development strategy was completely changed under the NEP, and (iv) the 1990s, when the reforms introduced redefined the adjustment closures for some of the sectors (i.e. the government, public enterprises, the central bank and private banks).

A general assumption in the following analysis of adjustment within the SAM model is that external shocks are beyond the country's control. Variables such as capital inflows, external interest rates, terms of trade, etc., are therefore taken to be exogenous.

4.1 Adjustment During the 1970s

The 1970s were characterized by the accumulation of a large external debt by the public sector, by increased state involvement in economic activity, by large transfers of resources to the private sector through bank credit, and by the rapid accumulation of external assets by the private sector (capital exports) (World Bank 1985b; Ramos 1980; Ladman 1982; Dunkerley 1984). The patterns of adjustment of sectoral balances during the 1970s were as follows.

(i) Companies

According to many authors, the accumulation balance for companies showed a favourable situation during the 1970s (Ramos 1980; Dunkeley 1984; Hinojosa and Espinoza 1983). Companies had access to funds out of their own savings, facilitated by favourable external prices for export commodities. In addition, companies enjoyed large financial flows from domestic financial institutions as a deliberate policy of the economic authorities to increase private participation in economic activity (Devlin and Mortimore 1983; Torrico 1982).

Adjustment in the accumulation balance for companies to the wider availability of funds partly came in the form of higher levels of fixed capital formation. Corporate investment was mainly allocated to the agro-export industry and to the construction sector (Dunkerley 1984; García-Rodriguez 1982).

In summary, during the 1970s, corporate investment demand was not constrained by the availability of savings. Companies that wished to undertake any profitable (or unprofitable) investment project could find finance either from their own increased profits or through bank credit made available by financial institutions.

To capture the investment-leading-savings position adopted by companies during that period, the adjustment in the accumulation balance can be described as follows:

(a) Corporate investment was determined by their investment demand (g_c). According to an econometric test (Jemio 2001), g_c was positively correlated with the amount of bank credit received within the period ($\Delta l_{pb,c}$), lagged government investment ($g_{g(-t)}$) (the crowding-in effect; World Bank 1985b), and activity levels in the formal sector (u_f) (the accelerator effect); it was negatively correlated with the international interest rate (i^*) and public sector investment demand (g_{pe}) (the crowding-out effect; Devlin and Mortimore 1983). Thus,

$$g_c = g0 + g1(\Delta l_{pb,c}, g_{g(-t)}, u_f, i^*, g_{pe}) \qquad (35)$$
$$\qquad\qquad + \quad + \quad + \quad - \quad -$$

(b) During the 1970s, corporate savings could be expanded by increasing the level of capacity utilization (u_f) (the Keynesian case). This adjustment mechanism is discussed later within the demand-supply balance for the formal sector.

(e) Finally, the adjusting variable that acts as the main closure for the accumulation balance for companies is the level of credit obtained from commercial banks ($\Delta l_{pb.c}$). Corporate access to bank credit was facilitated because large businesses in Bolivia are organized into large groups associated with a bank

that can guarantee the required liquidity on the basis of the profits of the group as a whole (Hinojosa and Espinoza 1983; Torrico 1982).

(ii) Households

During the 1970s, households investment demand was sharply restricted by the availability of savings and other sources of finance (Romero 1982). Therefore, in an ex-ante unbalanced situation between investment demand vis-à-vis planned savings (e.g. $S_i < I_i$), ex-post adjustment would most likely come through a reduction of investment to the availability of savings ($S \rightarrow I$). This savings-constrained condition is reflected in the model in the following ways:

(a) Household investment demand (g_h) is selected as the final adjusting variable for the accumulation balance for households (the Ricardian case).

(b) Household incomes arising from wage earnings and informal sector profits are assumed to be spent entirely on consumption, since this is assumed to be at the subsistence level (Urioste 1989b; Morales 1984). Actually, households whose main sources of income are wage earnings and non-corporate profits have no power to improve their earnings because of their inflexibility to expand output levels in the activities they control (u_i) (i.e. the informal sector) and because they are unable to improve their internal terms of trade (p_i), since P_i is determined in highly competitive, atomistic markets and P_f is fixed by capital owners using a mark-up based on their oligopolistic position in the markets they control.

(c) The bank loans available to households ($\Delta l_{pb.h}$) are defined as a constraint within the balance, to reflect the limitations of households in obtaining more loans from the domestic financial system due to credit rationing or restrictions imposed by bank rules on collateral (Torrico 1982).

(d) The variables u_f and π that determine consumption out of distributed profit incomes are determined within the accumulation balance for the formal sector.

(e) Finally, coca exports (ε_i) were not significant during the 1970s (Healy 1986).

(iii) Government

During the 1970s, the accumulation balance for the government represented a favourable situation (World Bank 1985b). The state had relatively wide access to external and domestic funds, an important part of which came from the government's own savings. This was possible because the favourable tendency of state-owned enterprise income increased government tax revenues. In

addition, the government enjoyed relatively easy access to foreign credit. Resort to domestic financial sources (i.e. Central Bank credit) was unnecessary because the state became a surplus sector. The large amount of resources available during the 1970s therefore allowed the government and public sector enterprises to expand investment without facing major financial constraints. The unconstrained savings situation enjoyed by the public sector is captured within the model in the following ways:

(a) Government consumption (Ω) and investment demand (g_g) are defined as being determined through specific demand functions. Econometric tests carried out (Jemio 2001) show that government consumption was positively correlated with government consumption in the previous period (Ω_{t-1}), and capital inflows received by the government, and was negatively correlated with the rate of inflation (p):

$$\Omega = f(\Omega_{t-1}, \Delta f_g, p) \tag{36}$$

Government investment, on the other hand, showed a positive correlation with government investment in the previous period $g_{g(t-1)}$, and with capital inflows received by the government (Δf_g):

$$g_g = f(g_{g(t-1)}, \Delta f_g) \tag{37}$$

(b) Foreign capital inflows to the government (Δf_g) are considered to be exogenous to the model, following Devlin's argument that during the 1970s Bolivia experienced a supply-led indebtedness (Devlin 1986); besides, the variables (u_f) and (π) that determine government incomes are resolved within the demand-supply balance for the formal sector. The closing variable in the balance for the government therefore has to be the amount of credit it obtains from the Central Bank ($\Delta l_{cb,g}$) (Lehwing 1989).

(iv) Commercial banks

In section 3.2, seven variables were identified as possible closures for the balance for the commercial banks: company investment (g_c), formal sector output (u_f), the share of corporate profits in the gross value of formal sector output (π), foreign credit to commercial banks (Δf_{pb}), Central Bank credit to commercial banks ($\Delta l_{cb,pb}$), commercial bank loans to companies ($\Delta l_{pb,c}$) and to households ($\Delta l_{pb,h}$). Most of these variables have been defined elsewhere in the model; thus, the two variables available for bringing adjustment to the balance for the commercial banks are:

(a) Foreign capital inflows to the commercial banks (Δf_{pb}), which as in the case of the government are taken to be exogenously determined (Devlin 1986).

(b) The accumulation balance for the commercial banks therefore adjusts through credit from the Central Bank ($\Delta l_{cb.pb}$) (Lehwing 1989).

(v) The Central Bank

Nine variables were identified as possible closures for the balance for the Central Bank: relative prices (p_i) and output level (u_i) in the informal sector, investment demand by companies (g_c), formal sector output (u_f), the share of corporate profits in the gross value of formal sector output (π), foreign credit to the Central Bank (Δf_{cb}), foreign exchange reserves held by the Central Bank (Δfr_{cb}), and Central Bank loans to the government ($\Delta l_{cb.g}$) and the commercial banks ($\Delta l_{cb.pb}$). Of these variables, only Δfr_{cb} and Δf_{cb} have not yet been determined elsewhere in the model. Either of these two variables could act as the closure of the balance for the Central Bank in order to reflect the foreign exchange unconstrained situation enjoyed by the Bolivian economy during the 1970s.

(a) Capital inflows received by the Central Bank are considered to be exogenous to the model (Devlin 1986).

(b) The balance for the Central Bank therefore adjusts by reducing or building up foreign exchange reserves (Δfr_{cb}).

(vi) The external sector

Eleven variables were identified as possible closures for the external balance: u_f, π, ε_f, ε_i, g_c, Δf_g, Δf_{cb}, Δf_{pb}, Δfr_{cb}, Δcf_h and q^P. All of these variables have been determined elsewhere, except capital exports by households (Δcf_h) and the exchange rate in the parallel market (q^P).

(a) During the 1970s, due to the easy availability of foreign exchange to Bolivia, there was no difference between the official and parallel exchange rates. All unofficial transactions in foreign currency were conducted using the officially determined foreign exchange rate (q).

(b) The variable that closes the external balance is therefore tΔcf_h. This closure reflects the fact that during the 1970s, the foreign exchange available in Bolivia exceeded the country's capacity to absorb and use it productively. As a result, the excess foreign exchange available was used to finance capital flight by the private formal sector (Ramos 1980; World Bank 1985b).

(vii) The formal sector

Nine variables were identified as possible closures for the supply-demand balance for the formal sector: u_f, p_i, u_i, ε_i, Ω, ε_f, g_h, g_g and q^P. Adjustment in the supply-demand balance for formal activities showed the following pattern during the 1970s:

(a) The determination of p_i and u_i is discussed within the closure of the balance for the informal sector (section (viii)).

(b) Exports from the formal sector demonstrated that they were responsive to relative price changes as nontraditional exports rose in response to terms of trade improvements (World Bank 1985b):

$$\varepsilon_f = f(qP^E) \qquad (38)$$

(c) The clearing variable in the demand-supply balance for the formal sector is therefore capacity utilization (u_f), since the productive capacity created during the 1970s allowed for output changes in response to excess demand (Ladman 1982).

(viii) The informal sector

Five variables were recognized as possible closures for the supply-demand balance for the informal sector: u_i, u_f, g_h, π and p_i. Adjustment for informal activities during the 1970s showed the following pattern:

(a) The level of informal output (u_i) (e.g. traditional agricultural output) is considered as a constraint within the model given the structural bottlenecks that characterize informal production (Torrico 1982; Urioste 1989b; Morales 1984; Schuh 1991); u_i is therefore assumed to be fixed.

(b) The variable that closes the demand-supply balance of the informal sector therefore has to be p_i.

(ix) Summary of adjustment mechanisms during the 1970s

The eight balances discussed above describe the adjustment in the Bolivian economy during the 1970s. The eight endogenous variables that were identified as closures for the eight balances of the system were: formal sector activities (u_f), internal terms of trade for informal activities (p_i), investment demand by households (g_h), commercial bank credit to companies ($\Delta l_{pb.c}$), Central Bank credit to commercial banks ($\Delta l_{cb.pb}$), Central Bank credit to the government ($\Delta l_{cb.g}$), capital exports by households (Δcf_h), and foreign exchange reserves held by the banking system (Δfr_{cb}).

The variables considered as constraints or fixed in the model were: informal sector output (u_i), commercial bank credit to households ($\Delta l_{pb.h}$), and the share of corporate profits in the gross value of formal sector output (π).

The variables considered as policy variables were: the nominal exchange rate (e), tax rate (t) and the required reserves/deposits ratio (r).

The variables specified as functions were: formal sector exports (ε_f), government consumption (Ω), and investment demand by companies (g_c) and by the government (g_g).

Finally, the variables considered as exogenous, whose impact we can evaluate through the model, were: capital inflows to government (Δf_g), to the commercial banks (Δf_{pb}) and to the Central Bank (Δf_{cb}); external prices for formal exports (P^E_f) and for imports (P^M); coca exports (ε_i) and the international interest rate (i^*).

4.2 Adjustment During the First Half of the 1980s

The first half of the 1980s was characterized by much lower official export revenues; negative net external capital inflows as debt payments exceeded disbursements of new loans and interest payments increased due to the much higher interest rate; larger fiscal deficits that were financed through money creation; extremely high rates of inflation; increased illegal export revenues due to the coca trade; and a highly segmented foreign exchange market with highly differentiated foreign exchange rates (World Bank 1985b, J.A. Morales 1987a, b; Dunkerley 1992; Healy 1986).

The supply-demand and accumulation balance adjustments under these new conditions are discussed in the following.

(i) Companies

During the 1980s, companies became foreign exchange constrained as they found more difficulties in expanding their availability of external resources because of the much lower levels of foreign credit and official export revenues. As a result, output responses in ‘formal’ activities were restricted by the lack of foreign exchange to finance imports of intermediate inputs (Mierau-Klein and Page 1991), so that their ability to expand corporate savings through increased output was limited. Moreover, companies had to adjust ex-post investment (g_c) to a much lower level determined by the availability of foreign exchange to finance imports of capital goods. As a result, some companies' planned investments did not materialize (Mierau-Klein and Page 1991). The constraint imposed by the foreign exchange gap on formal sector output and corporate investment

transformed ‘import capacity’ into the main closures of the official foreign exchange balance. This is further explained in section (vi).

In a situation of ex-ante excess of investment demand vis-à-vis planned savings, however, ex-post equilibrium still came through an expansion of companies' availability of funds. The main mechanisms were:

(a) As inflationary expectations rose, companies increased their share in the gross value of formal sector output (π) by increasing the mark-up rate (τ). This implied a fall in real wages and a consequent reduction in the share of wages in total income (R. Morales 1987b; UDAPE 1990a).

(b) Moreover, given the privileged position enjoyed by companies in domestic financial markets during that period, credit from commercial banks ($\Delta l_{pb.c}$) was assigned freely on demand. It mainly came through private bank loans, which in turn were financed by the Central Bank (Ramos 1989; World Bank 1989). The outcome was a continuous credit expansion that eventually fuelled inflation. Therefore, during the first half of the 1980s, $\Delta l_{pb.c}$ remained as the main closure in the accumulation balance for companies.

(ii) Households

During the first half of the 1980s due to higher informal (illegal) export prices (P_i^E) and increased export quantities (ε_i), revenues for households involved in the coca trade expanded sharply (Healy 1986; Naylor 1987). Coca-producing households generated large surpluses. Two groups of people benefited directly from this illegal trade: peasant producers of coca leaves and coca paste, and merchants and traders who organized the production of more refined drugs and smuggled them abroad. Peasants utilized most of their incomes to finance consumption (locally produced and imported) and to acquire some capital goods (e.g. trucks and houses) (Healy 1986). Merchants most likely used their surpluses to finance capital flight, since they were mostly linked to the international drugs trade (Sage 1989). Capital flight by households (Δcf_h) is determined endogenously within this model, as explained in section (vi).

Household earners of non-corporate profits, on the other hand, still faced a very limited access to investable funds. Personal savings were limited by low levels of informal output (u_i) (excluding the production of coca and its by-products) which remained stagnant and even fell sharply in some years, such as 1983, when adverse weather conditions resulted in large reductions in agricultural output (World Bank 1990e). In addition, the internal terms of trade for informal sector activities (p_i) were still subject to demand-supply interactions. Bank lending to most household units ($\Delta l_{pb.h}$) remained very limited (FUNDES 1990; Urioste 1989b).

Finally, from the above analysis it follows that during the first half of the 1980s, household investment still relied almost entirely on households' capacity to generate their own savings. Therefore, g_h still acted as the main closure in the accumulation balance for households.

(iii) Government

Like companies, during the 1980s the government faced an acute shortage of foreign exchange. Three factors contributed to this situation: (a) a much lower level of export revenues due to the international recession, (b) access to foreign credit stopped and eventually became negative ($\Delta f_g < 0$), and (c) the government started paying interest on the external debt accumulated during the 1970s ($q^o(i*f_g)$).

The foreign exchange gap forced an adjustment in government investment (g_g). Output in activities controlled by public firms (u_f) also had to adjust to the much lower level of foreign exchange available. The combination of these external shocks had negative effects on the fiscal balance:

(a) The fiscal deficit reached unprecedentedly high levels as tax revenues fell as a result of the much lower levels of activity in the formal sector. In addition, as inflation rose, tax revenues deteriorated because taxes were not indexed to inflation (the Tanzi effect) (Tanzi 1982; Sachs 1987; Mann and Pastor 1989).

(b) Government consumption (Ω), on the other hand, did not adjust to the much lower level of government revenues in order to avoid further reductions in economic activity.

(c) The main adjusting variable in the accumulation balance for the government was the amount of Central Bank credit directed to government in order to finance its deficit ($\Delta l_{cb.g}$). This process brought about a continuous increase in the quantity of money in nominal terms. However, the capacity of government to claim real resources from the private sector, by financing its deficit through money creation ('seigniorage') ($\Delta l_{cb.g}$) fell sharply as the inflationary expectations of economic agents became more rational. The outcome was hyperinflation (J.A. Morales 1987b; Sachs 1987).

(iv) Commercial banks

During the first half of the 1980s, the commercial banks played a very active role in providing finance to companies. As discussed previously, $\Delta l_{pb.c}$ was defined as the final closure in the accumulation balance for companies, implying that commercial bank credit adjusted to the requirements of corporate firms. During

that period, however, there were several important changes in the way commercial banks financed their operations:

(a) The access of commercial banks to foreign credit (Δf_{pb}) was halted.

(b) Household and company deposits in commercial banks fell in real terms, as inflation and highly negative interest rates made economic agents move their financial assets away from domestic assets and into foreign currency or other highly indexed assets (J.A. Morales 1987b; World Bank 1985b; Afcha 1989).

(c) Therefore, the main source of finance for commercial bank operations was credit they obtained from the Central Bank (World Bank 1985b, 1991). Therefore, $\Delta l_{cb.pb}$ is the most appropriate closure for the accumulation balance for the commercial banks.

(v) The Central Bank

During the years of hyperinflation (1982-85) the Central Bank was quite passive and accommodating to the financial requirements of the public sector ($\Delta l_{cb.g}$) and to the private financial sector ($\Delta l_{cb.pb}$). The external shocks witnessed during the early years of the decade, drastically changed the Central Bank's financial practices. The main changes observed were:

(a) External finance to the Central Bank (Δf_{cb}) was halted, and the heavy burden imposed by the need to service the external debt very quickly exhausted international reserves (fr_{cb}). These two sources of finance, which had been paramount in effecting the adjustment of the 1970s, therefore acted more as constraints during the first half of the 1980s.

(b) As a result of the extremely passive monetary policy adopted by the Central Bank, currency creation became the main mechanism to fund domestic credit expansion. Currency demand by the public, however, fell drastically in real terms since the hyperinflation represented a heavy tax burden on holders of domestic currency.

(vi) The external sector

A central point in understanding macroeconomic adjustment in Bolivia during the first half of the 1980s, is recognition of the existence of two highly segmented foreign exchange markets: the official and parallel. The foreign exchange control policy implemented in 1982 and the inability of the Central Bank to supply all foreign exchange demanded at the official exchange rate, were the causes of this segmentation (World Bank 1985b).

The official exchange market was managed by the Central Bank. Transactions within this market were carried out utilizing the official foreign exchange rate:

$$q[P^M(a_m u_f + g_c) + i^*(f_g + f_{cb} + f_{pb}) - P_f^E \varepsilon_f = (1 - fr)\Delta f_{pb} + [\Delta f_{cb} - \Delta fr_{cb}] + \Delta f_g] \quad (39)$$

Adjustment in the official exchange market showed the following pattern:

(a) The main official sources of foreign exchange were the revenues from exports by formal companies and public enterprises (ε_f), but these revenues were greatly diminished by lower external prices and the smaller quantities exported.

(b) Foreign borrowing by the government (Δf_g), the Central Bank (Δf_{cb}) and commercial banks (Δf_{pb}) practically disappeared or became negative.

(c) There was a large drain on foreign exchange reserves due to the interest payments on the country's external debt ($i^*(f_g+f_{cb}+f_{pb})$).

(d) Foreign reserves held by the Central Bank were exhausted (i.e. $\Delta fr_{cb} = 0$).

(e) Therefore, the only variable available as the closure for the balance for the official foreign exchange market was the capacity to finance official imports, namely, intermediate inputs ($P^M a_m u_f$) and capital goods ($P^M g_c + P^M \phi g_{pe}$). Since a_m is a parameter and P^M is determined exogenously, the variables that actually adjust the balance are u_f and g_c. The extent to which each of these variables adjusted depended on the way the Central Bank allocated foreign exchange across them. This closure is very much in line with the Two-gap model approach.

The parallel exchange rate market, on the other hand, operated and adjusted in accordance with market forces:

$$q^P[(c_m z \pi u_f)/q^P + \Delta cf_h] - (1 - (1 - \alpha)(1 - \tau_{CO}))P_i^E \varepsilon_i = 0 \quad (40)$$

(a) The main source of foreign exchange in the parallel market was the increased revenues from illegal exports of coca and its by-products (ε_i).

(b) Most of the foreign exchange demanded in this market was used to finance imports of consumption goods. Demand for imported consumer goods, as defined within the model assumptions, depended on household incomes arising from distributed profits and the proceeds from the sale of coca. These income flows depended on variables determined elsewhere in the model (u_f and π) or on exogenous variables (ε_i).

(c) Therefore, the variable left for adjusting the parallel foreign exchange market is the amount of capital used by households to acquire assets abroad (capital exports) (Δcf_h).

(vii) The formal sector

External shocks greatly changed the means of adjustment in the supply-demand balance for formal activities. As discussed in the previous section, the severe foreign exchange shortage faced by the formal sector during the first half of the 1980s restricted the output responses of formal activities due to the lack of foreign exchange to finance imports of intermediate inputs:

(a) Formal output (u_f), depended on the availability of foreign exchange to finance imports of intermediate inputs; thus it could not freely adjust to changes in demand.

(b) Given the lack of response of output, any excess demand in the supply-demand balance of the formal sector was cleared through price changes via higher mark-up rates (τ), which increased the share of corporate profits in the gross value of formal sector output (π).

(viii) The informal sector

Although informal output expanded during the 1980s, that expansion was exclusively concentrated on coca production and export (ε_i). Domestically sold informal production (u_i), on the other hand, was still highly inelastic, and it contracted substantially when adverse weather conditions devastated traditional agricultural production in 1983.

The internal terms of trade between informal and formal activities (p_i) is therefore retained as the closure for the supply-demand balance for informal activities.

(ix) Summary of adjustment mechanisms during 1980-1985

Nine balances were discussed in this section, one more than those defined for the 1970s, since the external balance in the period 1980-85 was divided into official and parallel. The system so specified, describes quite well the adjustments in the Bolivian economy during the first half of the 1980s.

Eight endogenous variables were identified as closures in the system: the share of corporate profits in the gross value of formal sector output (π), internal terms of trade for informal activities (p_i), commercial bank credit to companies ($\Delta l_{pb.c}$), investment by households (g_h), Central Bank credit to government ($\Delta l_{cb.g}$), Central Bank credit to commercial banks ($\Delta l_{cb.pb}$), capital exports by households (Δcf_h), and the term ($a_m u_f + g_c$), which represents the capacity to import intermediate inputs and capital goods. The ways in which the economic authorities allocate resources among these three alternative uses determine the values of u_f and g_c.

Therefore, there is one more variable to be designated as endogenous in order to make the whole system consistent: the obvious candidate is the foreign exchange rate in the parallel market (q^p).

The variables considered as fixed were: informal output (u_i), commercial bank credit to households ($\Delta l_{pb.h}$) and the level of foreign exchange reserves held by the Central Bank (Δfr_{cb}).

The variables considered as policy variables were: the official exchange rate (e^o), the tax rate (t), the required reserves-deposits ratio for commercial banks (r) and government consumption (Ω).

The variable specified as a function was formal sector exports (ε_f).

Finally, the variables considered as exogenous, whose impacts can be evaluated through the model, were: negative levels of capital inflows to the government ($\Delta f_g < 0$), to the Central Bank (Δf_{cb}) and to commercial banks ($\Delta f_{pb} < 0$), lower external prices for formal exports (P_f^E) and higher prices for imports (P^M), a higher international interest rate (i*) and, finally, increases in the prices (P_i^E) and volume (ε_i) of illegal exports.

4.3 Adjustment Following the 1985 New Economic Policy

The purpose of the NEP was to stabilize the economy (i.e. to reduce inflation and restore the external balance). However, it was also part of a broader structural adjustment programme aimed at changing the functioning of the entire economy by increasing reliance on the price system, promoting private sector initiative and reducing the influence of the state on production (World Bank 1989, 1991; IMF 1987b; J.A. Morales 1987a, Pastor 1989; Sachs 1987; Dunkerley 1992).

The programme was quite successful in bringing down inflation and maintaining price and exchange rate stability; however, long-term growth proved to be more difficult to attain. Although the foreign exchange constraint was partly removed by the unification of the exchange markets and by restoring relations with foreign creditors, the tight monetary policy imposed did not allow the public sector to execute much needed investment in infrastructure in order to promote private initiative.

Sectoral balance adjustment under the NEP followed the following pattern.

(i) Companies

The NEP tried to create the most favourable conditions for the development of the private sector. As a result, the availability of funds for companies was increased, as follows:

(a) Commercial bank credit to companies ($\Delta l_{pb.c}$) was increased as part of the general strategy to promote private initiative. After 1985, once inflation had been brought down, bank credit increased by almost 500 per cent in real terms between 1985 and 1989. In 1989, 88 per cent of total credit was directed to the private sector compared with just 48 per cent in 1985. Therefore, the variable that closes the accumulation balance for companies is the amount of credit from the banking system ($\Delta l_{pb.c}$).

(b) Corporate savings ($\Gamma\pi u_f$) benefited from increased profit margins resulting from lower real wages and export incentives and from higher levels of activity once the foreign exchange constraint on production was removed.

(c) Corporate investment, however, did not react significantly to the positive environment that the NEP tried to create in order to provide more incentives. High real interest rates, the lack of adequate infrastructure to support private investment and the low degree of confidence on the programme, prevented companies from expanding their investment demand (World Bank 1991). The high real interest rates paid by the banking system meant that savings and time deposits became highly attractive financial alternatives to productive investment, resulting in a sharp increase in bank deposits as funds were repatriated from abroad to take advantage of high interest rates and as some funds were switched from informal to formal financial intermediaries (World Bank 1989). Thus, corporate investment demand became less foreign exchange constrained and more restricted by their own investment demand functions, which, as discussed previously, were sensitive to the real domestic interest rate and other structural factors such as the lack of adequate infrastructure.

(ii) Households

The constraints and adjusting variables in the accumulation balance for households did not change substantially under the NEP.

(a) Investment (g_h) continued to act as the closure in the accumulation balance for households, since it remained largely conditional to their capacity to generate their own savings. The savings capacity of poor households continued to be extremely limited. Output responses (u_i) to excess demand were quite limited (apart from coca production). Traditional agricultural production continued to suffer from adverse weather conditions (J.A. Morales 1990; UDAPE 1990b; World Bank 1990b). The urban informal sector increased significantly only in terms of employment; incomes however fell due to the contraction of aggregate demand (Escóbar 1990). As a result, informal sector self-employed moved to much lower levels of subsistence and their savings and investment capacity became almost non-existent.

(b) Bank credit to households ($\Delta l_{pb.h}$) was still conditional on the availability of collateral and therefore did not play a significant role in the accumulation balance adjustment for households (FUNDES 1990; Fleising and Aguilar 1991).

(c) Peasant household producers of coca continued to enjoy relatively high revenues from the coca by-products trade. However, the price of coca fell due to excess supply, and to compensate for their income losses, these households moved to more advanced stages in the production of refined coca, in an attempt to increase their share in the coca-cocaine value added. The level of coca exports (ε_i) were maintained at those achieved during the first half of the decade (UDAPE 1990c; Dunkerley 1992).

(d) Household demand for time and savings deposits expressed in foreign currency (i.e. certificates of deposits, CDs) responded strongly to the higher real interest rates (i_r). Thus:

$$\mu = f(i_r) \qquad (41)$$

(e) Capital flight by households (Δcf_h) reversed to some extent when rich households repatriated some capital to take advantage of the much higher i_r. Capital flight determination is discussed later in this section.

(iii) Government

A paramount element within the stabilization and structural adjustment programmes implemented in Bolivia under the NEP, has been the reduction of the fiscal deficit. The measures undertaken were:

(a) Government consumption was substantially reduced.

(b) The tax reform and the more realistic exchange rate policy greatly improved government income compared with the levels observed during the first half of the decade. Government revenues were substantially increased through the tax reforms implemented in 1986.

(c) Interest payments on the external debt ($i*f_g$) were renegotiated in order to ameliorate their negative impacts on the fiscal balance and on the balance of payments.

As a result of the above measures, the non-financial fiscal deficit has been reduced significantly (5.1 per cent of GDP in 1989 compared with 20 per cent in 1984). The remaining deficit has been financed largely through Central Bank credit ($\Delta l_{cb.g}$), and it continues to be the ultimate adjusting variable in the balance for the government.

(iv) Commercial banks

The financial liberalization carried out under the NEP had significant impacts on the behaviour of the commercial banks:

(a) The liberalization brought about an increase in the real interest rate. High interest rates and the legalization of dollar deposits boosted deposits, which became the main source of bank finance. As discussed before, μ became a function of the real interest rate paid by banks (i_r).

(b) Foreign finance to commercial banks after the stabilization programme was still at a reduced level ($\Delta f_{pb} = 0$).

(c) Central Bank credit to commercial banks ($\Delta l_{cb.pb}$) expanded quite strongly after 1985, so that $\Delta l_{cb.pb}$ can be retained as the closure of the balance for the commercial banks.

(d) Most of the resources available to commercial banks were used to expand credit to companies ($\Delta l_{pb.c}$), as discussed previously. Commercial bank loans to households ($\Delta l_{pb.h}$), on the other hand, represented only a marginal share of total bank assets.

(e) Commercial banks increased their deposits in the Central Bank to take advantage of the high interest rates paid on time and savings deposits. As a

consequence, according to figures published by the Central Bank, although the maximum required reserves-deposits ratio on sight and saving deposits was only 20 per cent in 1986, the average reserves-deposits ratio went up to 37 per cent by December 1989. Thus, in terms of the SAM model, the parameter r became sensitive to changes in the real interest rate:

$$r = f(i_r) \tag{43}$$

(v) The Central Bank

There were significant changes in the Central Bank adjustment following the financial liberalization:

(a) Since limiting the growth of high-powered money to maintain price stability was among the main objectives of the NEP, the expansion of Central Bank credit to the government ($\Delta l_{cb.g}$) and to the private sector ($\Delta l_{cb.pb}$), had to be compensated through open-market operations carried out by the Central Bank (World Bank 1991). As discussed above, this was reflected in a sharp increase in commercial bank deposits in the Central Bank. Therefore, a plausible closure for the balance for the Central Bank is through changes in commercial bank deposits in the Central Bank (i.e. a larger value for r). A larger value for r was attained through a higher real interest rate. Therefore, it is the real interest rate (i_r) that brings adjustment to the balance for the Central Bank.

(b) Foreign capital inflows (Δf_{cb}) were limited to those agreed with official international institutions (IMF, World Bank).

(c) A gain in foreign reserves ($\Delta fr_{cb}>0$) was set as a target variable under the agreements with the IMF and World Bank.

(vi) The external sector

As discussed before, under the NEP the foreign exchange balance was unified, as was the exchange rate (i.e. $q = q^P$). For most of the period, the government used the exchange rate as an instrument of inflation control.

Capital flight by households, measured by the item ‘net errors and omissions’ in the balance of payments, became positive during this period, meaning that household owners of foreign assets abroad repatriated part of them in response to higher domestic interest rates and switched from informal to formal financial intermediaries (World Bank 1989). At the same time, however, even larger amounts of foreign currency generated through the coca-cocaine business, were

taken outside the country. Therefore (Δcf_h) is retained as the closure for the external sector balance.

(vii) The formal sector

As discussed previously, the unification of the official and the parallel exchange markets ameliorated the foreign exchange constraint faced by the formal sector during the early 1980s. Formal activities were therefore able to adjust through changes in their activity levels (u_f) in the case of excess demand. After 1985, however, the most likely case is that u_f adjustments were mostly downwards, since the NEP restricted demand by reducing Ω and g_g. Besides, the fall in real wages under the NEP reduced wage-earners' demand. Moreover, the higher interest rates prevailing after the NEP and the persistent lack of corporate confidence in the continuity of the programme, inhibited g_c. Formal exports (ε_f), on the other hand, reacted positively to the more favourable relative prices resulting from the devaluation of the official exchange rate.

(viii) The informal sector

Output responses (u_i) in the informal sector remained restricted. Therefore, the key adjusting variable in informal markets continued to be the internal terms of trade (p_i). Informal exports maintained the levels achieved during the first half of the 1980s. International prices for informal exports fell, however, because of excess supply.

(ix) Summary of adjustment mechanisms under the NEP

Eight balance equations were presented in this section, one less than those defined for the period 1980-85, after which the external balance was unified into a single market (see Table 3).

Eight variables were identified as balance closures in the system: capacity utilization by formal activities (u_f), internal terms of trade for informal activities (p_i), household investment (g_h), commercial bank credit to companies ($\Delta l_{pb.c}$), Central Bank credit to government ($\Delta l_{cb.g}$), Central Bank credit to commercial banks ($\Delta l_{cb.pb}$), capital flight by households (Δcf_h), and the domestic real interest rate (i_r).

The variables considered as constraints or fixed parameters were: the share of corporate profits in the value of formal output (π), informal output (u_i), commercial bank credit to households ($\Delta l_{pb.h}$), and the level of foreign exchange

Table 3 – Summary of Adjustments over Four Periods

	During the 1970s	During 1980-1984	Following the 1985 Stabilization	Following the 1990 Structural Reforms
Balance Closures	u_f, p_i, g_h, $\Delta l_{pb.c}$, $\Delta l_{cb.g}$, $\Delta l_{cb.pb}$, Δcf_h, Δfr_{cb}	π, p_i, g_h, $\Delta l_{pb.c}$, $\Delta l_{cb,g}$, $\Delta l_{cb.pb}$, Δcf_h, q^P $a_m u_f + g_c$	u_f, p_i, g_h, $\Delta l_{pb.c}$, $\Delta l_{cb.g}$, $\Delta l_{cb.pb}$, Δcf_h, i_r	u_f, p_i, g_h, $\Delta l_{pb.c}$, Δfr_{cb}, $\Delta l_{cb.pb}$, Δcf_h, i_r
Constraints or Fixed Parameters	u_i, $\Delta l_{pb.h}$, π	u_i, $\Delta l_{pb.h}$, Δfr_{cb}	π, u_i, $\Delta l_{pb.h}$, Δfr_{cb},	π, $\Delta l_{pb.h}$, $\Delta l_{cb.g}$,
Behavioural Equations	ε_f, Ω, g_c, g_g	ε_f	ε_f, g_c, g_g, μ, λ, r	ε_f, g_c, u_i, g_g, μ, λ, r
Policy Variables	e, t, r	e^o, t, r, Ω	e, t, Ω	e, t, Ω
Exogenous Variables	Δf_g, Δf_{pb}, Δf_{cb}, P^E_f, P^M, ε_i, i*	Δf_g, Δf_{pb}, Δf_{cb}, P^E_f, P^M, ε_i, i*	Δf_g, Δf_{pb}, Δf_{cb}, P^E_f, P^M, ε_i, i*	Δf_g, Δf_{pb}, Δf_{cb}, P^E_f, P^M, ε_i, i*

reserves held by the Central Bank (Δfr_{cb}), which were set as target variables under the agreements signed with the IMF.

The variables considered as policy variables were: the exchange rate (e^o) which was fixed under a 'crawling-peg' system, the tax rate (t), and government consumption (Ω).

The variables specified through behavioural functions were: formal sector exports (ε_f), investment demand by companies (g_c) and by government (g_g), companies' desired balance sheet 'portfolios' of financial assets relative to investment (μ), household preferences for deposits (λ), and the reserves-deposits ratio (r) required of the commercial banks.

Finally, the variables considered as exogenous, whose impacts we can evaluate through the model, are: the continuing very low levels of capital inflows to the government (Δf_g), to the Central Bank (Δf_{cb}) and to the commercial banks (Δf_{pb}), much lower external prices for formal exports (P^E_f) (c.f. the 1985 international tin

market crisis) and higher prices for imports (P^M), and finally, the reduction in prices (P^E_i) of illegal exports. The macroeconomic impacts of these exogenous shocks have to be analysed utilizing an economic system whose functioning was completely changed under the NEP.

4.4 Adjustment Following the Structural Reforms in the 1990s

The structural reforms introduced in 1990s, substantially modify sectoral balance adjustment.

(i) Companies

The structural reforms try to create the most favourable conditions for the development of the private sector. As a result, the availability of funds for companies was increased, as follows:

The transfer of the public enterprises to the private sector, through the capitalization process, will bring significant amounts of foreign direct investment (ΔFDI) to the country. Besides, the new regulatory framework created though the SIRESE law and the sectoral laws, provide a favourable environment for investment, of both domestic and foreign private corporations. This will give a boost to companies' investment. Companies' investment however, might be constrained by the lack of greater government's investment in infrastructure.

Due to the increase in foreign investment, companies are likely to enjoy high levels of financial resources availability. Companies may deposit part of these resources in local private banks, in order to accommodate them to their cash flows needs. Thus, companies' deposits in the financial system (ΔDep_c) are likely to be the closure in companies' accumulation balance. Although some companies would still resort to finance from private banks, on aggregate, the level of companies' deposits will be higher that of bank loans to companies.

(ii) Households

The constraints and adjusting variables in the accumulation balance for households are likely to be the same after the structural reforms.

The little access to credit by small scale industries ($\Delta l_{pb.h}$), both rural and urban, is considered by many observers, as one of the most important obstacle to this sector's development prospects (World Bank 1996, Funda-Pro 1997). Therefore, investment (g_h) is likely to act as the closure in the accumulation balance for households in the future.

A higher reliability on other sources of finance, such as households' own savings, will depend on the success of different government's strategies to increase the productivity of small scale enterprises (Ministerio de Hacienda 1996). The education reform is expected to have an impact on productivity in the medium to long term.

The importance of coca proceeds (ε_i), as a major source of income to households, has reduced over time, and in 1996 their contribution to GDP was estimated at only two per cent of GDP (World Bank 1992).

(iii) Government

The structural reforms of the 1990s, have modified government's adjustment rules in different ways:

(a) The popular participation and decentralization laws increased the amount of tax revenues designated to local governments. This introduces rigidities to the management of the government budget at the central level, because, by law 20 per cent of total tax revenues must be transferred to the regions.

(b) The financial reforms have limited the access of government to Central Bank credit ($\Delta l_{cb.g}$), reducing the significance of this variable as a closure of the government's balance.

(c) Government has taken measures to reduce its deficit to levels that can be financed by concessional foreign loans (around 2 per cent of GDP in 1995 and 1996).

(d) Taking into account income from taxes and customs duties, as well as contributions from the sale of hydrocarbons, tax revenues have increased from 14.4 per cent of GDP in 1989 to 19.5 in 1996, thanks to the country's greater economic stability, tax reforms and improved efficiency in the administration tax collection.

(e) Interest payments on the external debt (i^*f_g) were further renegotiated in order to ameliorate their negative impacts on the fiscal balance and on the balance of payments.

The reforms have demanded greater fiscal costs (e.g. pension reform), which will be financed through a combination of fiscal adjustment and the issue of public bonds (Δb_G). Thus, (Δb_G) is likely to be closing variable in government's balance after the reforms.

(iv) Commercial banks

The financial reforms carried out have changed some aspects of commercial banks' adjustment behaviour.

(a) The newly approved prudential regulatory framework requires commercial banks to comply with a higher asset to capital ratio and to eliminate lending to related parties. Commercial banks therefore have to increase their own capital in order to inter-mediate the increased amount of resources available to the banking system. Additional capital might come through direct foreign investment.

(b) The trends followed by the financial system in the last years, show that the availability of resources to commercial banks increased substantially; first, high real interest rates boosted deposits, which in turn reduced interest rate levels; second, commercial banks' foreign borrowing (ΔF_{pb}) increased significantly after 1990; and third, Central Bank credit to commercial banks ($\Delta l_{cb.pb}$) expanded quite strongly during the 1990s, so that $\Delta l_{cb.pb}$ can be retained as the closure of the balance for the commercial banks.

(c) Most of the resources available to commercial banks were used to expand credit to companies ($\Delta l_{pb.c}$).

(d) Commercial bank loans to households ($\Delta l_{pb.h}$), on the other hand, represented only a marginal share of total bank assets.

(v) The Central Bank

The financial reforms also introduced significant changes in the Central Bank's adjustment process:

The new Central Bank Law strengthened the Bank's autonomy; maintaining macroeconomic stability became the Central Bank's main priority. This considerably limited the access of the NFPS to Central Bank finance. Before the passage of the law in 1996, the Central Bank had already diminished its involvement in financing the NFPS deficits. The Central Bank's open market operations, aimed at absorbing excess liquidity resulting from the finance of the public sector's deficits, diminished after 1993. In 1995 however, the Central Bank resorted to this mechanism to absorb the excess liquidity created by the credit expansion to the private financial sector. Thus, with the structural reforms the Central Bank finance to the government ($\Delta L_{cb.g}$) became a constraint in the government's balance. During the 1990s, the outstanding Central Bank credit to the public sector reduced by an amount equal to almost 7 per cent of GDP.

The Central Bank sold to commercial banks part of its stock of treasury bonds and increased its foreign reserves by an amount equal to 11 per cent of GDP

since 1990. Thus, foreign reserves is likely to be the closing variable of the Central Bank's balance (Δfr_{cb}).

(vi) The external sector

The increased inflow of foreign exchange due to the capitalization process and the higher levels of foreign direct investment expected are likely to bring about some private capital outflows. Therefore (Δcf_h) is retained as the closure for the external sector balance.

(vii) The formal sector

The capitalization process will substantially increase investment in formerly owned public enterprises. Thus, productive capacity in these sectors will be significantly expanded. Besides, the capitalization is expected to improve the efficiency of basic services (e.g. transport, energy, telecommunications, etc.) which are essential to increase productivity in other sectors. Furthermore, foreign direct investment in sectors different to those that were capitalized, is also expected to increase installed productive capacity of formal sector activities. Formal activities' markets are likely therefore to adjust through changes in output (u_f) in the case of excess demand.

Formal exports (ε_f), on the other hand, reacted positively to the more stable macroeconomic environment and to more favourable exchange rate policies.

(viii) The informal sector

Output responses (u_i) in the informal sector are likely to remain restricted. The impacts of the structural reforms (e.g. education reform, Strategy for the Productive Transformation of the Agricultural Sector, etc.), aimed at increasing the informal sector productivity, only will be felt in the long term. In the medium term however, informal output can be considered as being a function of government investment.

$$u_i = f(g_g)$$

Therefore, the key adjusting variable in informal markets will continue to be the internal terms of trade (p_i).

(ix) Summary of adjustment mechanisms after the structural reforms

Eight balance equations were discussed in this sections (see Table 3).

Eight variables were identified as balance closures in the system: capacity utilization by formal activities (u_f), internal terms of trade for informal activities (p_i), household investment (g_h), commercial bank credit to companies ($\Delta l_{pb.c}$), foreign exchange reserves held by the Central Bank (Δfr_{cb}), Central Bank credit to commercial banks ($\Delta l_{cb.pb}$), capital flight by households (Δcf_h), and the domestic real interest rate (i_r).

The variables considered as constraints or fixed parameters were: the share of corporate profits in the value of formal output (π), informal output (u_i), commercial bank credit to households ($\Delta l_{pb.h}$), and Central Bank credit to government ($\Delta l_{cb.g}$).

The variables considered as policy variables were: the exchange rate (e^o) which was fixed under a 'crawling-peg' system, the tax rate (t), and government consumption (Ω).

The variables specified through behavioural functions were: formal sector exports (ε_f), investment demand by companies (g_c) and by government (g_g), companies' desired balance sheet 'portfolios' of financial assets relative to investment (μ), household preferences for deposits (λ), and the reserves-deposits ratio (r) required of the commercial banks.

Finally, the variables considered as exogenous, whose impacts can be evaluated through the model, are: the continuing very low levels of capital inflows to the government (Δf_g), to the Central Bank (Δf_{cb}) and to the commercial banks (Δf_{pb}), an increased level of foreign direct investment (Δfdi), external prices for formal exports (P^E_f) and higher prices for imports (P^M), and finally, the reduction in prices (P^E_i) of illegal exports.

5. Concluding Remarks

The approach proposed in this paper for the study of macroeconomic adjustment in a developing country such as Bolivia provides an insightful understanding of the ways in which the Bolivian economy adjusted to external shocks over the last three decades.

The SAM model developed and explained gives a subtle picture of the adjustment mechanisms that brought ex-post equilibrium to the various balances and therefore to the Bolivian economy as a whole, during the four sub-periods analysed. The analytical gains obtained through the SAM model are as follows.

First, by defining a more disaggregated framework, it has been possible to differentiate accumulation balance behaviours for the various social groups and institutions; as a result the role of income distribution in bringing adjustment can be much more clearly visualized within a consistent and integrated framework. Income distribution is captured at two levels: among factors of production (i.e. wages, non-corporate and corporate profits); and among institutions (i.e. households, companies, government). Income distribution is determined by factors such as relative prices, mark-up rates, wage rates, exchange rates, sectoral output (formal vis-à-vis informal), and access to credit (external and domestic).

Second, the model allows for the differentiation of adjustment rules from period to period. The foreign exchange unconstrained situation of the Bolivian economy during the 1970s is captured by the closures of the model selected for that period: the capacity of the formal sector to increase output, the existence of investment demand functions for the government and companies, the capacity of the financial system to adjust by reducing its foreign exchange reserves, and finally, by defining capital exports as the adjusting variable of the external balance. In this way, any excess of foreign exchange availability vis-à-vis the economy's capacity to absorb it productively, goes to finance capital exports.

The segmented condition that characterized the Bolivian external sector during the first half of the 1980s is captured by dividing the external balance into two separate balances, one for the official and the other for the parallel exchange market. With this division the dual situation that characterized sectoral adjustment during that period can be modelled. On the one hand, the government and the formal sector were foreign exchange constrained because of their highly reduced access to foreign exchange; this is captured by allowing the variables u_f, g_f and g_g to adjust the official external balance in Two-gap model fashion. On the other hand, households and some companies in the private sector became savings-constrained since the large resources received from foreign exchange revenues from illegal exports were utilized to finance imports of consumption goods and capital exports. This is captured by making g_h the closure in the

accumulation balance for households, and Δcf_h the closing variable in the parallel external balance.

The changes introduced in the sectoral adjustment behaviours under the 1985 stabilization programme are captured in the model by changing the balance closures. The unification of the exchange rate market as a means of stabilizing the foreign exchange rate is reflected in the consolidation of the official and parallel external balances into a single balance. The open-market operation policy introduced to sterilize the monetary effects of the fiscal deficit, and the impact that this policy had on the interest rate, are captured by making companies' desired balance-sheet 'portfolios' of financial assets relative to investment (μ) and eventually the real interest rate (i_r), the variable that brings ex-post adjustment to the balance of the banking system.

The further changes introduced in the functioning of the Bolivian economy under structural reforms of the 1990s are captured in the model by modifying the balance closures. The greater autonomy granted to the Central Bank is captured by transforming Central Bank credit to government into a constraint in the government balance. The higher levels of foreign direct investment expected in the following years, due to the capitalization process, is reflected in the more important role that foreign direct investment play in the companies' balance adjustment. The importance of government investment in the development of the informal sector is captured by making this activities' output a function of government investment.

Third, adjustment and macroeconomic equilibrium within the SAM model framework is determined by the interactions of all the sectoral balances of the economy. As a result, the interactions among the non-financial, financial and external sectors can be clearly identified and overall consistency of the macroeconomic closure is ensured.

Although the model presented in this paper provides many elements which explain how adjustment in the Bolivian economy took place over the last two decades, it is still too aggregated and therefore does not reflect many other structural characteristics that would enhance the analysis if included within the model. For instance, the division between formal and informal productive activities hides many particulars that determine market closures in sectors such as agriculture, mining and hydrocarbons, manufacturing and informal services. Since the outputs produced by these activities satisfy different markets, prices are determined following particular rules. Besides, different sectors have different output response capacities. The category 'companies' masks substantial differences in the accumulation behaviour of private companies and public enterprises.

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Table 2 – Schematic SAM for the Bolivian Economy

		1		2			3			4	5				6	7		
		ACTIVITIES		**FACTORS**			**INSTITUTIONS CURRENT**				**INSTITUTIONS CAPITAL**					**FINANCIAL**		
		Formal	Informal	Wages	Formal Profits	Informal Profits	Com-panies	House-Holds	Govern-ment	Rest of the World	Com-panies	House-Holds	Govern-ment	Rest of the World		Central Bank	Commercial Bank	**TOTALS**
ACT	Formal Informal	INTERMEDIATE DEMAND					FINAL DEMAND (CONSUMPTION)			EXPORTS	FINAL DEMAND (INVESTMENT)							TOTAL DEMAND
FACTOR	Wages Profits F. Profits I.	DISTRIBUTION OF VALUE ADDED TO FACTORS																TOTAL FACTOR INCOME
CURRENT	Companies Households			DISTRIBUTION OF INCOME TO HOUSEHOLDS					NET SUBSIDIES									TOTAL INCOME OF INSTITUTIONS
	Government	INDIRECT TAXES					DIRECT TAXES			TRANSFERS								
	Rest of the World	INTERMEDIATE IMPORTS DEMAND					FINAL IMPORTS DEMAND		INTEREST		IMPORTS OF CAPITAL GOODS							CUR. ACC. (DEBIT)
CAPITAL	Companies Households Government						SAVINGS BY INSTITUTIONS				**FLOWS OF FUNDS**							TOTAL INVESTMENT FINANCE
	Rest of the World									EXT. SAV.								
FIN.	Central Bank Commercial Banks																	
TOTALS		TOTAL SUPPLY		REDISTRIBUTED FACTOR INCOME			USE OF DISPOSABLE INCOME OF INSTITUTIONS			CURR. ACC. (CREDIT)	TOTAL INVESTMENT (FINANCIAL AND PHYSICAL)							

Table 3 – SAM Model for the Bolivian Economy

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
			ACTIVITIES		FACTORS			INSTITUTIONS CURRENT				INSTITUTIONS CAPITAL				FINANCIAL		
			Formal	Informal	Wages	Formal Profits	Informal Profits	Com-panies	House-Holds	Govern-ment	Rest of the World	Com-panies	House-Holds	Govern-ment	Rest of the World	Central Bank	Commercial Bank	TOTALS
1	ACTIVITIES	Formal		$P_f a X$					$P_f C_f$	$P_f G$	$e P_i^E E_f$		$P_f(1-q_j) I_H$	$P_f I_G$				$P_f X_f$
2		Informal							$P_i C_i$		$e_p P_i^E E_i$		$P_i q_i I_H$					$P_i X_i + e_p P_i^E E_i$
3	FACTOR	Wages	$w_f X_f$															W
4		Profits Formal	Rf															Rf
5		Profits Informal		Ri														Rj
6	CURRENT	Companies				$G Rf$												$G Rf$
7		Households			$w_f X_f$		Ri	DP										Y_H
8		Government				$(1 - G) Rf$		$t^G Rf$										GR
9		Rest of the World	$e P_m^M a_m X_f$					$e i^* F_{pb}$	$e_p P_m^M C_m$	$e i^*(F_G+F_{CB})$		$e P_m^M I_C$						$e P_m^M M$
10	CAPITAL	Companies						S_C									$D L_{PB.C}$	SF_C
11		Households							S_H								$D L_{PB.H}$	SF_H
12		Government								S_G					$e DF_G$	$D L_{CB.G}$	$D B_B$	SF_G
13		Rest of the World									S_E		$e_P DCF_H$			$e D FR_{CB}$	$e D FR_{PB}$	$e D F$
14	FIN.	Central Bank											$D Cu_H$		$e D F_{CB}$		$D Re_{PB}$	$D LB_{cb}$
15		Commercial Banks										$D Dep_C$	$D Dep_H$		$e D F_{PB}$	$D L_{CB.PB}$		$D LB_{PB}$
		TOTALS	$P_f X_f$	$P_i X_i + e P_i^E X_i$														
		TOTALS			W	Rf	Ri	$G Rf$	Y_h	$S_g + GE$	$S_e + eP_i^E E$	UF_C	UF_H	UF_G	$e D F$	DAS_{CB}	DAS_{PB}	