BOTSWANA INSTITUTE FOR DEVELOPMENT POLICY ANALYSIS

WORKING PAPER

Restricted

A note concerning the revision or rebuilding of the MEMBOT model

Some preliminary observations and suggestions

By Per Granberg

BIDPA Working Paper No. 1
March 1996

1088

Abstract

This paper discusses the structure of the existing MEMBOT model (Macro Economic Model for Botswana). The limitations of the current model are identified, and the need to revise it noted. It is suggested:

- that a revised model should be constructed, employing one of the commonly used spreadsheet formats;
- that the structures of the current model should be retained, but modified so as to accommodate present needs and realities;
- that the new model should contain a new block detailing relevant finance side structures.

Keywords
Economic planning
Economic models
Botswana

Restricted

A note concerning the revision or rebuilding of the MEMBOT model

Some preliminary observations and suggestions

By Per Granberg

BIDPA Working Paper No. 1
March 1996

[1] *BOTSWANA INSTITUTE FOR DEVELOPMENT POLICY ANALYSIS (BIDPA)*
4th. Floor, Tshomarelo House
Broadhurst Mall
Private Bag BR-29
Gaborone, Botswana
Tel: + (267) 37 17 50
Fax:+ (267) 37 17 48
Website: www.bidpa.bw

[1] Botswana Institute for Development Policy Analysis (BIDPA) is an independent trust set up by a Presidential

A Note concerning the Revision or Rebuilding of the MEMBOT Model

Some preliminary observations and suggestions

1. Introduction

1. This paper is not written for the purpose of giving a presentation of the existing MEMBOT model, but merely to discuss some central issues in relation to its impending revision. Readers who already have a basic understanding of the model, but feel a need for a short "reminder", are referred to Annex I, where a *short* description of the model's main structures is given. Readers unfamiliar with the model, or otherwise in need of further information about it, are referred to existing model documentation.[1]

a. Main Model Blocs

2. The existing MEMBOT model consists of the following main elements (or: model blocks):

- The Real-Side Economy (in constant and current prices), incl. Employment (i.e. demand for labour inputs). This block may be seen to represent the "core" of the model.
- The Central Government Budget and the Balance of Payments (both in current prices), incl. Government Debt and Custom Union Transactions. This block may be seen as containing extensions or additions to the above core.

3. In essence, therefore, the core of the existing MEMBOT model is restricted to dealing with the real side of the economy, but with extensions representing the specific areas of Government Budget and Balance of Payments. No comprehensive finance-side block, detailing financial structures, exists within the present model.

4. The MFDP is now in need of having the MEMBOT model revised or rebuilt. As part of this exercise, it has requested that the new model should include proper finance-side structures. In response, we suggest that the new model should contain a new block detailing such structures, but that this block should be introduced as an *addition* rather than as an *alternative* to the blocks of the existing model. In other words, we suggest that the new model should include the *same* type of main structures as does the present model, *plus* a finance side one.

---

[1] Technical Guide to MEMBOT, Economist's Guide to MEMBOT and User's Guide to MEMBOT (all from the Macro Unit of the MFDP, 1991)

b. Computational Structure

5. MEMBOT was originally built for a computer of severely limited capacity. It therefore had to be broken down into numerous sub-programmes that had to be run in a strictly defined sequence. As a result, the model structure had to be made "non-recursive", i.e. estimates calculated at an early stage could influence those of later stages, but *not* vice versa. Although this in theory represented a logical flaw in the model, it was seen as acceptable at the time, the economy itself being seen as largely non-recursive in nature (with relatively few inter-linkages between economic variables etc.).

6. Although transferred to a more powerful PC later on, the non-recursive structure of the model was not changed significantly. There are however reasons to believe that the economy has grown increasingly recursive (inter-linked) in nature during the 1980s and 1990s. If so, the present MEMBOT structure has become increasingly flawed.

7. This is neither an acceptable nor a necessary state of affairs. With today's powerful PCs one can easily escape the problem (subject, however, to the limitations imposed upon us by the chosen programming language, and the maximum overall size of the model). The revision of the model should consequently involve a full review of the current structures of the economy; one can not rely on a mere reprogramming of the structures of the existing model.

c. Programming Language

8. The existing model is programmed in FORTRAN, a computer language then widely used. FORTRAN still exists, but with today's general reliance upon standard spreadsheet packages etc., it is no longer in general use. FORTRAN expertise is consequently hard to come by. It is therefore proposed that the new model be constructed in one of the more widely known spreadsheet formats now available, such as Lotus123 or Excel. This will have obvious advantages in terms of transparency and user friendliness, but will also impose some technical limitations upon the modelling effort. Preliminary modelling efforts using Lotus123 do however indicate that these limitations can be overcome without too much problem.

2. The Existing Model Blocks

9. Above we proposed that the new model should include the same type of main structures as the present one, but also noted that the structures of the former may not be copied directly into the latter. Rather, these structures will in various respects have to be looked over and revised; both in order to correspond to present needs and realities, and to fit in with their new model environment. These aspects are further discussed below.

a. National Accounts Framework

10. The core block of the existing MEMBOT model concentrates on real-side economic variables, i.e. largely on the same type of economic variables as presented in the National Accounts statistics of Botswana. In order to ensure that derived model-results were directly comparable to their corresponding National Accounts entities, the model did in fact adopt the

definitions, standards and estimation-formulas used for calculating the Botswana National Accounts estimates.

11. This remains a valid principle also in today's setting. The present situation with respect to the existing MEMBOT model is however that it still reflects the National Accounts specifications and calculation routines of the *early 1980s*. But the conceptual framework and practical calculation formulas of the National Accounts have in various ways been revised since then.

12. For instance:

- the statistical coverage of some economic activities has been increased, capturing activities previously ignored,
- the treatment of some previously "lumped together" activities has been disaggregated or otherwise refined,
- the treatment of non-profit making institutions has been changed.

13. The present National Accounts treatment of some important variables may consequently differ significantly from those of old. The latest SAM matrix (SAM 1992/93) provides a telling illustration of this fact. The present matrix is in many ways different from the original SAM matrices, upon which the existing MEMBOT model was built, and it is today necessary to "force" the new SAM data into the format of the old model.

14. In constructing the new model, one should stick to the established principle of keeping the correspondence between the model and the National Accounts as firm as possible. The existing real-side MEMBOT blocks must consequently be checked against the present National Accounts framework both in detail and in totality, and revised or reconstructed as appropriate.

15. A slight problem may arise in this connection. The National Accounts framework presently adopted by the CSO may be of a transient nature only. A new international National Accounts Standard was launched some time back, and the CSO plans to adopted it at some stage in the "not too distant" future. At present it seems somewhat unclear exactly when this will be done, and to what extent it will alter the existing National Accounts framework. Unless this situation changes in the near future, it is proposed that we merely *take note* of the impending revisions at this stage. Hence, we should start implementing model revisions based on the presently existing National Accounts framework, rather than allowing them to be held up for an indefinite period. At the same time, however, we should as far as possible try to facility or prepare for a later revision of the new model when the need arises.

b. Classification of Production Sectors

16. The MEMBOT model may be described as a "macro economic model with disaggregated production"; i.e. although being a macro-economic model, it disaggregates the overall production activities of Botswana into a number of production sectors.

17. The specific number and nature of such sectors included in the existing MEMBOT model still largely reflect the computational limitations and pertinent policy questions of the

early 1980s. These factors will now have changed, and so should the sector specifications of the model.

18. A preliminary proposal for a new sector specification is given in Annex II. The proposed sector breakdown is seen to comprise a total of 25 sectors versus 19 in the present model. The implied sector disaggregation is concentrated in the areas of manufacturing and services, largely due to their past growth-record and their anticipated future growth potential, but in some cases (Ownership of Dwellings and Non-Profit Making Institutions) also because they require special attention from a National Accounts point of view. On the other hand, two of the present model's sectors (Soda Ash Mining and Domestic Servants) have been merged with other sectors, their contributions to the total national economy being fairly marginal.

19. A total of 25 production sectors may seem a fairly modest one. A larger number of sectors may arguably be desirable in terms of flexibility of assumptions etc. In practice we must however guard against expanding the number of sectors too much, because the addition of each extra production sector is relatively costly in terms of its effect upon the total "size" of the model.

c. *Classification of Household*

20. The existing MEMBOT model groups households as follows:

- Urban households (including relevant expatriate households),
- Rural households (including relevant expatriate households).

21. This classification reflects the format of the early SAM matrices. But, as already stated, the format of the SAM matrices has changed over time, a fact that should be reflected in the new model. It is consequently proposed that the new model adopts the following household classification:

- Urban households (excluding expatriate households),
- Rural households (excluding expatriate households),
- Expatriate households.

d. *Private Consumption*

22. The private consumption functions tend to be some of the most stable and reliable functions in the econometric "toolbox". As such it may be tempting to emphasise them, for instance by including a lot of "marginal refinements" into their estimation formulas. This has not been done in the case of the present MEMBOT model. Basically, the adopted consumption formulas are simple linear functions of disposable household incomes, without any reference to marginal consumption propensities or similar.[2]

23. From a purely technical point of view, the introduction of marginal propensities into the consumption functions would represent no significant problem. The real problem is data availability. Thus, the simple consumption functions adopted in the existing model may be

[2] Or expressed alternatively: the marginal consumption propensities are by implication assumed equal to the average ones.

seen as a reflection of the fact that *no* information was at hand at the time to illustrate the magnitude of the marginal propensities.

24. Even today, such data are very scarce, if at all available. Nevertheless, one may attempt to secure some rough estimates, drawing on National Accounts time series data, international comparisons or similar. Furthermore, even if this should prove impossible or impractical, one should be able to make some fairly representative "guestimates" in respect of broad consumption categories, for instance for "basic needs" versus "luxuries", and introduce them into the consumption functions on that basis.

25. A somewhat related topic concerns the question of imports versus domestic products. *If* the required coefficients can be secured, there might be considerable merit in introducing structures relating to the origin of products, as this would allow a firmer grip on questions relating to import substitution and similar.

26. However, before deciding to follow this path, one should carefully consider the costs of doing so. The practical implementation of these proposals may well prove quite time consuming, especially if (as seems probable) no estimates of the marginal propensities are readily available. This will of course be at the cost of paying less attention to other parts of the model.

27. A similar argument concerns the overall volume of the model. It should be understood that even without these additional refinements, the overall size of the new model will be very considerable. But there is a limit to how large it *ought to be,* both in terms of transparency and user friendliness. The introduction of above refinement may consequently well be at the cost of reducing other model elements. As seen in this perspective, the introduction of the import aspect in particular promises to become very costly, (because one would have to split today's import *totals* into a considerable number of *separate* product groups).

28. Keeping in mind that:

- private consumption is but *one* of several model variables,
- our general concern will tend to be more with the quality of overall *aggregates* than with the quality of the private consumption estimate in particular,
- a chain is no stronger than its weakest link,

the pertinent question is therefore whether it will be worth our while to "fine-tune" the consumption estimates (or any other category of estimates), given that the remaining variables may have to be estimated by relatively more simple means. The answer to this question may well be that one is, on the whole, better served by keeping the consumption formulas fairly simple.

e. Balance of Payments

29. The Bank of Botswana has recently been revising the format of the Balance of Payment tabulations, adopting a new set of international recommendations that links the Balance of Payments more directly to National Accounts. This is a welcome development, promising to simplify the existing model's somewhat cumbersome conversion of National

Accounts data into Balance of Payments ones (and vice versa). But it also means that the entire Balance of Payments section of the model will have to be looked at in detail, and probably revised extensively, or rebuilt completely. Again, the guiding principle should be to make the new model's structure correspond as closely as possible to the structure of the official estimates.

f. Other Model Elements

30. The other central model elements are those producing:

- the Employment estimates,
- the Central Government Budget estimates,
- the Government Debt estimates,
- the Custom Union Revenue estimates.

The extent to which these sections of the model may need to be revised is at yet not fully known, but at the moment it seems that they will require relatively minor changes only, the nature of which is summarised below.

31. *Employment:* This section is a mere "appendix" to the model, the employment estimates having no function within the model itself. This being the case, this section should preferably be excluded from the main body of the new model (so that its size is not unnecessarily inflated). The employment estimates do however represent an important input to the Employment Unit's work, and will for that reason still need to be calculated as part of any regular forecasting exercise. But this can be done using a sub-model, separate from, but linked to, the main body of the model.

32. *Central Government Budget:* It seems clear that this section will need to be revised in part, for instance in respect of the treatment of FAP grants and the addition of Budget Indicators. Furthermore, the introduction of a comprehensive finance-side section into the model will imply that some changes will have to be made in this section.

33. *Government Debt:* The Government Debt section of the existing model is very simple, reflecting the rudimentary nature of debt monitoring in the early 1980s. Any later developments in this field should be taken on board. In addition, the introduction of a comprehensive finance-side section into the model will imply that some changes will have to be made in this section. It should however be noted that even after the introduction of the finance-side block, this section will in all probability remain largely exogenous in nature, representing an "autonomous" government action parameter.[3]

34. *Customs Union Revenue:* No revisions are known to be needed in this section at this point in time, apart from those resulting from revision in other parts of the model. Should the ongoing re-negotiation of the Custom Union Arrangements bring results before the end of the modelling project, these will of course have to be taken on board.

---

[3] At least for the foreseeable future, it seems likely that the Botswana Government will not borrow out of *need*, but out of *choice;* i.e. it will borrow rather than draw down its own funds if the terms offered for the former are favourable compared to the cost of the latter.

3. The New Finance-Side Block

a. General Purpose

35. As already noted, the existing MEMBOT model is essentially restricted to dealing with the real side of the economy; no proper finance-side *structure* exists within the model. This is not, however, to imply that it contains no finance-side *variables*. On the contrary, the model does include a number of such variables. Essentially these are used to "fill in" various parts of the Government Budget and Balance of Payments tabulations not covered by the model's real side estimates. But, due to the absence of proper finance side structures, such estimates have to be introduced on an individual and exogenous basis. The present model is consequently limited to forecasting the effect upon the Government Budget and the Balance of Payments resulting from real-side events, *given* certain a priori specified finance-side estimates.

36. The purpose of introducing a finance-side block into the model, should therefore be to introduce important financial variables hitherto left out of the model, but more importantly to "endogenise" the finance-side variables as far as possible; i.e. to link them functionally to one another, and to appropriate real side variables (and vice versa).

b. Proposed Framework

37. In deciding a proper format for the finance-side block the aim should be to make it an *integral* part of the model; i.e. the finance-side estimates should be fully *consistent* with the real side ones. The international Standard for National Accounts (SNA) includes recommendations for the construction of a Flow of Funds matrix with this property. These recommendations have already been implemented by Botswana (i.e. by the CSO in building up the recent SAM matrices), and it is proposed that the modelling effort does likewise.

38. A proposal for such a framework is presented in Annex III,A. The proposed Flow of Funds table is based upon the SAM 1992/93 matrix, and has as such the advantage of being constructed from readily available official (base-year) data, as well as the desired quality of being consistent with the corresponding real-side estimates (which will relate to the same SAM-base). The real-side data in question are summarised in Annex III,B (Memo II).

c. The Flow of Funds Matrix

39. The Flow of Funds matrix proposed in Annex III,A represents an entirely new model entity. As such it may be useful to present and discussed its structure in some further detail. This is done below.

i. General Nature

40. The purpose of the Flow of Funds matrix is to illustrate the nation's internal and external economic transactions as seen from a financial point of view. Thus, the Flow of Funds represents all economic transactions in terms of *payments* made to, or from, the "actors" (or: institutions) in the financial arena. The Flow of Funds may consequently be seen to "follow the money", whereas the real-side block of the model may be seen to "follow the products".

41. All payments are recorded from the point of view of the individual institution. Hence, a payment made *to* the institution is recorded as a *positive* entry, while a payment made *from* the institution is recorded as a *negative* entry. The transactions of the Flow of Funds must consequently balance; any payment *made to* one institution is by definition balanced by a corresponding payment made *from* another institution.

42. Similar accounting identities also apply for the *totals* for each institution; the total payments *received* by the institution must balance the total payments[4] *made* by it.

ii. Institutions

43. The purpose of the Flow of Funds being to illustrate the nation's economic transactions from a financial point of view, its relevant institutions are not necessarily identical to the production sectors of the economy. In fact, the specific set of production sectors applicable to the real-side of the economy may represent neither an obvious, nor an optimal, choice in terms of relevant Flow of Funds agents. Nor do they represent *all* such agents. Also other entities, such as households, are important in the financial arena.

44. This is not, of course, to deny the fact that producers *do* play an important role in the financial arena. It should be emphasised, however, that they are not important as producers per se, but in their capacity as operators in that arena. Consequently, sector-distinctions that are important from a production point of view, may not be so in the current setting, and vice versa. For instance, the special function of the Central Bank is of central importance in the Flow of Funds, although largely irrelevant in respect of the production accounts.

45. It is neither necessary nor practical to detail the transactions of every possible Flow of Funds actor; a degree of aggregation is called for. Thus, the matrix proposed for the new MEMBOT model is limited to the following eight institutions:

- Households
- Mines
- Bank of Botswana
- Other Financial Institutions
- Other Private Institutions
- Central Government
- Local Government
- Rest of the World

46. These institutions have been chosen for the following reasons:

- Rest of the World : because it is essential in order to represent Botswana's international transactions.
- Bank of Botswana: because it has a special status in the financial sphere.
- Other Financial Institutions: because they play a central role in the financial arena.
- Central Government: because it is a major actor in the economy.

[4] Including payments in respect of acquisition of assets and claims.

- Mines: because they are major actors in the economy.
- Households: because they are important economic actors, and also because they are fundamentally different from the other institutions.
- Other Private Institutions: because they represent all production sectors not elsewhere specified.
- Local Government: because it does not lend itself to aggregation with any other institution.

47. With one exception, these institutions all correspond directly to production sectors (or aggregates thereof), or to final use categories, as given in the Input/Output tables summarising the real side estimates. The one exception concerns the financial sector, where the Bank of Botswana has to be split out from other financial institutions.

iii. Current Account Transactions

48. The gross factor incomes (i.e. the returns to capital and labour) are initially distributed among the institutions in which they originate. These data correspond to the estimates of GDP at market price, and are as such obtained directly from the real-side of the model.

49. The factor incomes earned by the various production sectors are however not theirs "to keep". They have to turn them over to their owners, be they households, other domestic institutions or the rest of the world. The incomes are consequently redistributed among these various institutions. Incomes are also redistributed among the various institutions in respect of payments for certain "services" obtained or provided (interests, royalties, land-rent, insurance premiums and claims). And similarly for income taxes paid to government, remittances received from abroad and various transfers received or paid out.

50. It may be noted that the gross total of each of these transactions must equal zero (i.e. when summed row-wise). This is due to the fact that no additional incomes are entered into the Flow of Funds through this section of the table, which merely redistributes existing ones.[5]

51. The actual calculations in respect of all these transactions will be made on a gross basis rather than the net basis summarised in the Flow of Funds table. This should go some way towards simplifying the operations involved. Furthermore, it may be noted that although the lion's share of above data may *not* be obtained directly from the real-side estimates, some of them may be assumed to grow roughly in step with such data, and hence may be estimated within the model. A number of transactions will however require "special attention" or have to be specified exogenously in some way or another.

52. Having redistributed all relevant incomes, we may calculate the total (current account) incomes of the institutions, and deduct their expenditures, to arrive at their savings. The said expenditures are obtained directly from the real-side Input/Output estimates. Note however that not all expenditures recorded in the Input/Output tables are relevant. Only *final*

[5] This may seem to militate against actual facts. After all, it is well known that additional incomes are injected into the economy by foreign aid and similar. Note however, that the rest of the world is treated as an institution within the Flow of Funds matrix, and that transfers *to* Botswana must equal transfers *from* this institution. The "zero sum" rule therefore holds true within the specification of the *complete* Flow of Funds matrix, while our "actual fact" is reflected in the subtotals for *domestic* institutions, which do not necessarily sum to zero.

consumption expenditures are included in the Flow of Funds, all intermediate consumption expenditures being excluded.[6] The entries for expenditures by domestic institutions therefore represent private and public consumption[7], while the two entries for the rest of the world represent Botswana's foreign trade, i.e. imports (cif) and exports (fob). Note that the exports in question represent *total* exports, while the imports are exclusive of capital formation products, the latter being included in the capital account section below.

iv. Capital Account Transactions

53. Current Account savings are transferred to the capital account, where they are treated as incomes. In addition, institutions may receive, or pay out, capital transfers, i.e. transfers received or paid out in respect of capital formation purposes. Foreign development grants are a case in point. The lion's share of capital transfers relates to transfers from government and the rest of the world, and will as such have to be linked to corresponding entries in the Government Budget and the Balance of Payment tables. The capital transfers are conceptually comparable to the above discussed redistribution of incomes, i.e. their gross total must be zero (for each row).

54. The capital account expenditures of domestic institutions include all costs in respect of their gross capital formation undertakings, while the entry for the rest of the world represents the total cost of capital formation imports. The relevant estimates may be obtained from the model's real-side.

55. The capital account savings are the residuals of incomes minus expenditures. These savings must be balanced against the net acquisition of financial assets, i.e. against changes in cash holdings, bank deposits and loans, equities etc. This may prove a difficult task, because our institutions, which are aggregates of persons or firms, can not be relied on to behave in a uniform manner, neither across individuals nor over time. Thus, we must in general anticipate that the individuals of a given institution will simultaneously make deposits and withdrawals, borrow and repay loans, increase and decrease their cash holdings, sell and buy equities etc. To an extent these transactions will cancel each other out, allowing us to rely on "average group behaviour". But even average group behaviour may change considerably over time, in response to the group's actual economic situation as well as to its general economic outlook and expectations.

56. It may therefore be tempting to keep the disaggregation of the total capital account savings to a minimum. Some disaggregation is nevertheless required, for instance in order to estimate the interest payments which are needed in the calculation of the current account estimates. Furthermore, a high degree of aggregation may possibly be seen to militate against the very purpose of introducing a finance side block into the model.

---

[6] The intermediate consumption expenditures are excluded because they represent the costs of products consumed in the production of other products, and only the latter are available for final consumption. Conceptually, they are therefore included in the costs of the latter. To include them separately would therefore constitute double-counting.

[7] The consumption expenditures recorded for Other Private Institutions may seem to contradict this statement, but they do in fact represent consumption expenditures by non-profit making institutions, which are classified as public consumption in National Accounts.

57. This purpose may be tentatively be stated as follows: Ideally one would want reliable forecasts relating to all important financial instruments. But even if such forecasts should prove difficult or impossible to produce, it may still be of considerable merit to present the planners with a comprehensive "table of options", consistent both internally and with the real side forecasts. This will enable them to analyse "if-then"[8] scenarios within the broader context of the economy, with a view to detect and analyse potential promises and problems relating to the financial arena.

58. But, if this is so, the specification of financial instruments ought to be reasonably detailed, in order better to clarify the various options available. It is consequently (tentatively) suggested that the following breakdown be adopted:

- Cash
- Deposits in:
    - Domestic Institutions:
        - Bank of Botswana
        - Other Financial Institutions
    - Foreign Institutions
- Loans from:
    - Domestic Institutions:
        - Bank of Botswana
        - Other Financial Institutions
    - Foreign Institutions
- Equities etc. held by:
    - Domestic Institutions
    - Foreign Institutions
- Official Foreign Exchange Reserves
- Bank of Botswana Certificates

59. Note that above breakdown is considerably more detailed than the one presented at the bottom of Annex III,A, the latter being an aggregation of above. Note also that the estimates for the foreign exchange reserves are already available from the Balance of Payment table, while the rest of these estimates will have to be calculated using exogenously specified coefficients etc. relating to relevant "group behaviour".

v. Stock of Funds

60. The Flow of Funds matrix does, as the name indicates, measure the financial *flows* within the economy, i.e. the changes in the corresponding *stocks* of financial assets and claims. These stocks should be taken into account in order to make our Flow of Funds forecasts more realistic. Otherwise we may run the risk of for instance allowing institutions to withdraw more than 100% of their bank deposits. A table detailing these stocks should consequently be included in our estimates. The format of this table should be same as proposed for the corresponding flows. (The format in question is illustrated in Annex III,B Memo I.)

[8] *If* certain variables, coefficients and structures are as (exogenously) specified by us, *then* certain other variables will be as estimated within the model.

vi. A Word of Warning

61. The uncertainties associated with the forecasting of certain Flow of Funds estimates have been described already. Before ending our discussion of these estimates, we would nevertheless again warn against unrealistic expectations. *One should not, in general, expect the same degree of accuracy for finance side forecasts as for real side ones.*

62. Thus, the existing MEMBOT table did not exclude a finance-side block due to neglect or oversight, but by *design*. At the time it was argued that the available financial data were too poor, and their functional stability too weak, to allow for "proper modelling".[9]

63. These aspects may have changed somewhat since the construction of the original model. Nevertheless, it would seem unjustified to expect that finance side variables may be modelled with the same degree of confidence as the real side ones. Essentially, one must still both *expect and accept* that finance side functions may prove fairly unstable, and that available statistics may be found lacking in some respects.

64. Therefore, whereas it is true that *all* the forecasts produced by the model will inherently be of an "if-then" nature, this will be *all the more* true of the finance side forecasts, and especially so for the acquisition and holding of financial assets.

4. Concluding Remarks

a. — Model Size

65. At various stages above we have touched upon the limit to the maximum "permitted' size of the new model. Superficially, this may seem to be the same problem as faced when constructing the original model. But the nature of today's problem is quite different. Yesterday's problem was one of limited computational capacity. This problem is today largely irrelevant. Instead we are facing the practical problem of deciding how large we want to *allow* the model to grow, given that it could easily become unmanageable and user-*un*friendly if it grows too big.

66. This is however not to suggest that any *definite* maximum should be set for the modelling effort. Rather we must allow the new model to find its "natural size" given its agreed *focus* and the number and nature of model-elements needed to cover this focus. This being said, however, we would like to caution against "over-loading" the model by the inclusion of too *many* elements, especially elements that may be non-essential or marginal with respect to the agreed focus.

67. Consequently:

- One should at all times keep clearly in mind that the volume of the model ought to be kept to a manageable level.
- One should from the very start guard against the *indiscriminate* inclusion of additional model structures or refinements.

[9] I.e. their functional relationships to one another, as well as to other variables, were seen as inherently unstable.

- Such additional features should only be accepted if they are deemed to be essential (in terms of the agreed focus) or cost effective (in terms of the implied quality improvements of the results relative to the implied increase in the model volume).

b. *Objective and Framework*

68. Before concluding this note on the rebuilding of the MEMBOT model, it may be opportune to reiterate the nature of its overall objective and organisational framework.

i. Objective

69. The production of a new macro-economic model for Botswana is an extensive and important task in itself. But even so, the modelling effort's *overall* objective extends beyond this task. Thus, it is recalled that the objective of the modelling effort is not only to build a new model, but also to build institutional and individual capacity to construct, operate and interpret economic models within relevant institutions in Botswana.

ii. Capacity Building Framework

70. In order to achieve above described aim, local modelling expertise must be created in Botswana. In general, the persons best situated to gain such expertise are those involved in the actual model construction process. An Assistant Research Fellow has already been recruited for this purpose. In addition, BIDPA has indicated its willingness to employ another young economist on a programme basis, should this be deemed essential in order to reach a "critical-mass".

71. Furthermore, these activities should be carried out with the full participation of relevant officers in the MFDP. Ideally BIDPA's role ought to be that of assisting these officers in *their* model-related efforts. In order to ensure this, BIDPA has expressed its willingness, within the limits of its capacity, to provide office facilities etc. for relevant MFDP officers, should the Ministry want to second them to the institute for part of the programme's duration.

72. But participation in the modelling programme ought also to be extended to others who may benefit from it, or who may have an important contribution to make. Relevant institutions in this respect would seem to be the Research Department of the Bank of Botswana and the Economics Department of the University of Botswana. Furthermore, the Central Statistics Office, being the data producer, will also have a role to play during the execution of the programme. Essentially, the role of these institutions will be to participate in a steering committee/working group, as well as in such seminars etc. that will be arranged to disseminate programme outputs.

iii. Organisational framework

73. It is proposed that a steering committee/working group be formed with participation from relevant model users and data providers. BIDPA will serve as the secretary to the committee/group. The task set for this committee/group will be to guide and participate in the programme activities. As a minimum the group should include relevant representatives from BIDPA and MFDP. But ideally it ought to include all relevant parties, on the understanding

that the MFDP is not the only institution who may have an active interest in this issue, or an important contribution to make.

Annex I

A Short Description of the Existing MEMBOT Model

74. MEMBOT is a sector-disaggregated macro-economic forecasting model for Botswana. It was constructed for the express purpose of helping the MFDP produce consistent forecasts for the overall economy and its various components over a typical "plan period". Since its construction in the late 1970s (and subsequent revision in the early 1980s) its basic structure has undergone only minor changes; essentially it remains the same today as it was almost two decades ago. It has consequently reached what must be considered an unusually high age for a model still "on active duty". This fact may be interpreted as an indication of the fundamental strength of its *basic* structure, but it may also serve to indicate that *specific aspects* of this structure may today be out of date.

75. MEMBOT was essentially developed as a real side model; i.e. its central structure deals with real side economic variables such as production and consumption, as opposed to finance side variables such as money and credit. Thus, its core deals with the same type of economic variables as does the National Accounts Statistics of Botswana, i.e. typically with variables such as: constant and current price Gross Output and Gross Domestic Product, Supply and Disposition of Resources, etc.

76. But the full scope of MEMBOT extends beyond the limits of standard National Accounts. Other accounts are also included, the most important of which are the Balance of Payments and the Central Government Budget. To a certain extent these may be seen as "add-ons" to the core model, essentially illustrating how these accounts are effected by real side developments.

77. MEMBOT disaggregates the production system of Botswana into 19 production sectors, each of which is treated as a "leader" or as a "follower". A sector is a typical leader if its activities are largely independent of the rest of the domestic economy, (while the latter may often be crucially dependent upon the leader). The traditional export sectors may serve as an example; their fortunes are largely decided by the world market, but are at the same time of crucial importance to the domestic economy. A typical follower, in contrast, is largely dependent upon the rest of the economy (i.e. the domestic market) for his fortunes.

78. Production forecasts for the followers are calculated within the model, reflecting this dependence. The forecasts for the leaders, in contrast, are typically entered into the model as exogenous assumptions. The rationale of this treatment is that important factors affecting the economy, such as the world market for diamonds, the prevalence of drought etc., can not be modelled with any confidence, and are better treated as assumptions. MEMBOT is therefore not intended to replace the user's assumptions about these sectors, but to provide a consistent framework for them. The model draws out the implications for the rest of the economy of the assumptions made for the key sectors, highlights possible inconsistencies between various parts of the forecast, and allows him to make appropriate adjustments.

79. MEMBOT central economic relationships are fairly simple, in many respects corresponding to those of a simple Input/Output model. Although not an Input/Output model in the fullest sense, MEMBOT nevertheless has many similarities to this kind of model. Thus,

its core section relies extensively upon the Input/Output relationships of the Botswana Social Accounting Matrix for its basic structural data, it calculates most demand estimates using simple Input/Output formulas, it calculates domestic prices using Input/Output matrix operations, and it presents its central real-side estimates in the form of annual Input/Output tables.

ANNEX II

Proposed production-sector classification for revised MEMBOT model

		GO P'mill	GDP P'mill	GO %	GDP %
1	Cattle sector	381.6	282.3	2.7%	3.4%
2	Oth. Agricult etc	233.0	157.2	1.7%	1.9%
3	Diamonds	3,010.0	2,835.0	21.6%	34.3%
4	Copper/nickel	236.3	147.2	1.7%	1.8%
5	Other Mining	124.4	51.9	0.9%	0.6%
6	Meat Processing	316.4	44.2	2.3%	0.5%
7	Dairy , Beverage & Oth.Agric.Proces'ng	530.0	107.0	3.8%	1.3%
8	Textiles	198.7	56.1	1.4%	0.7%
9	Chemical & Metal Products	246.6	37.5	1.8%	0.5%
10	Other Manufacturing	535.4	170.8	3.8%	2.1%
11	Water	113.4	75.6	0.8%	0.9%
12	Electricity	224.0	127.8	1.6%	1.5%
13	Construction	2,003.6	574.9	14.4%	7.0%
14	W & R Trade, Hotels & Rest.	848.8	481.2	6.1%	5.8%
15	Rail Transport	104.9	58.8	0.8%	0.7%
16	Road Transport	244.4	87.9	1.8%	1.1%
17	Air & Other Transport	107.7	41.5	0.8%	0.5%
18	Communications	165.1	124.3	1.2%	1.5%
19	Banking & Insurance	353.6	270.6	2.5%	3.3%
20	Business Services	502.3	375.7	3.6%	4.5%
21	Ownership of Dwellings	251.9	208.7	1.8%	2.5%
22	Central Government	2,349.0	1,363.3	16.9%	16.5%
23	Local Government	256.3	175.9	1.8%	2.1%
24	Other Personal Services	288.4	210.9	2.1%	2.6%
25	Private Non-Profit Institutions	296.3	195.2	2.1%	2.4%
	Total	13,922.1	8,261.7	100.0%	100.0%

Correspondence between proposed (new) and present (old) MEMBOT sectors

New sector: 1 = Old sector: 1
New sector: 2 = Old sector: 2
New sector: 3 = Old sector: 3
New sector: 4 = Old sector: 4
New sector: 5 = Old sector: 5 + 6
New sector: 6 = Old sector: 7
New sector: 7 = Part of old sector: 8
New sector: 8 = Part of old sector: 8
New sector: 9 = Part of old sector: 8
New sector: 10 = Part of old sector: 8
New sector: 11 = Old sector: 9
New sector: 12 = Old sector: 10
New sector: 13 = Old sector: 11
New sector: 14 = Old sector: 12
New sector: 15 = Old sector: 13
New sector: 16 = Part of old sector: 14
New sector: 17 = Part of old sector: 14
New sector: 18 = Part of old sector: 14
New sector: 19 = Part of old sector: 15
New sector: 20 = Part of old sector: 15
New sector: 21 = Part of old sector: 15
New sector: 22 = Old sector: 19
New sector: 23 = Old sector: 18
New sector: 24 = Old sec: 16 + part of old sec:17
New sector: 25 = Part of old sector: 17

Memo : Production-sector classification of existing MEMBOT model

		GO P'mill	GDP P'mill	GO %	GDP %
1	Cattle	381.6	282.3	2.7%	3.4%
2	Other agriculture	232.9	157.2	1.7%	1.9%
3	Diamonds	3,010.0	2,835.0	21.6%	34.3%
4	BCL	236.3	147.2	1.7%	1.8%
5	Soda Ash mining	54.7	7.3	0.4%	0.1%
6	Other mining	69.6	44.6	0.5%	0.5%
7	Meat & meat products	316.4	44.2	2.3%	0.5%
8	Other manufacturing	1,510.9	371.4	10.9%	4.5%
9	Water	113.4	75.6	0.8%	0.9%
10	Electricity	224.0	127.8	1.6%	1.5%
11	Construction	2,003.6	574.9	14.4%	7.0%
12	Trade & hotels	848.8	481.2	6.1%	5.8%
13	Rail transport	104.9	58.8	0.8%	0.7%
14	Other transport	517.2	253.7	3.7%	3.1%
15	Financial services	1,107.8	855.0	8.0%	10.3%
16	Domestic services	59.1	59.1	0.4%	0.7%
17	Other personal services	525.5	347.0	3.8%	4.2%
18	Local government	256.3	175.9	1.8%	2.1%
19	Central government	2,349.0	1,363.3	16.9%	16.5%
	Total	13,922.0	8,261.7	100.0%	100.0%

Correspondence between present (old) and proposed (new) MEMBOT sectors

Old sector: 1 = New sector: 1
Old sector: 2 = New sector: 2
Old sector: 3 = New sector: 3
Old sector: 4 = New sector: 4
Old sector: 5 = Included in New sector: 5
Old sector: 6 = Included in New sector: 5
Old sector: 7 = New sector: 6
Old sector: 8 = Split into New sectors: 7,8,9,10
Old sector: 9 = New sector: 11
Old sector: 10 = New sector: 12
Old sector: 11 = New sector: 13
Old sector: 12 = New sector: 14
Old sector: 13 = New sector: 15
Old sector: 14 = Split into New sectors: 16,17,18
Old sector: 15 = Split into New sectors: 19,20,21
Old sector: 16 = Included in New sector: 24
Old sector: 17 = Split into New sectors: 24,25
Old sector: 18 = New sector: 23
Old sector: 19 = New sector: 22

Note: GO = Gross Output (incl. indirect taxes paid by sector) (Source: SAM92/93)
GDP = Gross Domestic Product (incl. indirect taxes paid by sector) (Source: SAM92/93)

ANNEX III,A

FLOW OF FUNDS TABLE PROPOSED FOR MEMBOT MODEL

Current Account Transactions:	**Current Account Incomes TO:**									
	Institutions:									
Current Account Incomes FROM:	**House-holds**	**Mines**	**BoB**	**Other Finance**	**Other Private**	**Government Central**	**Government Local**	***Total Domest.***	**Rest of World**	***Gross Total***
Gross Factor Incomes (incomes from GDP, before redistribution of dividends etc):										
Wages & salaries	3,518.6	-	-	-	-	-	-	3,518.6	-	3,518.6
Gross Operating Surplus	-	2,688.3	29.7	97.9	1,431.8	489.0	35.9	4,772.6	-	4,772.6
Taxes on Products	-	-	-	-	-	1,087.0	-	1,087.0	-	1,087.0
Taxes on Production, net	-	-	-	-	-	(33.6)	4.1	(29.5)	-	(29.5)
Sum-Factor Incomes	3,518.6	2,688.3	29.7	97.9	1,431.8	1,542.5	40.0	9,348.7	-	9,348.7
Net Redistribution of Incomes (net incomes received from):										
Interests	(115.3)	(365.5)	859.4	169.2	(219.9)	129.4	12.2	469.6	(469.6)	0.0
Dividends	201.7	(579.5)	-	(30.9)	(198.4)	48.6	0.0	(558.5)	558.5	0.0
Migrant Workers' (net) Incomes	169.8	-	-	0	0	-	-	169.8	(169.8)	0.0
Royalties & Rents on Land	(18.9)	(959.2)	-	(0.6)	(3.9)	979.3	3.3	(0.0)	-	(0.0)
Insurance Premiums, net of Claims	(2.5)	(9.2)	(0.7)	23.5	(36.2)	0.0	(0.8)	(25.9)	25.9	0.0
Taxes on Income	(93.6)	(837.0)	-	(29.4)	(396.3)	1,331.2	25.1	(0.0)	-	(0.0)
Other Transfers	44.5	245.5	(798.0)	(107.3)	459.5	(66.6)	190.2	(32.2)	32.2	0.0
Sum-Net Redistribution Incomes	185.7	(2,504.9)	60.7	24.5	(395.2)	2,421.9	230.0	22.7	(22.7)	(0.0)
Total Current Account Incomes	3,704.3	183.4	90.4	122.3	1,036.6	3,964.4	270.0	9,371.5	(22.7)	9,348.7
Current Account Expenditures:										
Domestic Uses (ie: Misc. Consump.)	(3,599.3)	-	-	-	(243.3)	(2,253.2)	(250.1)	(6,345.8)	2,390.2	(3,955.7)
Foreign Uses (ie: Exports)	-	-	-	-	-	-	-	-	(3,902.0)	(3,902.0)
Total Current Account Expenditures	(3,599.3)	-	-	-	(243.3)	(2,253.2)	(250.1)	(6,345.8)	(1,511.9)	(7,857.7)
Current Account Savings:										
Total Current Account Savings	105.1	183.4	90.4	122.3	793.4	1,711.2	19.9	3,025.6	(1,534.6)	1,491.0

Capital Account Transactions:	**Capital Account Incomes TO:**									
	Institutions:									
Capital Account Incomes FROM:	**House-holds**	**Mines**	**BoB**	**Other Finance**	**Other Private**	**Government Central**	**Government Local**	***Total Domest.***	**Rest of World**	***Gross Total***
Surplus/savings on Current Account	105.1	183.4	90.4	122.3	793.4	1,711.2	19.9	3,025.6	(1,534.6)	1,491.0
Net Capital Transfers between Institutions (transfers/grants received from):										
Mines	-	(31.7)	-	-	31.7	-	-	0.0	-	0.0
Other Private	-	0.0	-	-	0.0	-	-	0.0	-	0.0
Central Government	-	0.0	-	8.8	219.8	(451.0)	222.4	0.0	-	0.0
Rest of World	-	-	-	5.2	76.9	285.2	-	367.3	(367.3)	0.0
Total Net Capital Transfers Received	-	(31.7)	-	14.0	328.4	(165.8)	222.4	367.3	(367.3)	(0.0)
Total Capital Account Incomes	105.1	151.7	90.4	136.3	1,121.8	1,545.4	242.3	3,392.9	(1,901.9)	1,491.0
Capital Account Expenditures:										
Total Gross Capital Format. Expend.	0.0	(351.7)	(18.2)	(43.5)	(1,136.7)	(752.8)	(242.3)	(2,545.1)	1,054.1	(1,491.0)
Capital Account Savings:										
Total Capital Account Savings	105.1	(200.0)	72.2	92.9	(14.9)	792.6	(0.0)	847.8	(847.8)	(0.0)

Disposition of Cap. Acc. Savings:	**NET ACQUISITION OF ASSETS BY:**									
Type of Asset:	**House-holds**	**Mines**	**BoB**	**Other Finance**	**Other Private**	**Government Central**	**Government Local**	***Total Domest.***	**Rest of World**	***Gross Total***
Cash & Deposits (net)	97.4	(243.7)	(1,107.2)	535.1	(451.7)	575.9	(5.0)	(599.2)	599.2	0.0
Equities & Other Assets	7.7	43.7	60.1	(412.2)	161.0	216.7	-5.0	81.8	(81.8)	0.0
Official Reserves	-	-	1,365.2	-	-	-	-	1,365.2	(1,365.2)	0.0
BoB Certificates	0.0	0.0	(245.8)	(30.0)	275.8	-	-	(0.0)	-	(0.0)
Total	105.1	(200.0)	72.3	92.9	(14.9)	792.6	(0.0)	847.8	(847.8)	0.0
Control total/Unallocated residual	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00

ANNEX III,B

MEMO I : STOCK of Assets & Claims 1) 2)

Stocks held at End of Year

Type of Assets & Claims:	STOCK OF ASSETS & CLAIMS HELD BY: House-holds	Mines	BoB	Other Finance	Other Private	Government Central	Government Local	Total Domestic	Rest of World	Gross Total
Cash	100.0	10.0	(261.2)	81.2	70.0	-	-	(0.0)	-	(0.0)
Deposits in : Domestic Institutions	653.8	(51.2)	(5,817.2)	(1,338.5)	585.2	5,731.4	176.5	(60.0)	60.0	0.0
of which in : BoB	0.0	0.0	(5,817.2)	96.8	0.0	5,720.4	0.0	0.0	0.0	0.0
: Other Finance	653.8	(51.2)	0.0	(1,435.3)	585.2	11.0	176.5	(60.0)	60.0	0.0
: Foreign Institutions	0.0	80.0	NA	349.0	70.0	0.0	0.0	499.0	(499.0)	0.0
Loans from : Domestic Institutions	(572.7)	(210.0)	0.0	2,581.6	(1,608.3)	(190.6)	0.0	(0.0)	0.0	(0.0)
of which from : BoB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
: Other Finance	(572.7)	(210.0)	0.0	2,581.6	(1,608.3)	(190.6)	0.0	(0.0)	0.0	(0.0)
: Foreign Institutions	(713.7)	(4,695.0)	0.0	(20.0)	(412.5)	(913.8)	0.0	(6,755.0)	6,755.0	0.0
Equities etc held by : Domestic Institutions	????	????	????	????	????	????	????	????	????	0.0
: Foreign Institutions	????	????	????	????	????	????	????	????	????	0.0
Official Reserves	-	-	9,591.6	-	-	-	-	9,591.6	(9,591.6)	0.0
BoB Certificates	0.0	200.0	(1,215.6)	902.8	112.8	-	-	0.0	-	0.0
Sum-Net Assets (ie. Net Credits)	(532.6)	(4,666.2)	2,297.6	2,556.0	(1,182.8)	4,627.1	176.5	3,275.6	(3,275.6)	0.0

Notes: 1) All assets and claims are measured on a credit basis
2) Note that the data included in this table are (at this stage) NOT actuals, no such data being easily available from SAM or similar sources.

MEMO II : SUMMARY OF REAL-SIDE ESTIMATES CORRESPONDING TO, AND CONSISTENT WITH, ABOVE FLOW OF FUNDS ESTIMATES

Macro Budget Identity : Supply & Disposition of Resources

Total Supply of Resources:	Source of Supply: Domest.	Import	Total
A : Gross Resources:			
GO, net of Indirect Taxes	13,260.7	-	13,260.7
+ Indirect taxes (incl. duties)	1,057.5	-	1,057.5
= GO, inclusive of Indirect Taxes	14,318.2	-	14,318.2
+ Imports cif (incl. reexports)	-	3,624.8	3,624.8
= Total Gross Supply at market price	14,318.2	3,624.8	17,943.1
B : Net Resources:			
GDP at factor cost	8,291.2	-	8,291.2
+ Indirect taxes (incl. duties)	1,057.5	-	1,057.5
GDP at market price	9,348.7	-	9,348.7
+ Imports cif (incl. reexports)	-	3,624.8	3,624.8
Total Net Supply at market price	9,348.7	3,624.8	12,973.5

Total Disposition of Resources (at market price):			
A : Gross Resources:			
Intermediate Consumption	3,537.0	1,432.5	4,969.5
+ Private Consumption	2,689.8	909.4	3,599.3
+ Public Consumption	2,698.3	48.2	2,746.6
+ Exports (incl. reexports)	3,902.0	180.6	4,082.6
+ Gross Capital Formation	1,491.0	1,054.1	2,545.1
= Total Disposition of Gross Resources	14,318.2	3,624.8	17,943.1
B : Net Resources:			
Total Disposition of Gross Resources	14,318.2	3,624.8	17,943.1
- Intermediate Consumption	4,969.5	-	4,969.5
= Total Disposition of Net Resources	9,348.7	3,624.8	12,973.6

BIDPA Publications

Working Paper Series

BIDPA Working paper 1

Granberg, Per
***A Note Concerning the* Revision or rebuilding *of the MEMBOT Model. Some Preliminary Observations and Suggestions.* BIDPA, 1996. RESTRICTED.**
The paper discusses the structure of the existing MEMBOT model (Macroeconomic model for Botswana). The limitations of the current model are identified and a need to revise it is noted.

BIDPA Working Paper 2

Granberg, Per
***A Study of the Potential Economic Effects of AIDS. Some Preliminary Thoughts.* BIDPA, 1996.**
Given the current rate of HIV/AIDS infection in Botswana, there seems a need to analyse its economic impact. It is suggested that BIDPA may take an initiative towards this end. The paper presents some preliminary and tentative ideas about such a project.

BIDPA Working paper 3

Duncan, Tyrrell (ed.).
Study on Poverty Alleviation in Botswana: Inception report. BIDPA, 1996
This inception report sets out the various steps planned in completing the study, which comprises a statistical review of poverty utilising the 1985/86 and 1993/94 Household Income and Expenditure Survey. The study will focus six special areas: Basic Education, Preventative Health, Labour Based Public Works, Destitute Policy, Financial Assistance Policy and Arable Lands Development Programme.

BIDPA Working Paper 4

Isaksen, Jan.
Main Ingredients for a Public - Private Sector Strategy for Private Sector Employment Creation in Botswana: Prepared for the Fourth Private Sector Conference on Employment Creation, Francistown 26 - 28 May 1996.
The paper attempts to draw lessons from policy experiences in Eastern Asia. On the basis of such lessons, the paper suggests a number of practical policy steps which hopefully would be relevant to the policy debate in Botswana It argues that a resumption of rapid economic growth through diversification and industrialisation are the most important contributions to the acceleration of employment creation in Botswana

BIDPA Working Paper 5

Granberg, Per.
A Revised Poverty Datum Line for Botswana. BIDPA, June, 1996
The paper is part of a larger study of poverty and poverty alleviation in Botswana, undertaken by BIDPA for the Ministry of Finance and Development Planning. The paper presents revised estimates of the Poverty Datum Line (PDL) for Botswana, needed to analyse the household income and expenditure survey for 1993/94 and 1985/86 in terms of poverty.

BIDPA Working Paper 6

Gergis, Abdalla.
Regulation, Privatisation and Commitment in Botswana: Paper presented at BNPC's First Stakeholder Consultative Conference on Productivity: Productivity - Key to the future, November 6, 1996.
The paper notes the challenge facing Botswana, giving particular attention to the changing role of the state and the need to adjust the regulatory environment. Recent economic developments in Botswana are discussed, as are the questions of international competitiveness and the search for anew engine of growth for the economy.

BIDPA Working Paper 7

Fidzani, N.H., P. Makepe and J. Tlhalefang
The impact of trade liberalisation on Botswana's beef and maize sectors. BIDPA 1997

The paper examines the Botswana beef and maize sectors in terms of structure, main activities and market distortions. The origins and sources of these distortions are analysed to determine how their removal would bear upon the various stakeholders. The paper also attempts to sketch implications of regional integration.

BIDPA Working Paper 8

Isaksen, Jan.
Data Requirements and Methodologies for Multi-country Research.
The paper was presented at a workshop on developing a research agenda for accelerated development in Sub-Sahara Africa Held in Harare, Zimbabwe, March 1997. It presents data and methodology for co-operation at national, regional and continental levels in research. It concludes that there is need for international co-operation build on national priority research.

BIDPA Working Paper 9

Gergis, Abdalla
"To Privatise", What is & How? Paper presented at seminar on "Competition, Productivity and Privatisation: Commonwealth Experiences and for Botswana" organised by BIDPA and BNPC under the sponsorship of the Commonwealth Secretariat, Gaborone 21-23April, 1997 BIDPA, 1997

The paper was presented at a seminar on Competition, Productivity and Privatisation. It draws on lessons of experience as well as existing knowledge about privatisation, briefly addressing the main issues discussing how privatisation can be planned and implemented successfully.

BIDPA Working Paper 10

Greener, Robert
The Impact of HIV/AIDS and options for intervention: results of a five -company pilot study.
BIDPA, 1997
The paper was written for the Botswana National Task Force on AIDS at the workplace. It presents results from a study of the impact of HIV/AIDS, based on a sample of five companies in Botswana It concludes that the impact to date has been small, because the HIV epidemic is still too recent to have developed into an AIDS epidemic.

BIDPA Working Paper 11

Harvey, Charles.
The role of Africa in the global Economy: the contribution of regional co-operation, with particular reference to Southern Africa. BIDPA' 1997

The paper was written at the request of the Vice President and Minister of Finance and Development Planning. The paper notes that Africa's importance in the world economy has declined over the years and argues that this, and the extreme poverty in most of Africa, calls for analysis of ways to reverse the trend. Prospects for regional co-operation and integration are discussed as possible ways to accelerate economic growth in Southern Africa.

BIDPA Working Paper 12

Ditlhong, Molapisi.
Poverty Assessment and Poverty Alleviation in Botswana BIDPA 1997
The paper discusses the nature and extent of poverty in Botswana, drawing data from the Study of poverty and poverty alleviation in Botswana conducted by BIDPA for Ministry of Finance and Development Planning.

BIDPA Working Paper 13

Gergis, Abdalla
Competition, Productivity and Privatisation. BIDPA 1997.
A summary report of the proceedings of the Seminar on Competition, Productivity and Privatisation.

BIDPA working paper No. 14

Lisenda, Lisenda
Small and Medium-Scale Enterprises in Botswana: Their Characteristics, Sources of finance and Problem BIDPA, December 1997.
The study analyses the characteristics of Small and Medium-Scale Enterprises (SMEs) in Botswana highlighting the educational background of owners and exposure to business related training, geographic location of enterprises, premises of operation, age of enterprise, and size of enterprise by number of employees, sales and total investment and activity. Also considered are administration and financial sources of the enterprises. Record keeping is assessed by size of enterprise, gender of operator and source of finance of enterprise. Problems faced by SMEs are highlighted.

BIDPA Working Paper No. 15

Granberg, Per.
A simple formula for forecasting the Botswana urban population total. BIDPA, February 1998
The paper establishes a simple relationship between urbanisation and economic growth. The relationship is intended as a simple "annex" to the revised MEMBOT model (forthcoming), capable of providing quantitative estimates illustrating the likely nature of urban population changes under alternative economic scenarios.

BIDPA Working Paper No. 16

Sesinyi, Magdeline.
Minimum wages and employment: literature review and background on minimum wages in ***Botswana.*** **BIDPA, 1998.**
Gives a brief literature review on minimum wages and their possible effects on employment, with particular focus on the likely effects of minimum wage introduction on the two excluded sectors, namely the Domestic and Agricultural Sectors. It briefly outlines research results on minimum wages from past studies, highlighting their main recommendations. The paper concludes that minimum wage increases results in trade-off, and no matter how well intended come with a price in the form of lost jobs for some and increased benefits for others.

BIDPA Working Paper No. 17

Jefferis, Keith, Charles Okeahalam and Tebogo Matome
International Stock Market Linkages in Southern Africa. BIDPA, 1999

Stock markets are taking on an increasingly prominent role in financial development, and many developing and transition economies are establishing stock markets as part of financial reform processes. In theory stock markets can contribute to the mobilisation of savings and the allocation of investment, but there are questions as to whether this works in practice. One important issue is whether stock markets are efficient (in the financial sense), and a related question is whether share prices reflect economic fundamentals; both of these questions are important in addressing whether stock markets properly allocate capital. Another issue relates to the question of international linkages between markets: with greater integration of capital markets globally, financial market developments appear to be rapidly transmitted between markets around the world. While this can have beneficial impacts, in terms of improving the global allocation and pricing of capital, it may be disruptive if international capital flows are large relative to national markets and economies. This paper addresses pertinent issues in the context of stock markets in three southern African countries: Botswana, Zimbabwe and South Africa.

BIDPA Working Paper No. 18

Dumcombe, Richard
The Role of Information and Communication Technology in Small and Medium Enterprise Development in Botswana. BIDPA, October 1998

The paper analyses the role of information and communication technologies (ICTs) in small and medium enterprise (SME) development in Botswana. It outlines the economic and policy background to SME development, and presents an analysis of the SME sector with regard to firm size, location and market sector. It presents the results of a pilot survey of firms in the SME sector examining the information and communication practices of a small sample of firms. Current developments in information and communication technologies are outlined, and some preliminary findings relating to ICT impact on SMEs are summarised. Finally, some policy considerations are mentioned and the objectives of the main fieldwork phase of the project are outlined

BIDPA Working Paper No. 19

By Harvey, Charles

The impact on Southern Africa of the financial crises in Asia and Russia BIDPA, June 1999

The countries of southern Africa have not suffered seriously from "financial contagion", which is the short-term and sometimes devastating impact of financial crises in other countries. The first stage of financial contagion occurs through the markets for foreign exchange, shares and bonds. The second stage, which can be even more devastating, occurs if trouble in financial markets causes a crisis in the country's banking system, as happened in several Asian countries. South Africa's economy is potentially the most vulnerable in Southern Africa to financial contagion, because it has highly developed financial markets which are open to inflows and outflows of foreign capital. However, the economic cost of financial contagion has been limited in South Africa because the country's banking system is sound. Zimbabwe has been similarly protected from the worst effects of financial contagion. Financial markets in the other countries of Southern Africa are very underdeveloped, which limits the first stage of financial contagion; this is fortunate, because some of them have unsound banking systems. All of these countries are actively trying to develop their financial sectors, however, so that their relative immunity to financial contagion may be reduced in the future. This will strengthen the case for maintaining macroeconomic balance, realistic exchange rates, and absolutely sound banking systems.

BIDPA Working paper 20

Jeferris, Keith The *Long Term Impact of Structural Economic Change on Government Spending*. BIDPA, June 1999

Botswana's current economic objectives centre on diversification away from its historical dependence on diamonds and government. Such diversification will change the structure of the economy, and has important implications for the ability of government to raise revenue through taxation and therefore for its ability to finance its expenditure. This paper explores the likely impact of diversification on government's revenue raising ability and hence on the magnitude of its overall role in the economy. It uses projections over a 20-year period to simulate possible scenarios for taxation and the size of government. The key point is that any diversification will cause government revenues to fall, in relative terms. The diamond sector is extremely profitable, and those profits are taxed at a very high rate; as the economy diversifies, other sectors will emerge that will be less profitable and less highly taxed. The projections in this paper show that under a variety of different assumptions about sectoral growth rates, and taxation and spending, government will have to significantly reduce its role in the economy. Such a change will have major implications for choices to be made about the allocation of public expenditure.

Publications Series

1. Gaolathe, Ndaba "Botswana's booms and recession experience: a discussion" IN: Salkin J.S., D. Mpabanga, D. Cowan, J. Selwe, M. Wright (eds.) ***Aspects of the Botswana Economy***. Gaborone: Lentswe La Lesedi, 1997 pp: 37 - S2.

In the years around 1990, the Botswana economy experienced a period of "boom" conditions, eventually followed by a "burst". The paper sets out to analyse this experience, trying to explain the underlying factors, and to draw out policy lessons.

2. Gergis, Abdalla (ed.)
Botswana's New Industrial Development Policy BIDPA/MCI. Gaborone: Government Printer, 1997.

The publication contains the proceedings of the joint BIDPA/MCI seminar held in September 1996. The volume includes the seminar report on group discussions of the draft industrial development policy and the background papers presented by speakers at the seminar. The report summarises the issues raised during the two days of discussions.

3. Gergis, Abdalla (ed.)
Prospects of EU/MCP relationship with particular reference to Botswana:
Conference held at the Grand Palm Hotel, Gaborone 25 - 26 September 1997:
Conference highlights Gaborone: Government Printer 1998.

This document presents highlights of the conference and of papers presented by speakers. The report captures the essence of the debate on the future of Lome Convention and highlights main issues that emerged from the consultation process.

4. Granberg, Per.

Exchange rate, inflation and competitive: an analysis of the relationship between Botswana's Exchange and Inflation Rates and its implication for the competitive strength of her producers

The publication contains findings of the project: Study of Botswana's exchange rate policy. The publication details simple input/output based model for analysing the exchange rate question, and employs it to draw out the implications for various sectors of the economy, under alternative exchange rate scenarios. It goes on to analyse the available statistical evidence, and draw comparison to model results. Finally, it discusses the rationale, and possible revision, of the current exchange rate policy for a broader perspective with special reference to the likely implications of following a significantly different policy.

Serials

1. BIDPA Briefing

A quarterly newsletter, with topical supplements, that provides regular comment and analysis on all aspects of Botswana economy.

2. The BIDPA Newsletter

A quarterly newsletter reporting on events, projects and general activities of the Botswana Institute for Development Policy Analysis (BIDPA).