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## **The Role of Financial Programming in Macroeconomic Policy Management**

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### Abstract

Most African governments have made considerable progress in pursuing macroeconomic stabilization, usually under the tutelage of the International Monetary Fund. Policy targets for the IMF-supported programs are universally derived from some variation of the standard financial programming methodology. Yet most governments in the region remain dependent on the Fund for the technical analysis. This technical dependency often engenders a lack of ownership of program targets, and the targets themselves are often unrealistic, on the side of austerity. This paper makes the case that African governments must now develop their own financial programming models and system, to take command of the technical analysis, negotiate with the Fund in more pro-active terms, and establish the foundation for a deeper commitment to prudent macroeconomic policy management. Every country has economists who have been trained in financial programming. This is a start, but a concerted effort is needed to develop practical, customized applications, with supporting systems to implement, maintain and refine the models. The paper outlines the basic structure of a generic financial programming model, explains the importance of developing the capacity for home-grown programming, and briefly addresses some common criticisms about the pertinence of financial programming for small, low-income countries with structural rigidities, as predominate in the region.

**JEL Codes:** E0, E5, E6, O1, O2

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## The Role of Financial Programming in Macroeconomic Policy Management

Bruce R. Bolnick<sup>1</sup>

### I. INTRODUCTION

In 1992, the Zambian economy teetered on the brink of hyperinflation, following two decades of poor policy management. In an effort to stem the inflationary spiral and build public confidence in the economic policies of the new government, the Minister of Finance announced in the 1993 Budget Address a “new” budget strategy. The essence was to eliminate “destructive budget deficits” by *determining* expenditure targets from estimates of the available financing and projections of revenue -- consistent with specified targets for inflation, growth, and foreign reserves. In essence, the Minister was simply announcing that the Government was embracing *standard financial programming methodology* as the basis for macroeconomic policy management.<sup>2</sup>

Since *local capacity* for financial programming was undeveloped at the time, the implementation of this strategy depended largely on technical analysis provided by IMF staff in the course of designing and monitoring the Fund program.<sup>3</sup> This IMF analysis, of course, was subject to discussions with the Government, but Zambian negotiators entered such discussions in a reactive mode, without full command of the technical assumptions underlying the macroeconomic analysis. Yet the derived policy targets are heavily dependent on the technical details. Given Zambia’s sad record of prior policy implementation, the Fund tended to adopt technical assumptions which led to very tight, sometimes even impractical, targets for monetary and fiscal policy. Bacha (1987) refers to this as the IMF’s “tendency to overkill.” In fact, for 1993, the Fund’s analysis produced monetary targets that proved to be extremely contractionary once the disinflation program began to take effect after mid-year. Again in 1994, the Fund’s technical analysis was premised on very conservative assumptions. This resulted in a large projected fiscal “gap,” which the Government closed by agreeing to a large tax increase. Was the large fiscal correction actually needed to achieve the intended program targets? Or was the fiscal gap an artifact of the technical assumptions adopted by the Fund in their financial programming analysis?

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<sup>2</sup> To strengthen the signal that a new fiscal regime was at hand, the Minister also announced the introduction of a new “cash-budget” process, designed to ensure that government expenditures would no longer be financed by borrowing from the central bank — that is, by printing money. With poor revenue performance and erratic donor inflows during the year, the cash budget proved to be an extremely austere straight jacket, but it succeeded in eliminating fiscal injections of money, leading to a decline in the quarterly inflation rate from 200% (annualized) in December 1992, to 10.5% by December 1993. For details, see Bolnick (1997).

<sup>3</sup> Because Zambia was in arrears to the Fund at the time, the Fund arrangement was called a Rights Accumulation Program, rather than an ESAF program.

The incidents just mentioned will be discussed in greater detail in section III. They are outlined here at the outset to underscore the importance of regional governments developing their own capacity for financial programming. This is no simple matter. For example, as far back as 1990 the Reserve Bank of Malawi (RBM) hosted a consultant from the World Bank to design a financial programming model for Malawi. A sound but somewhat complicated model was delivered, and then not deployed.<sup>4</sup> By default, RBM continued to depend heavily on the IMF for technical analysis of the macroeconomic program. Over the past two years, though, RBM has made great strides in developing a financial programming system suitable for local implementation. This work will be discussed in other presentations over the next two days.

In the context of these observations, the present paper offers an overview of the role of financial programming in macroeconomic policy management in southern Africa. The paper is organized as follows. Section II briefly explains the basic structure of a generic “financial programming” model. Section III discusses the importance of developing capacity for home-grown financial programming. Section IV then addresses several criticisms concerning the pertinence of financial programming for small, low-income countries with structural rigidities, as predominate in the region. Section V ends with a summary and conclusions.

## II. WHAT IS “FINANCIAL PROGRAMMING”

The term “programming,” in this context, refers to quantitative methods for *determining policy targets* which are consistent with explicit macroeconomic objectives and assumptions about the structure and performance of the economy, over a short to medium time period (often twelve to eighteen months). The programming analysis can be thought of as running a projection model in reverse. A projection model asks “what macroeconomic outcomes will result from a given set of policies?” while a programming model asks, “what macroeconomic policies are required to achieve a given set of outcomes?” The specified outcomes include targets for inflation and foreign exchange reserves, consistent with a commitment to macroeconomic stability. Thus, a programming exercise starts with the objectives and derives the corresponding policies, with an emphasis on *consistency*. The consistency conditions are manifest in an interdependent set of macroeconomic accounting identities, including national accounts, the balance of payments accounts, financial-sector balance sheets, and the government budget constraint. Values of the various model parameters also have to be consistent with the structure of the economy and the designated policy objectives.

The standard “financial programming” model, which the IMF has been developing since the 1950s,<sup>5</sup> focuses on the objective of *macroeconomic stabilization*, including both external and internal balance. *External balance* is expressed in terms of a balance of payments condition:

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<sup>4</sup> See Connolly (1991). An IMF technical mission in 1992 viewed the model as “more complicated” than the Fund approach, and pointed out that it was not operational “due to a lack of disaggregated and up-to-date data, as well as technical complications. Mehran, et al. (1992), p. 18.

<sup>5</sup> The prototype model is Polak (1957).

macroeconomic policy and exchange rate policy must be consistent with achieving a prudent foreign exchange reserves position, given a feasible and sustainable plan for net foreign capital flows. The *internal balance* condition is conceptualized in terms of the expansion in nominal aggregate demand consistent with the target rate of inflation and projected real growth over the program period. In the standard IMF framework, the internal balance condition determines targets for money and credit growth. Operationally, the general approach can be outlined as follows:<sup>6</sup>

Step 1. Specify target values for objectives such as domestic inflation and foreign exchange reserves.

Step 2. Project the values for variables that are “exogenous” to the model, including real GDP growth, prospective inflows and outflows of donor financing, and prices for main export products.

Step 3. Derive the values of macroeconomic variables that are “endogenous,” because they depend on the values determined in step 2; the endogenous variables include nominal GDP growth and the exchange rate.

Step 4. Derive the permissible growth of money supply (usually, but not always defined as M2) and the corresponding expansion of domestic credit. Establish a target for bank credit to non-government, then derive the allowable amount of domestic financing for the budget, as the balancing item in the monetary programme. Step 4 constitutes the *monetary programme*.

Step 5. Combine the projection of net foreign financing and the target for net domestic financing, to determine total funds available to finance the budget deficit. This determines the target budget balance. Factor in the projected level of domestic revenues and derive the allowable target level of government expenditure. Step 5 is the *fiscal programme*.

Appendix 1 presents the consistency conditions which stand at the core of most financial programming models. This set of equations can be augmented in many ways, such as incorporating econometric estimates of underlying structural relationships, or adding structural equations to bring the determination of otherwise exogenous variables into the model. A particularly important class of modifications was introduced a decade ago in response to widespread concerns that focusing exclusively on stabilization objectives meant a neglect of the need to stimulate economic growth. This concern led to the development of models which incorporate a simple growth module into the macro-financial framework.<sup>7</sup> Nonetheless, in many countries (especially where data on the real sector is quite weak), the standard approach is still to analyse real GDP growth separately, and introduce it into the program as an exogenous parameter.

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<sup>6</sup> Adapted from Mills and Nalari (1992, p.82).

<sup>7</sup> See Chand (1989) and Khan, Montiel and Haque (1990).

### III. THE IMPORTANCE OF CAPACITY FOR FINANCIAL PROGRAMMING

Achieving and maintaining macroeconomic stability would still be a fundamental role for the state in any economic system,<sup>8</sup> because prudent macroeconomic management is a cornerstone for promoting economic development.<sup>9</sup> Financial programming, in essence, is a quantitative framework for determining policy targets which are consistent with a designated set of macroeconomic objectives. Thus, some approach of this sort would be required as a central tool for ensuring macroeconomic stability *even if IMF conditionality had never been invented*.

Yet countries which desire a “stamp of approval” from the IMF to facilitate aid flows and debt relief have no choice but to adopt macroeconomic policy targets based on financial programming analysis. The issue is whether the technical work is ceded to IMF staff, or whether the host government undertakes its own in-depth analysis of the macroeconomic picture. Long-standing practice in the region has been to let the Fund do most of the analysis. This may be explained partly by institutional factors such as staffing and organizational constraints.<sup>10</sup> Perhaps another reason for the slow development of local programming capacity has been insufficient commitment by leaders of government to macroeconomic stability -- given the concomitant need for belt tightening and stringent financial controls. A third factor may have been the widespread concern that financial programming represents an inappropriate foreign ideology imposed from Washington. Finally, the practice of depending on the Fund may have been motivated by a feeling that the Fund would insist on its own analysis, in any case.

Whatever the justifications in the past, today the implementation of financial programming should be high on the policy agenda for every country in the region. Every country now has an ample cadre of well-trained central bank and government economists to manage a suitably design programming model, despite the continuous brain drain. Also, most countries in the region — unfortunately, not all — have become more serious about achieving macroeconomic stability. This is partly a result of bitter lessons from first-hand experience with the adverse effects of lax policies. Another factor is the increased accountability for delivering positive results, stemming from the spread of multiparty democracy and the emergence of civic dialogue on economic policy. A growing commitment to stability can be seen in lower inflation and higher growth across sub-Saharan Africa,<sup>11</sup> and it can be heard in the daily clamor for faster and broader economic development, reflecting impatience with the continent’s severe poverty and marginalization on the world stage. Finally, governments and donors alike are paying increasing attention to “local ownership” of conditionality policies. There is a growing appreciation of the

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<sup>8</sup> See World Bank (1997).

<sup>9</sup> This is not the place to address the lively debate about *how much* macroeconomic stability is needed to create a conducive environment for investment, growth, and rising incomes. Is 20% inflation good enough? Or 6% inflation? Or should the target be 0% inflation?

<sup>10</sup> Interestingly, the IMF mission cited in footnote 4 strongly recommended the adoption of new tools for short-term liquidity projections by RBM, but: “In light of the scarce resources available ... the mission would at this stage advise against further development of the RBM programming model.” Mehran, et al. (1992), p.20.

<sup>11</sup> IMF, World Economic Outlook, various issues.

fact that policies which are “made in Washington” or Brussels are less successful than policies with local roots, to the disadvantage of hosts and donors alike.<sup>12</sup>

These deep contemporary currents create pressure for the implementation of home-grown policy analysis. It is important, as well, to recognize that the technical analysis undertaken by the IMF is often biased appreciably in favor of stringency. Consider the inherent uncertainty in setting parameter values for the macroeconomic consistency analysis. Even restricting attention to prudent and mutually consistent assumptions, there is inevitably a *range* of values to choose from, for each parameter. Should the target inflation rate be 6% or 8%? Should the program assume real growth of 4% or 5%? Should the reserves target be set at 4.0 or 4.5 months of imports? Should we assume that the velocity of money will be stable or decline by 2%, indicating a gradual rise in monetization? And so forth. We can call this the *legitimate range of uncertainty* about appropriate parameters in the model. Within this range, judgments must be brought to bear, recognizing that every parameter affects the derived policy targets. Even assumptions that seem far removed from the policy arena -- for example, projections of Other Assets Net of the banking system-- can have a substantial effect on the program targets.

By systematically exploring various sets of *responsible* parameter values, one may generate a high-low range for fiscal and monetary targets, fully consistent with the objectives for internal and external balance. Adopting “tight” parameter values across the board -- call this the “austere scenario”-- generates a program that maximizes the likelihood of favorable outcomes for inflation and foreign reserves. But as always, there is a trade-off: the austere scenario implies less funds for public services, higher taxes, tighter credit markets, and greater risk of underperforming on economic growth in the short to medium run. Alternatively, setting parameter values at the other end of the responsible range of uncertainty will yield less stringent monetary and fiscal targets and less likelihood of a serious contraction, but with more risk of underperforming on inflation and foreign reserves.<sup>13</sup> To sharpen the point, let’s call this the “growth scenario.” Intermediate parameter values will generate a macroeconomic program with an intermediate balance of risks and costs.

Characteristically, the IMF sets parameter values very conservatively, creating a strong tendency towards the austere end of the range of program targets.<sup>14</sup> In fact, some programs go “off track” because the track is set unrealistically, not because of mismanagement in implementing the program. The need for developing local capacity for financial programming should therefore be clear. Only by having command of the macroeconomic framework, in detail,

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<sup>12</sup> World Bank (1999); DAC (1999).

<sup>13</sup> To quantify the trade-offs, one would need good information on the probability distribution of key parameters. Even with a precise estimate of the choice set, a large degree of the judgements is still needed to decide how the trade-off should be resolved.

<sup>14</sup> Indeed, I am tempted to label the first case as the IMF scenario, in honor of one Fund economist who candidly told me it was essential for the program in country X to be excessively tight, because the government would miss the target anyway. This logic easily becomes a self-fulfilling prophecy. It would be an exaggeration, however, to suggest that the Fund always adopts extreme values within the high-low range. They undoubtedly lean towards the austere scenario, but intermediate parameter values are used here and there.

can authorities ensure that the structural assumptions and balance of risks adequately embody local judgments.<sup>15</sup> In reality, the opposite has been the norm. Many of the assumptions which underpin the Fund's program projections are insufficiently scrutinized by government negotiators. Even when government does challenge the Fund on certain assumptions, it can be difficult to make a compelling case for modifications -- usually involving relaxation of the targets -- without offering a careful analysis of the technical options.

To appreciate the serious repercussions that may ensue from leaving the Fund in control of the technical analysis, it is useful to examine a few recent examples from Zambia and Malawi. Since agreements with the Fund have not been public information in either country, the descriptions which follow are stylized versions of the actual events.<sup>16</sup>

Example 1: Zambia 1993. At the end of 1992, the three-month inflation rate in Zambia was above 200% (all rates here are annualized equivalents) and rising, with velocity having doubled over the previous year. Facing a dangerous inflationary spiral, the government agreed with the IMF that the 1993 program should target a decline in inflation to less than 20% by year end. Clearly, stringent policies were needed. The question was: How stringent? In technical discussions with the Fund, the government team cited international evidence showing that the velocity of money generally begins to rise in the first year of a successful disinflation. Therefore, it seemed appropriate to assume a downward trend in velocity for 1993. The IMF opposed the idea of assuming "re-monetization." They held that disinflation would lag the deceleration in money growth, causing velocity to rise further. In any case, the Fund team pointed out that the targets could be reassessed by monitoring missions, if evidence appeared of rising demand for money. The government acquiesced, and the program for 1993 was approved with extremely tight monetary targets, as derived from the indicated velocity assumption.

It took several months for the new cash budget system to operate effectively. By June, as the three-month inflation rate reached 321%, fiscal and quasi-fiscal pressures on the money supply finally came under control. Thereafter, monetary policy tightened abruptly as the authorities strove to meet the September benchmarks. For the period June through September, reserve money grew at an annual rate of 10%, down from 68% a year earlier. Simultaneously, real interest rates on Treasury bills soared to over 100% (from -28% the previous year). By October, the three-month inflation rate was below 30%.

Most remarkably, the Zambia Kwacha began to *appreciate* in July, as money growth decelerated. Many commentators believed that the appreciation was due to a flood of donor funds. In fact, no such flood existed. The basic cause was a virtual evaporation of demand for

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<sup>15</sup> Cooper (1991, p. 63) notes that projections in the IMF financial programming model "proceed from judgments that are grounded in analysis, but that may nonetheless be in error. Much of the disagreement between the IMF and national officials hinges on these judgments. While most critiques of the IMF challenge the basic approach — see, for example, Taylor (1987) and Helleiner (1993) — the main operational problem is determining parameter values *within* the context of the financial programming methodology.

<sup>16</sup> The examples which follow are drawn from first-hand observations of the author, while serving as an advisor in Zambia and in Malawi.

foreign exchange, just when Bank of Zambia had to be selling forex *to meet the pre-programmed monetary targets* for the third quarter. To attract buyers, BOZ continued to push down the price of forex, even while recognizing that the market was signaling an increase in demand for kwacha balances. By October, when the kwacha had strengthened to 368 per dollar, from 551 in June. Faced with this evidence, the Fund agreed to loosen the monetary targets. Money growth accelerated, and the exchange rate rebounded to 520 by year end, at which time the three-month inflation rate was down to 10%.

The extraordinary bubble of appreciation, combined with extremely high real interest rates, created tremendous strain and uncertainty for the productive sector. It was evident that a major source of the instability was having monetary targets that were too tight, and not adjusted quickly enough. If the program for 1993 had allowed for even a small rise in money demand and decline in velocity, the path of disinflation would most likely have been less disruptive, though inflation might have declined a bit less quickly. Whatever one believes about the appropriate velocity assumption for the macroeconomic program in 1993, the lesson is that assumptions matter a great deal. Reasonable views and informed judgments of the government team should carry greater weight in determining the program targets.

Example 2: Zambia 1994.<sup>17</sup> Again in 1994, the Fund's technical analysis had serious repercussions for the economy, this time on the fiscal side. As explained above, there is unavoidably a range of uncertainty in determining parameter values for the program, leaving a margin of latitude for bargaining. In 1994, the Fund's analysis produced a large financing gap in the fiscal program. To conclude the negotiations, the government adopted fiscal measures involving reduced expenditure and higher taxes. The measures included a rise in the sales tax rate from 20% to 23%, reversing two years of tax-rate reductions to stimulate growth.

Yet the fiscal gap was a product of the technical assumptions. Under an alternative set of assumptions -- well within the legitimate margin of uncertainty -- the fiscal gap would not have arisen. Suppose that the program had assumed: (a) a slightly smaller *rise* in foreign exchange reserves; (b) a bit less depreciation of the real exchange rate; (c) a smaller, but still robust target for growth of credit to non-government; (d) a decline in velocity to the level achieved before inflation hit triple digits in 1992; and (e) a target of zero net non-bank borrowing in *real* terms, rather than nominal terms. Under this set of plausible assumptions, the allowable net bank credit to government for 1994 would have been higher by 1.6% of projected GDP -- with no difference in the inflation target. Instead of requiring a counterproductive hike in the sales tax, the program would have had room for further tax *reductions*.

The IMF program for 1994 generated a great deal of controversy, especially on the tax increase, even though all parties accepted the need for tough measures to end the economy's tailspin. The IMF, of course, wanted to use parameter values that produced very tight fiscal and monetary targets, fearing that any loosening would lead to a loss of fiscal controls. Some government economists endorsed the tactic, for the same reason. Once again, the point is not to

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<sup>17</sup> This section is based on Bolnick (1994).

argue for a particular set of assumptions, but simply to show how important the assumptions can be.

Example 3: Malawi 1999. In early December, 1998, the IMF concluded negotiations with the Malawi Government on the ESAF program for 1999, paving the way for large disbursements of sorely needed foreign assistance. The ink was hardly dry before it became obvious that the monetary targets would be very difficult to achieve. By March, 1999, M2 was above target by more than K1 billion, or more than 15%.

Was the large gap between the target for M2 and actual performance a sign of irresponsible policy management? Or was the target unrealistically tight? Many indications on the ground suggested that liquidity was not at all excessive. The foremost indication was low demand for foreign exchange during a season when banks are usually net sellers. Faced with a lack of demand, it was difficult for RBM to withdraw reserve money via foreign exchange transactions. Unlike Zambia in 1993, RBM chose *not* to precipitate a sharp appreciation to stimulate sales. As a result, the monetary target was missed by a wide margin. Other market signs of *tight* money included negative levels of excess reserves in the banking system, a large increase in commercial bank borrowing from RBM at high penalty rates, and very high forward-looking real interest rates, relative to estimates of inflation performance for the rest of the year. By all appearances, real money demand had risen in response to high interest rates, a relatively stable exchange rate since August 1998, a strong foreign exchange reserves position, and good prospects for falling inflation going into the harvest season.

How could the target be so far off in just a few months? In line with the theme of this section, the answer lies in the technical assumptions which were fed into the financial program. One problem was that the program assumed a 12-month inflation rate of around 35% in December, 1998. The actual value turned out to be 53% — more or less as predicted by RBM and government economists at the time of the negotiations. Evidently, the Fund did not want to use a realistic projection in its report to the Board. This meant that the program for 1999 started with a base level of prices and nominal GDP well below actual values. Accordingly, virtually every nominal figure in the macroeconomic program for 1999 was unrealistically stringent. Compounding the problem, the program assumed that velocity would rise by 12% in 1999, on a period-average basis. Such a sharp decline in demand for real money balances is difficult to rationalize, except as a technical device for deriving tight monetary and fiscal targets. If anything, the program scenario of declining inflation, high real interest rates, and a fairly stable exchange rate suggested that money balances ought to be recovering in 1999, not falling. Not surprisingly, when RBM ran its own financial program using alternative values for these key parameters, they computed a March target for M2 that virtually matched the actual value — with the same inflation targets as used in the ESAF program.

Let no one mistake these three examples as arguments for lax policy management. This is emphatically not the intention. Options that are irresponsible must be ruled out of bounds by any government seriously concerned about achieving macroeconomic stability and establishing a reputation for credible policy management. The issue at hand is the importance of taking command of *the technical work which determines the program targets*, in consultation with the IMF. Local implementation of financial programming will strengthen government's hand in the

negotiations, generate more practical programs, and enhance local ownership of the macroeconomic policy targets.

#### IV. SOME COMMON CRITICISMS

The question remains as to whether *financial programming* is an appropriate framework for application to low-income countries in Africa. Let us briefly consider six common criticisms.

1. *Financial programming is based on a rigid monetarist model that has no relevance for countries in this region.*

Early versions of the financial programming model were definitely cast as monetarist models, and the analytical framework developed by the Fund was a precursor to the monetary approach to modeling the balance of payments. The fact that the quantity equation is central to the model sounds rigidly monetarist. Yet the quantity *equation* (equation 2 in the Appendix) itself is a macroeconomic identity which applies to every economy every year, regardless of ideology. It does not require a rigid mechanical link between money and inflation, given suitable assumptions on velocity and real GDP growth. As discussed in section II, the financial programming model is essentially a *consistency framework* based on technical identities: the national accounts identity, the budget constraint, the monetary survey, the balance of payments identity, and yes, the quantity equation. To postulate that the change in  $M \times V$  equals the target change in  $P \times Q$  is equivalent to saying that aggregate demand equals aggregate supply<sup>18</sup>— and easier to compute in economies with weak data on aggregate demand.

2. *Financial programming is a framework imposed by Washington; the tool is needed only because of the external pressure.*

The IMF has certainly does impose monetary and fiscal targets based on the use of financial programming analysis. Under their Articles of Agreement, the Fund can only extend financial assistance (beyond the first tranche) if recipient governments are certified to be pursuing policies to remedy major macroeconomic imbalances.<sup>19</sup> Even without the external pressure, however, governments need some form of financial programming model to ensure that fiscal and monetary targets are *consistent* with intended macroeconomic objectives.

3. *Financial programming is too complicated to be useful in low-income countries with limited technical capacity.*

IMF missions use a fairly complicated model, which embodies detailed inter-relationships between national accounts, balance of payments, monetary accounts, and fiscal accounts, plus

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<sup>18</sup> Bolnick (1975) showed that the Polak model could just as well be interpreted in Keynesian terms, because in countries with underdeveloped financial markets, transactions which inject or withdraw money from circulation are equivalently injections and withdrawals to aggregate demand.

<sup>19</sup> See Guitan (1995).

other assorted elements, case by case. The complexity reflects the cumulative effect of years or decades of refinements. Yet a basic set of consistency conditions, as summarized in the Appendix, can be implemented in a format as simple as a single spreadsheet page. Appendix 2 provides an example, from Zambia in 1994. Alternatively, the financial program can be as complicated as the fully simultaneous system described by Mikklesen (1998) for El Salvador. Advanced industrial countries use even more complex techniques, including dynamic, large scale econometric models. For low-income countries, there is a long history of advanced models being imported and not sustained. It may be best to begin with a simple system that can evolve to incorporate additional elements over time.

4. *Financial programing gets things backwards. Targets should be determined by the need to provide essential public services and stimulate the economy, not from monetary analysis.*

This claim has wide circulation. The argument goes as follows: Instead of curing macroeconomic imbalances by *compressing demand*, the country is better served by *stimulating production and exports*, requiring larger government expenditure and bank credit. The argument is not illogical: in terms of the quantity equation, why not increase Q rather than reducing M? The problem is that this route is entirely impractical under circumstances of high inflation or large external imbalances. If the money supply is growing by 30% or 50% or 100% per year, it is impossible for real output to rise accordingly, on a sustained basis. Likewise, exports cannot possibly respond enough in the short term to close glaring gaps in the balance of payments.<sup>20</sup> Restoring macroeconomic balances requires lower growth of money and nominal aggregate demand. Which leads to the next point.

5. *Financial programming causes contraction, unemployment, and declining real wages; other are needed models to foster growth rather than poverty.*

Macroeconomic stabilization requires contractionary measures when the initial conditions entail large internal or external imbalances. Blaming the model is like blaming the mirror for revealing blemishes. The contractionary effect of adjustment has to be weighed against the longer-term damage to growth, job creation, and standards of living, which result from *failing* to control inflation and achieve a sustainable balance of payments position. Still, as noted above, the IMF does have a tendency to derive macroeconomic policy targets that are more stringent than necessary -- tilting the balance of risks towards contraction in order to achieve faster adjustment. As governments assume command of the technical analysis, the underlying judgments can shift, and more attention can be paid to devising strategies for "adjustment with growth" (see section II). Using a macroeconomic consistency model to improve monetary and fiscal policy management is ultimately pro-growth, pro-job-creation, and pro-poor. Of course, appropriate structural reforms are equally essential.

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<sup>20</sup> The magnitude of the gap is compounded by rising velocity and currency substitutions which occur as a result of high inflation and macroeconomic instability, reducing further the feasibility of restoring near-term internal and external balance through the supply side.

6. *Financial programming is too aggregative to take into account important structural constraints in our economy.*

In many respects, the “structuralist” critique<sup>21</sup> raises valid points. For example, financial programming models rarely incorporate cost-push effects of rising interest rates. Also, by focusing on financial flows, the models can give a misleading or incorrect picture of real-side effects on variables like employment, real wages, and production. But one must not lose sight of the fact that different models serve different purposes. The purpose of financial programming is to provide a *macroeconomic framework* ensuring that monetary targets are consistent with growth and inflation objectives, that the budget program is compatible with projected financing, and that balance of payments conditions are sustainable. Other analytical tools can be used for the design of structural and sectoral policies.

Economists who implement a financial program must be sensitive, however, to local conditions in setting parameters values. These include the responsiveness of imports and exports to changes in the exchange rate, the structural links between depreciation, inflation, and interest rates, and the relationship between trade performance and revenues. While GDP growth is usually exogenous to the model, the estimates should seriously take into account structural factors such as real interest rates, the real exchange rate, and real growth of credit to the private sector. These and other structural refinements can be incorporated into the analytical framework over time.

## V. SUMMARY AND CONCLUSIONS

This paper has outlined the nature of “financial programming” and explained the importance of the methodology as a standard tool of macroeconomic policy management, with an emphasis on local control. Among the main points, I would highlight the following:

- Financial programming is a quantitative approach for determining monetary and fiscal targets which are *consistent* with designated macroeconomic objectives and projected values of key parameters, taking into account domestic production and prices, the external sector, and monetary and fiscal conditions.
- The main *objectives* usually include target values for growth, inflation, and the accumulation of foreign exchange reserves. Other important parameters include the exchange rate and targets for the expansion of domestic credit to non-government.
- The financial program derives monetary targets from simple accounting identities, given the designated objectives and assumptions. The model also matches the monetary targets to projected sources of money growth, using the monetary survey as the framework for analysis. The allowable amount of net bank credit to government is the balancing item.

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<sup>21</sup> For example, see Taylor (1987) and Taylor (1997).

- The monetary analysis is combined with projections of non-bank financing, and an estimate of net foreign financing (consistent with external balance), to derive a target budget balance. Combined this with a projection of domestic revenues, one determines the government expenditure targets for the program period, consistent with the overall macroeconomic objectives.
- Applications of the general framework can be very simple or very complicated; relatively simple versions can easily be implemented.
- Viewing the model as a straightforward consistency exercise is deceiving, however, because there is a great deal of *uncertainty, discretion, and judgement* in setting the parameter values which determine the fiscal and monetary targets.
- For this reason, governments need to assume ownership of the analytical framework, and bring their own analysis to the bargaining table.

The last points bear emphasis. Financial programming in practice does not proceed neatly from step 1 to step 5, as outlined in section II. In reality, the process is more iterative, as initial assumptions are continually reviewed in light of later calculations. In some cases, the assumptions and parameter values are even manipulated to obtain a desired result, such a pre-conceived budget target. (The IMF often negotiates with budget targets in mind from the outset, a practice called “fiscal dominance.”) Every parameter in the model is a potential issue for negotiation, within a range of technical uncertainty. No one can “know” the future parameter values with precision, particularly in countries where data quality is low and economic relationships have been unstable. Yet the parameter values have a large bearing on the results, with important real-world effects on the level of expenditure for public services, the pace and direction of tax reform, the growth of money and credit, and the overall stance of monetary and fiscal policy.

As a corollary, missed benchmarks may reflect problems with the assumptions used to derive policy targets, rather than mismanagement. In an unstable economic environment, where major adjustments are being pursued, there is a high degree of uncertainty in setting parameter values, even over periods as short as three to six months. Thus, the macroeconomic framework should be reassessed on a regular basis, in light of the latest information.

Since financial programming is not a mechanical process, and since the results have a large effect on the economy, governments throughout the region would be well advised to strengthen their capacity for implementing the methodology as a basic tool for macroeconomic policy management. This will also reduce the extent to which programs are designed and imposed “from Washington.”

Effective implementation requires a strong commitment to macroeconomic stability at the highest levels of government. On the technical side, it also requires serious attention to database development; adoption of new procedures and assignments within the central bank; the establishment of close operational links with liquidity managers in the central bank and budget

managers at Treasury; and technical training to ensure that the methodology is deeply understood by economists involved in the process.

Once financial programming is integrated into the policy process, the technical analysis can provide authorities with a powerful tool for achieving macroeconomic stability, as a vital prerequisite for promoting investment, efficiency, growth, improved public services, and above all, the alleviation of poverty.

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# Appendix 1

## Underlying Accounting Identities

The main economic relationships underlying the consistency framework for the Financial Programming are numerical embodiments of five familiar macroeconomic accounting identities:

### A. Nominal GDP Growth

$$Y_{t+1} = Y_t * (1 + GQ) * (1 + INF) \quad (1)$$

where,

Y	= Nominal GDP
GQ	= Growth rate of real GDP
INF	= Inflation rate (GDP deflator, period average)

### B. Quantity Equation

$$M * V = P * Q \quad (2a)$$

$$\text{or } M = P * Q / V \quad (2b)$$

where,

M	= Broad money (period average), derived
V	= Velocity of broad money (period average)
P	= Price level (GDP deflator, period average)
Q	= Real GDP

### C. Monetary Survey

$$M = NFA + NDC + OIN \quad (3a)$$

$$\text{or } \Delta M = \Delta NFA + \Delta NDC + \Delta OIN \quad (3b)$$

where,

M	= Broad money
NFA	= Net foreign assets of banking system
NDC	= Net domestic credit of banking system = Net credit to government (NDC <sub>g</sub> ) + net credit to parastatals + credit to private sector
OIN	= Other items net of banking system

— all of which are end-period stock variables.

#### D. Government Budget Accounts

$$\text{DEF}_{ig} = \text{TEXP} - (\text{REV} + \text{GRNT}) = \Delta\text{NDC}_g + \text{NFF} \quad (4a)$$

$$\text{DEF}_{xg} = \text{TEXP} - \text{REV} \quad (4b)$$

$$\text{PBAL}_{xg} = (\text{TEXP} - \text{INT}) - \text{REV} \quad (4c)$$

$$\text{DPBAL} = (\text{TEXP} - \text{INT} - \text{FFDE}) - \text{REV} \quad (4d)$$

where,

$\text{DEF}_{ig, xg}$  = Budget deficit including grants, excluding grants

$\text{PBAL}_{xg}$  = Primary balance, excluding grants

$\text{DPBAL}$  = Primary domestic balance

$\text{EXP}$  = Total expenditure

$\text{REV}$  = Domestic revenue

$\text{GRNT}$  = Grants

$\text{NFF}$  = Net foreign financing

$\text{INT}$  = Interest payments (domestic and foreign)

$\text{FFDE}$  = Foreign financed development expenditure

-- all of which are flow variables.

#### E. Balance of Payments Accounts

$$\begin{aligned} \Delta\text{NFA} &= - (\text{CAPBAL} + \text{CURBAL}) \\ &= - (\text{NOFF} + \text{NPCF} + \text{NSTCF}) - (\text{BOT} + \text{NFP} + \text{NTRAN}) \end{aligned}$$

where,

$\Delta\text{NFA}$  = Change in net foreign assets (increase enters as negative sign)

$\text{CAPBAL}$  = Capital account balance

$\text{CURBAL}$  = Current account balance

$\text{NOFF}$  = Net official foreign financing

$\text{NPCF}$  = Net private capital flows (long term)

$\text{NSTCF}$  = Net short-term capital flows

$\text{BOT}$  = Balance of trade in goods and non-factor services

$\text{NFP}$  = Net factor payments

$\text{NTRAN}$  = Net transfers

## Appendix 2

### Example of a Simple Programming Framework

#### MACROECONOMIC FRAMEWORK FOR THE 1994 BUDGET IN ZAMBIA

1	1993	1994 Proposal					
2	Actual	Jan-Apr	May-June	Q3	Q4	FullYear	
3							
4	A. Parameters						
5	-----						
6	Inflation rates (annualised %)						
7	End period	138.3	53.9	9.4	6.2	4.1	20.2
8	Period avg	187.3	51	27	7.4	6.4	47.1
9	Exchange rate						
10	Kwacha per US\$: period avg	473	671	702	759	759	713
11	Kwacha per US\$: end period	650	692	713	775	775	775
12	Real GDP growth (% per year)	4.0					4.0
13							
14	B. External Sector (millions of US\$)						
15	-----						
16	Reserve increase	8.0	5.2	5.0	15.0	14.8	40.0
17	Change in BOZ short-term liabilities	-29.3	-0.9	--	--	--	-0.9
18							
19	C. Budget Flows						
20	-----						
21	Overall domestic balance	(44,745)	(23,695)	604	(3,094)	15,185	(11,000)
22	Primary domestic balance	26,718	11,905	14,104	2,906	20,085	49,000
23	Domestic interest (excl. BOZ)	(71,463)	(35,600)	(13,500)	(6,000)	(4,900)	(60,000)
24							
25	Net non-project foreign assistance	53,127	--	--	--	--	--
26	Domestic non-bank financing	10,772	2,750	2,750	2,750	2,750	11,000
27	Discrepancy (incl. float)	(2,032)	--	--	--	--	--
28							
29	Bank financing of deficit	(17,122)	20,945	(3,354)	344	(17,935)	0
30							
31	D. Money stocks (millions of kwacha)						
32	-----						
33	M2, end of period	199,266	221,103	230,963	255,572	270,426	270,426
34	Growth (annualized %)	107.2	36.6	29.9	49.9	25.4	35.7
35							
36	Non-government credit	90,844	87,644	97,347	110,690	132,241	132,241
37	Growth (annualized %)	87.3	-10.2	87.8	67.2	103.7	45.6
38							
39	E. Money Flows						
40	-----						
41	Broad money	103,096	21,837	9,859	24,609	14,855	71,160
42							
43	Gross reserves	4,478	3,488	3,510	10,922	11,239	29,159
44	Change in BOZ external short-term						
45	liabilities	17,828	604	--	--	--	604
46	Debt swaps	--	--	--	--	--	0
47	Credit to government	(17,122)	20,945	(3,354)	344	(17,935)	0
48	Non-government credit	42,344	(3,200)	9,703	13,343	21,551	41,397
49	ZIMOIL payments	(763)	(8,200)	(4,297)	(5,657)	(1,675)	(19,829)
50	Other	43,107	5,000	14,000	19,000	23,226	61,226
51	Other net assets BOZ	55,569	--	--	--	--	0
52							
53	MEMO: GDP (millions of kwacha)	1,835,629					2,748,585