



BEST PRACTICES IN MACROECONOMIC FORECASTING: KEY ISSUES FOR DISCUSSION

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I. INTRODUCTION

The aim of this paper is to lay out why forecasting is so vital to economic policy, and the key issues which are important for forecasting.

The remainder of the paper is structured as follows. Section 2 looks at key reasons why the most accurate forecasting is essential, notably its importance for sustained development. Section 3 analyses problems with forecasting methods and makes recommendations for how to improve forecasting techniques in low-income countries. These are based on international and regional best practices used by many countries, and focus in turn on technical problems to do with modelling and data, on the forecasting methods themselves, and on issues related to institutional structures and technical assistance/capacity-building.

It is perhaps unnecessary to say that if anyone had invented a system for forecasting accurately, it would be being used everywhere and we would be having sustained high world growth - there would be no need for further analysis. As in so many other areas of economic policy in the new liberalised environment, developing countries face exactly the same problems as developed countries and international organisations, and easy solutions do not exist.

II. WHY FORECAST WELL?

The fundamental reason for forecasting trends in any economy is to ensure that the government (and as far as possible civil society) is following a path conducive to sustainable long-term development of the economy and reduction of poverty, and not responding excessively to current pressures. There are three types of such pressures:

- **domestic political factors.** The classic example of these, commonly experienced in developed and developing countries alike, is pre-election pressure to increase government spending, cut taxes, or cut interest rates - but there are many other examples such as pressure for changes in taxes, tariffs, or wages;
- **external political factors.** For many countries represented here, the most important are conditionalities of the international financial institutions or other donors; but all governments are subject to the disciplines of international or regional agreements reached (for example on trade policy through WTO, on convergence criteria in EU or UEMOA, or on environmental issues);
- **domestic or external 'shocks' to the economy.** These are unexpected events which throw policy off course and may distort it permanently away from an optimal path. Domestic examples are droughts or floods; external examples are commodity price changes. As I will discuss in more detail below, not all of these are really 'shocks'.

Of course to a considerable degree these three groups are interrelated - shocks will produce demands from domestic groups and external donors for rapid responses, and these responses may be excessive, inadequate or mis-designed unless government is able to forecast their impact. Equally

obviously, the aim of government is not to eliminate such factors (which is impossible in any country) - but to foresee them wherever possible and to overcome any distortionary impact they might have.

It is equally vital to realise that good projections can - especially in countries which are under extreme pressures of all three types (such as commodity-dependent low-income countries undergoing political liberalisation and adjustment programmes) - have a major impact on the sustainability of economic policy and eventually even on political stability. In particular, they can:

- reinforce prospects for economic stabilisation/adjustment, long-term growth and poverty reduction, by setting targets (eg for balance of payments, fiscal, monetary, GDP and investment/savings) which are realistic about supply responses, guarding against predictable shortfalls of resources, and protecting systematically against negative shocks. They thereby:
- increase government commitment to long-term growth-oriented adjustment and poverty reduction, by avoiding shortfalls of resources which lead to constant 'crisis management'.
- encourage external and domestic donor/creditor/taxpayer/investor commitment to financing government resource needs due to perceptions of government policy consistency and credibility, good governance and high administrative capacity
- reduce long-term macroeconomic imbalances and therefore dependence on debt relief, aid flows and imports, by being more realistic about prospects for short-term reduction.
- ensure that government focuses on longer-term development issues such as poverty reduction, employment, lower aid dependence, environmental protection, popular participation and structures for sustainable domestic financing of growth through savings and investment - and longer-term problems such as reconstruction after wars, droughts or floods, measures against desertification or deforestation, export diversification etc.

Therefore, as long as 7 years ago, many African policy-makers working in co-operation with IMF and World Bank staff concluded that forecasting was far too important to be treated as a 'game' in which much of the time of the senior policy-makers and technical staff in African and donor governments, the IMF and World Bank was diverted away from designing and monitoring long-term economic policy for growth and poverty reduction, towards short-term 'gap-filling' and short-term progress towards macroeconomic 'balance' (Mistry, Martin et al 1992).

Over the last 7 years, and most notably since the launching of the Heavily Indebted Poor Countries' Initiative, the international community has slowly moved a long way towards taking a more long-term and wider attitude to forecasting. Following the Annual Meetings of 1999, the focus for all low-income countries will gradually shift to a Poverty Reduction Strategy Paper (to replace the PFP), at the core of which will be analysis of 15-year prospects for sustained growth and poverty reduction with the aim of reaching the International Development Targets of reducing poverty by 50% by the year 2015.

As the rest of this paper argues, the tools are already available for such forecasting. The reasons for their non-use lie elsewhere, in problems with data, assumptions and institutions.

III. PROBLEMS AND BEST PRACTICES

3.1 Technical Issues: Models and Data

Obviously it is desirable (rather than projecting individual line items or sectors) to ensure that your forecasts are consistent across all sectors of the economy. This can be done by basic consistency tests, but is much better done by a model, which demands tests of consistency and closure between or within different sectors of the economy and shows error messages, if these are not provided. The question is - which model (if any existing) should low-income countries use?

There are essentially five types of economy-wide models, which are often discussed:

- the IMF financial programming framework used (with adaptations by each IMF team) for the discussions with the country (see Bolnick 1999; Mikkelsen 1999);
- the World Bank RMSM model and its more advanced and complex RMSM-X/XX and MACOR variants (Holsen 1989; Khadr et al 1989; Whalley 1984; World Bank 1980);
- the 'three-gap' model and various structuralist models (see Bacha; Taylor 1988);
- CGE and other more complex flow of funds models (Stewart et al 1999; Sahn 1999); and
- dynamic, large-scale econometric models (e.g. NIESR 1999; UK Treasury 1999).

There are also many sectoral and sub-sectoral models, and models of the global economy. In addition, the most positive recent developments have involved merging these models and applying them to low- and middle-income economies to generate growth-oriented adjustment models (Khan et al 1990/1991; Reinhart 1991; Tarp 1993/1996¹) - though even these efforts have their critics (e.g. Polak 1990).

All such models have their critics whose criticisms are generally well founded. For every model there will be people who criticise the model for oversimplification in its assumptions, for omitting or misinterpreting essential elements of economic linkages in low-income economies, or for focusing excessively on individual sectors or sub-sectors; there will also be critics who describe the model as too complex given the data available in the country or the capacity/time of technicians. Yet the worth of all models depends more on the way in which they are used and the assumptions which are put into them (see Section 3.2, and also Bolnick 1999 and Tarp 1996). Most of the above models - especially the first 3 types - can also relatively easily be adapted to take account of the realities of the economy under examination (for example, incorporating structural features and constraints into the financial programming and RMSM frameworks) and the capacity of the country, (by making them more or less complex depending on data or skills/time availability).

Virtually all low-income countries have a large number of technicians who have been on financial programming or RMSM courses at the IMF Institute or EDI - or, better still, on courses more tailored to the needs of the country organised by institutions like MEFMI, BCEAO, CEMLA. An

¹Tarp and his colleagues are even finalising a study based on merging all four frameworks and applying them to the South African economy.

increasing number are using such tools to analyse their economies, but many face problems:

- the courses provided usually work on the basis of a country case study rather than using live current data for the participating countries;
- the participating countries or the key individuals responsible for this type of work do not have immediate access to copies of the tools used to take back with them to their countries;
- where (as always) there is a need to tailor the models or parameters to the specificities of individual economies, there is little assistance available to conduct such tailoring;
- if they do have access to the tools, they may face problems of hardware or software incompatibility;
- institutional structures in their own countries may not permit them to use the models on a regular basis to prepare for visiting BWI missions (ideally they would also benefit from some follow-up training on the tools) and therefore they may lose their familiarity.

Nevertheless, some countries (generally after a considerable amount of capacity-building assistance or with the capacity themselves to build spreadsheets/models comparable to those of the BWIs) have reached the stage where they are able to run models comparable to the BWIs before each mission.

Another problem is that countries are often using multiple models. Frequently, countries have one model in the central bank; another in finance and another in planning. Sometimes one can even find 2 or 3 projects in the same institution to create models. These problems can stem from institutional rivalries (see Section 3) but as often as not reflect genuine divergences of approach or requirements for analysis between professional staff in different agencies. The key question is: should countries try to reconcile all of the models or not? On the one hand, almost all developed economies are happy to generate multiple forecasts from governmental and non-governmental agencies, using very different model structures and parameters, and then to analyse the 'consensus' of the more reliable institutions as an input to policy analysis. This would obviously be the optimal ultimate goal for developing countries. But given the potential shortage of human resources and time in many low-income countries - and the critical need to have a consensus position with government on forecasts, in order to prepare for discussions with international organisations and donors, the most urgent priority is to agree on ways to ensure that structures and parameters of different models are consistent and that results for different sectors are eventually fed into a single model whose results all institutions will endorse; the second priority is to build a relatively simple which commands a consensus in its structure from all agencies, and which can be used by all.

However, underlying the debate about which models to use is a more fundamental problem: of the lack of timely and reliable data to use to run the models. Virtually all countries now have sufficient data to run a basic financial programming model (even if they are not entirely sure of the quality of the data, particularly on imports or capital flows), but the additional elements necessary for a RMSM (and in particular for a CGE or other comprehensive flow of funds model) are often absent. This is particularly true of savings and investment data, but also applies in many countries to data on private capital flows, imports, GFCF, capacity utilisation and many other necessary variables.

In this context, what should low-income countries do? The key factors to bear in mind are:

- it is neither necessary nor desirable to choose one model;
- it is rarely desirable to choose an off-the-shelf model without plans on how to adapt it to country circumstances;
- the model should be appropriate in its complexity to reflect the realities of the country;
- the model should also be appropriate to the degree of capacity for economic analysis already existing in the country;
- the model should be the one (or the combination) which is most likely to assist the country in its key processes of economic policy formulation and negotiation with external institutions.

Those countries which have already designed a model (or various models) need to think actively about to develop them further (or to ensure that they are compatible and used co-operatively).

3.2 Forecasting Methods

3.2.1 Principles

To a certain degree, the choice of model is unimportant. What is really crucial is what goes into it. We have already discussed baseline data, but the most vital element is the use of that data to establish parameter values, assumptions and economic policy objectives which will determine the endogenous projections, and its combination with assumptions about exogenous variables to produce accurate forecasts. These will always be determined on a largely judgemental basis, but that judgement must be well-informed by supplementary analysis and by consulting the widest range of possible sources of data and information. As argued excellently by Bolnick (1999) and Tarp (1996), by changing what appears to be a relatively insignificant parameter, the same model can produce widely divergent forecasts, which may be the cause of government policy going off track.

In addition, technicians in many countries are reluctant to forecast more long-term. Modellers want to be sure that their model reaches closure in each of the projected years - which becomes exponentially more time consuming through additional iterations for every year added to the projection period, as well as frequently crashing models which are run on older computers or with insufficient software. Here again one must be realistic and learn lessons from the practices of some international institutions: the IMF, for example, has not attempted to reach closure even of the financial programming model over a 15-20 year period for its DSA projections. Rather it has projected the single sector of the balance of payments (even in countries in the CFA zone where its financial programming focuses on closing the gap in the TOFE-budget) and reassured itself that the trends in terms of current account, overall balance and reserves are satisfactory, and to check for basic consistency with the monetary targets and GDP growth. More recently it has begun to conduct similar projections for the budget and to check these for the same consistency elements. Obviously, it would be desirable if a country could forecast 20 years with a fully closed model, but it is by no means essential in order to think rationally about long-term debt sustainability for the external sector.

Furthermore, those designing assumptions do not believe that any assumptions can be supported with any degree of confidence beyond a period of about 5 years. This is a perfectly justified view, shared by forecasters in many developed economies: but one needs to distinguish among different

reasons for different types of projections. Projections over a 5-year period can be examined using probability techniques and sensitivity tests to look closely at their potential margin of error, and used as a reasonably accurate guide for policy under different scenarios. Longer-term projections are best used as a guide to potential extreme outcomes which could result from what may seem over the short-term to be marginal policy changes (for example, a reduction in budget revenue of 0.1% of GDP per year or a 5% increase in the average concessionality of foreign borrowing). Both are necessary to guide policy from different perspectives. This is why the Bretton Woods Institutions have no hesitation in conducting both - even though they will very often know less about the details of the economy they are forecasting than national technicians.

3.2.2 Assumptions for Different Sectors

It is important to look at the best practices in designing the assumptions which can go into any model for the four main sectors of the economy: balance of payments, budget, monetary and financial, and real sectors. Each country has its peculiarities and therefore it will have different preferences for projection methods.

What follows is a schematic presentation of possible projection methods for various components of each sector. Beforehand, a few guidelines might be in order for all line items. All projections should:

- be based on actual country data with realistic estimates of the base year, rather than international estimates based on multiple-country data;
- cross-check as many sources of data as possible;
- err on the side of pessimism (defined as trends which produce greater financing needs), while being compatible with potential financing availability;
- be based on detailed analysis and explanation of the differences between earlier projections and actual outcomes;
- disaggregate as much as possible for all variables;
- analyse past trends and volatility, including seasonal variations during the year;
- take account of changes in policy or circumstances which influence the prospects of repeating earlier trends;
- construct scenarios based on probabilities of repeating earlier trends.

3.2.2.1 Balance of Payments

- **Exports:** rather than use simple export/GDP ratios or growth rates, disaggregate the price and volume of all significant commodities; be extremely realistic about prospects for continuing initial rises in response to liberalisation, for repeating historical production peaks (take account of depletion of reserves or soil), or for diversifying into new non-traditional products (a good rule of thumb is not to put new products into the projections until they begin exporting); use actual export prices (not world market prices) to allow for premiums or discounts related to quality of export goods; use multiple sources for projections of world commodity prices; watch policies of neighbouring countries which could divert exports through their territories by offering higher prices to producers; be realistic about the generally very limited influence of producer country alliances on world prices;

- **Imports:** instead of simplistic equations based on erroneous assumptions about strong relationships with GDP and exchange rates, base projections on requirements for growth and poverty reduction, rather than on external financing availability; disaggregate the volume and price trends of all significant categories of imports if available (by sector, SITC category or major product, end-user or source country), rather than using an overall MUV index or value trends; calculate GDP elasticities disaggregated by sector and SITC category (see Martin et al 1995); take full account of import needs for all export-related or FBI projects in order to evaluate their net effect. If no such disaggregations are available, it may be necessary to fall back on global import value elasticities, adjusting them upwards or downwards for factors such as major project-related imports or weather influencing food imports;
- **Services: (former Non-Factor Services)** base projections an analysis of trends influencing the relationship between freight and insurance and goods exports or imports, adjusting this relationship for expected changes in policy, deteriorations/improvements in infrastructure or collapse/expansion of local insurance industries, which will increase/reduce freight and insurance costs and earnings; preferably disaggregate further to examine the service costs and earnings of various sectors;
- **Factor Receipts and Payments:** disaggregate into interest (see debt below), other investment income (see private capital flows), travel and tourism, workers remittances and other factor receipts; analyse trends in host country policies for workers remittances (e.g. immigration policies and levels of unemployment) and in the potential numbers of workers and their earnings per capita; be realistic about possible tourism expansion based on analysis of competition in world markets, particularly from neighbouring countries, and trends in global demand and expenditures per capita;
- **Transfer Receipts and Payments:** examine using regular qualitative surveys of foreign exchange bureaux the composition of private transfer receipts in order to reallocate them to other projection lines; conduct regular surveys of donors to assess prospective official transfers, notably at Consultative Groups but also through in-country surveys, and adjust the results downward for their past disbursement records based on analysis of grant databases;
- **Debt-Related Flows:** base debt service and disbursement projections on baseline data produced from recording systems (preferably the international standard systems such as the Commonwealth Secretariat's CS-DRMS or UNCTAD's DMFAS); but adjust these for realistic disbursement schedules on new loans; for planned new borrowings; for analysis of prospects for debt relief; and for potential exchange and interest rate risks (all these calculations are possible using analysis tools such as Debt Pro used by the IMF and DSM+ used by the World Bank). Include all information on service and disbursements for parastatal debt, private non-guaranteed debt and intra-company loans, collected through comprehensive surveys of enterprises;
- **Non-Debt Capital Flows:** collect maximum information on such flows through comprehensive surveys of private capital flows via banks, enterprises, stock exchanges and foreign exchange bureaux (Bhinda et al forthcoming); supplement these with surveys of international investment funds to track portfolio fund investment; make maximum efforts to track hidden repatriations through intra-company loans and transfer pricing; base projections on such information and on relating capital repatriation and dividend payments to expected returns on investments in different sectors (e.g. LIBOR plus differing risk premia); allow for changing trends (for example, falling capital repatriation but rising dividend repatriation would be consistent with economic stability); conduct motivational sample surveys of investors to help predict likely future trends of

flows in key sectors; be extremely realistic about prospects for new FDI projects (insert them into projections when disbursements actually begin) - and make sure to distinguish carefully genuine FDI and associated loans; also be realistic about prospects for development of local capital markets to attract flows, and take into account competition from regional neighbours and trends in global markets;

- **Reserves:** wherever possible and consistent with monetary targets, target the fastest possible achievement of levels of reserves sufficient to protect against external or domestic shocks. Rules of thumb used internationally vary from 4 to 6 months of import cover - with most recommending that this refer to imports of goods and services, and many suggesting higher levels to cover US\$-denominated deposits in foreign currency bank accounts. Analyse the scale of reserves depletion encountered in previous shocks and build reserves to levels sufficient to protect against such events. Reserves are of course linked to net foreign assets, which should be projected on a disaggregated basis, separating gross reserves and gross liabilities, as well as the net IMF position and any escrow accounts for debt service;
- **Exchange Rates:** there are several standard methods to use to project exchange rates. The least useful is to keep the exchange rate fixed and stable. Trend methods (random walk) are usually found to be much less reliable than inflation related methods such as PPP. Ideally a considerable amount of econometric work is needed to identify the principal determinants of the exchange rate and project it according to their projected variations.

3.2.2.2 Budget

- **Revenues:** As elsewhere, the rule should be maximum disaggregation by type of tax and non-tax revenue. Global projections of revenue/GDP ratios as measures of 'revenue effort' by individual countries are highly misleading, and projections of rapid increases have almost always proven overoptimistic. Above all, there is a need to take into account the 'taxpayer culture' of the country. In countries where trust in the ability of the state to use resources wisely (or the tradition or enforcement of tax payment) has disintegrated, due to protracted civil war or other internal/governance problems, it may take decades (or prove impossible) to restore a culture where revenue/GDP levels can rise to match historical peaks. In countries which are decentralising government, another important factor is the potential overlap between central and local taxes, and the relative ability to collect at different levels - as well as any potential redistribution of flows resulting from such taxes to or (usually) from the central government. A third general rule is that calculations of recent tax elasticity (i.e. responsiveness to changes in tax rates) and buoyancy (responsiveness to changes in the tax base e.g. income levels) are useful mainly when made for individual taxes and sectors and when focussed on periods which are comparable in their degree of economic liberalisation. Finally, all tax revenue projections need to take account of potential improvements in administration and enforcement - but not to be too optimistic about their effects, as experience world-wide has indicated no magic solutions from institutional reforms .

A more disaggregated analysis indicates that projections of **trade taxes** need to be closely linked to (admittedly volatile) exports and imports, and adjusted to take account of global or regional trade liberalisation policies. Given current international trends, they are therefore likely to fall considerably. Most developing countries have also recently been reducing **direct taxes on personal and corporate income**, and making these less progressive. However, the evidence that lower and less progressive taxes will lead to higher investment, production and taxpayer compliance (and therefore higher medium-term revenues) is very weak, and projections should

beware of any such assumptions, demanding evidence based on regularly updated analysis of the actual effects of such measures before projecting medium-term rises. Trends in social security taxes and pension contributions have varied dramatically, and projections need to take account of government policy on contribution mechanisms and the desirable degree (and labour market effects) of different rates and progressivity scales.

To compensate for any short-term falls in revenue, countries have moved to new types of taxes in order to broaden the revenue base. However, experience indicates that such measures (VAT, land taxes, property taxes, road taxes, taxes on the informal sector) can often take long periods to introduce, and may be subject to reversal due to political pressure. Their revenue levels have proven extremely difficult to predict - making caution essential. Excise duties (tobacco, alcohol, petrol) are more reliable sources of income, though account must be taken of elasticities and buoyancies of product consumption which may be affected by other government health, road safety, licensing law or environmental policies. Savings and dividend taxes are not very common in low-income countries, but again should be subjected to careful analysis of the potential elasticity effects on saving and investment, as well as the desirability of targeting such taxes on more short-term, speculative savings and investments.

- **Non-tax revenues** are exceptionally hard to predict and generally a source of dramatic over-optimism. Privatisation revenues should not be programmed until contracts for sale are signed with the successful bidder, as they may easily be offset by transfers of parastatal enterprise debts and other liabilities to government, or bidders may fail to produce the agreed sums. Fishing licences and other (non-aid) grant or royalty revenues should also not be programmed until they have been signed, and projections should take account of trends in world commodities markets. User charges for services are also an unreliable source of revenue, as they are usually highly elastic to changes in levels: because the resulting drop in use of/access to public services particularly penalises the poorest, they are likely to be reduced or phased out in many of the poorest countries in the future.
- **Expenditures:** Expenditure items should ideally (as with import projections) be based on calculations of expenditures which are necessary to produce high rates of growth - and particularly in the context of low-income countries' programmes with the IMF and World Bank which are now moving from ESAF to the Poverty Reduction and Growth Facility (PRGF), those expenditures which are demonstrably costed and linked to reducing poverty according to human development targets agreed with the Bretton Woods Institutions and leading to accomplishment of the 'International Development Targets' by 2015 (for more detail see Section 3.2.2.5). Previously it was normal to talk of 'capital' and 'recurrent' expenditures, and of 'domestically-financed' and 'externally-financed' expenditures, and to look at line items such as supplies etc. However, this often led to expenditure targets being driven by prospects of donor disbursements through multiple projects, or of mobilising counterpart funds for government contributions, rather than needs, with Ministries then fighting for nominal or real incremental increases in expenditure. As a result, it is now universally regarded as superior to analyse expenditures in a global schema known as a Medium-Term Expenditure Framework (MTEF), whereby government ministries set themselves objectives ('programme budgeting') and cost the measures necessary to achieve these objectives, including all types of expenditure.

Ideally, donors and government would pool all of their funds, with donors providing fast-disbursing untied budgetary support, and then government would be in a position to project expenditures purely on the basis of need, without needing to distinguish capital and recurrent or donor-/domestically-financed, without having to adjust these for the vagaries of arbitrary

divisions among expenditure types or financing sources.

Nevertheless, it is impossible to avoid remembering when you are making projections that some donors have not supported this system, and others have not furnished the promised disbursements - and that revenues do not always live up to expectations. Therefore financing sources do influence the speed with which expenditures can be implemented and the projections of such expenditures. In the extreme, projections become extremely short-term and are based on monthly cash budgets tied to receipts of revenues and donor funds.

- **Capital Expenditures** are especially vulnerable to such vagaries, partly because they tend to be linked to individual donor projects with unpredictable disbursement prospects, and partly because where government runs short of local currency funds it will almost certainly cut down capital expenditures (due largely to greater political pressures to maintain recurrent expenditures such as salaries). As a result, projections need to be based on the most realistic possible profile for donor financing.
- **Current Expenditures** projections have often in the past assumed nominal stabilisation or real cuts, particularly in wages, in order to meet budget targets and based on civil service reform programmes which are intended to reduce staff levels. However, such cuts have proved highly difficult to implement, with redundancy payments often causing initial increases in expenditures, and salary rises for the remaining public officials (to increase their incentives) have often absorbed most of (or even exceeded) savings through staff cuts. It is therefore vital to be realistic and to project the effects of such programmes in detail - and not to build projections on expectations of large savings.
- **Subsidies and Transfers** will usually assume sharp cuts due to commercialisation or privatisation of loss-making parastatals, to 'financial independence' for the central bank, or to privatisation of government pension or social security funds. However, delays in privatisation of parastatals, successful privatisation of profit-making parastatals, payment to clear debts of parastatals which are being privatised, and recapitalisations of central banks, have reduced net savings to negligible levels or even had huge net budgetary costs.
- **External Financing** should be projected in the same realistic manner as in the external sector, in order to ensure consistency (while of course excluding from the budget grants and loans which are destined for non-budget sources).
- **Domestic Financing** needs are usually projected as a target, on the basis of minimising government borrowing and domestic debt. This target will of course not be met unless the projections for other fiscal variables are realistic - above all for external financing - or if it is met, this may be at the expense of accumulating arrears on payments below the line, or not paying bonds issued to refinance central or commercial banks or pensions. If any domestic borrowing is envisaged, it is essential to maintain constant contact with the major lenders (purchasers of government securities) through regular survey, to discover their intentions on interest rates, yield curves and maturity profiles.
- Finally, it is important to remember that assumptions on **exchange rates** will be crucial to assessing the impact of externally-driven line items (external debt service, aid/grant disbursements and taxes on trade)

3.2.2.3 Monetary and Financial Sectors

Here the key question is whether current mechanisms for collecting data - largely linked to bank

supervision and monetary policy formulation - provide sufficient information about intentions to allow meaningful projections. Though projections can be based on analysis of factors influencing recent trends, it is normally essential to supplement them with surveys of the banking system and their customers which provide ideas on their responses to policy measures.

- **Net Foreign Assets** are in part linked to the projections of reserves under the external sector. However, it is also vital to forecast foreign assets and liabilities of the commercial banks, and their earnings, which will depend on their liquidity preferences and competence in investing their assets. Ideally, especially if the banking sector is small, this should be done on a bank-by-bank, and on a gross basis.
- **Domestic Assets/Money Supply** also needs to be disaggregated into all components of the money supply, including currency in circulation, cash in vaults and bank reserve deposits, in order to identify trends which influence each element. It is particularly vital to take account of changing velocity and multipliers in response to changing inflation expectations during a period of rapid stabilisation; and to distinguish domestic and foreign currency deposits which may have different motivations and need separate projections.
- **Banking Sector:** detailed analysis of banking sector supervision and monetary policy returns should be carried out on a regular basis to see what factors are influencing changes in bank policies on the length and remuneration of deposits, the maturity and yield curves of loans, and changes in capital and the nature of assets and liabilities (for example moving from Treasury Bills to real estate); banking data also need to be examined and supplemented by interview to see what is responsible for these trends as well as for preventing the private sector from getting access to credit 'saved' by the government.
- **Savings and Investment:** these are often the most difficult projections to make, given the lack of good baseline data. For accurate projections, they require details of GFCF, capacity utilisation, and changes in inventories, and analysis of their past responses to policies. Private sector investment changes should be projected on the basis of the most detailed possible motivations, rather than being treated as an endogenous variable.
- **Inflation:** this is often set as a target and then simplistically implemented through money supply targets via a coefficient. However, projections should be based on analysis of all of the supply and demand-side factors influencing inflation, including food supply, devaluation, import prices etc. Account must also be taken of lags in the adaptation of inflation expectations to changed realities, and their effects on money demand, velocity of circulation and multipliers.

3.2.2.4 Real Sectors

Real sectors are very often projected using overall GDP growth rates and changes in components of expenditure of GDP, rather than disaggregation by component of production. Ideally these different perspectives should be fully reconciled by the model through a flow of funds framework. As with other sectors, the maximum disaggregation is necessary to be sure about the sources of growth within the economy and how the real sector will respond to policy measures. Many existing analyses of the real sector tend to focus too much on recent trends or results rather than prospects, and smaller sample surveys of sectors or sub-sectors, including strong attitude/prospects sections, are essential:

- **Agriculture:** commonly used methods to support projections include surveys of cultivable area and fertility, farm surveys of plantings, yields and agricultural value-added of different crops, and

of animal populations, analysis of response to policy changes such as producer price increases or improvements/problems in supporting inputs or infrastructure, developments in major agro-processing projects which will require higher agricultural production, and projections of climatic and environmental conditions based on probability, frequency, and long-term trends. In most countries, the dominant medium-term factors are underlying (land, climate, infrastructure), but price and input issues can have a major short-term impact.

- **Mining and Petroleum:** the most helpful methods here are to draw on results of prospecting on reserves of minerals and petroleum, but with a major discount for over optimism of prospectors; to project international markets for trends which will influence cost-benefit analysis by large investors and therefore their production levels, particularly placing stress on break-even points and the resulting potential for closure of projects; and to survey small-scale prospectors (very difficult);
- **Manufacturing:** regular industrial surveys (which need to include the informal sector wherever possible) need to be more forward looking in order to point out industrial confidence and the prospects for growth; major subsectors and projects should be analysed separately; the positive effects of a good legal and regulatory environment are important, as are conditions in the labour market and (depending on the import needs of the sector) access to imported inputs or the negative effects of competition from imported goods;
- **Services:** regular forward-looking surveys of private sector service industries are essential, as is analysis of effects of government policy (for example liberalisation of insurance or transport). Growth in government services will be linked to government expenditure, though the relationship is not linear as it depends on the productivity of expenditure.
- **Informal Sector:** this is often the most difficult area to track, though surveys of small-scale enterprises are a good starting point. A few countries conduct comprehensive regular analyses through non-government agencies of trends in this sector. Many countries resort to estimates - particularly of unrecorded minerals, manufactures and services, and of smuggled agricultural or mineral exports. Insofar as this sector is also tracked by some consumption taxes or passes funds through foreign exchange bureaux, some countries use trends in these areas to indicate major divergences from formal sector growth trends, and to adjust overall GDP figures accordingly.

3.2.2.5 Projecting Poverty Reduction

A vital new issue is the projection of poverty reduction and its integration into macroeconomic forecasting. Under the new PRGF, countries will need to be calculating as precisely as possible the impact of all macroeconomic policies on social indicators such as income distribution, employment, health, education, and gender/regional/other equity.

This will require a huge increase in the amount of resources devoted to analysis of recent trends in indicators and their current levels, through comprehensive household surveys/living standards surveys, more frequent smaller-sample welfare indicator questionnaires which include more qualitative issues on standards of services and factors reducing usage or access by the poorest, and surveys of indicators and access in the social sectors.

It will also imply much greater analysis of the detailed effects of government expenditure and many other policies (for example taxation, employment and wages, infrastructure provision) on poverty reduction. A huge effort will be needed to get poverty reduction projections even to the point reached by balance of payments and budget projections. But, as this is the key area for future policy

negotiations with the Bretton Woods Institutions (and should be the top priority for all governments), it must be at the head of the queue for allocating additional government and donor resources.

3.2.3 Consistency Checks, Sensitivity Tests and Alternative Scenarios

As shown in Box 1, there are many basic consistency checks which can be implemented either through a model or with more eclectic/indicative methods.

Another type of 'consistency check' is a check for consistency with the ratios or other indicators which show progress towards stabilisation and adjustment. Evidently those considered most important in negotiations with the Bretton Woods Institutions are the budget deficit (usually measured as the primary deficit excluding grants or the overall deficit) and the balance of payments deficit (usually the current account excluding grants or the overall balance), and various debt and vulnerability indicators related to the HIPC Initiative.² More detailed monetary, fiscal and inflation targets have already been discussed in relation to projections of line items above.

However, countries may well have different ideas on the key ratios or targets. As already indicated, they might potentially have targets for reserves in months of imports, for reducing aid dependence or import dependence in relation to GDP, or for reducing the 'vulnerability' of the country to external shocks in other ways (e.g. export diversification). They might also have ideas for targets for poverty reduction, per capita growth, investment and savings - or for total debt (domestic + public and private external) indicators or for capital flows related to money supply or reserves.³ There may well be a very long list of targets which appear to conflict (the classic example is usually inflation, the exchange rate and interest rates) and - as also practised by the Bretton Woods Institutions - it is only through a process of iteration among the different targets, having defined clearly those which are the most important, that a country can decide what it regards as the most 'sustainable' set of overall projections. If possible, the targets can even be formally weighted for their importance and tests conducted across the range of indicators resulting from a scenario in order to assess the overall performance of a scenario. Of course, by adjusting the parameters in a model or the assumptions for individual line items, it is possible to reconcile almost any targets: but it is vital to start with realistic assumptions and parameters and then not to adjust them so far that they strain credibility.

Another way of avoiding excessive conflicts among different targets is to test many alternative scenarios in order to indicate the impact of changes in different line items or of different comprehensive macroeconomic scenarios. The second option is far better if the model is not too cumbersome and does not require huge data sets to be changed in each different scenario. It is also vital - and too often forgotten - to justify the degree of divergence from baseline projections by basing it on country-specific analysis of recent volatility of different line items or sectors - or the occurrence of economy-wide shocks such as drought or natural disaster (or even political cycles such as those related to elections) and of the knock-on effects on the overall macroeconomy - and indeed, based on relatively long historical series if available, of the probability that such events will recur.

² Though the role of vulnerability indicators has been virtually eliminated in the Enhanced HIPC Initiative agreed in 1999, such indicators might still be used to measure a country's vulnerability to external or domestic shocks to its reform programme - and indeed should be used by all countries in making projections.

³ For more on these more comprehensive indicators of the sustainability of external financing, see Martin 1999c.

Box 1

Checking the Consistency of Macroeconomic Scenarios

It is fundamental to check for consistency among the line items you are projecting. This exercise is iterative: as you introduce a new assumption, it will have several implications elsewhere in the economy — even with the limited links among macroeconomic variables we are considering here. So you need to think carefully about any possible linkages every time you change a line of data. Ideally, such checks would be conducted using a macroeconomic model. However, if your model does not contain these checks, you will need to do some thinking! The most normal consistency checks would be:

- *between GDP and exports*: these might be approximately correlated, since export growth would influence GDP;
- *between GDP and domestically generated budget revenues*: higher GDP growth might improve the prospects for mobilising revenue so that the revenue/GDP ratio would rise;
- *between imports and GDP or exports*: for example, lower GDP growth might coincide with higher import elasticities relative to GDP (especially if food imports rise due to drought). Export growth might depend on investment using imported goods;
- *between macro prospects and reserves coverage*: improving macro prospects would normally increase reserves coverage in months of imports;
- *between exports/imports of goods and services*: these would normally be closely correlated, because the largest service items are freight and insurance on exports/imports of goods;
- *between exports and private transfers*: these might be correlated positively if the private transfers reflect mainly unrecorded exports rather than worker remittances;
- *FDI / non-debt flows*: investor perceptions of good growth prospects might result in higher inflows. Inflows might lead to higher growth and export production, but might also be spent on larger imports, and produce higher dividend outflows or associated private sector debt;
- *budget expenditure*: higher budget expenditure on infrastructure and human capital development might increase growth in the medium-term; unproductive expenditure might increase inflation and reduce growth;
- *inflation*: Faster exchange rate depreciation might accelerate inflation, as might higher government borrowing as a result of a higher budget deficit;
- *interest rates*: higher inflation or exchange rate depreciation might raise domestic interest rates as lenders need to cover uncertainties;
- *exchange rate*: normally in the baseline projection you would assume a stable exchange rate (or a gradual depreciation in line with the inflation differential between your country and its trading partners). Faster inflation in other scenarios might provoke faster depreciation by undermining confidence.

As part of consistency checks you will also need to investigate the *potential influences of external debt and aid financing* flows on macroeconomic prospects. For example:

- Are new borrowings intended to be invested in large export projects?
- Will new loans support the recurrent or capital budgets, influencing expenditures?
- Will they support reserves or be spent on imports?

3.3 Institutional and Capacity-Building Issues

There are many institutional issues raised by macroeconomic forecasting:

- At the international level, it would be desirable for international institutions and donors to be able to supply copies of their forecasting models for individual countries, and documented details of the assumptions they use, for purposes of comparison with national models, to train national staff fully in the use of these country-specific models, and to get feedback from senior nationals with which to change the models. Decentralisation of economic analysis to in-country missions would help this process immensely. It would of course be preferable for them to agree on models which are consistent, comprehensive and integrated in order to avoid disputes over basic methodologies and equations. In addition, it is essential that they supply projections of the international economy to low-income countries on a regular and timely basis and at minimum cost, through the internet. The private sector suppliers of information also need to make more effort to reach low-income governments and to improve mutual relations so that countries increase their confidence in projections (of course countries need to organise themselves to make sure that any information obtained reaches the right officials - the ones who are actually doing the forecasting).
- Governments themselves need to ensure that the structure of their technical and negotiating teams on projections is as simple and effective as possible, in order to avoid duplication and improve co-ordination. This means appointing a clear, stable and well resourced lead unit for finalising projections, supported by other units co-ordinated through working group structures on each of the areas outlined above. Such working groups should cover issues of data compilation, modelling methods and forecasting assumptions, feeding conclusions into the central forecasting unit.
- In order to motivate the work of the forecasters, it is essential that their results are used by government at the top level in its own internal policy discussions and those with donors and international institutions. Putting them aside in favour of work by international experts (whatever their source) is likely to undermine any organisational structures: systematic political commitment to defending locally-developed (high-quality) forecasts - through, for example, regular presentation of broad findings to policy-makers - is often lacking.
- This also implies - as is the case in all capacity-building - a new attitude to technical assistance. governments must define their own needs. Thereafter they must lead the process of defining terms of reference and contracting technical assistance, and ensure that it is genuinely capacity-building, with specific objectives for regular and comprehensive on-the-job training, deadline for handover of powers and skills, and assurances that documentation of all aspects will be compiled.
- Obviously, individual units may need reinforcement, restructuring or changes in their work programmes, as well as training in forecasting techniques and equipment. It is highly likely that individual countries will require training for a wide range of staff. Staff continuity or handover training of successors is also essential, as is a permanent written repository of information on country-specific and international forecasting techniques.
- It is necessary to think also about underlying structures and capacities as well as those of the front-line agencies. For example, on imports, does the customs service have adequate resources? On GDP, does the Statistical Office have good sources of data and methodology?
- Once such structures are established, there is also a case for multiplying the different forecasting

sources within and beyond government, both to provide more details of sectors and effects of individual policy measures, and to compare results based on different assumptions and model structures.

- At a regional and international level, continuing exchanges on best practices in forecasting will be essential to ensure that methodologies are updated.
- Finally, to return to the starting point of this paper, it is vital that the forecasts are used for policy purposes, to anticipate external and domestic shocks or pressures and avoid ad hoc and distortionary reactions. This will reinforce prospects for long-term growth and poverty reduction, increase government commitment to pursuing long-term policies, and encourage the external and domestic donor/creditor/taxpayer/investor commitment to financing and supporting these policies which will be essential to their success.

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