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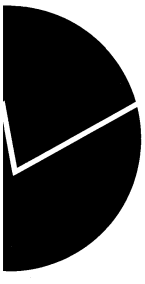

Statistisk sentralbyrå

Marie W. Arneberg

Rapport

Theory and Practice in the World Bank and IMF Economic Policy Models

Case study Mozambique

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Tall kan ikke forekomme	Category not applicable	.
Oppgave mangler	Data not available	..
Oppgave mangler foreløpig	Data not yet available	...
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Foreløpige tall	Provisional or preliminary figure	*
Brudd i den loddrette serien	Break in the homogeneity of a vertical series	—
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Abstract

Marie W. Arneberg

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The aim of this report is to give some insight into the content and use of the economic policy model for developing countries in the World Bank (WB) and the International Monetary Found (IMF). It gives a presentation of the theoretical foundation of the model, which might be labeled as «monetarist»; private, and particularily public, consumption must be kept down. This will make resources available for private investment which will lead to economic growth, while at the same time avoiding inflation. The causal relations in the model are discussed with regard to both Keynesian and Structuralist economic theory. Section 3 gives a presentation of the model as it appears in practice and how it is used by the WB staff. The conclusion is that the WB/IMF model mainly provides a framework for securing consistency between exogenous assumptions and targets for future economic development, and does not necessarily give a prediction of the most likely development. This can be justified only if WB/IMF give outsiders information about the assumptions used, so as to enable other donors to make their own evaluation about the realism and quality of the projections. Section 4 gives an evaluation of the projections for Structural Adjustment Programmes in Mozambique from 1987 to 1994. It shows that although the Mozambiquan authorities have followed World Bank prescribed policy, the outcome of that policy has not at all been in accordance with the model projections. The main failure lies in the modelling of exports and inflation. There is also a possibility that production is determined by demand. As this is in conflict with the basic theoretical foundation of the model, model prescribed (tight) policy may actually worsen the economic situation in Mozambique by strengthening stagnation.

Keywords: International monetary fund, Mozambique RMSM, structural adjustment (programme), , World Bank.

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Contents

1. The Bretton Woods institutions*

The Bretton Woods institutions (BWI) were founded in 1944 as a result of discussions among delegates from 44 countries on a new world order to secure stability and avoid a third world war. The best way to secure stability and peace was, according to this meeting in Bretton Woods, to make countries economically interdependent. This could only be done by promoting free trade and by organizing an exchange system for foreign currency which made free trade possible in practice. One essential goal was to coordinate economic policy in order to avoid for instance repetition of the competing devaluations of the thirties.

IMF's mandate is to finance temporary balance of payments disequilibria, that is to supply the member states with foreign exchange (US$) in situations where shocks (such as changes in world markes prices or natural disasters) threatens a country's ability to buy imports. The World Bank is dedicated to more medium term financing of economic growth (which is assumed to be identical to "development").

The support from IMF and the WB is mainly given as credits. The idea is hence that the money should be paid back, but since the beginning of the 1980s, this has not been the case for many developing countries. However, the official policy is still that the loans should be paid back. Structural Adjustment Programmes (SAPs) have been implemented by the BWI's in developing countries over the last ten years partly in order to make these countries able to repay their dept. The SAPs consist of giving a developing country further credits on the conditions that the government follows BWI's policy recommendations. This stems from the IMF's obligation only to finance temporary balance of payment problems. If, however, the balance of payment problems are not temporary, IMF is not obliged to finance the gap. Without any assistance from IMF, the country would then have to "adjust" policies to the new situation. IMF therefore recommends a mixture of financing and adjustment, the former being conditioned on the latter.

The SAPs rest on three main components (Demery 1993). This paper will be mainly focused on the first; the importance of macroeconomic stability. The other two components are the need for prices to reflect relative scarcities and a reduction in the role of the state concerning the operation of markets. The general belief is that stabilisation should proceed before structural reforms, or else the latter would be unsuccessful. The stabilization component was earlier the main concern of the IMF, as the World Bank was predominantly occupied with lending to spesific development *projects*. The introduction of the SAPs ment that the IMF had to become more interested in the long term development, the World Bank in short-term disequlibria, and that both the BWI had to take into account the workings of the economy.

The BWIs then need models for economic policy for two reasons: First, they must have some opinion about the amount of credit that is needed to fulfill certain policy goals. In the case of IMF, this means an estimate of credit necessary to finance the temporary deficit on the balance of payment. This of course implies that they need an estimat of the size and duration of the deficit as well. The World Bank needs models to predict credit needed to fullfill a certain goal concerning the growth of production. This implies a need for knowledge about the causality behind economic growth, and especially how growth can be promoted through increased access to foreign exchange.

The second need for a model araises from the introduction of the SAPs in the sence that the BWIs now are interfering in government policy. The prescriptions for internal policy must be founded on some understanding of how an economy works and is affected by *all* policy measures, not only by foreign exchange inflow. Section 2 gives a presentation and a critique of the models used by the BWIs.

As IMF steadily becomes more involved in economic policy, the need for the two BWIs to coordinate their respective policy-recommendations increases. This is to avoid that short-term policy for restoring balance, will

* I would like to thank Ådne Cappelen, Statistics Norway, and Halvor Mehlum, University of Oslo, for valuable comments.

conflict with long-term policy for economic growth. Cooperation has been institutionalized in the "Policy Framework Paper" (PFP) which sets out medium term goals for economic policy and the main policy measures that are to be undertaken by the government (more or less voluntarily). When a country is embarking on a new Programme, a comprehensive PFP is presented to the "Consulting Group" (CG), consisting of representatives from the BWIs, other donor countries and the government of the country concerned. The preparation of a PFP is done by IMF and WB staff on so-called "missions" to the country, in (more or less) cooperation with local authorities. The models are then used, together with knowledge and guesses about the future and the past, to calculate the policy measures necessary to reach the specified goals. Section 4 gives a presentation and evaluation of the PFPs for the periode 1994 - 1996 for Mozambique with emphasis on the use of models.

2. The policy models: Theoretical framework

The most widely used model in the World Bank is called RMSM (Revised Minimum Standard Model) which was developed some 20 years ago. The IMF model has no name, but will be referred to as the Financial Programming Model (FPM). As shown in section 3, these models are now merged in the new RMSM-X model. Based on this general model framework, country-spesific models are elaborated dependent on the amount of information available and required in each country. The presentation of the models in this section is based on the work of Khan and Montiel (1990).

2.1. The World Bank model : RMSM

WB's analythical exercise concists of quantifying sources for financing economic growth. Production is thus exogenously given as a policy target. Increased production demands increased capacity of production, and an investment programme must be financed to reach the capacity equivalent to the production goal. Investment must be financed by saving, either by domestic private or public sector or financed abroad. Private saving is determined by private disposable income, and together with assumptions about the amount of savings from abroad (grants and loans) this gives the necessary public saving and credits from WB to fulfill the investment program. The government thus can help finance the investment program by reducing taxes (which will increase private saving) and by reducing public consumption (increasing public saving). The gap between actual and necessary saving will then be financed by the World Bank.

Output is determined solely by capacity. The model thus ignores effects of demand on output, that is, full capacity is implicitly assumed. There is also assumed to be a fixed relation between capital and output (on the margin), for example that the amount of additional output always will double the amount of additional capital. This impilcitly means that there is no possibilities for substituting labour with capital or vice versa. Together with the assumption of full capacity, this means that unemployment can only by caused by capital shortage. Mathematically, this can be written as

$$(2.1) \quad dy = (1/icor)*dk,$$

where y is real output or Gross Domestic Product in real terms, GDP (which is the same as income here), *icor* is the incremental capital-output ratio, and k is the amount of capital at a given point in time. The d symbols change in stock of output or capital during a certain period of time, and dk denotes private investment as the government is not supposed to engage in any investment. As is shown in section 3, *icor* can in practice be allowed to vary to reflect varying degrees of capital utilization, but then the capacity utilization must be assumed by the model user. *(2.1)* can be interpreted as explaining the growth of GDP as determined by the available investment level. It is, however, more in line with the World Bank way of thinking and using the model, to view growth as a target which is set by the government. Thus, (2.1) determines the investment neccesary to realize the desired growth rate.

Private saving is assumed to be a fixed propotion of private disposable income. On the micro (individual and enterprise) level, this can be interpreted as if an individual always has the opportunity to save for example 20 percent of his or her after-tax income no matter how low the income is or how large income-reduction the individual experiences during the period. It also implies that the individual always will spend 80 percent of the after-tax income, regardless of income level or -change. The relation is however assumed to hold only at the macro level, which implies that the private sector in total will save 20 percent of its income, regardless of changes in total income *level and distribution* (between individuals or between individuals and enterprises). This gives the consumption function

$$(2.2) \quad cp = (1 - s)*(y - t),$$

where cp is private consumption in real terms, s is the saving rate and t is total amount of direct taxes paid by the private sector to the government. Allthough the interest rate is not taken into consideration here, the Bank makes additional calculations on how the interest rate influences private saving. Increased real interest

rates is thus a common feature of a stabilization programme.

Import volume is a fixed propotion of total real income. This is built on the same reasoning as the fixed savings rate, but in addition, the imports are assumed to be unaffected by a change in the income distribution between public and private sector. Where z denotes import volume and a the propensity to import for the economy as a whole, the import function can be written as

$$(2.3) \quad z = a*y,$$

These relations must however satisfy an accounting relation that states that the sum of consumption, investment and exports can not exceed supply (production and imports):

$$(2.4) \quad y + z = cp + cg + dk + x,$$

where x is exogenously determined export volume. *(2.4)* can be rewritten to show the relation between saving and investment:

$$(2.5) \quad dk = (y - t - cp) + (t - cg) + (z - x)$$
$$= s*(y - t) + (t - cg) + (a*y - x),$$

which states that investment can stem from private or public saving (cg is public consumption), or from "recource inflow" of net imports. Net imports is thus foreign saving in the sense that foreigners are accumulating assets on the country through selling more goods than they buy (we return to this source for balance of payment problems later on). A negative shift in world market demand for domestic goods will thus promote investment and growth through increased foreign saving (!). This is of course due to the constant production level. Less exports give more (foreign) saving instead of reduced production, and as investment is determined solely by saving, less exports leads to increased growth. Reshuffeling this gives

$$(2.5') \quad dk = (s + a)*y + (1 - s)*t - cg - x,$$

which shows the possible sources of investment and hence economic growth: The higher the target income level (given that it is realized), the higher is investment via private saving and import. Taxes increase investment through increased public saving, although taxes have the adverse effect on private saving through reductions of disposable income. Increased public consumption and exports reduce investment in the sense that resources are allocated away from investment goods. As the goal is growth and the means are public consumption and taxes, a growth-promoting policy would be to reduce the public deficit by increasing taxes or by reducing government spending according to the desired growth rate (under certain restrictions on the size of the output-capital ratio). Note that the model does not explain the *demand* for capital, but implicitly assumes that demand for capital (miraculously) equals the supply or total amount of saving, which means that what is saved will automatically be invested. A more reasonable interpretation is that, ex post, what is invested must somehow have been saved first. Alternatively, this investment function can be explained by chronic excess demand for capital.

As already noted, growth will conflict with targets for the balance of payment for two reasons: Investment will increase income, which in turn increases imports, and increased exports leads to a reduction in investment (supply). The balance of payment is defined as net inflow of foreign exchange which stems from international trade and capital flows:

$$(2.6) \quad dr = x - a*y - df,$$

where dr is the balance of payment (net inflow of foreign excange measured in foreign currency) which is a target variable for the government. df is change in assets placed abroad, which is capital flight when we talk about private assets, and foreign reserves when we talk about public assets (measured in foreign currency). If df is negative, this means that the country is borrowing abroad. This exposition of the model does not tell anything about how the foreign debt is going to be paid back, because it excludes interest payments (although included in the applied model). This can indirectly be taken care of by treating f as a policy variable, which means that the authorities must have some opinion about how heavy a debt burden the country can manage to serve. The government can control f by reducing government reserves aboad, by increasing the foreign debt or by regulating capital flows to prevent capital flight. It is of course a possibilty that the country does not have the possibility to borrow as much as it desires, which will put an additional restriction on foreign credit. If f is determined by the government, and not residually determined in *(2.6)*, then the authorities need an additional policy measure to influence the balance of payment. It is assumed that the real exchange rate can be manipulated by the government to influence the volume of import and export:

$$(2.7) \quad z = a*y - b*e$$

$$(2.8) \quad x = x_0 + c*e$$

where e is the real exchange rate (the ratio between foreign and domestic prices), and b and c indicates the change in respectively the demand for imports and the supply of export that corresponds to a given change in the price of traded goods due to a de- or revaluation. The demand for export goods is assumed to be infinite at given world market prices, and will thus absorb the increase in supply. Demand for imports decreases when the price goes up, and a devaluation (e up) will hence decrease the volume of imports and increase exports at a given income level. Note that it is the real, and not the nominal, exchange rate which is considered as a

policy instrument (which implicitly demands that the authorities can control the domestic price level, and that world market price level is constant). Inserting this new policy tool into the balance of payment identity gives

(2.6') $dr = (b+c)*e - a*y - df.$

(2.5') and *(2.6')* together then give the correct policy mix for the desired growth rate and balance of payment. To reach the growth target, the government should increase taxes and / or decrease government spending in order to free resources for investment. The balance of payment problem which stems from income growth via increased imports are counteracted by a devaluation which increases exports and decreases imports. The essence in equations *(2.6)* to *(2.8)* is that all external imbalances can be corrected by borrowing abroad and changing the exchange rate so as to reach the desired growth and balance of payment target. It is, however, equally (or may be even more) realistic to assume that external imbalances, here caused by a ceiling on foreign borrowing, can not be corrected simply by adjusting the exchange rate. If imports and exports does not reply to devaluations in the manner assumed here (or *b* and *c* close to zero), external imbalances can not be corrected, and the government will have to reduce the production target. In the model, this implies that output is made endogenous. We will not go further into this here.

2.2. IMF: The Financial Programming Model

FPM is calculating i) financing of the balance of payment deficit, ii) measures for export growth (exchange rate depriciation) and iii) domestic credit growth, by connecting the balance of payment to the domestic financial situation (money and credit growth).

First, targets are set for the balance of payment and the foreign reserves. Next, financing of the balance of payment deficit is estimated, that is credits and grants from abroad. Necessary policy measures for export growth are then deduced. The need for financing is thus given by the gap between target value and estimated value (included export growth) of the balance of payment.

Demand for money is deduced from exogenous assumptions about nominal income growth. The ceiling on domestic credit (from the banking sector) is then derived. Private sector´s need for credit, together with the total credit ceiling, decides the credit ceiling for the public sector.

The most striking feature of the model is that production in real term, *y*, is assumed to be exogenously determined by for instance a long term equlibrium in the commodity market. Nominal GDP, *Y*, is thus determined by the price level, *P*, which is a weighted sum of domestic and world market prices measured in national currency (we use large letters to indicate nominal values so as to distinguish them from the real values or volume sizes in the RMSM model):

(2.9) $Y = P * y$

An implication of this assumption is that policy measures will not have any effect on real output or income. Any contractionary or expansionary effects of policy action must be analyzed outside the model. The link between the real and the monetary side of the economy is represented by money demand, M^D, responding in a constant manner to changes in nominal income, where *d* denotes the change between two periodes, and *v* is the inverse of the velocity of money:

(2.10) $M^D = v * dY$

This stems from an identity that states that to every nominal value of production there must be a corresponding amount of money; $M = v*P*y$, and that a given rate of income growth must be accompanied by the same rate of money growth. (2.10) should however not be interpreted as an identity, but as a causal relation between money demand and inflation.

(2.11) $dM^S = dM^D = dM$

The equlibrium condition *(2.11)* states that money supply, M^S, will change in accordance with changes in money demand, and is not viewed as a policy instrument. This is due to assumptions about an unregulated market for curreny, which implies that the central bank has an obligation to exchange the amount of foreign currency the public wishes to domestic currency. If the public wishes more money, they can borrow from abroad, and the central bank will have to exchange. While this assumption does not hold for most (developing) countries, it justifies the exlusion of the interest rate from the model: When there are no limitations on foreign lending, the domestic interest rate will equal the international level. In addition to being unrealistic, the exlusion of the interest rate from the model makes it unable to analyze monetary policy as an instrument to promote investment through lowering the interest rate. The increased amount of money, *dM*, is thus by definition accompanied by a corresponding increase in foreign currency reserves measured in local currency, *dR*:

(2.12) $dM = dR + dD_p + dD_g$

This is the central bank's accounting identity. There is no banking sector outside the central bank, which is autonomous to the government. D_p and D_g denote credit from the central bank to private and public sector respectively. The right hand side of the identity constitutes the assets of the bank, while the left hand side expresses the bank's liabilities. When credit to for

instance the private sector is expanded, this increases the money supply with the same amount.

The model so far, as represented by equations (2.9) to (2.12), is consistent with a so called monetarist view on how economies work: Increased money supply, beyond keeping track with real production growth, will lead to increased price level (inflation). To keep inflation down, it is thus necesary to avoid credits from the central bank from growing faster than real output. This is a result of equation (2.11) that implies that any amount of money supply will be absorbed, so that increased money supply equals actual money growth. The public absorbs money because they want to buy something. If the available production is constant and the amount of money available has increased, then prices must go up to meet the demand for goods. In real life, however, it is possible that increased money supply will not be automatically be absorbed. This will lead to a lower interest rate, which in turn may increase investment and hence money demand. Equilibrium in the money market will thus be established at a lower interest rate and a higher production level.

Besides the inflation rate, the foreign reserves (or the balance of payment) is the main target variable in the IMF programmes. From the real side of the economy we have the following relation between foreign reserves and trade balance:

$$(2.13) \quad dR = X - Z - dF_p - dF_g$$

Building up reserves is possible if there is a trade surplus, that is value of exports (X) exceeds value of imports (Z), both measured in local currency. Furthermore, capital inflow will increase the reserves. Capital inflow (measured in local currency) stems from private or public sector selling out their assets in (or increasing their debt to) foreign countries, F_p and F_g respectively.

Import value, Z, is a fixed propotion, a, of nominal income similar to the RMSM model described above. With some simplifying assumptions (especially that domestic and foreign prices measured in domestic currency are set to 1 initially) equations (2.7) can be rewritten as:

$$(2.14) \quad Z = Z_{-1} + (Z_{-1} - b)*dE + b*dP_d + a*dy,$$

where E denotes the nominal exchange rate (ratio betwen local and foreign currency). Imports will thus respond both to real income growth and to domestic price increases, dP_d, which make imported goods relatively less expensive than domestically produced goods. Note that a devaluation will increase the price level on imported goods and thus decrease the value of imports if the price-sensitivity of imports, b, is so large that it exceeds the *direct* effect of a devaluation (the value of a given volume of imports will increase due to a devaluation). Equivalent reasoning gives the export value function:

$$(2.15) \quad X = X_{-1} + (X_{-1} - c)*dE - c*dP_d$$

where c is the sensitivity of export producers to increased prices on output and intermediate goods. A devaluation will increase the local value of export goods, which may cause increased production. On the other hand, the general price increase that follows a devaluation will increase the price on intermediate goods (and probably labour costs as well but that lies outside the model). Producers who are heavily dependent on imported intermediagte goods will thus gain less from a devaluation.

$$(2.16) \quad dF = dF_f * (1 + dE)$$

The sum of private and government holdings (or debts) abroad are exogenously determined. Capital flight and debt burden will thus only be affected by a change in the exchange rate, as the local value of capital flight then changes.

To sum up, the government has two policy instruments; changes in domestic credit and the exchange rate, with which it wants to influence two target variables; the inflation rate and change in the balance of payment (or foreign reserves). To reach the target value for the balance of payment, dR, the government can devaluate. This will increase the exports while imports are reduced (dR increases). The trading sector will have more currency than before and may want to exchange it into local currency, buy more assets abroad or reduce foreign debt. If the trading sector is not investing the whole profit abroad ($dF = d(X-Z)$), the reserves will increase with the trade surplus, which is strengthened by increased local value of initial reserves. The money supply increases by the same amount as the reserves, as holders of foreign currency exchange it into local currency.

Prices will increase as a direct effect of a devaluation; imported goods get more expensive. Further, the increased export value gives the exporters more money in their hands which they may want to use for consumption. If the export volume also has increased, this leaves less production for domestic consumption as real output is unaffected. These effects must lead to a domestic price increase. Note that this is entirely dependent on the assumtion of constant prodution. The inflation resulting from a devaluation can be avoided by a reduction in domestic credit which will reduce the money supply and thus the price level according to equation (2.10). To avoid reduced private investments, a ceiling is set on credit to the public sector. This implies reduced public spending or increased taxes through the public sector budget constraint

(2.17) $T - C_g = dF_g - dD_g$

where T denotes current tax income and C_g current government spending.

2.3. Critique of the "Bretton Woods Model"

While keeping the main elements from the two models, they can be merged to a consistent framework to analyse the link between the balance of payment and inflation (from FPM) to production, investment and saving (from RMSM) as is shown in Khan and Montiel (1990). This can be done by introducing variable prices (from FPM) in the RMSM production function *(2.1)*, and keeping the RMSM investment relation. The monetary relations *(2.10)*, *(2.11)* and *(2.12)* from FPM are kept unchanged. Further, the export- and import equations *(2.14)* and *(2.15)* from FPM are used, to capture the effect of relative prices and exchange rate changes on trade. The merged model have three target variabels; production (or rather investment), inflation and the balance of payment. The government can use three instruments to reach the target levels; public spending (or taxes), domestic credit and the exchange rate. As far as I understand, the latest version of the RMSM model is a step in the direction of merging the two models, as the RMSM-X includes both the monetary sector and prices. This model is presented in section 3.

The "Bretton Woods Model" is thus a "monetarist model" with variable production, although in a very limited sense; production responds only to changes in capacity (investment). Fund / Bank programmes is thus prescribing tight fiscal and monetary policy in order to cut the inflation rate and trade deficit. The concern for economic growth is implemented by securing the amount of capital needed to increase capacity. This way of understanding the workings of an economy has lead to critique from both Keynesian and structuralist economists, here in the words of Taylor (1993): "There is always a risk that IMF-inspired adjustment policies will drive their recipients toward prolonged "stabilized stagnation," because they ignore crucial macroeconomic factors such as linked foreign exchange and fiscal constraints, financial fragility, and the dynamics of the inflation process". Others would add that by ignoring short-term disequlibria, for example low capacity utilization and unemployment, the model also misses the effects of such disequilibria (which will often be a result of an adjustment program) on long term economic growth. An example is that the labour marked might settle in a high-unemployment equlibrium. Further, there is a complete lack of understanding of forces that influence investment. These two factors implies that the macro-policy element of a structural adjustment program can have a contractive effect on investment and hence reduce economic growth. The oversimpification of economic processes in the model can of course be defended by the poor data availibility in most developing countries. It is however, a danger that the simplicity of the model affects the reasoning of the model users, and that, as stated by Rattsø (1990), the experienced poor investment response to the structural adjustment programs can be seen as a result of the lack of investment explanation in the model (which in turn affects the program design).

In short, the BWI view is that in order to achieve long term economic growth and a satisfactory external balance, consumption today must be reduced. First of all, short term balance in public budgets is required. A relatively smaller public sector will give room for expanding private production through i) increased production capacity and ii) increased competitiveness towards the rest of the world. This reasoning is built on the assumption that imbalances are always caused by consumption (especially *public* consumption) exceeding available production. This gap between available resources and consumption will ultimately be closed by inflation and trade deficit. If, however, this assumption is not fulfilled, or if there are other causes behind the observed imbalances, BWI prescribed policy will not lead to the desired results.

i) Increased production capacity and introduction of new technology require investment in both physical and human capital. Some of these investments are best handled by the public sector because autonomous private enterprises are not able to organize the split of costs and profit of such investments. This applies especially to investment in infrastructure and education. Opposed to the common view that public investment crowd out private investment through high interest rates, credit rationing and a high future tax burden, these investments are often *complimentary* to private investments. Oshikoya (1994) has found a positive relation betwen public and private investment in developing countries. The effect is stronger in middle-income than in low-income countries. Taylor (1993) stresses that a heavy foreign debt burden, which must commonly be carried by the public sector, combined with ceilings on credit to the public sector will in most cases lead to a fall in public investment. This may reduce private investment and hence deteriorate economic growth. The conclusion is that in countries with large external debt, a reduction in public expenditures in order to improve the external balance is not adequate policy if stagnation is to be avoided.

According to Oshikoya, domestic credit availability is a major determinant of private investment in both county groups. Thus, BWI policy that often includes ceilings on credit to the private sector as well, in order to get inflation down, will have an adverse effect on economic growth. On the other hand expanding credit

by increased borrowing abroad or by printing money can also have a negative effect on investment. Uncertainty about the future will have a negative impact on investments, as they are often irreversable. Oshikoya found that the uncertainty represented by a large foreign debt burden, has a strong negative effect on private investment. Thus, the financing of BWI programmes, which always has a credit element, can actually contribute to reduce investment and economic growth.

ii) Increased competitiveness in a macro sense requires that the domestic cost level, measured in foreign currency, increases relatively slower than the cost level in other countries. Competitiveness in a micro sense is a more complex issue, which encompasses innovation of new products etc., but I will leave this out here. Increased competitiveness can be reached by lower inflation rate, or by devaluation of the local currency. The former is preferred, as devaluation has unwanted side-effects such as increased inflation and formation of expectations about further devaluation, which leads to speculation and capital flight (which can only be counteracted by extremely high interest rates). On the other hand, real appreciation of the exchange rate through inflation without devaluating, will give an over-valued local currency, which may result in deteriorating competitiveness and capital flight.

A BWI supported programme will commonly combine measures to reduce inflation with devaluations. A devaluation will have different consequenses dependent on the initial status of the country concerned as the outcome of a devaluation will depend on initial access to foreign currency: If foreign exchange is very scarce, a devaluation leading to only a small increase in exports will enable the country to import more intermediate goods, which will increase output and maybe also reduce inflation. A devaluation will thus be expansionary and can successfully be combined with tight fiscal and monetary policy to reduce inflation. This can not be analyzed in the BWI model, since there is always full capacity utilization (foreign exchange shortage does not set a limit to production). In the opposite situation, however, devaluation can lead to inflation and output contraction through increased prices on intermediate goods. Combined with tight economic policy, this can give policy "overkill" and lead to stagnation. Another coordination problem arises in countries with many state-owned enterprises who are engaged in trade or who use imported intermediate goods, as a devaluation then feed directly in to public budgets.

Reduced competitiveness is not the only cost of inflation; in many developing countries, inflation has accelerated to levels that makes it impossible to set up binding contracts. As most economic activity is built on contracts, high inflation will deteriorate economic activity or lead to "dollarisation", that is local currency is for all practical purposes substituted by foreign currency. This implies that the authorities has no control over the monetary policy.

If the BWI view on the causes behind inflation were correct, that is domestic demand exceeding production, then tight fiscal and monetary policies would bring down inflation by cutting aggregate demand via reduced real wages. Experience has shown however, that long-lasting price increases makes inflation *structural*, that is inflation is not any more a symptom of an over-heated economy. Instead, inflation becomes a self-supporting process which rests on expectations about future prices and implicit or explicit contract indexation of prices and wages. Tight economic policy will not bring inflation down if most prices are not set by a "free" market, as is the case when wages are set by for instance bargaining between trade unions and employees' organizations, or if product prices are set by a mark-up on production costs. Taylor notes that successful anti-inflationary packages always includes a combination of measures. Tight monetary or fiscal policies are not *necessarily* a part of the package, which may contain: 1) real exchange rate appreciation obtained by devaluating slower than the inflation rate, 2) market interventions such as income policies that reduce real wages by some sort of social contract which ensures redistribution in favour of certain groups, 3) easing local bottlenecks by increasing imports of certain goods or services, 4) a surpricing price freeze.

As already mentioned, a BWI program often includes devaluation of local currency in order to increase competitiveness towards the rest of the world. Although not recognized by the BWI (and therefore not included in the models above), improving the balance of payment can be attained by other means than improved competitiveness, such as direct regulation of trade and capital movements. Export-promoting measures can be used to protect (infant) export industry as has been successfully done in several of the newly industrialized Asian countries; tax reliefs, subsidies and import restrictions. If adequately applied, import quotas can be used without creating severe problems concerning bottle-necks and smuggeling.

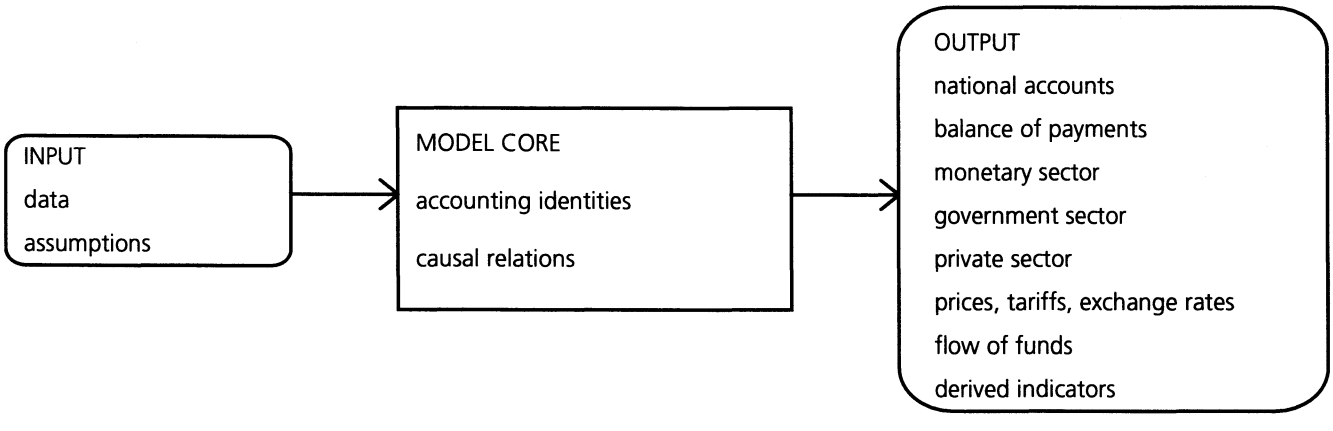
3. The RMSM model in practice

This section will be limited to a survey of the latest (fall 1994) RMSM-X model, as this is avalible from the World Bank and described in World Bank (1994 a and b). The model basically corresponds to the merged model as exposed in section 2, but is far more detailed concerning number of goods, financial assets, taxes and so on. The model is an Excel worksheet based system that is, for technical reasons (less time-consuming), divided in two modules; the main RMSM-module and the debt module. The debt module is used to compute detailed stocks and flows of debt between different creditors and debitors. Required input to the debt module is provided by the Debt and Finance unit of the International Economics Department in the World Bank, and the input data worksheet for Mozambique is given in appendix 1. I will not go into further detail about the debt module, but concentrate on the main RMSM module which can be seen as constituted by three parts; i) input of data and assumptions, ii) the model core which is a set of equations expressing the identities and causal relations of the model, and iii) the organization of output variables. The main module consists of about 15 worksheets, of which three contain input to the model; data, assumptions and gap-fill loan conditions respectively, and nine contains output from the model. In addition to input and output worksheets, the module also includes worksheets for checking consistency of input data, for linking RMSM to other databases and for saving different user-specified scenarios.

The user may choose the endogenous variables (which is equivalent to choose the model closure) indirectly by not specifying values (assumptions) for these variables. Thus, if the interest is in the effect on policy target variables such as growth and inflation of exogenously determined government policy, this is referred to as the *policy closure* among the three closures described in the RMSM-X reference guide (World Bank 1994a). As a more intuitive approach to model usage according to the exposition in section 2, I will concentrate on the so called *public sector closure*, where government spending and borrowing are exogenous. This corresponds to quantifying how large a public sector a certain path of economic growth will allow, and production must thus be exogenously determined.

3.1. Input

Data: As the RMSM-X computes annual *changes* in economic variables, the required input data consists of one year of flow variables (such as investment) and two years of stock variables (such as money). For planning purposes, data are taken from the latest year of an available complete data set - the base year. Values of the variables must be consistent in the sense that they sum up to satisfy identities such as the national income identity where production and imports (sources) equals consumption, investment and exports (uses). The Consistency Checking Worksheet in the RMSM module is used to ensure that the data are consistent. If some variables are left out of the dataset,



this worksheet will compute them as residuals and hence ensure consistency with the rest of the observed values. The user have to make sure that the most important variables are taken from official data sources, and let other variables be computed as residuals. This is the reason why for instance figures for base year "errors and omissions" in World Bank papers often is quite a sum of money - it is simply a result of inconsistent official data. I assume this is also (part of) the reason why different papers operate with different estimates for the same variable in the same base year; it may differ which variables are determined as residuals.

Assumptions: While input data are required for the previous year, assumptions must be made for the current year and all projection years for about 120 variables (which is a little more than the number of variables in the base year dataset !). A central assumption for all closures is the capital/output ratio (icor) which the user can choose to allow for future variations in capital utilization. This is especially relevant in the case of declining output, which is often followed by underutilized capital equipment. By manipulating the icor, this allows the user to give exogenous assumptions about contractive effects of BWI programs. Further, in all closures, the user must make assumptions about the velocity of money, devaluation rate, price- and income elasticities for different import and export goods, development of world market prices, foreign investment and interest rates, direct and indirect taxes and so on. Some assumptions will depend on which closure the user wants: The public sector closure requires assumptions about the path of production growth, inflation, private consumption and investment as well as private credit. Further, the user must specify the conditions (interest rate, maturity etc.) for the gap-fill loan which is endogenous in the public closure. In the policy closure, the amount of gap-fill loan must also be specified exogenously. In the public closure, the variable that is left to be endogenously determined besides government spending and domestic borrowing, is borrowing from abroad. To give the reader an impression of the magnintude of exogenous assumptions required in this model, appendix 1 gives a complete list.

3.2. Model core

Equations: The equations in RMSM-X can be divided into identities, market equlibrium conditions and causal relations. The identities consist of the national income identity and a budget constraint for each of the four sectors; central government, monetary sector (referred to as the central bank in section 2), private sector (defined as the rest of the domestic economy) and foreign sector (rest of the world). The budget constraints require that the total source of funds for one sector must equal its use of funds. Total sources of funds is the sum of current and capital sources. Capital sources are income from transactions of financial objects such as bonds and credit. In RMSM, saving is also recognized as a capital source of funds. Current sources are income from direct and indirect taxes (for the government), labour, capital (profit and interest income) and transfers. Capital uses of funds are real or financial investment, money holdnings or other financial assets, while current uses are defined as consumption, interest payment, tax payments etc. Saving is thus the difference between current sources and uses of funds in a sector. Every sector must then satisfy their budget constraint (where saving is included as a capital source and as a current use of funds):

(3.1 - 3.4)

capital sources of funds + current sources of funds = capital uses of funds + current uses of funds,

For the whole economy, this adds up to the national income identity, corresponding to *(2.4)*

resource availability (national income + net transfers from abroad + imports)
=
resource usage (consumption + investment + net interest and mortage payments to abroad + exports)

Besides these five equations, RMSM contains four market-clearing conditions (supply equals demand) for the financial assets: Money, domestic credit, government domestic borrowing from the private sector and foreign loans. All these conditions are taken care of in *(2.11) - (2.13)*. As mentioned, the interest rate is not taken into account in RMSM-X, and these equlibrium conditions thus have no element of causal explanation.

There are causal (or behavioral) equations in the model, which determine money demand, exports and imports. These equations are presented in *(2.10), (2.15)* and *(2.14)*. Exports and imports are calculated on a less aggregate level, with the use of elasticities of selected groups of goods. In addition to these equations, one may also consider the production function (2.1) as causal. When production is exogenously determined, as in the public closure, the production function is interpreted as an (inverse) investment function. Further, private consumption is specified as a percentage of disposable income, which stems from the assumption of a constant savings rate in *(2.2)*. (If the user selects private sector closure, however, private consumption and hence the savings rate will be residually determined).

Computation: The computation of endogenous variables are done by recursive solution of the equations in the model. Recursive solution, as opposed

to simultanous solution, means that the model starts with solving an equation for one variable, and then substituting this value into the next equation. As is explained below, this requires that the user runs several iterations with different closures to make sure that the results make sense.

The causal relations determine the value of variables which are succesively substituted into the nine identities of the model. Dependent on the users choice of exogenous variables (closure), the identities will residually determine eight endogenous verables. When public sector closure is selected, the solution proceeds as follows (endogenous variables in italics):

Total investment follows from the exogenously given production (real GDP) and capital/output ratio as is shown in *(2.1)*. *Imports* and *exports* follow from the assumptions on foreign and national income, worldmarket prices and elasticities which are fed into *(2.14)* and *(2.15)*. *Private consumption* is determined by *(2.2)*, and follows from disposable income (GDP minus exogenous taxes) and the savings rate (or inversely; the propensity to consume). In the public closure, *private investment* follows from assumptions on private investment as a share of GDP. Thus, when total and private investment are determined, *government investment* follows (the general exposition in section 2 treated all government expenditures as consumption, but in the model, government investment is treated separately). When production, private consumption, total investment, imports and exports are determined, *government consumption* is computed as the residual in the national income identity *(2.4)*. Changes in the *money* stock is determined in *(2.10)* by the inflation rate, real GDP and the velocity of money. *Total credit* from the monetary sector (central bank) is then residually determined from *(2.12)* as foreign reserves (*dR*) are exogenously given corresponding to certain months of imports (together with the devaluation rate, this gives the effect of the foreign reserves on the money stock). Private credit's share of total credit is exogenous, and hence *private credit* and *government credit* follows when total credit is determined. The monetary sector is thus closed.

To close the foreign sector with *(2.13)*, foreign debt (*F*) has to be determined as a residual, because foreign reserves have been determined exogenously as a policy instrument (months of imports). As data for existing debt and assumptions about expected new loans by foreign lenders are specified by the user in the debt module, the remaining capital inflow needed to close the foreign sector (the gap fill loan) is designated a marginal borrower. In the public closure, the marginal borrower is the government. Thus, the *foreign capital inflow to the government* (dF_g) is determined, and the foreign sector is closed.

To close the private and government sectors, only *sale of government bonds to the private sector* remains. This is computed as a residual in the private sector identity, and substituted into the government sector identity.

3.3. Output

Results from the main RMSM-X module are for convenience organized in nine separate worksheets. The national account worksheet includes the value of national accounts variables for the projection period. There are separate worksheets for the balance of payment in US$ and local currency, exports and imports, government accounts, private sector accounts, monetary sector accounts and a worksheet for the path of prices, currency rate and real interest rates (on loans). In addition to these, there are two worksheets with useful information based on output values in the other worksheets; one with derived indicators such as real GDP growth per capita and other relative growth rates, and one with the flow of funds matrix that show sources and uses of funds in the four sectors.

3.4. The importance and danger of iterations

As the model is very open, the results depend heavily on the assumtions made by the user. Presumably reasonable assumtions might give unreasonable results. In the public and private sector closures, the foreign sector is closed by the gap-fill loan. The user must make sure that this loan is within reasonable limits. In the policy closure, where imports of non-food commodities close the foreign sector, it is obvious that the user must prevent this variable from becoming negative.

The trick to avoid non-sensical results, is to run the model many times, with different closures, and to not be content before the different starting points converge in terms of similar results. This is of course not very "scientific", but is a practical necessity with such an open model. The user should not, however, feel free to change all input variables, and "editing" the original data must be considered as cheating.

The openness of the model and the recursive solution method that makes results heavliy dependent upon the user's judgements, have, according to the World Bank "... many practical advantages, however, and a concious decision has been made to keep the basic version as lean and transparent as possible" (World Bank, 1994 a, p. 24). This «transparacy argument» holds only if the Bank extends it to concern the publishing of the model results. Keeping the results transparent for other donor countries and the recipient country, requires that the Bank supplements it's PFP tables with some documentation of the model use. This supplement should include at least the final list of assumptions, and preferably a description of simulations that have been rejected together with the reasons for rejection and the choice of new

assumptions. One should always evaluate the results in light of the realism of assumptions to avoid an "objective" analytical tool becoming a tool to promote certain ideologies. As pointed out in Cappelen (1992), the simplicity or "opennes" of the model makes it hard for non-BWI staff to evaluate the use of the model. The necessity of supplementing the model with auxilliary hypothesis, especially about production growth and the role of the interest rate, implies that most of the analysis takes place in the heads of the BWI economists, which are not open for evaluation by outsiders.

Although the RMSM is extremely dependent on the user's assumptions, it is important to stress that the theoretical framework still is vital for the results. The monetarist theory, as outlined in section 2, set strict bounds to the possible outcomes of the prediction. Especially, one should bear in mind the lack of an investment function and the simple money demand function. By leaving out the interest rate in the explanation of these to variables, the model is unable to analyze monetary policy. Further, the production function in RMSM, by definition rules out the possibility for fiscal policy to affect the production level (even though GDP are treated as endogenous in some closures, the size of production is solely determined by resources available for investment).

3.5. Conclusions

Given the content of the model, it can be used for three purposes: i) Determine policy given certain targets, ii) Determine the change in targets for different choices of policy and iii) Determine the effect on targets of changes in exogenous assumptions. It is also possible, to a certain extent, to change the relations in the model and thus analyze the effect on targets of alternative assumptions about economic causality.

The BWI projections are, as far as we can see it, not projections of a most likely development of certain economic variables. Instead they are projections of a policy package that is "consistent" with some wanted goals (or targets). The realism of the projection assumptions and targets should therefore be available for evaluation by independent experts. Further, by "consistent", it is meant that accounting relations and some causal relations are satisfied. As the causal relations are very simple (some would say oversimplified), the model projections does not seem very convincing.

4. Historical Evaluation of RMSM Projections: The Case of Mozambique

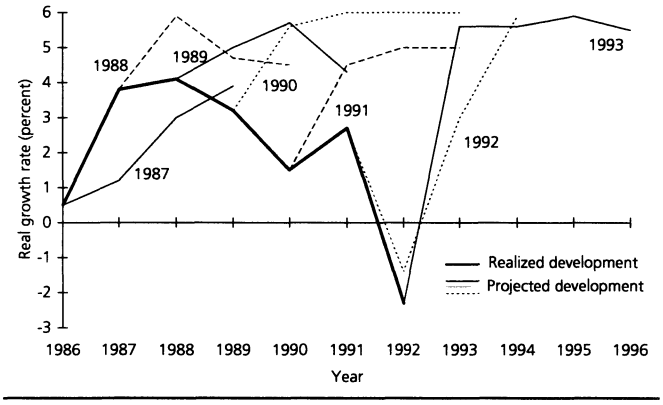
This section gives an evaluation of the projections published in Policy Framework Papers for the period of structural adjustment programmes in Mozambique from 1987 to 1994.

4.1. Realism of programme targets

At first glance, the most striking feature of the predictions is the general optimism with respect to the target variables; GDP growth, inflation and export growth (or current account deficit). The thin lines in figure 1 show the predicted real GDP growth rate with the year indicating the year the predicion was made. The thick line indicates the actual development, or more precise, information avaliable at the time the predicions were made (this information is preliminary, and can, especially for the years previous to 1990, deviate from the realized values). The projections made in 1994 is left out due to lack of comparability, and the figure thus leaves out the significant growth rate of 1993 at nearly 20 percent. Rather than being a *prediction* of expected growth rate, figure 1 indicates that the World Bank sets a *target* for the growth rate.

As exposed in table 1, the programme targets have been more or less constant through the whole periode the BWIs have been in Mozambique. Further, it is evident that these targets have not been realistic. The most obvious explanation is that Mozambique has experienced a civil war in most of the period covered in these PFPs. As stated in the PFPs, the targets are conditioned upon an unchanged security situation, which has in fact been the case until 1992. Realized

Figure 1. Projections of GDP growth



growth shows that it has been overly optimistic to expect such a high growth rate in a country facing a civil war. It would of course be too demanding to expect the World Bank to predict natural disasters such as the severe drought in 1992. However, with regard to the critique against the BWI view in section 2, figure 1 seems to support the view that the BWIs and thus ths RMSM model underestimates the contractive effects of the Structural Adjustment Programmes (or more accurately, overestimates growth as the contractive effects are completely neglected).

Figure 2 shows the projections of the inflation rate, and strengthens the impression of too optimistic expectations. While the inflation rate has varied around 40 percent per year, the target has been a reduction to 10 - 20 percent in a two to three years perspective. It is

Table 1. Programme targets

Programme years	Production target	Inflation target	External balance target
1987 - 1989	- reverse decline in overall economic activity, accelerating growth in 1989	15 % by 1989	Improved balance of payment, -first by increased aid (1987), then by increased export
1988 - 1990	4 % growth	15 % 1990	imports covered by exports should rise steadily
1989 - 1991	4 % growth	10 % 1991	imports covered by exports should increase steadily
1990 - 1992	6 % growth	10 % by 1992	reductions in the external current account deficit
1991 - 1993	5 % growth	10 % by 1993	reductions in the external current account deficit
1992 - 1994	3 % growth	18 % by 1994	reductions in the external current account deficit
1994 - 1996	6 % growth	10 % by 1996 (revised to 15 % in a later PFP)	reductions in the external current account deficit

Sources: see reference list.

Figure 2. Projections of GDP growth

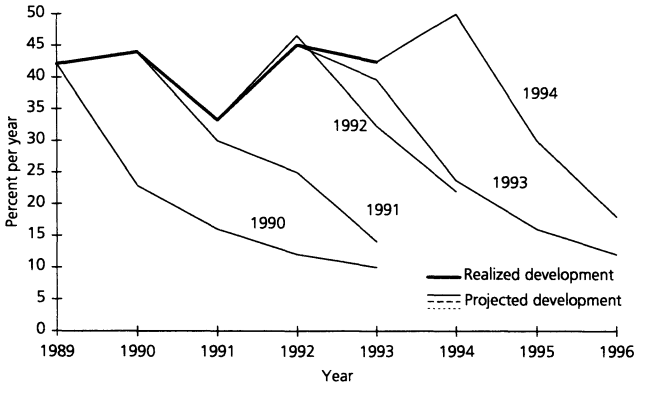


Figure 3. Projected export growth (in US$ terms)

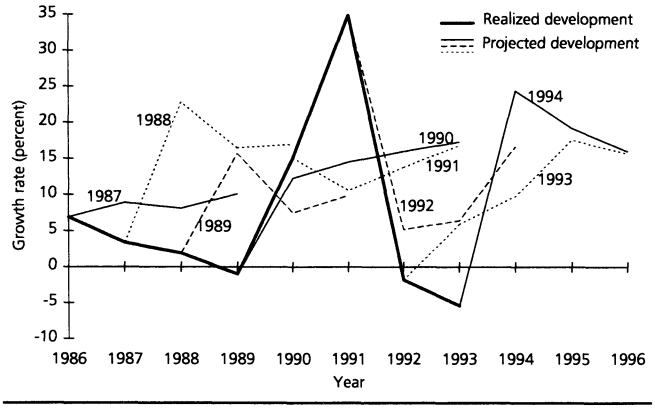
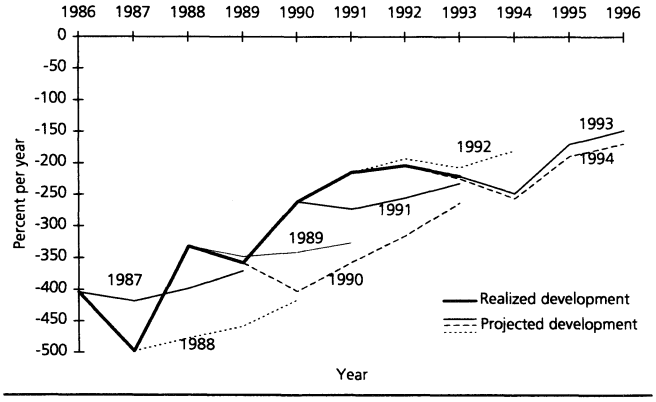


Figure 4. Projected current account deficit in percent of exports



reasonable to believe that this discrepancy is caused by the model underestimating the inflationary effects of devaluations and leaving out the effect of expectations on the inflation rate.

Figure 3 shows that, except for the years 1990 and 1991, the assumptions or targets for export growth at about 15 percent a year also have been too optimistic. The decline in 1992, but not for 1993, can be explained by the very high increase in 1991. Figure 3 might indicate that the model overestimates the effect of devaluations on export growth.

According to figure 4, the current account deficit (before grants) as a ratio of exports have shown a more positive development than projected. As the export growth has been overestimated, this must be due to a lower import growth than expected, which is verified in the PFPs (see reference list). The lower import growth is probably due to GDP growth being smaller than expected (fig. 9 shows that imports to GDP has developed close to expectations).

4.2. Realism of assumptions regarding government policy

Essential to the relevance of the evaluation above, is whether the government has followed the advice from the BWIs, as the assumptions about government policy are essential to the result in RMSM. The main policy elements are the balance in government budgets and ceilings on credit to the government. As figure 5 shows, the actual development of government expenditures has been close to BWI prescribed policy (projections) except for the first years of the programmes. The target was initially to stabilize government expenditures at about 35 - 40 percent of GDP, but had to be revised to nearly 50 percent. The impression is however, that Mozambique is a country which follows BWI conditions (Cappelen 1992). The discrepancy between projections made in 1993 and 1994 is probably caused by the unexpected high rate of GDP growth in 1993 and postponement of demobilization programmes from 1993 to 1994. It is still to be seen whether the projected future reduction in government expenditures to GDP will be realized, as this depends on the target GDP growth rate at about 6 percent.

Although the government is in charge of the tax rates, it is not able to control tax revenues as the tax base (income, trade and so on) is partly endogenous. Figure 6 indicates however, that government revenues as a percent of GDP have closely resembled prescribed policy. The decline in the 1994-projections compared to 1993 projections are, besides the unexpected high GDP level, caused by a recent tax reform. All in all, it can be stated that, except from the earliest periode of the SAP in Mozambique, the development of the fiscal deficit have corresponded to prescriptions (though both expenditures and revenues exceeded expected values in the beginning of the periode, the value of the former was greater, and the deficit larger than projected). Failure of (assumtions about) fiscal policy can thus not be regarded as an explanation for the dicrepancies between projected and actual target variables.

It has not been so straight foward to evaluate monetary policy, as figures for money and credit until recently have not been included in the PFP tables. This is presumably due to the old version of the RMSM not including a monetary sector.

Figure 5. Government expenditure as percent of GDP

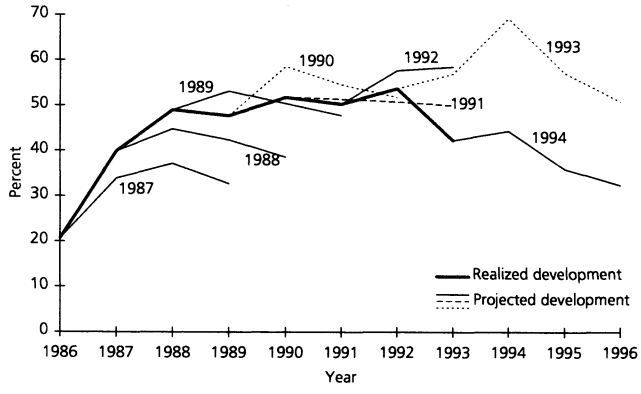


Figure 6. Government revenues as percent of GDP

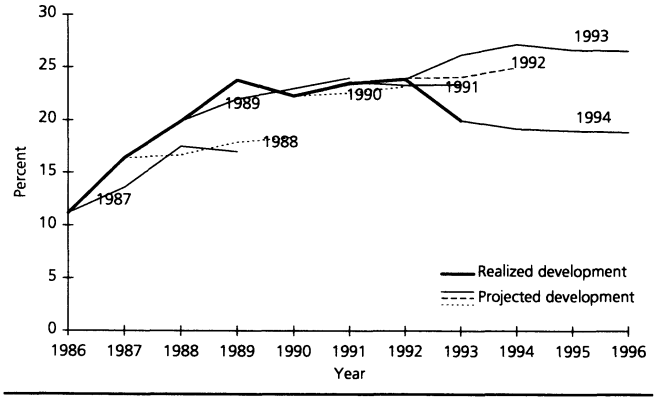


Figure 7. Growth in money stock and nominal GDP

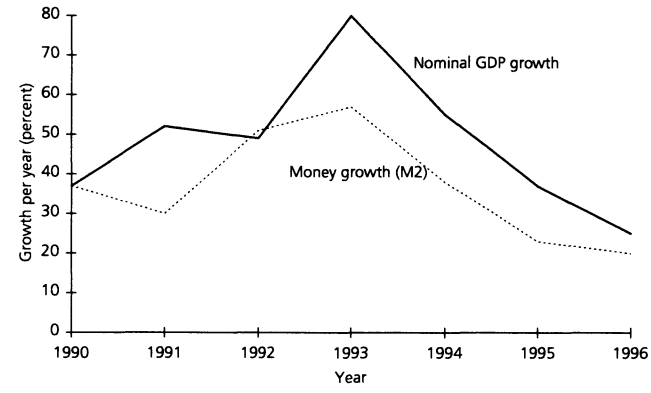
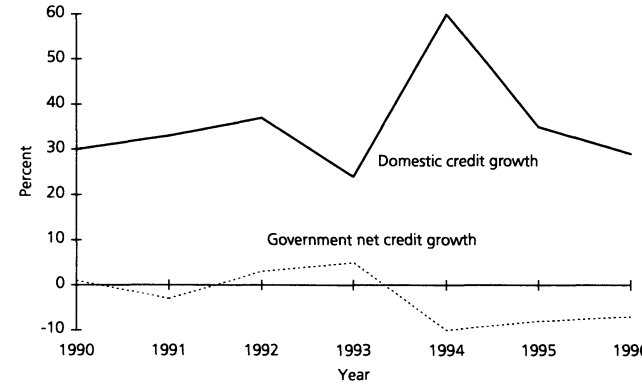


Figure 8. Growth in domestic credit and redit to the government



As figure 7 shows, money growth has kept below growth in nominal GDP in accordance with the prescribed policy targets from table 2. The tight monetary policy has however, failed to bring inflation down. According to the PFPs, money growth followed, or even was lower than target value in the eightees, but has later been higher than projected. This must be seen in relation to the inflation rate which has also exceeded target: When inflation is higher than expected, one must allow money growth to exceed target. Figure 8 shows that net repayment of credit from the government was achieved only in 1991, although it has been a target ever since (figures for 1994 and onwards are projections). It must never the less be stressed that most of the credit expansion has been to the benefit of other sectors than the government. As a conclusion, it seems that government policy has been mainly in line with the conditions laid by the IMF and the Bank, and that the policy assumptions in the model thus have been quite correct.

Table 2. Monetary policy targets

Programme years	Money growth target	Interest rate target	Credit to government target
1987 - 1989	45 % in 1987.	positive real interest rates by end 1989	reducing the governments recourse to the domestic banking system
1988 - 1990	43 % in 1988.	positive real interest rates by end 1989	Steady reductions in domestic bank financing of budget deficit. Government credit maximum 27 % of total credit.
1989 - 1991	30 % in 1989	positive real interest rates by end 1989 / early 1990	Government reducing borrowing from the banking system.
1990 - 1992	less than growth in nominal GDP (30 %)	ensure real interest rates remain positive	Net repayment by the Government to the banking sector. Government credit maximum 4 % of total credit.
1991 - 1993	significantly lower than growth in nominal GDP	maintain positive real interest rates	Significant net repayment by the Government to the banking sector. No new credit to government sector.
1992 - 1994	significantly lower than growth in nominal GDP	liberalized interest rates by end 1993, temporarily subject to maximum lending rates and minimum deposit rates.	Limits on net credit to government from banking system
1994 - 1996	Money growth: 1994: 40 % 1995: 25 % 1996: 17 %	maintain positive real interest rates. Evaluate possible full liberalization.	Growth in net credit to government: 1994: -7,6 % 1995: -7,1 % 1996: -5,0 %

4.3. Evaluation of projections of foreign dependency

Imports has grown at a lower speed than expected, but so has domestic production. Actual import dependency, as measured by imports as a ratio of GDP, has thus more or less kept in line with the projections, as shown in figure 9. The optimistic view expressed in the early PFPs, that imports would stabilize at about 40 % of GDP, has steadily been replaced by more pessimistic projections. The most recent projections show that the BWIs expect imports to exceed domestic production in the medium term. This depressing outlook can of course not be attributed the model used by the BWIs, but must be regarded as a negative effect of the trade policy in the structural adjustment programs which in fact partly has been foreseen by the model.

Figures 10 to 12 show the degree to which Mozambique has become dependent upon foreign financing (Thin lines correspond, as earlier, to projections made in the year after the starting point of the line. Hence, the thick line corresponds to observed development). The projected external financing requirements have been systematically underestimated (fig. 19). The debt service ratio (before debt relief) has never the less developed in accordance with projections, and has been reduced from nearly three times the value of exports, to "only" one and a half times export value. As exports have been overestimated, but not debt service to exports, this means that the debt service has been overestimated as well. This seems contradictory to the fact that foreign financing has been underestimated, but can be explained by interest payments in practice being tied to the ability to pay, that is the export earnings. It seems that the ability of Mozambique to repay its debt has also been overestimated, as the projected debt reliefs have been underestimated. This can of course be explained by tactics; the creditors will hide their true willingness to remit debt in order to maximize the repayment.

4.4. Conclusions

The main impression of this evaluation is that the projections have been too optimistic with regard to the target variables growth and inflation. By "optimistic" it is implicitly stated that these variables seem to be given as exogenous target values and are not determined by the model itself. It thus seems that the effect on economic performance from liberalizing markets and other "reforms" is overestimated by the BWI. What is determined in the model is the economic policy and foreign assistance that is consistent with the targets. Economic policy seems to have followed prescriptions, but was obviously not adequat or sufficient to reach the goals. This has happened in spite of foreign assistence being larger than assumed necessary to reach the targets. It seems that the crucial failure has been export, which has not responded to the exchange rate

Figure 9. Import dependency rate (imports to GDP)

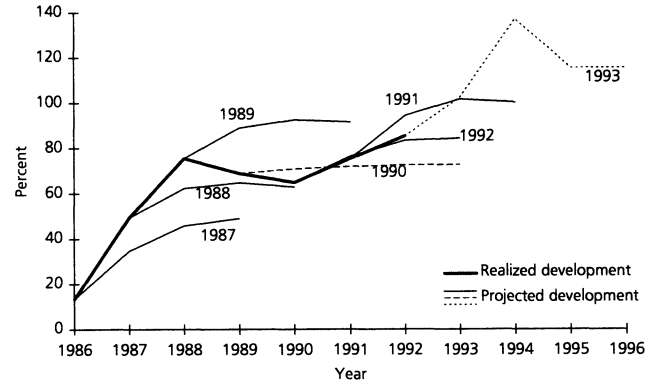


Figure 10. Projected total external financing requirements (millions of US$)

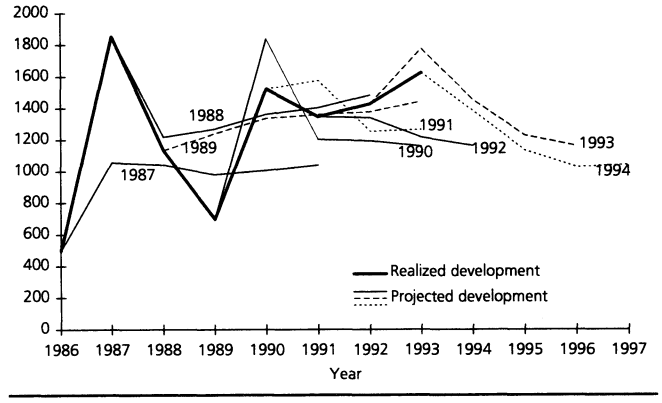


Figure 11. Debt service before debt relief in percent of exports. Actual and projected

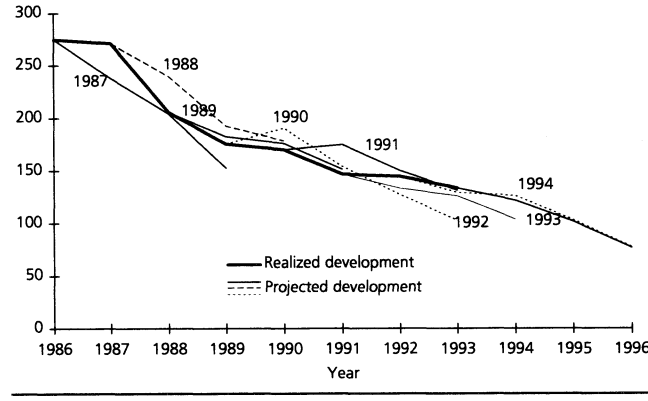
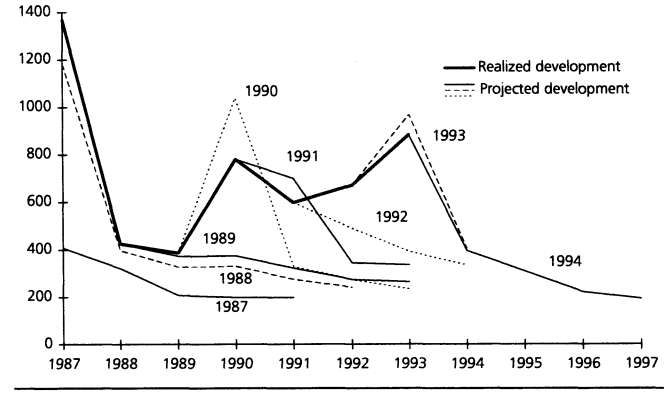
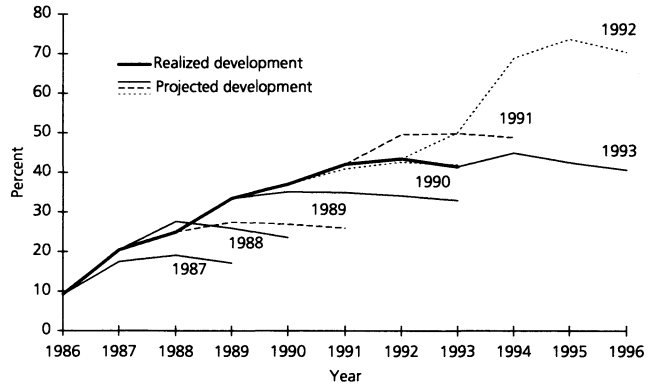


Figure 12. Projected and actual debt relief (US$ millions)



and trade policy changes according to the relations in the model. Another possibility is that investments have been lower than expected, but according to figure 13, this does not seem to have been the case (although firm conclusions can not be drawn, due to extremly poor data quality on investments). If investments have followed the pattern in figure 13, the poor growth performance can be explained by "bad" investments (which has not led to sufficient increase in production capacity) or by production being determined by aggregate demand, instead of capacity. If output is constrained by low demand, tight economic policy as described by the BWI may actually have worsened the situation. This can not be analyzed by the RMSM model, as the causal relations in the model are too simplified to be suited to explain production and growth.

Figure 13. Gross investment in percent of GDP, predicted and actual



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Appendix 1: Assumptions required in the RMSM-X model

GENERAL ASSUMPTIONS

GDP Growth (public & private closure)
GDP Inflation (p.a.) (public & private closure)
ICOR
MUV Growth Rate
Population Growth
Nominal Devaluation Rate

EXTERNAL SECTOR

(a) Trade Balance

RER-Elasticity of Imports:
- Food
- Other Consumer Goods
- Primary Goods
- Manufactured Goods
- POL and Other Energy
- Capital Goods
- Nonfactor Services

GDP-Elasticity of:
- Food
- Other Consumer Goods
- Primary Goods
- Manufactured Goods
- POL and Other Energy
- Capital Goods (in policy closure)
- Non-Factor Services

GDI-Elasticity of:
- Capital Goods (in public & private closure)

RER-Elasticity of Exports:
- Manufacturing

Foreign Income Elasticity of:
Manufacturing
Foreign Income Growth

Growth rates for Exports
- Commodity 1
- Commodity 2
- Commodity 3
- Commodity 4
- Other Commodities
- Other Exports
- Nonfactor Services

International Prices on:
Import Products:
- Food
- Other Consumer Goods
- Primary Goods
- Manufactured Goods
- POL and Other Energy
- Capital Goods
- Non-Factor Services

Export Products:
- Commodity 1
- Commodity 2
- Commodity 3
- Commodity 4
- Other Commodities
- Manufacturing
- Other Exports
- Non-Factor Services

(b) Current Account (Mll of US$)
- Freight & Insurance / Total Imports
- Interest Rate on Foreign Reserves
- Return on DFI/Portfolio Inv. (Profit Remit.)
- Foreign Transfers to Government (US$)
- Foreign Transfers to Private Sector (US$)
- Current Official Grants (US$)
- Budgetary Current Grants/Total Current Grants

Growth Rates for:
- Workers Remittances
- Foreign Profits Remittances (payments)
- Government Transfers to Foreign Sector
- Private Transfers to Foreign Sector

(c) Capital Account (Mll of US$)
Direct Foreign Investment (US$)
Portfolio Investment (US$)
Capital Official Grants (US$)
Budgetary Capital Grants/Total Capital Grants
Capital n.e.i. (asset accumulation)
Reserves Asset Changes of Com. Banks (-=increase)
Errors & Omissions (US$)

(d) Stocks of Foreign Reserves (Mll of US$)
For. Res. of the Mon Auth. as Months of Imports (GFS)
Stock of For. Res. of the Mon. Auth. (policy closure)
Gold (Troy ounces)
Percentage Change Gold price (London end of period)

MONETARY SECTOR
-
(a) Credit ratios
Budget Gov't Credit/Total Credit (priv & policy closure)
Private Credit/Total Credit (public closure)
Other non-financial public Sector/Total Credit
Other Financial Institutions/Total Credit

(b) Real Interest Rate of:
Demand Deposits
Time Deposits
Public Bonds/Gov't borrowing from Private Sec.
Monetary Sector Lending Rate to Priv sec.
Monetary Sector Lending Rate to gov't sec.

(c) Others
Share of Profit & Losses for Cent. Gov.
Growthrate of Money Stock (policy closure)
Currency in Circulation/M2
Time Deposits/M2
Velocity of Money wrt M2
Capital transfers from the Private Sector
Monetary Savings

NATIONAL ACCOUNTS
-
(a) Investment (in constant base year prices)
Private Investment/GDPmp (public & policy)
Public Investment/GDPmp (private closure)
Changes in Stocks/GDPmp

(b) Consumption (in constant base year prices)
Private Consumption/Dis Inc (Public closure)
Gov't Consumption/GDPmp (Private & Policy)

(c) Value Added
Growth of Agriculture
Growth of Industry
Growth of Manufacturing

Growth rate of Prices:
-
Ariculture
Industry
Manufacturing

CENTRAL GOVERNMENT
-
(a) Current Account

Tariffs on Imports (% change)
Food
Other Consumer Goods
Primary Goods
Manufactured Goods
POL and Other Energy
Capital Goods
Nonfactor Services

Subsidies on Exports (% change)
Commodity 1
Commodity 2
Commodity 3
Commodity 4
Other Commodities
Manufacturing Exports
Other Exports
Nonfactor Services

Direct Taxes/GDPfc
Taxes on Inter'l Trade/Merch. Imports (CIF)
Other Indirect Taxes/GDPmp
Non-Tax Revenues/GDPmp
Wages & Salaries/Total Gov't Consumption
Subsidies/GDPmp
Export Subsidies/Exports GNFS
Transfers to Private Sector /GDPmp
Transfers to Other NFPS/GDPmp

(b) Capital Account
Capital revenues (LCU)
Capital Transfers to Private Sector (LCU)

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