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Malawi’s prospects for growth: a quantitative analysis

Ernest R.W. Mponela

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MALAWI'S PROSPECTS FOR GROWTH:
A QUANTITATIVE ANALYSIS

A Thesis submitted to the Faculty of Atlanta University
in partial fulfillment of the requirements for the
Degree of Master of Arts

By
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Atlanta, Georgia
December 1983
ABSTRACT
ECONOMICS

MPONELA, ERNEST R. W. B.Sc., Chancellor College, 1976

Malawi's Prospects for Growth: A Quantitative Analysis

Adviser: Dr. F. Boadu


The study employs an econometric method to investigate the demand sources of growth in Malawi's gross domestic product (GDP). A simple 12 equation macroeconomic model is fitted to statistical data for the period 1967-81. After being found satisfactory, the estimated model is used to explore the prospects for economic growth up to the year 1985.

It is found that export prices, government consumption and foreign capital inflows explain over 92 percent of the variations in nominal GDP; and that growth in real GDP up to 1985 may be forecast at between 1 and 3 percent per annum.
ACKNOWLEDGEMENTS

Thanks are due to Dr. Fred Boadu for his helpful suggestions.
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CHAPTER I
INTRODUCTION

This study discusses economic growth from a quantitative viewpoint. Empirical investigations into both supply and demand sources of growth are surveyed. Attention is then drawn to Malawi. Economic theory is used to construct a simple macroeconomic model of the country's economy. The model is then fitted to statistical data and its goodness of fit examined. The better the fit, the better the theory underlying the mathematical model is said to "explain" Malawi's growth and so may be used for prediction.

Objectives

The main aim of the study is to explore Malawi's prospects for economic growth up to the year 1985 from the base year of 1981 for which the latest data is available. For this purpose, growth is defined to be any increase in Malawi's gross domestic product (GDP). The word is used in contradistinction to "development," which is a wider description of economic improvement, but less amenable to quantification. GDP rather than gross

\footnote{Todaro defines "growth" as an increase in productive capacity which enables increases in national income. He defines "development" as an improvement in the quality of all human lives. See Michael P. Todaro, Economic Development in the Third World, 2nd ed. (New York, 1981), pp. 524-26.}
national product (GNP = GDP - Net factor income outflow) is used because of the idea that it is normal for a developing country suffering a shortage of capital to pay out dividends, interest and other factor income to foreign owners of capital. What matters, therefore, is not the amount of income retained within a developing economy, but rather, the amount of income generated within it.

Methodology

The point of departure is the hypothesis, Keynesian in nature, but also deducible from the usual national accounting definition \( Y = C + I + G + (X - M) \), that variations in Malawi's GDP can be attributed to variations in aggregate demand. Any increase in demand is presumed to stimulate production as shortages and/or draw-downs in inventories develop. Similarly, reductions in demand are presumed to induce reductions in production and income as the resulting excess supply of commodities leads to excessive inventories.\(^2\)

Even for smallholder farm production, excess demand for a commodity means that the commodity will be easier to sell at a more remunerative price. More production

\(^2\)Demand is thus presumed to determine the level of actual GDP through its influence on the degree of productive capacity utilization.
will therefore be forthcoming, and vice-versa.

Underlying the hypothesis is the "circular flow of income" model of the national economy. If we abstract from reality and categorize the national economy into three sectors, namely, productive firms, households and government, income is deemed to flow from firms to households as payment for factor services employed in production but owned by households, e.g., labor and capital. Some of this income is then passed on to government as income and other taxes. Ignoring saving, the remainder finds its way back to firms through purchases of goods and services by households, completing the circle.

Markets in such a model need not, obviously, be perfectly competitive, non-fragmented or otherwise conform to other assumptions of Keynesian theory for production to respond to changes in demand. The hypothesis of demand sources of economic growth is therefore not discredited by the alleged inapplicability of Keynesian theory to developing countries.³

In any event, as Friedman has observed, the relevance of a hypothesis or theory does not lie in the seeming "validity" of its assumptions. The usefulness of a theory lies in its ability to predict economic phenomena.\(^4\)

In this study, the suggested theory relating to growth of Malawi's GDP is tested by examining how well the associated theoretical model predicts Malawi statistical data for the 15 year period 1967-81.

The mathematical theoretical model is constructed from the main hypothesis described above. Malawi's GDP is presumed to be determined by the level of aggregate demand. Aggregate demand is then decomposed into private consumption, government consumption, total investment and the net expenditure on domestic production by foreigners (net exports = total exports - total imports of goods and non-factor services). Total investment includes stockbuilding but makes no allowance for depreciation due to lack of data. No distinction is made between private and public investment to simplify the analysis. Finally, behavioral equations for these components of demand are specified, based on traditional economic knowledge, and the author's perception of Malawi's economic structure.

The exogenous determinants of aggregate demand enter the picture here as explanatory variables in the behavioral equations. The most important exogenous variables that influence demand and therefore output are presumed to be export prices and foreign capital inflows.

Export prices influence demand by their influence on the net expenditure level on domestic production by foreigners. Capital inflows influence demand through the extra investment and consumption expenditure they permit.\footnote{Chapter II reviews some studies which highlight the importance of the export sector and foreign capital inflows in explaining growth. Investment's dual contribution to aggregate demand and productive capacity (supply) is recognized.}

The parameters of the resulting theoretical model are then estimated by the method of two-stage least squares. This method is a way of fitting a simultaneous equation system to statistical data.

The goodness of fit is then tested by comparing the predictions of the estimated model to the actual observations for the period 1967-81.

The closer the predictions, the better the underlying theory of GDP growth may be said to explain Malawi's experience. It is then justifiable to employ it to forecast GDP and so explore the prospects for growth.
given expected trends in the exogenously determined variables.

The Relevance of GDP Growth Analysis

The present study is important for several reasons. First, it throws light on Malawi's macroeconomic structure. Through the estimation of consumption, investment, export, tax and import functions, the various elasticities provide interesting information. The consumption function is used to derive a saving function which shows the extent to which domestic resources are being devoted to fixed capital formation for economic development. The investment function directly clarifies the role of foreign capital inflows vis-a-vis domestic savings. The import function, by showing the marginal import intensities of the various components of aggregate demand, suggests the major sources of pressure on the balance of payments. Furthermore, the income multiplier that may be calculated for each exogenous variable indicates the relative importance of each in generating growth of GDP.

Second, the study is important in providing a simple econometric model which may be used for forecasting GDP and its components within the model's appropriate time range. To the best knowledge of the author, no similar model exists.
Third, this study provides a tested model which may be used to check the macroeconomic consistency of various projections of GDP, tax yield, investment, capital inflows and other variables of the model.

Thus, although the theoretical model presented here may not be anything new, the information it subsequently generates throws new light on Malawi's current economic position characterized by a deceleration in income growth and an increase in foreign debt service payments.

Table 1 below shows recent trends in GDP and its expenditure components. The deceleration after 1979 is attributable to a drought which occurred in the 1979-80 agricultural season. The deceleration in agricultural incomes restrained the growth of demand for, and therefore economic activity in, secondary industry, discouraging investment as well. Import requirements for capital goods and materials were thus reduced, improving the balance of payments current account balance as shown in Table 2.

This improvement is, however, being offset by increases in factor income and capital outflows. After

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6A fuller account of Malawi's economic performance is given in Chapter III. Monetary units are in Malawi Kwdcha (K), approximately equivalent to $0.85. For this study, an exchange rate of unity is assumed.
<table>
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<th>1978</th>
<th>% Change</th>
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<th>% Change</th>
<th>1980</th>
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<td>509.6</td>
<td>4.5</td>
<td>532.5</td>
<td>0.1</td>
<td>532.9</td>
<td>0.1</td>
<td>533.3</td>
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<td>GDP (c.m.p.)</td>
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<td>22.9</td>
<td>1,049.6</td>
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<td>-0.0</td>
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<td>-0.1</td>
<td>-143.3</td>
<td>-0.4</td>
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c.m.p. = current market prices
Table 2
Summary Balance of Payments 1978-81
(K/$ million)

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<tr>
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<td>14.2</td>
<td>14.2</td>
<td>19.3</td>
<td>19.5</td>
</tr>
<tr>
<td>- Debit</td>
<td>18.2</td>
<td>49.0</td>
<td>54.6</td>
<td>62.8</td>
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<tr>
<td>Long-term Capital, Net</td>
<td>+80.4</td>
<td>+104.8</td>
<td>+99.8</td>
<td>+104.2</td>
</tr>
<tr>
<td>- Credit</td>
<td>98.8</td>
<td>128.3</td>
<td>159.1</td>
<td>189.2</td>
</tr>
<tr>
<td>- Debit</td>
<td>18.4</td>
<td>23.5</td>
<td>59.3</td>
<td>85.0</td>
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<tr>
<td>Short-term Capital (Plus Errors and Omissions)</td>
<td>+10.0</td>
<td>+64.2</td>
<td>+50.9</td>
<td>-15.2</td>
</tr>
<tr>
<td>Change in Official Reserves (Increase -, Decrease +)</td>
<td>+15.3</td>
<td>+9.3</td>
<td>-7.5</td>
<td>0.0</td>
</tr>
</tbody>
</table>

1978, payments abroad for factor services, consisting essentially of interest payments, more than doubled from about K18.2 million ($18.2 million) in 1978 to about K49.0 million ($49.0 million) in 1979, K54.6 million ($54.6 million) in 1980 and K62.8 million ($62.8 million) in 1981. Similarly, long-term capital outflows have accelerated from only K18.4 million ($18.4 million) in 1978 to K23.5 million ($23.5 million) in 1979 and K85.0 million ($85.0 million) in 1981. These expanded requirements for foreign exchange have put unprecedented pressure on the balance of payments. However, net drawdowns in official reserves have been moderate because of accommodating capital borrowings from the International Monetary Fund (IMF) under its various balance of payments facilities. Since 1979, an average of K27.0 million ($27.0 million) per annum in net long-term capital inflows have come from the IMF source, cushioning the overall reserve position.  

The gravity of the problem may further be described with reference to the debt-service ratio, which is the ratio of total debt-service payments in one year to total exports of goods and non-factor services in the same

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7 The cited figures are from an unpublished, balance of payments, working paper from the Economic Planning Division.
year. For government alone, this ratio stood at 20.2 percent in 1981 and was projected to rise to almost 21.8 percent in 1982 as amortization and interest payments rose from K61.86 million ($61.86 million) in 1981 to K63.43 million ($63.43 million) in 1982.8

An increasing proportion of export earnings are therefore being devoted to debt service at a time when an increasing amount of foreign exchange is required to finance imports of raw materials to support current economic activity, and at a time when an increasing amount of foreign exchange is required to finance the importation of capital goods.9

GDP growth analysis of the type attempted here is expected to throw light on these trade and growth problems.

Outline

After this introduction, Chapter II surveys the literature on the sources of economic growth in developing countries. Chapter III then introduces the reader to the Malawi economy, describing its development policies and economic performance since 1975. A

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theoretical macroeconomic model is introduced in Chapter IV. The parameters of the model are then estimated in Chapter V. Finally, Chapter VI employs the estimated model to explore Malawi's prospects for growth up to the year 1985.
CHAPTER II
LITERATURE SURVEY

The application of quantitative techniques to problems of economic development is now widespread. Econometric models, which are mathematical representations of economic phenomena, have been estimated for many developing countries, including India, Nigeria and Puerto Rico.¹

The most popular models seem to be of the "two-gap" variety. These see the major constraint to development as being the level of domestic savings, on one hand, and the level of capital inflows, on the other. Domestic savings become a constraint when they are inadequate to finance the required level of investment needed to generate a required rate of growth in national output. Similarly, capital inflows become a constraint to development when they are inadequate to finance the balance of payments current account deficit created by an excess of imports over exports of goods and non-factor services. This reduces a country's ability to import

further inputs of raw materials and capital equipment. The essence of two-gap models is to quantify these two gaps, show which one is binding at any one time, and suggest the implications for development policy.

Good examples of this approach are the study of Israel by Chenery and Bruno and the study of Greece by Aldelman and Chenery, both of which are reviewed in this chapter.\(^2\)

A more general type of quantitative analysis follows Tinbergen. His method may be represented by a system of simultaneous equations. To be determined, the number of endogenous variables in such a system is equal to the number of independent structural equations. Some of the exogenous variables, those determined outside the model, will be under the control of a policy maker. They are called instrument variables. These instrument variables are functionally related, though the structural equations, to all the endogenous variables, those determined within the model. Those endogenous variables which a policy maker would want to influence are called the target variables. Thus, given the required level of

some target variables, such as employment, output, the balance of payments, or any other endogenous variable specified in some objective function, the problem is to choose the levels of available instrument variables, such as government expenditure and capital imports, such that, given an unchanged economic structure, as described by the set of the structural equations, the targets are achieved. To be consistent, however, an economic policy needs to have, at least, as many instruments as targets, so that the model yields non-trivial solutions.

This theory of quantitative economic policy pioneered by Tinbergen may be described in three parts. First, an objective function $Z$ is postulated. $Z$ may be a welfare or profit function to be maximized. $Z$ may also be a cost function to be minimized. In any case, $Z$ will have a given number of independent variables $X_i$. Second, an econometric model $M$ is fitted, detailing structural relationships between the endogenous variables $X_i$ and some exogenous variables of two types: instrumental variables $Y_j$ and other exogenous variables $U_k$. Third, constraints are imposed on the exogenous variables reflecting institutional and other barriers to large changes. The essence of the procedure is then to optimize $Z$ (maximize or minimize as the case may be) given the econometric model $M$ and subject to the
exogenous constraints. These constraints may take the form of a limit on the amount of capital inflows a country can expect, or a ceiling on the amount of government expenditure increase or decrease.³

In many respects, this study follows Tinbergen's approach. The objective of the study is to explain and forecast growth in Malawi's GDP. The objective function \( Z \) therefore consists of some important variables \( X_i \) which determine the level of GDP. These endogenous variables are in turn linked, through a Keynesian-type macroeconomic model \( M \), to such important exogenous variables as the level of government consumption spending, export commodity prices and foreign capital inflows. However, since all the variables assume unique values, no optimization process for \( Z \) is involved.

Most economic development theory focuses on the fundamentality of capital in generating growth of national income. This hypothesis is not without empirical justification.

Diwan and Maswah (1968) estimated production functions for a number of developing countries. They took as the arguments, or independent variables, of the functions capital, labor, resources, foreign exchange and

imports. In their attempt to test the two-gap theory of economic development, they found that capital and foreign exchange were, indeed, relevant in explaining variations in output.

However, as could be expected of a relatively abundant factor of production, labor was found to constitute a redundant, or non-binding, constraint to growth of national output.  

The fundamentality of capital therefore means that the main barrier to growth is imposed by the lack of resources for capital formation. These resources are domestic savings supplemented by foreign savings.

Chenery and Bruno (1962), in their exploration of the "development alternatives" for Israel, suggest seven limits to the growth process:

(i) The existing factor supply (labor, capital stock);
(ii) The rate of population increase;
(iii) The rate of savings
(iv) The efficiency of factor use and its change over time;
(v) The inflow of foreign resources (excess of

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imports over exports);

(vi) The present and future composition of demand [supporting this study's main hypothesis]; and

(vii) The ability to plan and carry out development activities (investment, technical assistance, etc.).

The most important and quantifiable of these variables then form the basis of their 12-equation model of economic development consisting of an aggregate production function, a labor demand function, an import demand function, a replacement investment function, a savings function, a labor supply function, an export function, and three definitional equations relating to savings-investment, balance-of-payments and employment equilibria. The instrument variables of the model are government current expenditure, foreign capital inflows, the unemployment rate, the marginal propensity to save, the effective exchange rate and the annual increase in labor productivity. The exogenous or predetermined variables are time, export prices, the initial unused capital stock and the final unused capital stock.

When the parameters of the model are estimated from data of the period 1959-60 to 1964-65, it becomes possible to explore, in an implicit linear programming fashion, the choice frontier that maximizes social welfare. The welfare function is assumed to be a
function of total consumption, foreign capital inflows and a proxy for the capital stock--GNP (the capital stock contributes to welfare through its contribution to future goods). Given a feasible range for the instrumental variables and expected values of the other exogenous variables, the estimated model generates a feasible range for target variables and consequently a feasible range for the welfare function.

When a resource such as foreign capital inflow becomes a binding constraint to growth, one can calculate the possible contribution to growth of relaxing the constraint by one unit. This is the resource's shadow price or marginal productivity. Chenery and Bruno have found that countries which face a binding foreign exchange constraint to economic growth usually have the highest productivity of external aid. Low productivity of external capital, however, is associated with countries with high capital-output ratios (although this is tautological), low savings and high import propensities.\(^5\)

An extended but similar investigation into the role of domestic and foreign resources in economic growth is offered by Adelman and Chenery. They examine the special

\(^5\)Chenery, p. 79-103.
case of Greece.⁶

A different type of study is that by Papanek. In order "to provide some quantitative evidence on the relationships between savings, foreign resource inflows, and growth in less developed countries," he applies cross-country regression analysis to thirty-four countries. The period covered is from the early 1950's to the late 1960's. The dependent variable is growth, defined as the rate of annual increase in gross domestic product (GDP). This growth rate is regressed on the following independent variables: gross domestic savings, aid (net transfers received by governments plus official long-term borrowing), foreign private investment (private long-term borrowing plus net foreign private direct investment) and other foreign inflows, all as percentages of GDP.

The main conclusions of the study are:

1. More than one third of the increases in GDP are explained by increases in domestic savings, aid, private investment and other foreign inflows.

2. While gross domestic savings, aid, foreign private investment and other inflows are significant in explaining growth in Asian and Mediterranean countries,

they pose a lesser constraint for sub-Saharan Africa.  

The growth process can also be studied through the "accounting approach." Under this method, the principal relations between variables come from the definitions, identities and other relations of national accounting. In 1978, Elias investigated the sources of economic growth in seven Latin American countries, namely, Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. The study covered the thirty-four years from 1940 to 1974.

Elias took GDP and decomposed it into two types of outputs called consumption (C) and investment (I). On the input side, GDP is decomposed into given types of labor input and given types of capital input. Using the basic identity between the value of outputs on one hand, and the value of inputs on the other, an identity in the relative (e.g., percentage) growth rates of the outputs and the inputs is derived. The relative change in GDP is thus expressed equal to a weighted average of the relative growth rates of C and I on the output side, and also equal to the weighted average of the relative growth rates of the various types of capital and labor inputs on 

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the input side. When such an identity was fitted to data for the seven Latin American countries representing over 80 percent of the population of the area, the following results emerged. Capital inputs accounted for over 50 percent of the GDP growth. Labor inputs accounted for at most 30 percent of the GDP growth. The consumption goods sector (C) represented more than 80 percent of total GDP. 

A similar investigation into the sources of growth was conducted by Nishimizu and Hulten for Japan. Their principal conclusion was that:

produced factors of production—capital and intermediate goods—were the predominant source of sectoral economic growth in Japan for the period 1955-71. At the aggregate level, capital accumulation accounted for between 52 percent and 58 percent of the growth in gross private domestic product [gross domestic product excluding government services], labor for 17 percent, and productivity change for between 32 percent and 25 percent.

The operational significance of a macroeconomic model extends beyond the identification of resource gaps and other constraints. The various elasticities implied by the parameters of the model can illuminate important

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relations of economic dependence between sectors and between the domestic economy and abroad.

After estimating a 35-equation econometric model of Puerto Rico, Dutta and Su (1969) found that the U.S. demand for Puerto Rican exports was elastic, being "very much greater than unity." Puerto Rico's demand for U.S. imports, however, was less than or close to unity, reflecting the necessity of U.S. goods and services in the island's economy. On a microeconomic level, the income elasticity of demand for food, services and housing was found to be very inelastic, as could be expected. The income elasticity of demand for automobiles was estimated at 0.82. The inelasticity of this estimate is said to be "due to the fact that automobiles are an essential means of transportation in a fast developing insular economy where few alternative means of transportation exist."10

This study's supposition that growth largely follows effective demand is supported by a recent work by Thirlwall and Hussain (1982) who maintain that "capital accumulation, labor supply and technical progress [supply side variables that most growth theory focuses on] are

---

partly, if not mainly, endogenous to an economic system and respond to variations in the pressure of demand."11 Capital inflows can stimulate growth by acting as an exogenous stimulant to demand to which supply can then adapt.

While the significance of foreign capital in economic development is widely recognized, some empirical investigations suggest that this significance is not absolute.

An econometric test applied to 44 underdeveloped countries for the period 1953 to 1966 by Weisokopf (1972) showed that only 8 countries "were apparently dominated by a trade constraint." He consequently concludes that "a binding trade constraint on growth has been a relatively infrequent phenomenon in the postwar experience of the underdeveloped countries."12

A major problem facing developing countries today is indebtedness. This arose as some investment requirements needed to generate growth were financed by foreign loans


rather than pure aid.

According to Feder (1980), external debt of non-oil exporting developing countries reached $250 billion in 1978. External debt and growth seem to be directly related. All other things being equal, a higher growth rate requires a higher level of capital accumulation which, in turn, requires a higher level of foreign borrowing. This borrowing requirement is higher, the higher the capital/output ratio, but is lower, the higher the savings ratio (to GDP). Since foreign debt has to be repaid in foreign currency, indebtedness can subsequently retard growth by reducing the amount of foreign exchange that may be used to import capital goods and materials to support current and future economic activity.13

Some growth theorists suggest that growth is directly related to country size, but inversely related to dependence on foreign trade. Country size offers the prospect of beneficial economies of scale, and may also be an index of growth resource abundance. Dependence on foreign trade for export earnings and/or imports, however, may hinder growth through the conditioning outside forces may have on the domestic economy.

This traditional view is, however, discredited by Khalaf (1979). By employing multiple correlation analysis on 30 countries for the period 1951-7, he found no significant relationship, whatsoever, between growth and country size, on one hand, and between growth and trade dependence, on the other. He therefore concludes that:

If small countries, on account of their size, have high dependence on trade and export concentration, then neither their dependence on trade nor their export concentration are likely to be important factors in development and growth. These results could also mean that attempts by small countries to diversify their exports and to reduce their degree of dependence on trade need not have any significant impact on their development and growth.14

This view is, however, contradicted by Feder (1982), who concludes that trade dependence for export earnings in fact stimulates growth. The stimulus arises from increases in factor productivities induced by the export sectors' openness to foreign competition. Efficiency in the export sector, in turn, generates external economies that permeate the whole economy, tending to stimulate growth. Feder's views are based on an empirical examination of 31 semi-industrialized developing

countries. The period covered is 1964-73.\textsuperscript{15}

Feder's findings are supported by Krueger (1983) whose "analysis of ten developing countries [led him to conclude that] export promotion contributes more to growth than import substitution."\textsuperscript{16} Import substitution is thought to be an inferior development strategy to export promotion, due to its usual dependence on tariff protection and the consequent lack of adaptability to changing economic conditions.

The literature on the econometric approach to economic growth in developing countries has not, thus, been without controversy. Even on matters of methodology, Shourie (1972), has strongly criticized the use of macroeconomic regression models for developing countries. His arguments center on the inadequacy "of the data from which these models are estimated; the significance of the coefficients of their equations; the functional form of equations"; the mechanical use of statistical tests and "their use for making forecasts and

\begin{flushleft}

\textsuperscript{16}Anne Krueger, "The Effects of Trade Strategies on Growth," \textit{Finance and Development} (June 1983), 6-8.
\end{flushleft}
prescribing policies for years far into the future."\textsuperscript{17}

While these pitfalls should, undoubted, be heeded, Shourie's criticism seems to apply more to the unwary econometric investigator than the tool of regression analysis itself.

CHAPTER III
INTRODUCTION TO THE MALAWI ECONOMY

Malawi is a small independent nation in Central Africa. The social-economic system is neither socialist nor capitalist. Private enterprise exists side by side with public enterprise through which the government exercises some degree of local participation and control.

The mid-year population in 1982 is estimated at 6.3 million. Its rate of natural increase is approximately 2.6 percent per annum (Table 3).

Apart from labor, the other abundant factor of production is land; but there are no significant amounts of exploitable minerals. Development policy therefore places first priority on agricultural development.

The main objective in agriculture is to achieve self-sufficiency in food crops such as maize and increase the surplus of cash crops (e.g., tobacco, sugar, tea and cotton) that may be exported abroad.

Production is being stimulated through two main ways: intensive cultivation in rural development projects and extensive cultivation by smallholder farmers.

In the intensively cultivated projects, farm families are provided with seed, fertilizer, other inputs and such services as health, education and water. In
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<tr>
<td>GDP (1973 factor cost)</td>
<td>418.3</td>
<td>448.3</td>
<td>483.7</td>
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<td>532.6</td>
<td>532.9</td>
<td>533.3</td>
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<td>1.28</td>
<td>1.39</td>
<td>1.50</td>
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<td>1.82</td>
<td>2.15</td>
<td>2.40</td>
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<td>GDP (current factor cost)</td>
<td>532.6</td>
<td>622.6</td>
<td>726.1</td>
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<td>79.6</td>
<td>97.6</td>
<td>112.6</td>
<td>22.8</td>
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<tr>
<td>GDP (current market prices)</td>
<td>567.5</td>
<td>652.6</td>
<td>769.3</td>
<td>853.7</td>
<td>1,049.6</td>
<td>1,242.6</td>
<td>1,391.4</td>
<td>16.1</td>
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<tr>
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<td>5.4</td>
<td>5.5</td>
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<td>5.8</td>
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<td>GDP Per Capita (K/$)</td>
<td>109.1</td>
<td>120.9</td>
<td>139.9</td>
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<td>181.0</td>
<td>210.6</td>
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</table>


* Compounded annually from 1975.
addition, instruction is given in modern and more productive methods of farming.

Attempts are made to provide similar productive opportunities to non-project smallholder farmers.\textsuperscript{1}

Malawi's economic performance since 1975 is summarized in Tables 3-8. As before, all monetary values are in Malawi Kwacha (K) (K1 = $0.89). However, for this study, an exchange rate of unity is assumed.

Gross Domestic Product

The growth of gross domestic product (GDP), a measure of the value of currently produced goods and services, is shown in Table 3. Since 1975, real GDP, expressed at 1973 factor cost, has increased at the compound rate of about 4 percent per annum. This rate translates into an approximate growth in real per capita income of almost 2 percent per annum.

At current market prices, GDP has been increasing at approximately 16 percent per annum from about K109.1 million ($109.1 million) in 1975 to about K1,391.4 million ($1,391.4 million) in 1981. Correspondingly, per capita GDP at current market prices rose at about 13 percent per annum from K109 ($109) in 1975 to K228 ($228)

\textsuperscript{1}Malawi's development policies are contained in Economic Planning Division, Statement of Development Policies 1971-80 (Zomba, 1981).
in 1981.

The average price level, as indicated by the implicit GDP deflator, has been increasing at the compound rate of 11 percent per annum and seems to be considerably influenced by movements in the merchandise imports unit value index (Table 8).

The industrial origin of growth in GDP since 1975 can be gauged from Table 4.

The most buoyant sectors were services, electricity and water, distribution, agriculture and manufacturing.

An examination of the structure of production reveals that the share of agriculture in total real GDP (at 1973 factor cost) has remained relatively stable at 45 percent. Similarly, manufacturing's contribution to real GDP has remained relatively stable over the last eight years at about 13 percent. Services on the other hand, consisting of public administration, education, health and personal services, have increased their share from about 13 percent in 1975 to nearly 17 percent in 1981. This growth is attributable to the expansion of the public establishment needed to run an increasing number of development projects in agriculture, education and health.

Production in the subsistence or non-monetary sector is estimated through the assumption that it grows pari
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<td>Agriculture, Forestry + Fishing</td>
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<td>Monetary</td>
<td>54.7</td>
<td>65.4</td>
<td>77.3</td>
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<td>8.4</td>
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<td>8.8</td>
<td>8.9</td>
<td>9.1</td>
<td>2.2</td>
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<td>Electricity + Water</td>
<td>6.0</td>
<td>6.4</td>
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<td>22.7</td>
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<td>15.2</td>
<td>15.8</td>
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<td>295.5</td>
<td>326.9</td>
<td>348.8</td>
<td>368.4</td>
<td>370.0</td>
<td>360.7</td>
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<td>152.8</td>
<td>156.8</td>
<td>160.8</td>
<td>164.1</td>
<td>162.9</td>
<td>172.6</td>
<td>2.5</td>
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</tbody>
</table>


* Percent per annum compounded.
passu with population growth at about 2.6 percent per annum. When production in this sector exceeds subsistence requirements, the excess is assumed to overflow into the monetary sector as it is sold for cash. Conversely, when production falls short of subsistence needs, the shortfall is made good by withholding crops from sale so that per capita subsistence output and consumption remain constant.

The contribution of the non-monetary sector to real GDP has declined from about 36 percent in 1975 to about 32 percent in 1981 (Table 4), suggesting a monetization process.

The most important subsistence crops are maize, groundnuts and pulses (peas and beans). These are grown principally during the rainy season which extends from late November to late April the next year.

The most important smallholder cash crops are fire-cured tobacco, groundnuts, cotton, rice, maize and pulses.

Important cash crops grown mainly on estates are flue- and burley-cured tobacco, tea and sugar.

The processing of some of these cash crops contributes a great deal to value-added, in the manufacturing sector. This sector's main outputs are processed agricultural commodities destined for export,
food, beverages, tobacco, footwear, clothing, textiles and intermediate goods for building and construction.

**Gross Domestic Expenditure and Saving**

Gross domestic expenditure rose by about 14 percent per annum, compounded, from K671.5 million ($671.5 million) in 1975 to about K1,482.3 million ($1,482.3 million) in 1981 (Table 5), giving rise to a K104 million ($104 million) resource gap over domestic production in 1975 which, however, declined to K90.9 million ($90.9 million) in 1981 mainly due to a decline in investment demand occasioned by a deceleration in national income and the termination of some capital projects. The investment ratio (to national income at current market prices) declined from about 29 percent of GDP in 1975 to about 22 percent of GDP in 1981.

The decline in investment expenditure was accompanied by an increase in the share of consumption in the total use of resources in the economy from 76 percent in 1975 to about 79 percent in 1981.

However, the increase in consumption was slower than the increase in GDP so that gross domestic savings still continued to rise (Table 6). In 1975, and at K57.4 million ($57.4 million), these savings financed about 36 percent of all investment requirements. In 1981, and at K206.4 million ($206.4 million), gross domestic savings
### Table 5

**Gross Domestic Expenditure 1975-81**  
(K/$ million)  

<table>
<thead>
<tr>
<th>Year</th>
<th>Consumption</th>
<th>Public</th>
<th>Private</th>
<th>Investment</th>
<th>GFCF</th>
<th>Public</th>
<th>Private</th>
<th>Stockbuilding</th>
<th>% Growth Rate*</th>
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<tr>
<td>1975</td>
<td>510.0</td>
<td>68.9</td>
<td>441.1</td>
<td>161.6</td>
<td>145.6</td>
<td>88.8</td>
<td>56.8</td>
<td>16.0</td>
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<tr>
<td>1976</td>
<td>582.9</td>
<td>73.9</td>
<td>509.0</td>
<td>107.0</td>
<td>135.0</td>
<td>79.3</td>
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<td>1977</td>
<td>633.9</td>
<td>83.5</td>
<td>550.4</td>
<td>169.0</td>
<td>158.4</td>
<td>102.1</td>
<td>56.7</td>
<td>10.6</td>
<td>14.2</td>
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<tr>
<td>1978</td>
<td>674.9</td>
<td>119.4</td>
<td>555.5</td>
<td>318.0</td>
<td>265.8</td>
<td>163.2</td>
<td>102.6</td>
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<tr>
<td>1979</td>
<td>891.2</td>
<td>99.9</td>
<td>791.3</td>
<td>321.9</td>
<td>274.5</td>
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<td>1980</td>
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<td>314.5</td>
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<td>1981</td>
<td>1,170.0</td>
<td>158.7</td>
<td>1,011.3</td>
<td>312.3</td>
<td>271.3</td>
<td>193.0</td>
<td>78.3</td>
<td>41.0</td>
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Gross Domestic Expenditure 671.5 689.7 802.9 993.2 1,213.1 1,385.9 1,482.3 14.1


* Compounded from 1975.

N/A = Not Applicable
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<td>314.5</td>
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* Compounded from 1975.

N/A = Not Applicable
financed 66 percent of all investment requirements. The gross domestic savings ratio (to GDP) stood at 15 percent, down from almost 21 percent in 1978. Due to the simultaneous deceleration in income, investment and the savings ratio, it is not clear whether the decline in the savings gap (over investment) represents a real reduction in Malawi's dependence on foreign savings.

**External Trade and the Balance of Payments**

Malawi's balance of payments estimates are presented in Table 7. The major trends that may be discerned from the figures are: (1) A deceleration in the merchandise trade deficit partly induced by a deceleration in merchandise imports mainly of plant, machinery, fuel, and transport means; (2) An acceleration in payments abroad for factor services in the form of dividends, interest and other factor payments; (3) Increases in long-term borrowing by private firms accompanied by increases in the retirement of principal borrowed previously; and (4) Increases in debt amortization by public enterprises and the central government.

An upward trend in foreign debt service is expected to overwhelm the favorable visible trade balance so that the overall balance of payments position, as indicated by the level of foreign reserves, is likely to remain critical.
Table 7
(K/$ million)

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<td>Merchandise Trade Balance</td>
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* Percent per annum compounded from 1975.
-- Negligible change; ++ Colossal increase
.. Not Applicable
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<tr>
<td>- Quantum</td>
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<td>164.8</td>
<td>157.4</td>
<td>201.3</td>
<td>240.5</td>
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<td>- Unit Value</td>
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<td>212.7</td>
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<tr>
<td>- Quantum</td>
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<td>146.5</td>
<td>147.9</td>
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<td>- Unit Value</td>
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* Compounded from 1975.
The state of Malawi's balance of payments position may be gauged from the level of official external reserves. At the end of 1975, these reserves stood at the equivalent of K55.3 million ($55.3 million), but rose to a peak of K76.2 million ($76.2 million) at the end of 1977 and subsequently dropped to K40.5 million ($40.5 million) at the end of 1981. Malawi required an average of the equivalent of K26.8 million ($26.8 million) in foreign reserves to cover one month's imports valued c.i.f. in that year.

**Money and Domestic Credit**

The quantity of money, narrowly defined (notes and coin in circulation plus demand deposits), rose at the rate of about 8 percent per annum during the period 1975-81. Broad money (including time and savings deposits), however, rose faster at the rate of 13 percent per annum.

In 1981, the quantity of narrow money stood at the equivalent of K101 million ($101 million). Monetary GDP for the same year is estimated at K1,032.5 million ($1,032.5 million), giving an average money circulating velocity of 5-10.

The value of domestic credit extended since 1975 has run at the rate of nearly 25 percent per annum to

---

approximately K398 million ($398 million) in 1981. Half the credit went to the private sector. The other half went to statutory bodies and government.\(^3\)

The macroeconomic model presented here attempts to explain and predict Malawi's growth, which is defined for our purpose as being any increase in gross domestic product (GDP).

Following Keynesian theory, variations in GDP are attributed to variations in the components of aggregate demand rather than variations in factor input utilization.\(^1\) The supply side is assumed passive for two

\(^1\)The Keynesian theory of national income, employment and money is adequately explained in R. G. D. Allen, Macroeconomic Theory: A Mathematical Treatment (London, 1968). Its general applicability to third world developing countries is easily vindicated. Two of the most widely used planning models, namely, the Harrod-Domar macroeconomic growth model and Leontief's input-output microeconomic model are largely Keynesian. The first assumes a fixed factor proportions production function yielding a fixed capital/output ratio \((k)\) from which an "accelerator" investment function may be discerned \((k = K/Y\), whence \(K = kY\) and \(dK = kdY\) so that \(I = kdY\) where \(d\) denotes some change). The model also assumes that total savings \((S)\) are a constant proportion \((s)\) of total income \((Y)\) so that \(S = sY\), from which a Keynesian consumption function, \(C = cY\), with \(c = (1 - s)\) may be derived. The model then predicts the savings proportion \((s)\) needed to support a given growth rate \((g)\) in income \((Y)\) in such a way that aggregate demand clears supply, or mathematically, \(I = S\), yielding the final result, often employed in development planning, that \(kdY = sY\) or \(dY/Y = s/k\). Leontief's input/output model is also Keynesian. It is often employed to calculate or predict each economic sector's output, employment or even import requirements given each sector's final demand which is either already known forecast or planned. For a brief introduction to the theory and practice of development planning, see Todaro, p. 429-466.
main reasons. First, even if growth was approached from the supply side and the usual two factor production function with labor and capital included in the specification of the model, the equilibrium level of GDP that equates aggregate supply to aggregate demand would still be largely determined by the latter. Given the institutional barriers to a declining price level, excess supply generated by an overemployment of labor and/or capital would go to waste or accumulate in inventories, forcing a subsequent reduction in production and factor utilization. Conversely, an excess of aggregate demand over supply would conceivably raise prices enough to bring extra factors of production into employment and raise output. When extra capital is needed to produce extra output, effective demand enables extra units of capital to be imported from abroad. When extra labor is needed to produce the extra output, it can either be imported from abroad or more capital may be imported instead to increase the productivity of the available labor supply. The second reason for supposing the supply side to be passive is empirical. Data is not available on the national utilization levels of both capital and labor. A model with these arguments would therefore be difficult to estimate.

No attempt is therefore made to explain Malawi's
growth in terms of the growth in either capital inputs, or labor inputs or, for that matter, improvements in technology, factors that are usually discussed in long-term growth theory.

It is assumed that under normal circumstances when there is no drought or physical impediments to the expansion of output, GDP, denoted by Y, is determined by the level of aggregate demand without any lags in the adjustment process.\(^2\)

Aggregate demand is totally decomposed into four parts: consumption expenditures by private residents \(C_p\), total investment expenditures by both government and private residents \(I\), consumption expenditures by government \(G\) and net expenditures on GDP by foreigners \(X - M\), where \(X\) and \(M\) denote total exports and total imports, respectively, of goods and non-factor services. Investment \(I\) includes unintended investment in stocks.

Total expenditures are defined to exhaust domestic production. A shortfall of consumption expenditures over consumption goods production, for example, leads to an accumulation of stocks which is conceived, in the usual national accounts tradition, as being "bought" by the

\(^2\)All variables consequently refer to one specific time period of one-year's duration.
owners, maintaining the following identity between output and expenditure.

\[ IV.1 \quad Y = C_p + I + G + (X - M) \]

This relation suggests that variations in GDP may be attributed to changes in one or more components of aggregate demand. Consequently, the model can be developed further by stipulating the behavioral equations for private consumption, investment, government consumption, exports of goods and non-factor services and imports of goods and non-factor services. In this process is ignored, to simplify the analysis, the recognized influence of the supply of and demand for money and other wealth assets on aggregate demand. No distinction is also made between the supply of and demand for monetary output, on one hand, and the supply of and demand for non-monetary or subsistence output on the other. In 1981, approximately 28 percent of total output valued at 1978 factor cost was represented by smallholder production. Since smallholders are not specialized between production for sale and production for subsistence, their production, consumption, saving and investment decisions are not separable.

The Major Functional Relations

Private Consumption Function: Private consumption of final goods and services is assumed to depend
positively on the level of disposable income \((Y_d)\). Disposable income is taken to be the net income after all applicable income taxes have been paid to government. Following Keynesian theory, the higher the level of disposable income, whatever its source, the higher will be the induced level of private consumption expenditure as households face a relaxed budget constraint. To simplify the analysis, we assume that the relationship is linear so that we can write the private consumption function as below:

\[
\text{IV.2 } \quad C_p = a_1 + b_1 Y_d
\]

\(a_1\) and \(b_1\) are parameters or constants to be determined. \(Y_d\) is the value in current Kwacha (or dollars) of disposable income.

The possible effect of prices on private consumption is ignored under the assumption that at low levels of per capita output, the consumption basket will consist, essentially, of necessities such as food for which the price elasticity of demand is insignificant.

\(b_1\), the marginal propensity to consume out of disposable income by private residents is expected to be positive to reflect the positive relation between \(C_p\) and \(Y_d\).

Tax Function: The introduction of disposable income \((Y_d)\) as a variable in the equation IV.2 requires the
specification of a tax function. We make this behavioral equation express the total tax yield \( T \) to government as a linear function of the taxable base–domestic income \( Y \).

IV.3 \[ T = a_2 + b_2Y \]

\( a_2 \) and \( b_2 \) are parameters with \( b_2 \) presumed positive to reflect the progressivity of the Malawian tax system and the \textit{ad valorem} nature of most taxes. \( T \) and \( Y \) are both expressed in nominal terms.

Investment Function: The level of investment in Malawi may be broken down into three components, namely, subsistence economy investment, other investment by private residents and public investment.

The level of capital formation in the subsistence sector may be presumed to grow in line with the level of output which in turn, as suggested in Chapter III, grows to maintain per capita subsistence requirements.

The level of monetary private investment may be presumed to depend on the outlook for business and the assurance of sufficient demand to generate enough sales, profit and a reasonable return on capital employed. A good summary variable for these factors is GDP which we therefore include as an explanatory variable in the investment function.

Due to the inadequacy of the social and economic
infrastructure inherited by Malawi at independence, the opportunities for worthwhile investments are so vast, the actual level of public investment has been constrained by the availability of resources.

Due to the relatively small taxable base and the possible disincentive effects of high taxation on industry, there is a limit to the extent to which government can mobilize local resources for public investment. Total GDP in 1981 is estimated at less than 1.5 billion Kwacha.

Foreign capital imports have consequently financed a substantial portion of public investment and determine its maximum level. We therefore make foreign capital inflows the second explanatory variable.

Total gross investment (no adjustments can be made for depreciation due to lack of data) is therefore assumed to be a simple linear function of GDP and foreign capital receipts denoted by F. F is defined here as the sum of the credit items in the balance of payments relating to transfers and long-term capital.

\[ IV.4 \quad I = a_3 + b_3 Y + C_1 F \]

\( b_3 \) and \( C_1 \), the marginal propensities to invest out of domestic income and foreign capital inflows, respectively, are presumed to be positive. \( I, Y \) and \( F \) are measured in nominal terms.
We ignore short-term capital movements and drawdowns on foreign reserves which mostly go towards meeting short-term export and import financing and other uses remotely related to capital formation.

Other studies make investment a function of foreign savings \((M - X)\), it being understood that total investment is equal to the sum of domestic savings and foreign savings.\(^3\) However, foreign savings represent a net capital inflow and so obscure the magnitudes of total capital inflows and total capital outflows of which it is a difference.

Total capital outflows consist mostly of debt repayments. They are therefore a function of past debt and foreign investment commitments. Total capital inflows are mostly a function of credit worthiness, current business outlook, whims of aid-donors and other factors mostly unrelated to those influencing capital outflows. It is therefore not surprising to see that foreign savings do not satisfactorily explain variations in investment as can be inferred from examining recent growth patterns in investment in Table 5 above.

Export Function: Approximately 90 percent of

Malawi's exports are agricultural. However, exports of textiles, wooden boxes, skins and other manufacturers are increasingly becoming important.

Export earnings have a quantity component and a price component. The quantity component may be deemed to bear a direct relationship to the volume of domestic production. The price component is exogenously determined largely on international commodity markets for such key crops as tea, sugar and tobacco. We therefore express total export earnings on goods and non-factor services (X) as a function of real GDP (Y*) and the unit value index for merchandise exports (P_X).

\[ X = a_4 + b_4 Y^* + C_2 P_X \]

\( b_4 \) and \( C_2 \) are presumed positive. Real GDP (Y*) is nominal GDP (Y) deflated by the exogenously given GDP deflation index (P_Y).

Import Function: Imports either satisfy need directly as goods and services for consumption, investment or re-export, or satisfy the need for final goods and services indirectly in the case of intermediate products.

We therefore make total imports (M) linearly dependent on the components of final demand, namely, investment, private consumption and government consumption.
IV.6 \[ M = a_5 + b_5I + c_3C_p + d_1G \]

\( b_5, c_3 \) and \( d_1 \) are presumed positive, being the marginal import intensities of the associated components of demand.

The average price for imports could also be an important additional explanatory variable for consumer goods. But these constitute only about 14 percent of the total. The rest consists of fuel, plant, machinery, intermediate materials for industry and other commodities whose price elasticity is thought to be insignificant, especially over the short period, since the commodities are either necessities, e.g., oil for transportation, or face strong derived demand in a sheltered market for final outputs, e.g., materials for industry. We therefore omit the import price level in our specification to simplify the analysis.

**Exogenous Variables**

There are four variables which are determined outside the model. These are foreign capital inflows \( (F) \), government consumption \( (G) \), the GDP deflation or domestic price level index \( (P_y) \) and the unit value index \( (P_x) \) for merchandise exports which is used here as a proxy for the unit value index for total exports of both goods and services.
Indigenous Variables

The variables explained by the model are eight: GDP (Y), private consumption (C_p), total investment including stockbuilding (I), disposable income (Y_d), tax yield (T), exports (X), real GDP (Y*) and imports (M).

The Complete Model

The whole model may now be presented below.

IV.7 \[ Y = C_p + I + G + (X - M) \]
IV.8 \[ C_p = a_1 + b_1 Y_d \]
IV.9 \[ Y_d = Y - T \]
IV.10 \[ T = a_2 + b_2 Y \]
IV.11 \[ I = a_3 + b_3 Y + c_1 F \]
IV.12 \[ F = \bar{F} \]
IV.13 \[ G = \bar{G} \]
IV.14 \[ X = a_4 + b_4 Y* + c_2 P_x \]
IV.15 \[ Y* = Y/P_y \]
IV.16 \[ P_y = \bar{P}_y \]
IV.17 \[ P_x = \bar{P}_x \]
IV.18 \[ M = a_5 + b_5 I + c_3 C_p + d_1 G \]

There are twelve independent equations in twelve unknown variables. This static simultaneous equation system therefore possesses unique solutions.

Postulates of the Model

Substituting equation IV.9 and IV.10 into equation IV.8; IV.12 into IV.11; IV.13 into IV.18; and IV.15,
IV.16 and IV.17 into IV.14 yields the following equivalent system:

IV.19  \[ Y = C_p + I + G + (X - M) \]

IV.20  \[ C_p = a_1 - b_1a_2 + (b_1 - b_1b_2)Y \]

IV.21  \[ T = a_2 + b_2Y \]

IV.22  \[ I = a_3 + b_3Y + c_1F \]

IV.23  \[ X = a_4 + b_4(Y/\bar{F}_Y) + c_2P_x \]

IV.24  \[ M = a_5 + b_5I + c_3C_p + d_1\bar{G} \]

Substituting equations IV.20 through IV.24 into the equilibrium condition IV.19 and rearranging terms yields the following equation which is in a suitable form to generate major postulates of the model regarding growth of GDP.

IV.25  \[ Y = [(a_1 + a_3 + a_4 + c_3b_1a_2) - (a_5 + b_1a_2 + b_5a_3 + c_3a_1) + (c_1 - b_5c_1)\bar{F} + (1 - d_1)\bar{G} + c_2\bar{P}_x]/[(1 + b_1b_2 + b_5b_3 + c_3b_1) - (c_3b_1b_2 + b_1 + b_3 + (b_4/\bar{F}_Y))] \]

This equation expresses gross domestic product in terms of the parameters of the model and the four exogenous variables \( F, G, P_x \) and \( P_y \). Variations in GDP may therefore be linked to variations in the parameters and/or exogenous variables.

Keeping all other variables constant, we can make the following Keynesian inferences from IV.25:

1. Increases in autonomous (as opposed to induced)
expenditures on private consumption, investment and exports stimulate GDP. This is indicated by the positive relationship between Y and $a_1$, $a_3$ and $a_4$ which are the intercepts of the consumption, investment and export functions, respectively.

2. The leakage effect on the circular flow of income of autonomous taxes is dampened if the propensity to import out of private consumption is significant. By reducing disposable income, autonomous taxes reduce private consumption and therefore that part of it that might otherwise have been imported. This observation is indicated by the positive relation between Y and the product $c_3b_1c_2$.

3. The negative terms in the numerator suggest that GDP is depressed by increasing autonomous imports ($a_5$), by the effect of autonomous taxes on the private marginal propensity to consume ($b_1a_2$), the higher the marginal propensity to import out of autonomous investment ($b_5a_3$) is, and the higher the marginal propensity to import out of autonomous private consumption ($c_3a_1$) is.

4. Foreign capital receipts stimulate GDP. However, their effect is diminished when the marginal propensity to import in investment projects is high. This fact is indicated by the term $(c_1 - b_5c_1)$. When the propensity to import out of investment is 100 percent,
for example, \( b_5 \) takes the value unity. \((c_1 - b_5 c_1)\) reduces to zero so that capital imports fail to have any stimulation on the level of domestic production and income. The foreign capital impact multiplier is given by:

IV.26

\[
\frac{dy}{\delta F} = \frac{(c_1 - b_5 c_1)}{(1 + b_1 b_2 + b_5 b_3 + c_3 b_1) - (c_3 b_1 b_2 + b_1 + b_3 + (b_4 / P_y))}
\]

where \( d \) refers to a change in the associated variable.

5. In a similar manner, the effect of government consumption expenditures on aggregate demand and output is less, the higher the propensity to import out of government consumption \((d_1)\). The government consumption expenditure impact multiplier is given by:

IV.27

\[
\frac{dy}{\delta G} = \frac{(1 - d_1)}{(1 + b_1 b_2 + b_5 b_3 + c_3 b_1) - (c_3 b_1 b_2 + b_1 + b_3 + (b_4 / P_y))}
\]

6. As it might have been expected, increases in export prices, all other things being the same, directly stimulate GDP. This is shown by the term \( c_2 P_x \) in equation IV.25. The other expansionary effect of exports can be inferred from an examination of the denominator. Growth is higher, the higher the marginal propensity to export out of real domestic product \((b_4)\).
7. As suggested by traditional theory, the marginal propensity to spend (the sum of the marginal propensities to consume, invest and export, \( b_1 + b_3 + b_4 \)) is positively related to GDP. The marginal propensities to tax \( (b_2) \) and import \( (b_5 \text{ and } c_3) \), however, are negatively related to GDP.

These theoretical propositions hold regardless of the values the parameters take when the model is fitted to data. However, they become of practical relevance when it is demonstrated that the model adequately describes the data. This task is attempted in Chapter V.
CHAPTER V
THE STATISTICAL MODEL

The theoretical model introduced in Chapter IV is now fitted to data covering the 15-year period 1967-81. The results of the statistical fit are then presented and their significance briefly explored.

The Data

The data is presented in Table 9, which is based on a compilation of statistics from three main sources: the National Statistical Office which publishes the Monthly Statistical Bulletin each calendar month; the Economic Planning Division of the Office of the President and Cabinet, which publishes the yearly Economic Report; and the Reserve Bank of Malawi, which publishes its quarterly Financial and Economic Review.

The Monthly Statistical Bulletin records the most recent statistics on the major indicators of the economy, including indices of production and external trade.

The Economic Report contains economic analyses and data on GDP, its components, public finance, money, banking and the balance of payments. In 1982, this source revised its national accounts series for the period since 1978 to incorporate the results of a more recent economic survey. The revision, however, was not substantial, and affected only the production and
### Table 9

#### The Data 1967-81

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<th>Year</th>
<th>(1)</th>
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<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
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<td>314.5</td>
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<td>306.0</td>
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<td>1,071.7</td>
<td>7,990.1</td>
<td>1,913.1</td>
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<td>72.93</td>
<td>142.23</td>
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<td>208.51</td>
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</table>

**Source:** Economic Planning Division, National Statistical Office and the Reserve Bank of Malawi, 1968-81.
accumulation accounts, leaving trade and government statistics unchanged. The present study is based on the old national accounts series for which uniform statistics are available beyond 1978.

The Financial and Economic Review reports on both economic and financial developments and always carries a wealth of statistical tables.

External trade statistics are regarded to be fairly accurate. So are government figures on taxes, foreign transfers, other aid and long-term loans from abroad.

However, GDP, the GDP deflation index, private investment and consumption are only estimates based on occasional statistical surveys and/or current economic indicators.

Private consumption is estimated by treating it as a residue in the balance between the estimated net supply of resources to the economy (GDP plus net imports of goods and non-factor services) and total demand (total consumption plus total investment). Its reliability is therefore more questionable.

The Estimating Procedure

The statistical model is given by the following system of equations.

\[ \text{Equations} \]

\[ \text{1Economic Planning Division, Economic Report 1982, p. 79.} \]
\[ \begin{align*}
V.1 & \quad C_p = a_1 + b_1 Y_d + U_1 \\
V.2 & \quad T = a_2 + b_2 Y + U_2 \\
V.3 & \quad I = a_3 + b_3 Y + c_1 F + U_3 \\
V.4 & \quad X = a_4 + b_4 Y^* + c_s P_x + U_4 \\
V.5 & \quad M = a_5 + b_5 I + c_3 C_p + d_1 G + U_5
\end{align*} \]

Definitional equations which have no parameters to estimate are omitted. The \( U_i \)'s (\( i = 1, 2, 3, 4, 5 \)) are the usual "disturbances" included to take up errors of observation, omission, mis-specification of relationships, etc. It is assumed that these disturbances follow a Normal probability Distribution with mean equal to zero, have some common variance, and are pairwise independent so that the covariance between any pair is equal to zero.

An examination of each equation of the model shows that the whole model is over-identified, which means that it is so specified that there is more than enough information to statistically distinguish one equation from another.\(^2\)

\(^2\)See J. Johnston, *Econometric Methods*, 2nd Ed. (New York 1972), p. 359. For each individual equation, "the number of predetermined variables excluded from it [are] at least as great as the number of endogenous variables less one." This is the necessary condition for identifiability. The whole model has 8 endogenous variables and 4 predetermined or exogenous variables.
It is thus appropriate to employ the technique of "2-stage Least Squares"\(^3\) to estimate the parameters of our simultaneous equation model. These parameters are \(a_1, a_2, a_3, a_4, a_5, b_1, b_2, b_3, b_4, b_5, c_1, c_2, c_3\) and \(d_1\).

In the first stage of the method, each endogenous independent variable is linearly regressed, by Ordinary Least Squares, on all the exogenous variables \(P_x, P_y, G\) and \(F\). The resulting regression equations are then used to generate new values for each endogenous independent variable. These values are "purged" of the stochastic component of each endogenous independent variable correlated with the disturbances \(U_i\) \((i = 1, 2, 3, 4, 5)\) that makes simple estimation by Ordinary Least Squares inappropriate in a simultaneous equation system.

In the second stage of the estimation procedure, each dependent variable is regressed on the corresponding endogenous independent and exogenous independent variables to yield the final estimates of the parameters.

The first stage yielded the following equations:

\[
V.6 \quad Y = -277.17 + 6.10P_y + 0.74G + 0.02P_x + 0.50F
\]

\(^3\)2-Stage Least Squares is described fully in Johnston, p. 380. Ordinary Least Squares fits an equation to data by minimizing the sum of the squared distances between actual observations and their corresponding points on the fitted curve.
These equations generated new data for the variables $Y$, $Y_d$, $Y^*$, $I$ and $C_p$ which was subsequently used in the second stage to yield the following results.

The Results

Private Consumption Function:

\[
V.11 \quad C_p = 32.17 + 0.78Y_d
\]

\[
R^2 = 0.99 \quad \hat{\sigma}^2/s^2 = 1.44 \quad s^2 = 816.00
\]

$S^2$, $R^2$ and $\hat{\sigma}^2/s^2$ denote, respectively, the estimated variance, coefficient of determination and the Von Neumann ratio. The figures in parentheses are standard errors of the estimated coefficients.

The high explanatory power of the equation as indicated by the high coefficient of determination, $R^2$, coupled with small standard errors of the coefficients and the absence of serial correlation, makes the suggested relation acceptable.

The Tax Function:

\[
V.12 \quad T = -13.13 + 0.14Y
\]

\[
R^2 = 0.99 \quad \hat{\sigma}^2/s^2 = 1.47 \quad s^2 = 33.26
\]
The suggested tax function thus, also, satisfactorily explains variations in tax yield. The residues, or unexplained errors, are small and so are the standard errors. The fit confirms the hypothesis that tax yield, including collections on international transactions, follows closely the level of domestic economic activity as indicated by GDP.

The Investment Function:

$$V.13 \quad I = -9.82 + 0.11Y + 1.00F$$

$$R^2 = 0.88 \quad \sigma^2 = 1485.31$$

The fit is also adopted as an approximation to general investment behavior. The estimated variance corresponds to a standard deviation of 38.54, which may be compared to the mean observation on I of 149.81.

The Export Function:

$$V.14 \quad X = -59.88 + 0.08Y^* + 1.22P^X$$

$$R^2 = 0.87 \quad \sigma^2 = 643.81$$

Real output ($Y^*$) and the index of export prices ($P^X$) thus seem to explain about 87 percent of the variations in total export earnings.

The Import Function:

$$V.15 \quad M = 30.30 + 0.29C + 0.62I - 0.61G$$

$$R^2 = 0.98 \quad \sigma^2 = 287.34$$

The sign of the marginal propensity to import out of
government consumption was expected to be positive. It turned out negative (-0.61). This result is, however, conceivable. Government consumption is financed largely from tax revenue. An increase in government consumption therefore may occur after an increase in tax revenue which represents a decrease in disposable income and therefore import demand, depending on the relative import intensity of government consumption which is thought to be small for two reasons: first, a large proportion of government consumption consists of wages, salaries and local goods and services; second, the simple correlation coefficient between G and M is estimated at 0.0002. Government consumption and total imports of goods and services may therefore move in opposite directions as suggested by the negative coefficient.
A Test of the Model

The estimated model is given below. A bar indicates an exogenously determined variable.

VI.1 \( Y = C_p + I + G + (X - M) \)

VI.2 \( C_p = 32.17 + 0.78Y_d \)

VI.3 \( Y_d = Y - T \)

VI.4 \( T = -13.13 + 0.14Y \)

VI.5 \( I = -9.82 + 0.11Y + 1.00\bar{F} \)

VI.6 \( X = -59.88 + 0.08Y^* + 1.22\bar{P}_x \)

VI.7 \( Y^* = Y/\bar{P}_y \)

VI.8 \( M = 30.30 + 0.29C_p + 0.62I - 0.61\bar{G} \)

Substituting equations VI.2 through VI.8 into VI.1 and rearranging yields the following expression for GDP.

VI.9 \( Y = \frac{(-63.80 + 0.38\bar{F} + 1.61\bar{G} + 1.22\bar{P}_x)}{(0.49 - (0.08/\bar{P}_y))} \)

The second term in the denominator, \( 0.08/\bar{P}_y \), is small and may, for some purposes, be ignored. Replacing \( \bar{P}_y \), the domestic price level index, by its mean, for example, gives a value for the term of only 0.06((0.08/127.54) X 100). Applying the above simplification to VI.9 yields:

VI.10 \( Y = -130.20 + 0.78\bar{F} + 3.29\bar{G} + 2.49\bar{P}_x \)

This result from the estimated model may be compared
to another result obtained directly by regressing GDP on the four exogenous variables by Ordinary Least Squares.

\[ Y = -277.17 + 0.50F + 0.74G + 0.02P_x + 6.10P_y \]

where, as before, \( Y \), \( F \), \( G \), \( P_x \) and \( P_y \) represent GDP, foreign capital inflows, government consumption, export price index and the domestic price level index, respectively.

The central relation VI.9 gives the following annual predictions which are compared to the actual observations to discover its explanatory power (see Table 10).

The sum of the squared, unexplained variations in GDP, the sum of the squared errors, is 149,860.05, which is only 7.33 percent of the total squared variations in GDP around its mean (2,043,850.00).

Relation VI.9 thus explains about 92.67 percent of the total variation in GDP which therefore represents a reasonable fit from which we can draw conclusions about the demand sources of growth. The standard error is estimated to be around 100, or one sixth the mean observation on \( Y \). The high explanatory power of the relation reflects the high explanatory power of the structural equations of the model from which several observations may now be made.

Some Interesting Macroeconomic Observations

1. The marginal propensity to consume out of
Table 10
A Test of the Model (Kmn)

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<th>Year</th>
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<th>Predicted</th>
<th>Error</th>
<th>(Error)^2</th>
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<td>652.51</td>
<td>0.09</td>
<td>0.01</td>
</tr>
<tr>
<td>1977</td>
<td>769.3</td>
<td>868.79</td>
<td>-99.49</td>
<td>9,898.49</td>
</tr>
<tr>
<td>1978</td>
<td>853.7</td>
<td>960.09</td>
<td>-106.39</td>
<td>11,319.88</td>
</tr>
<tr>
<td>1979</td>
<td>1,049.6</td>
<td>840.31</td>
<td>209.29</td>
<td>43,802.49</td>
</tr>
<tr>
<td>1980</td>
<td>1,242.6</td>
<td>1,009.56</td>
<td>233.04</td>
<td>54,305.97</td>
</tr>
<tr>
<td>1981</td>
<td>1,391.4</td>
<td>1,256.37</td>
<td>135.03</td>
<td>18,233.87</td>
</tr>
</tbody>
</table>

149,860.05
disposable income by private residents may be approximated by 0.78. This is the change in private consumption that may be expected to follow a unit increase in disposable income.

2. The marginal propensity to tax out of GDP may be approximated by 0.14.

3. The GDP elasticity of total gross investment is approximately 0.11. This is the increase in gross investment, including stockbuilding, that may be induced by a unit increase in GDP.

4. Long-term capital inflows plus transfers are not "misused." One hundred percent seems to go towards capital formation rather than consumption. The investment elasticity of foreign capital imports is unity.

5. The real output elasticity of exports is 0.08. However, the export price elasticity of exports is higher at 1.22.

6. Government expenditure on consumption goods and services seems to generate the least import demand. The small import leakage effect explains partially the relatively large government consumption elasticity of GDP. The government consumption multiplier may be put at 3.29 (equation VI.10). It is therefore conceivable that, within reasonable limits, an increase in the propensity
to tax, followed by a corresponding increase in government consumption, would lead to some improvement in the external trade balance while stimulating domestic production at the same time.

7. The foreign capital multiplier is estimated at 0.78 (equation VI.10). The effect of foreign capital on GDP seems to be, to some extent, diminished by the subsequent import leakage it generates as investment goods are imported from abroad. Malawi could therefore wrest more growth from a given level of foreign resources by investing more in domestic-resource-using economic activities such as small scale industries and less capital intensive agriculture.

8. Export prices have a strong influence on GDP growth. The export price multiplier is presently estimated at 2.49. However, since the government has no control over export prices, this source of growth may also be the source of instability when export prices for such important crops as sugar, tea, tobacco, cotton and groundnuts fluctuate.

9. The savings function is given by:

\[
\text{VI.12} \quad S = Y - C_p - G
\]

or

\[
S = Y - 32.17 - 0.78Y_d - G
\]

\[
S = Y - 32.17 - 0.78 (Y - T) - G
\]

\[
S = Y - 32.17 - 0.78 (Y + 13.13 - 0.14Y) - G
\]
\[ S = Y - 32.17 - 0.78Y - 10.24 + 0.11Y - G \]

so that \( S = -42.41 + 0.33Y - G \)

In the particular case where the government's recurrent account is balanced so that \( G = T \), the above relation reduces to:

\[ \text{VI.13 } S = -29.28 + 0.19Y \]

from which a marginal propensity to save equal to 0.19 may be approximated. Since the constant term is negative, the marginal savings rate is greater than the average savings rate. The later is therefore increasing which means that an increasing amount of domestic resources are being devoted to capital formation.

10. The resource gap (= savings gap) is given by:

\[ \text{VI.14 } M - X = 30.30 + 0.29C_p + 0.62I - 0.61G \]
\[ + 59.88 - 0.08Y^* - 1.22P_x \]

or \[ M - X = 90.18 + 0.29C_p + 0.62I - 0.61G \]
\[ - 0.08Y^* - 1.22P_x \]

This shows that Malawi's current account (of the Balance of payments) deficit is largely conditioned by the level of investment which generates a lot of imports, the proportion of real domestic product which is exported and the level of export prices, both of which increase export earnings.

Possible instrument variables which government may use to influence the resource gap seem to be private
consumption \( (C_p) \), its own expenditure on consumption \( (G) \) and the extent to which it can stimulate an export boom.

**Malawi's Prospects for Growth up to 1985**

It has been shown that over 92 percent of the changes in nominal GDP may be attributable to the four exogenous variables \( P_y, G, P_x \), and \( F \). Once the values of these variables are set, the other components of aggregate demand \( C_p, I, T, Y_d, X \) are endogenously determined to give the corresponding level of GDP.

To explore the prospects for growth up to 1985, we need only compute the likely courses for the exogenous variables. The established relationship \((VI.9)\) between these variables and GDP then automatically portrays the probable path for GDP.

**The Domestic Price Level, \( P_y \)**

An official forecast of the GDP deflator puts its annual growth rate, up to the year 1987, as 12 percent.\(^1\)

This forecast may be compared to the average of 11.1 percent per annum experienced since 1975 (Table 3).

Malawi's price level is greatly influenced by import prices. Due to world-wide economic problems of recession and indebtedness by developing countries, it is thought that the world price level is likely to stabilize

somewhat during the next two years, especially if OPEC, the organization of oil exporters, fails to push another oil price increase.

The domestic price level is therefore projected to rise at the previous rate of 11.1 percent per annum up to 1985.

**Government Consumption, G**

Recent projections of government consumption indicate that government consumption expenditure will rise to K245.0 million ($245.0 million) in 1983, K290.9 million ($290.9 million) in 1984 and K345.4 million ($345.4 million) in 1985. This increase is "in line with the assumed real increase in recurrent account and related items."\(^2\) These projections are adopted in total.

**Export Price Index, \(P_X\)**

No significant departure from previous trend up to 1985 is expected. The export price index is projected to rise at approximately 5.7 percent per annum, incorporating a steady decline in the terms of trade of a similar magnitude. Import prices are expected to rise only slightly faster than the average domestic price level.

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\(^2\)Economic Planning Division, p. 79.
Foreign Capital Inflows, $F$

Projections of foreign transfers and long-term loans to government are available. Similar figures for public enterprises and the private sector are not available. Due to the difficulty of forecasting these numbers, a low and high estimate is given for each year up to 1985. These estimates are in the neighborhood of recent flows and are presented in Table 11.

The government grants and loans forecast is based on official projections of government expenditure and receipts on development account contained in Economic Report 1982. These projections are considered firm and so are adopted in total.\(^3\)

The low forecast of private transfers and long-term capital assumes that these remain at their 1981 levels. This assumption is made despite the fact that GDP has slowed-down during the last three years, a condition which might be expected to induce a reduction in the demand for foreign capital as excess production capacity develops. However, it is thought that such a reduction in demand for foreign capital will not be substantial so that 1981 flows provide a good approximation.

The high forecast of private transfers and long-term capital

\(^3\)Economic Planning Division, p. 81.
Table 11

Forecast of Capital Inflows (K/$ million)

<table>
<thead>
<tr>
<th>Year</th>
<th>Government Grants and Loans</th>
<th>Other Inflows Low</th>
<th>Other Inflows High</th>
<th>Totals Low</th>
<th>Totals High</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>152.8</td>
<td>74.7</td>
<td>100.2</td>
<td>227.4</td>
<td>253.0</td>
</tr>
<tr>
<td>1983</td>
<td>138.8</td>
<td>74.7</td>
<td>134.3</td>
<td>213.5</td>
<td>273.1</td>
</tr>
<tr>
<td>1984</td>
<td>135.7</td>
<td>74.7</td>
<td>180.1</td>
<td>210.4</td>
<td>315.8</td>
</tr>
<tr>
<td>1985</td>
<td>124.5</td>
<td>74.7</td>
<td>241.6</td>
<td>199.2</td>
<td>366.1</td>
</tr>
</tbody>
</table>

capital assumes that these will continue to grow at their historical rate of about 34 percent per annum.

Given these trends, gross domestic product is forecast as shown in Table 12, using the established equation VI.9 above.

The forecasts (Tables 12 and 13) imply an annual compound growth rate in GDP at current market prices of 12.2 percent for the low forecast, and 14.0 percent for the high forecast.

In real terms, GDP is forecast to grow between 1.1 percent per annum and 2.9 percent per annum.

With population presumed to grow at approximately 2.6 per annum, growth in real per capita income occurs only under optimistic conditions. These conditions include (i) an unfettered growth in foreign private investment at or above 34 percent per annum, and (ii) a rise in export prices exceeding the historical rate of 5.7 percent per annum. These conditions would allow real per capita GDP to grow at about 0.3 percent per annum, or slightly higher.

Malawi's prospects for real growth are therefore not very bright and definitely much inferior to her historical performance. Since 1975, the country has enjoyed a real growth rate of about 5 percent per annum. Real per capita income grew at about 2.4 percent per
Table 12
Forecast of GDP

<table>
<thead>
<tr>
<th>Year</th>
<th>$\bar{P}_y$</th>
<th>P</th>
<th>$\bar{P}$</th>
<th>$\bar{F}$</th>
<th>Low</th>
<th>High</th>
<th>Y</th>
<th>Low</th>
<th>High</th>
<th>Annual Growth Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>266.6</td>
<td>206.4</td>
<td>252.3</td>
<td>227.5</td>
<td>253.0</td>
<td>1,440.8</td>
<td>1,461.9</td>
<td>14.7</td>
<td>16.4</td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>296.2</td>
<td>245.0</td>
<td>266.7</td>
<td>213.5</td>
<td>273.1</td>
<td>1,592.2</td>
<td>1,641.1</td>
<td>10.5</td>
<td>12.3</td>
<td></td>
</tr>
<tr>
<td>1984</td>
<td>329.1</td>
<td>290.9</td>
<td>281.9</td>
<td>210.4</td>
<td>315.8</td>
<td>1,778.9</td>
<td>1,864.9</td>
<td>11.7</td>
<td>13.6</td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>365.7</td>
<td>345.4</td>
<td>298.0</td>
<td>199.2</td>
<td>366.1</td>
<td>1,990.0</td>
<td>2,125.4</td>
<td>11.9</td>
<td>14.0</td>
<td></td>
</tr>
</tbody>
</table>
Table 13
Forecast of Annual Growth Rates in Real GDP

<table>
<thead>
<tr>
<th>Year</th>
<th>Low Forecast</th>
<th>High Forecast</th>
<th>Inflation Rate Assumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>3.6</td>
<td>5.3</td>
<td>11.1</td>
</tr>
<tr>
<td>1983</td>
<td>-0.6</td>
<td>1.2</td>
<td>11.1</td>
</tr>
<tr>
<td>1984</td>
<td>0.6</td>
<td>2.5</td>
<td>11.1</td>
</tr>
<tr>
<td>1985</td>
<td>0.8</td>
<td>2.9</td>
<td>11.1</td>
</tr>
</tbody>
</table>
annum. However, if present conditions continue and
government fulfills its declining projected development
expenditures, real income will rise at only 1.1 to 2.9
percent per annum. Per capita real income will decline
by about 1.5 percent per annum or at best rise by about
0.3 percent per annum.

The resource gap (M - X) is projected to reach K125
million ($125 million) in 1985 under the low forecast and
K260 million ($260 million) under the high forecast. As
a percentage of GDP, the resource gap will decline to
about 6.3 percent under the low forecast but rise to
about 12.2 percent under the high forecast as the higher
level of private capital inflows, and thus the level of
private investment, induces a higher level of import
demand (equation VI.14).

In 1975, the resource gap at about K104 million
($104 million) represented about 18.3 percent of GDP.
The projected gaps in 1985 are therefore thought to be
manageable, although no attempt is made here to project
the whole balance of payments account.

Total investment in 1985 is projected to reach
K408.3 million ($408.3 million) or 20.5 percent of GDP
under the low forecast and K590.0 million ($590.0
million) or 27.8 percent of GDP under the high forecast
(Equation VI.5).
Gross domestic savings in 1985 are expected to amount to about K267.2 million ($267.2 million). This amount represents 13.4 percent of GDP and will finance about 65.4 percent of total investment.

Under more optimistic conditions, however, gross domestic savings in 1985 may be forecast at K311.3 million ($311.3 million). This amount will represent about 14.6 percent of GDP and will finance about 52.8 percent of total investment, the remainder being financed by foreign capital inflows.

The Implications for Policy

As Dutta and Su have pointed out, "a model of an economy is necessarily less than its reality." However, the present model is thought to be useful in identifying inconsistencies in macroeconomic policy and also in identifying unfavorable trends which may, at first sight, not be apparent.

Current projections of government development expenditure show a steady decline towards the end of the decade.\(^4\) This decline will lead to deficient aggregate demand unless the private sector is stimulated enough to

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\(\text{\footnotesize Economic Planning Division, p. 81. Development account expenditure is projected to fall from K152.8 million in 1982-83 to K138.8 million in 1983-84, K135.7 million in 1984-85 and K124.5 million in 1985-86.}\)
compensate for the shortfall. Deficient demand in turn will mean, as projected above, a lower level of actual GDP growth regardless of the level of capacity output generated by capital formation in the past.

However, GDP growth may not be the central occupation of economic policy. The government may be trying to consolidate previous investments and avoid adding new ones which might prove burdensome in running and maintenance costs. Provided this consolidation improves the productivity of past investments, growth need not be sacrificed. *Ceteris paribus*, an increase in the productivity of export-oriented projects, for example, increases exports and therefore the net expenditure by foreigners on GDP, increasing aggregate demand and GDP even with government expenditures on consumption and investment fixed.

At a time when Malawi is experiencing slow growth, there may be a tendency to refrain from, or cut back expenditures on, social services and other supposedly consumption items in favor of supposedly more productive but import intensive investments in industry. As it has been shown above, import intensive investments may have a smaller impact on GDP than government services. The extra production capacity created by the "productive investments" is, however, not fully utilized due to
deficient demand.

The implications of our study for the emerging foreign exchange shortage problem is twofold. First, government can work towards easing the situation by devoting an increasing proportion of domestic but particularly foreign resources to export-oriented projects. This will have the effect of increasing the share of domestic production that is exported and so stimulate both GDP growth and foreign exchange earnings that may go towards debt-service. Second, government should be aware that some import intensive investments may hinder both the external trade balance and growth of domestic output by creating import leakages, particularly if the investments are financed from domestic resources, so that the whole foreign exchange financing burden falls on export earnings.
BIBLIOGRAPHY


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