The rapid increase in oil prices during the last decade has been perhaps the most significant shock experienced by the world economy. A great deal of attention has been focused on the impact of higher oil prices on oil importing countries, but relatively little on its impact on the oil exporting countries.\(^1\) The purpose of this paper is to develop a macro-model designed to analyze the impact of the rise in oil prices on the economy of Iran. The basic framework is highly aggregated and incorporates only the most important factors relevant to such an analysis. Nevertheless, the estimation results of the model are encouraging because they predict fairly accurately the movements of the main economic variables over the sample period (1960–77), which ends before the recent political developments.

Our basic framework can be summarized as follows. In an oil producing country, the bulk of government revenues is derived from oil exports and denominated in foreign exchange. The domestic spending of these revenues increases aggregate demand for traded and nontraded goods, leading to an increase in imports, domestic output, and prices. In the absence of any exchange rate adjustment,\(^2\) prices of traded goods are determined from outside and most of the inflationary pressure is reflected in higher prices for nontraded goods. The rise in relative prices of nontraded goods increases the relative demand for imports and further increases their

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\(^{1}\)For earlier empirical work pertaining to other oil exporting countries, see Aghevli (1977b) for Indonesia, and Khan (1976) for Venezuela.

\(^{2}\)The rate of exchange of the Iranian currency in terms of the U.S. dollar was quite stable during 1960–77, remaining in the range of 68.75 rials per U.S. dollar.
growth until the economy reaches equilibrium at a higher level of imports, consistent with oil exports. The important question in this process is to what extent does the increase in government expenditures, arising from higher oil revenues, result in higher growth of output or in higher domestic inflation. The answer clearly depends on the size of the increases in oil revenues as well as the choice of the development projects undertaken by the government and the absorptive capacity of the economy.

A cursory comparison of the growth of output and prices in Iran during 1960–72 with that during 1973–77 highlights the impact of higher oil prices on the economy: the average growth of output rose from 9 percent to 13 percent, while the average inflation rose from 2 percent to 13 percent. The higher growth of output, however, was partly at the expense of the traded sector, because the accompanying higher inflation led to a movement of the terms of trade against this sector. Consequently, the non-oil exports all but vanished; the import-substituting sector was limited mainly to assembly plants based on imported inputs, with their output sold domestically behind high trade barriers; and imports increased substantially, their share in total output doubling from 15 percent to 30 percent during 1970–77. These developments have important longer-term implications for the economy. Oil resources are irreplaceable; their ultimate exhaustion, with the gradual erosion of the competitive position of the traded sector, will clearly leave the economy in a perilous situation. It is therefore essential that appropriate financial policies be adopted to provide an impetus to the growth of the traded sector and to ensure the viability of the economy when oil reserves are depleted.

Section I discusses the Government’s budgetary policy and its impact on the money supply; Section II discusses the sources of domestic inflation; Section III discusses the private expenditure and income determination; Section IV specifies the demand for imports; Section V provides the estimation results for the complete model; Section VI contains the simulation results under alternative assumptions regarding the Government’s oil revenues; and Section VII contains the major conclusions and policy implications of the paper.

I. Government’s Budgetary Policy and Its Impact on Money Supply

Because of limited sources of financing in many of the developing countries, changes in the budget deficit are, to a large extent, reflected

3The share of non-oil exports in total exports declined from 12 percent in 1960 to 2.7 percent in 1977.
in changes in the rate of monetary creation. Even a balanced budget, however, can lead to monetary expansion when a large proportion of government revenues are in foreign exchange, that is, oil revenues. Unlike domestic taxes, foreign revenues in the form of royalties on natural resources do not induce a reduction in disposable income, and their domestic spending leads to the creation of additional money. In this case, the contribution of the budget to the monetary expansion is best measured by the Government's domestic deficit, defined as the difference between the domestic expenditure $DE$ and domestic revenue $DR$. The change in the money supply $M$ can then be written according to the following identity when $P_{EX}$ and $P_{IM}$ denote the private sector's exports and imports and $C$ denotes the flow of credit to the private sector from the domestic banking system and from external sources (that is, private capital inflows).

$$\Delta M = DE - DR + P_{EX} - P_{IM} + C. \quad (1)$$

The breakdown of the Government's total expenditure into domestic and foreign components is not readily available. The above identity is therefore rewritten as follows, when $GE$ denotes total government expenditure and $IM$ denotes total imports (government plus private imports).

$$\Delta M = GE - DR + P_{EX} - IM + C. \quad (2)$$

The Government is assumed to have planned its expenditures on the basis of a balanced budget policy; that is, in the long run, the authorities desired to spend all of the available revenues. In the short run, however, expenditures were adjusted, with a lag, to any abrupt changes in revenues. Government expenditures were therefore determined according to the following relationship, when $GR$ denotes the Government's total revenues.

$$\Delta GE_t = \gamma (GR_t - GE_{t-1}). \quad (3)$$

Rearranging terms results in equation (4).

$$GE = \gamma GR_t + (1 - \gamma)GE_{t-1}. \quad (4)$$

Government revenues were composed of oil revenues $OR$ and domestic revenues $DR$.

$$GR = DR + OR. \quad (5)$$

Oil revenues were determined exogenously according to official prices of

$^4$ For an earlier discussion of this point, see Stillson (1976) and Aghevli (1977b).
oil and production levels. The Government derived its domestic revenues from direct taxes on income and property and indirect taxes on trade. These taxes were generally adjusted in line with the increase in income although as a result of various institutional and administrative factors the adjustment took place with a lag.\(^5\) The adjustment of the domestic revenues is specified as follows.

\[
\Delta DR_t = \delta(d_o + d_1 YP_t - DR_{t-1}).
\]  
(6)

Rearranging terms results in equation (7).

\[
DR_t = \delta d_o + \delta d_1 YP_t + (1 - \delta)DR_{t-1}.
\]  
(7)

II. Sources of Domestic Inflation

The domestic price level \(P\) is a weighted average of the price of traded goods \(P'\) and the price of nontraded goods \(P^n\).

\[
\ln P = w \ln P^n + (1 - w) \ln P'.
\]  
(8)

We assume that the price of traded goods is determined exogenously in the world markets while the price of nontraded goods adjusts to equilibrate the domestic market according to the following adjustment mechanism, when \((M/P)\) denotes the actual level of real money balances and \(m^*\) the desired level.

\[
\Delta \ln P^n = \lambda_1 [\ln (M/P)_{t-1} - \ln m^*] + \lambda_2 \ln (P'/P^n).
\]  
(9)

Equation (9) indicates that first, any excess supply of money increases the pressure on the price of nontraded goods; and second, any rise in the price of traded goods leads to a rise in the price of nontraded goods, as it increases the demand for and reduces the supply of nontraded goods.

The desired demand for real money balances, \(m^*\), is specified as a simple function of income when \(a\) denotes the income elasticity.

\[
\ln m^* = \nu + a \ln Y.
\]  
(10)

Substituting \(m^*\) from equation (10) in equation (9) and rearranging terms results in

\[
\Delta \ln P^n = \nu \lambda_1 + \lambda_1 \ln (M/P)_{t-1} - \lambda_1 a \ln Y_t + \lambda_2 \ln (P'/P^n).
\]  
(11)

\(^5\) For a discussion of some of these factors see Aghevli and Khan (1977 and 1978). In an inflationary environment, the long collection lags of domestic taxes result in the creation of large budgetary deficits. In the absence of discretionary policy, the monetization of the deficits leads to higher rates of monetary expansion and results in a further increase in the inflation rate.
III. Private Expenditure and Income Determination

Private expenditure $E$ is specified in real terms as a function of income and excess supply of real money balances.

$$\ln (E/P)_t = e \ln Y_t + \beta [\ln (M/P)_{t-1} - \ln m^*].$$  \hspace{2cm} (12)

In this monetary version of the expenditure function, an excess supply of money directly affects real expenditure, in contrast to a Keynesian version, in which an excess supply of money affects expenditure through the interest rate channel.\footnote{For similar empirical formulation of the expenditure function, see Sassanpour and Sheen (1976).} Substituting $m^*$ from equation (10) and rearranging terms results in

$$\ln (E/P)_t = - \beta v + \beta \ln (M/P)_{t-1} + (e - \beta a) \ln Y.$$  \hspace{2cm} (13)

Domestic output $Y$ is determined according to the following identity:

$$Y = (E + GE + PEX - IM)/P.$$  \hspace{2cm} (14)

It should be noted that we have included only private exports and excluded oil exports from our definition of income. For national accounting purposes, oil revenues should clearly be included in any definition of gross national product. However, insofar as oil exports have negligible domestic value added, they do not contribute directly to the income of the domestic residents until they are spent by the Government. Thus, oil revenues that are not spent by the Government are excluded from our definition of income because they have no effect on the behavioral relationships of our model, which is designed to capture the behavior of the non-oil economy.

IV. Demand for Imports

As already mentioned, import data for the Government and the private sector are not separately available. Demand for total imports is therefore specified as a function of government expenditures and private expenditures. In addition, the terms of trade between imports and domestic goods ($P'/P^n$) are also included to capture the impact of relative prices on the demand for the volume of imports.

$$\ln (IM/P)_t = m_0 + m_1 \ln (GE/P)_t + m_2 \ln (E/P)_t - m_3 \ln (P'/P^n)_{t-1}.$$  \hspace{2cm} (15)

The above formulation is basically along the lines suggested by the
literature on “The Monetary Approach to the Balance of Payments” in the sense that any excess supply of, or demand for, money is partly satisfied through the adjustment of private expenditure and, consequently, imports. In this framework, any increase in government expenditures resulting from higher oil revenues affects imports through three channels. First, government expenditure on foreign goods increases imports directly. Second, government expenditure on nontraded goods results in an expansion of money supply, leading to an increase in private expenditures on all goods including imports. Third, higher private expenditure leads to higher nontraded prices, further increasing the demand for imports.

V. Estimation Results

The complete model is composed of six behavioral equations and three identities, determining nine endogenous variables. The model was estimated for the period 1960–77, using an ordinary least-squares method. The list of variables is provided in Table 1. The estimated equations are provided in Table 2, where the t-values are given in parentheses underneath the coefficient.

Although preliminary, the empirical results are quite encouraging. All the coefficients of the model have the correct sign and, with only one exception, they are significant at 0.05 confidence level. The structural equations predict the behavior of the endogenous variables well, as indicated by the relatively high values of the $R^2$ coefficient.

The estimation of government expenditures indicates that these expenditures were adjusted in line with the increase in total revenues, such that

7The monetary approach to the balance of payments specifies the overall balance of payments as a function of excess supply of, or demand for, money. Although our empirical results for the overall balance were quite encouraging, we chose to concentrate only on the import function and disregard the private capital flows, because our framework is based on a money-good economy and does not incorporate capital assets. In future revisions, attempts will be made to incorporate capital assets into the model. For a collection of papers on the monetary approach, see Frankel and Johnson (1976) and International Monetary Fund (1977).

8Equations (4), (7), (8), (11), (13), (15), and identities (14), (2) and (5).

While a full-information maximum-likelihood (FIML) method would have been preferable for reducing the simultaneous bias error, this method could introduce large specifications errors (see Theil, 1971, p. 528). The use of two-stage least squares was also excluded because of the relatively small number of observations.

9Sources and description of data are provided in the appendix.

10The only exception is the coefficient of the terms of trade in the sixth equation. While the coefficient of real income in the private expenditure equation is not significant, there is no a priori restriction on the sign of this coefficient because it is a composite term (that is, $e - \beta a$).
Table 1. List of Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Endogenous variables</strong></td>
<td></td>
</tr>
<tr>
<td>$M$</td>
<td>Money supply (broad definition)</td>
</tr>
<tr>
<td>$GE$</td>
<td>Government expenditure</td>
</tr>
<tr>
<td>$GR$</td>
<td>Government total revenue</td>
</tr>
<tr>
<td>$DR$</td>
<td>Government domestic revenue</td>
</tr>
<tr>
<td>$P$</td>
<td>Domestic prices (CPI)</td>
</tr>
<tr>
<td>$P^*$</td>
<td>Price of nontraded goods</td>
</tr>
<tr>
<td>$E$</td>
<td>Private expenditure</td>
</tr>
<tr>
<td>$Y$</td>
<td>Domestic real income (non-oil)</td>
</tr>
<tr>
<td>$IM$</td>
<td>Imports</td>
</tr>
<tr>
<td><strong>Exogenous variables</strong></td>
<td></td>
</tr>
<tr>
<td>$PEX$</td>
<td>Private exports (non-oil)</td>
</tr>
<tr>
<td>$C$</td>
<td>Changes in credit to the private sector from the banking system and external sources</td>
</tr>
<tr>
<td>$OR$</td>
<td>Government oil revenues</td>
</tr>
<tr>
<td>$P'$</td>
<td>Price of traded goods</td>
</tr>
</tbody>
</table>

*This index was calculated as a weighted average of trading countries' export price indices, adjusted for exchange rates.*

The budget was balanced over the longer term. The adjustment coefficient $\gamma$ is about 0.62, which indicates that the mean lag of adjustment—the period required for about 63 percent of any disequilibrium between actual and desired expenditures to be eliminated—was about seven months. The estimation of government revenues indicates that non-oil revenues responded with a lag to the rise in income. The mean lag of response was about eight months, which was somewhat longer than the mean lag of government expenditures.

The estimation of the domestic price level indicates that the weight of nontraded goods in the consumer price index is about one half. The estimation of the price changes of nontraded goods indicates that the monetary factors significantly contributed to the increase in the price of these goods. The changes in the price of imports also had a significant effect on the changes in the price of nontraded goods. The income elasticity of the demand for money, $a$, calculated from this equation is about 1.2.

---

12 That is, the sum of the coefficients $GR_t$ and $GE_{t-1}$ is not significantly different from unity, which is the condition implied by equation (3).

13 The mean lag of adjustment is equal to $(1 - \gamma)/\gamma$. The parameter $\gamma$ is in the range of 0.56–0.69, depending on whether the coefficient of $GR_t$ or $GE_{t-1}$ is used to calculate $\gamma$.

14 In principle, this is an identity with given weights, but because of unavailability of these weights we were forced to treat this identity as a behavioral equation and estimate the appropriate weights. The sum of the estimated weights of nontraded and traded goods is not significantly different from unity.
Table 2. Estimated Model

<table>
<thead>
<tr>
<th>Item</th>
<th>Estimated Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government expenditures</td>
<td>$GE_t = 8.0 + 0.69 GR_t + 0.44 GE_{t-1}$</td>
</tr>
<tr>
<td></td>
<td>(0.8) (1.3) (6.6)</td>
</tr>
<tr>
<td></td>
<td>$R^2 = 0.99$ $h = 0.56$</td>
</tr>
<tr>
<td>Government domestic revenues$^1$</td>
<td>$DR_t = -16.6 + 0.12 YP_t + 0.40 DR_{t-1}$</td>
</tr>
<tr>
<td></td>
<td>(4.4) (5.3) (2.2)</td>
</tr>
<tr>
<td></td>
<td>$R^2 = 0.99$ $h = 0.62$</td>
</tr>
<tr>
<td>Domestic price level$^1$</td>
<td>$\ln P_t = 0.01 + 0.53 \ln P_t^* + 0.52 \ln P_{t-1}^*$</td>
</tr>
<tr>
<td></td>
<td>(0.3) (7.3) (7.6)</td>
</tr>
<tr>
<td></td>
<td>$R^2 = 0.99$ $DW = 1.48^1$</td>
</tr>
<tr>
<td>Price changes of nontraded goods$^1$</td>
<td>$\Delta \ln P_t^* = 1.16 + 0.37 \ln (M/P)_{t-1}$</td>
</tr>
<tr>
<td></td>
<td>(1.7) (2.4)</td>
</tr>
<tr>
<td></td>
<td>$- 0.45 \ln Y_t + 0.60 \ln (P'/P&quot;)_{t-1}$</td>
</tr>
<tr>
<td></td>
<td>(2.1) (3.6)</td>
</tr>
<tr>
<td></td>
<td>$R^2 = 0.64$ $DW = 1.87^1$</td>
</tr>
<tr>
<td>Real private expenditures</td>
<td>$\ln (E/P)<em>t = 3.06 + 0.43 \ln (M/P)</em>{t-1}$</td>
</tr>
<tr>
<td></td>
<td>(4.6) (2.8)</td>
</tr>
<tr>
<td></td>
<td>$- 0.18 \ln Y_t$</td>
</tr>
<tr>
<td></td>
<td>(0.8)</td>
</tr>
<tr>
<td></td>
<td>$R^2 = 0.98$ $DW = 1.95$</td>
</tr>
<tr>
<td>Volume of imports</td>
<td>$\ln (IM/P')_t = 4.26 + 0.63 \ln (GE/P)_t$</td>
</tr>
<tr>
<td></td>
<td>(4.1) (7.6)</td>
</tr>
<tr>
<td></td>
<td>$+ 0.89 \ln (E/P)_t$</td>
</tr>
<tr>
<td></td>
<td>(4.7)</td>
</tr>
<tr>
<td></td>
<td>$- 0.83 \ln (P'/P&quot;)_{t-1}$</td>
</tr>
<tr>
<td></td>
<td>(1.1)</td>
</tr>
<tr>
<td></td>
<td>$R^2 = 0.99$ $DW = 1.48$</td>
</tr>
<tr>
<td>Income identity</td>
<td>$Y = (E + GE + PEX - IM)/P$</td>
</tr>
<tr>
<td>Money supply identity</td>
<td>$\Delta M = GE - GDR + PEX - IM + C$</td>
</tr>
<tr>
<td>Budget identity</td>
<td>$GR = DR + OR$</td>
</tr>
</tbody>
</table>

$^1$ Corrected for autocorrelation.

The estimation of the real private expenditures indicates that the excess supply of money was the main factor explaining the variations in the ratio of private expenditures to income. The adjustment coefficient was about 0.4, which indicates that somewhat less than half of any excess supply of money was reflected in the increase in private expenditures. The income elasticity of real private expenditure, $e$, is about 0.7.$^{15}$

$^{15}$ The coefficient of real income is equal to $e - \beta a = 0.18$. Using $\beta = 0.43$ for the real balances term and $a = 1.2$ for the income elasticity of money demand, calculated in the previous equation, results in the value of 0.7 for $e$. 

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The estimation of the import equation indicates that the increase in government and private expenditures contributed significantly to the increase in imports. The elasticity of imports with respect to private expenditures is close to unity, which is higher than the elasticity with respect to government expenditures. The relative price coefficient has the correct sign but is not significant.

VI. Dynamic Simulations

In order to test the reliability of the model for predicting the movements of the endogenous variables, a dynamic simulation of the model was conducted over the period 1960–77, using the parameter estimates obtained in the previous section and the actual values of the exogenous variables. A comparison of the simulated values of the endogenous variables with their actual values provides a rigid test for the reliability of the model, because under this simulation procedure the lagged endogenous variables are generated by the model and the errors are accumulated over time. The results (Charts 1–9) indicate that the model tracks the actual movements of the endogenous variables over the period remarkably well and, consequently, it can be utilized to predict the behavior of key economic variables, even outside the sample period.

In order to quantify the impact of the oil price increases in 1973–74 on the economy, a second set of dynamic simulations was conducted when oil revenues were assumed to have increased at a constant rate during the 1973–77 period. This constant rate was set according to two alternative scenarios: first, the rate was set equal to the average rate of increase over the 1973–77 period (that is, 42 percent); and second, the rate was set equal to the average rate of increase over the 1960–72 period (that is, 17 percent). Under the first alternative, oil revenues increased more gradually and did not exhibit the abrupt increase observed in 1973-74; consequently, they did not reach the actual values observed until 1977. Under the second alternative, oil revenues fell well below the actual values observed. The simulation results for these alternative scenarios, designated by SIM 1 and SIM 2 (Charts 1–9), and their comparison with the previous dynamic simulation based on actual oil revenues, enable us to isolate the impact of the oil price increases on the economy. It should be noted that in our framework higher accumulation of international reserves is equivalent to lower oil revenues. Consequently, different simu-

16 This dynamic simulation can be contrasted to a static one, where the values of lagged endogenous variables are assumed to be exogenously given and, consequently, the errors are confined to a single period.
Chart 1. Broad Money

Chart 2. Government Expenditure

Chart 3. Government Total Revenue

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Chart 4. Government Non-Oil Revenues

Chart 5. Consumer Price Index

Chart 6. Home Goods Price Index
Table 3. Simulation Results: 1973–77

(In percent)

<table>
<thead>
<tr>
<th></th>
<th>Actual</th>
<th>Simulated</th>
<th>SIM 1</th>
<th>SIM 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Growth of</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government expenditure</td>
<td>38.0</td>
<td>36.9</td>
<td>33.1</td>
<td>16.0</td>
</tr>
<tr>
<td>Output</td>
<td>13.4</td>
<td>13.2</td>
<td>11.0</td>
<td>3.3</td>
</tr>
<tr>
<td>Price of home goods</td>
<td>12.2</td>
<td>11.2</td>
<td>8.6</td>
<td>8.6</td>
</tr>
<tr>
<td>Imports</td>
<td>34.4</td>
<td>36.5</td>
<td>30.9</td>
<td>15.2</td>
</tr>
</tbody>
</table>

1 Oil revenues assumed to increase at an average annual rate of 41 percent.
2 Oil revenues assumed to increase at an average annual rate of 17 percent.

Simulation results could be interpreted to represent different rates of reserve accumulations with similar increases in oil revenues. The simulation results SIM 1 and SIM 2 indicate that the increase in oil revenues had a pronounced effect on the economy. Under the SIM 1 scenario a more gradual increase in oil revenues would result in a slower growth of government expenditure and, consequently, of output; the average growth of output would be about 11 percent, compared with the observed rate of 13 percent (Table 3). The lower growth of output would be accompanied by a lower inflation rate; the average inflation in home goods prices would be 8.6 percent, compared with the observed rate of 12.2 percent. The slower growth of output would also result in a slower growth of non-oil revenues, private expenditures, and imports.

The importance of oil revenues to the economy becomes abundantly clear under the SIM 2 scenario. A reduction of the increase in oil revenues to the levels observed prior to 1973 would have resulted in a sharp decline in the growth of output to about 3 percent. On the other hand, the inflation in home goods prices would continue to remain at 8.6 percent, the rate observed under the SIM 1 scenario.

A comparison of SIM 1 and SIM 2 results reveals that an increase in oil revenues initially results in higher growth rates without inducing higher rates of inflation; the growth rate under SIM 1 is much higher than under SIM 2, while the inflation rate is the same in both cases. The initial stability in the inflation rate is due to the fact that the increase in income levels leads to an increase in the demand for money, matching the increase in money supply associated with higher government expenditures. After a point, however, limitations on the absorptive capacity of the economy set in, slowing down the growth of output and leading to an excess supply of money and to higher domestic inflation. Consequently, the benefits of additional growth from further increases in government expenditures beyond this point should be weighed against the costs of inflation. 17

17 For an analysis of the associated benefits and cost of inflation-financed growth, see Aghevli (1977a).
VII. Conclusions and Policy Implications

In this paper we have developed a macroeconomic framework to evaluate the impact of the rapid increase in Iran's oil revenues on its domestic economy. Our results confirm that higher oil revenues since 1973 were instrumental in improving the growth of the economy. Because of limitations on excess capacity in the economy, the higher growth rates were accompanied by higher rates of inflation in the prices of nontraded goods. Given a fixed exchange rate, the increase in the prices of nontraded goods led to a reallocation of resources from the traded goods sector to the nontraded goods sector; by 1977, non-oil exports had all but vanished, imports as a proportion of income had grown substantially, and the import-substituting sector was limited to those industries that were afforded substantial protection.

The above developments are a logical result of an oil producing country acting on its comparative advantage in oil. However, this policy ignores the fundamental difference between production based on the exploitation of exhaustible resources and the production of other goods and services. Oil resources represent a stock of capital assets in the economy, and if the capital stock is not to be depleted, oil revenues should be invested—either domestically or abroad—to provide a flow of earnings over time. Whether capital should be consumed at all is obviously an intergenerational choice, but it can be argued that in a less developed economy capital should not be depleted and, in fact, part of the earnings should be invested toward further diversification.

The basic policy implication of this analysis is that, in the longer run, oil producing countries need to develop non-oil industries and promote their traded goods sector if they are to sustain economic growth when the oil resources are exhausted. Financial policies should therefore be geared to the achievement of this longer-term objective. An important element of these policies would be to limit government domestic expenditures to levels consistent with the absorptive capacity of the economy. Otherwise, the rapid deterioration of relative prices against the traded goods sector would inhibit its development.

APPENDIX

Sources of Data


18 This was illustrated by our simulation results, indicating that, after a point, expansion of government expenditure mainly results in higher prices.
Description of Variables

\[ M = \text{broad money} = \text{narrow money (Source A; line 34) + quasi-money (Source A; line 35)} \]
\[ GE = \text{government expenditure (Source A; line 82)} \]
\[ GR = \text{government total revenue (Source A; line 81)} \]
\[ OR = \text{government oil revenue (Source B)} \]
\[ DR = \text{government domestic revenue} = GR - OR \]
\[ P = \text{consumer price index (Source A; line 64)} \]
\[ P^* = \text{price of nontraded goods (Source A; line 63a)} \]
\[ P' = \text{price of traded goods (weighted average of trading partners' export prices adjusted for exchange rate)} \]
\[ YP = \text{non-oil GDP}^{10} = \text{GDP (Source A; line 99b) - oil exports (Source A; line 70a)} \]
\[ IM = \text{imports (Source A; line 98c)} \]
\[ PEX = \text{non-oil exports} = \text{exports (Source A; line 70) - oil exports (Source A; line 70a)} \]
\[ E = \text{private expenditures} = YP - GE - PEX + IM \]
\[ Y = \text{real income (non-oil)} = YP/P \]
\[ C = \text{changes in credit to the private sector from the banking system and from external sources} = \Delta M - GE + DR - PEX + IM. \]

References


\(^{10}\text{Strictly speaking, non-oil GDP should exclude the value added of the oil sector. This value added, however, is quite small and can be excluded without appreciably affecting the broad magnitudes.}\)


