DISCUSSION PAPER

DRD72

Yugoslav Economic Performance in the 1980s: Alternative Scenarios

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January 1984

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Abstract

This paper utilizes a multisector, computable general equilibrium (CGE) model to analyze Yugoslav economic performance during the 1981-1990 period. The model is used to generate both counterfactual historical simulations for the 1981-1984 period and alternative forward-run scenarios for the 1984-1990 period. The counterfactual simulations assess the relative contribution of domestic policy errors and adverse changes in external trade and credit market conditions on deteriorating economic performance between 1981 and 1984. These simulations illustrate the impact of the growing foreign exchange crisis on domestic growth and productivity performance.

The forward-run scenarios examine growth and debt repayment prospects during the 1984-1990 period on the assumption that Yugoslavia will successfully implement a change in development strategy toward a more open economy with increased exports. The new development strategy is assumed to be realized by an appropriate exchange rate policy that eliminates the excess demand for foreign exchange and the complicated rationing schemes it has engendered. As a result, the bias in incentives against exports is removed, and both export and productivity performance improve. The forward runs also assume that Yugoslavia will maintain austerity measures to control domestic absorption, especially aggregate investment, throughout the 1984-1990 period. Alternative simulations analyze the implications of differences in the severity and composition of such measures for economic performance. These simulations illustrate the trade-offs between the growth of domestic investment and real wages on the one hand and the balance of payments and debt repayment on the other.
YUGOSLAV ECONOMIC PERFORMANCE IN THE 1980s: ALTERNATIVE SCENARIOS*

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Introduction

In the last decade, the Yugoslav economy has undergone a number of shocks. There have been major changes in both domestic policy, including major institutional reforms, and shifts in the world economy, including oil price increases and worldwide recession. Since about 1979, problems with foreign trade have dominated policy discussions as economic performance has become steadily more constrained by shortages of foreign exchange. Until quite recently, the Yugoslav response to foreign exchange shortages was to impose increasingly severe rationing of imports. Now, however, they are considering ways to increase exports and to implement what is essentially a shift in development strategy. Policy debate is currently intense and centers on issues of moving toward a more open economy, with more reliance on market incentives, and removing the severe bias in incentives against exports that has characterized the system over the past decade.

*The work described in this paper was supported by the World Bank. The views and interpretations in this document, however, are those of the authors and should not be attributed to the World Bank, to its affiliated organizations, or to any individual acting on their behalf.
The policy debate in Yugoslavia has parallels in many other countries. To what extent are their problems due to external conditions beyond their control, and to what extent are they due to failures in domestic policy? Given the variety and severity of the shocks the economy has faced, what are the best policies to pursue in the 1980s? In this paper we seek to analyze these questions within the framework of a multisector, computable general equilibrium (CGE) model of the Yugoslav economy. Such models have been used to analyze issues of structural adjustment in other countries. The framework is useful because it permits analysis with an empirical model that explicitly incorporates structural relationships among many sectors and market interactions between producers and demanders.

In a separate paper we have used the model to analyze Yugoslav performance in the 1976-1980 period. In that paper we concluded that, while external shocks were important, the policy response within Yugoslavia was inadequate for dealing with the problems which emerged during this period. Resorting to quantitative restrictions on imports led to serious distortions in the domestic market, especially large biases in incentives against exporters, underutilization of capacity, and losses in efficiency. Between 1978 and 1981, the second oil crisis hit, international interest rates rose, and the world recession hurt export markets. The Yugoslav response to these events was, again, inadequate and created a complicated and confused incentive structure.

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1See, for example, Dervis and Robinson [1982] and Dixon et al. [1981]. Dervis, de Melo, and Robinson [1982] survey the use of CGE models in developing countries.

2See Robinson and Tyson [1983].
In this paper we take up the story in 1981. We first analyze the course of the economy in the 1981-1994 period and then consider different medium-term scenarios for the 1984-1990 period. In the next section, we describe the CGE model which we used for the analysis. The discussion is very brief, focusing only on the essential features of the model. More detailed descriptions, including specification of equations, are available elsewhere. In the succeeding sections, we use the model to generate various counterfactual historical simulations and alternative forward simulations which explore the economic trade-offs that have faced, and will face, Yugoslav policymakers.

The CGE Model

The CGE model for Yugoslavia, like CGE models implemented for other developing countries, operates by simulating the operation of markets for factors, products, and foreign exchange. The model is highly nonlinear and involves the specification of conditions of supply and demand for all the markets. A solution for a given year generates market-clearing prices and quantities, including all the elements comprising the circular flow in the economy. The Yugoslavia model has 18 production sectors; 4 labor categories; 2 household types (rural and urban); and enterprises differentiated by sector, government, a "rest of the world" institution, and an aggregate capital account which serves the role of the banking system in gathering savings and allocating investment funds to sectors. Depending on how one counts, the model has around 1,000 to 1,500 equations which are solved for each period in a dynamic simulation.

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The emphasis on markets and market-clearing mechanisms in the CGE model reflects the view that the independent behavior of decentralized producers and consumers plays a significant role in influencing economic performance. However, this view of the economy does not imply that markets are perfect or that the decision making of producers and consumers is necessarily guided by neoclassical rules of profit maximization or utility maximization. Instead, the Yugoslavia model explicitly recognizes the existence of rigidities and imperfections in the economy and of special behavioral features of self-managed enterprises.

Production and Employment

In most CGE models, it is assumed that producers maximize profits given a neoclassical production technology in an environment of perfectly competitive markets. In the Yugoslavia CGE model, the assumption of profit maximization is replaced by a set of rules that attempts to capture the behavior of self-managed firms. The specification incorporates two basic features of such behavior: (1) rigidities in employment levels that limit the supply responsiveness of the firm to changes in product market conditions and (2) payment rules that produce a divergence between the marginal value product of labor and the personal income or wage that labor receives.

We assume that output decisions of self-managed firms are guided by a form of neoclassical profit maximization. Firms are assumed to treat a portion of their labor force as fixed in the short term, analogous to sectoral capital which is also assumed to be immobile in the short run. Decisions on the amount of variable labor to be used in a given period are guided by a "planning" or "accounting" wage. Distinguishing between variable and fixed labor
has the effect in the model of reducing the employment variability and sectoral supply responsiveness relative to what they would be in a world of perfect factor mobility and unconstrained profit maximization.

The model of firm behavior distinguishes between the planning wage that a firm uses in deciding the level of labor utilization and the actual personal income paid to members of the firm. Income payments can be seen as consisting of two parts: a planning wage component and a component that reflects the worker's share in the firm's net income. The size of the second component depends on both the legal and contractual obligations affecting the distribution of enterprise income and on the firm's decision as to what part of its disposable net income should be distributed to workers. In the model, these shares are set by various coefficients which can either be fixed or determined endogenously in response to policy choices. The variation of these distribution shares in response to government policy is an important feature of the Yugoslav institutional system and of the forward simulations with the model (discussed further below).

**Foreign Trade**

Exports are treated in two different ways in the version of the model used here. For the counterfactual experiments, exports are exogenous and are varied parametrically to explore the impact of different scenarios. In the forward simulations, exports are determined endogenously. For each sector, the model includes separate world demand functions and domestic export supply functions (the latter specifies the enterprise's decision to sell on the world market rather than on the domestic market).

On the import side, the model assumes that domestically produced goods and imports are imperfect substitutes. Elasticities of substitution vary across
sectors, with the lowest elasticities in raw material and capital goods sectors. Given this specification, the demand for imports depends on the relative price in the domestic market of domestically produced and imported goods. The world price of imports is assumed fixed (the "small country" assumption); but their price in the domestic market depends on the exchange rate, tariffs, and premia, if any. Thus, trade policy will have an important effect on import demand. The relative importance of these factors in determining domestic prices and demand depends on the relative shares of imports and exports in total domestic supply as well as on the trade substitution elasticity.

The total demand for foreign exchange in the model is determined by summing desired imports across all sectors. The total is compared with the supply of foreign exchange arising from exports and net foreign capital inflows (including remittances and reserve decumulation). An adjustment mechanism must be specified to equate the supply and demand for foreign exchange. There are two versions used for the simulations. In the counterfactual experiments for the 1981-1984 period, the model uses an endogenous mechanism of import rationing which is intended to capture in a stylized manner the elaborate foreign exchange rationing system that the Yugoslavs have built up over the past few years. The mechanism and its implications for economic performance are discussed further below. In the forward simulations, we assume that the model assumes that Yugoslavia will pursue an exchange rate policy which is designed to keep the real exchange rate roughly constant (for example, a "crawling peg" policy), and then capital inflows will adjust to clear the foreign exchange market.
Demand, Prices, and Macro Closure

The demand side of the model works by tracing through the incomes generated in the productive sectors of the economy and the various demands they induce. There are three categories of income recipients whose behavior is modeled: productive enterprises, households, and the government (or non-productive sector). The model contains an elaborate set of accounting and behavioral rules to determine how value added (or factor income) is distributed among income recipients.\(^1\) To complete the circular flow, the saving and expenditure behavior of each income recipient is specified, leading to demands for sectoral output for consumption and investment purposes. The problem of achieving macroeconomic savings-investment balance is a separate issue involving what has come to be called the macro "closure" of the model.

There are a variety of ways discussed in the literature for achieving savings-investment equilibrium in CGE models. Different approaches are based on different theoretical views of how the macro system works: neoclassical, Keynesian, monetarist, Kaldorian, "structuralist," etc., with many variations and combinations.\(^2\) In the Yugoslavia model, we use different specifications for the counterfactual simulations and the forward simulations. In the counterfactual simulations, the model is run with neoclassical closure. Investment is determined by the sum of savings from all sources: enterprises, government, households, and foreign or rest of the world. The institutional savings rates, as well as the aggregate price level, determine the behavior.

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\(^1\)These rules are described in detail in World Bank [1983].

\(^2\)For further discussion of issues of macro closure, see Taylor [1983] and Robinson and Tyson [1984].
rate, are all exogenous. Some of these parameters are varied in the counterfactual simulations as part of the alternative scenarios. In the forward simulations, we specify a different macro story which is designed to reflect the particular institutional framework in Yugoslavia. In this specification, inflation is endogenous and nominal personal incomes (or wages) are treated as exogenous. The details are discussed below when we present the forward simulations.

External Conditions and Economic Performance, 1981-1984

As a result of outstanding debt repayment requirements, coupled with poor export performance, Yugoslavia was forced to strengthen its domestic austerity program in 1982-83 in order to cut imports. In 1982 and 1983, had Yugoslavia been able to export more, or to borrow more (or, equivalently, to pay back less), a smaller dose of austerity would have been possible and the performance of the economy would have been better. To a large degree, domestic policy errors were responsible for Yugoslavia's difficulties. In particular, the persistence of an overvalued dinar exchange rate and import rationing schemes produced a bias in incentives against exports that has played a major role in Yugoslavia's poor export growth since the mid-1970s.¹ Nonetheless, Yugoslavia's 1982-83 economic difficulties were not all of its own making. Like other net-debtor, newly industrializing countries, Yugoslavia was adversely affected by the changes in its external economic environment: (1) a sharp slowdown in the growth of its export markets and (2) a tightening of external credit market conditions.

¹For a discussion of the extent of dinar overvaluation and the bias against exports, see Robinson and Tyson [1983].
In this section, we discuss the results of simulations of the CGE model designed to assess the impact of these changes on the Yugoslav economy. All the simulations begin in 1981, the base period for the current version of the CGE model. The first simulation (the base run) reproduces the actual course of the Yugoslav economy in 1982 and 1983—consistent with information available at the time the simulation was completed (August, 1983)—and produces a projection for 1984. The 1984 projection, in turn, depends on a number of endogenous variables whose values are determined by 1982-83 history and on a number of exogenous variables whose values are based on various Yugoslav and World Bank estimates.

The base run scenario depends on a number of behavioral assumptions about the functioning of the Yugoslav economy and also on assumptions about external conditions confronting it. For the purposes of this paper, the most important behavioral assumptions regarding the domestic economy concern the effects of a foreign exchange shortage. The base run simulation takes the supply of foreign exchange and the exchange rate as given in each year. The 1982-83 values for the supply of foreign exchange are based on actual historical values for export earnings, net remittances, net foreign capital flows, and reserve accumulation (decumulation). The 1984 values for these exogenous variables are based on projections as of summer 1983. The 1982 dinar-dollar exchange rate is set at its actual period average value. The 1983 period average exchange devaluation realized during the first half of 1983 by a combination of internal stabilization measures and further exchange rate adjustments through the end of the year. For 1984, it is assumed that the Yugoslavs will continue to maintain a constant price level deflated exchange rate. Therefore, the period
Average dinar-dollar exchange rate in nominal terms is projected to depreciate just enough to offset the projected differential between Yugoslav and world inflation rates.

Given the exchange rate, the demand for foreign exchange is determined endogenously in the model for each year by summing desired imports across all sectors. In 1982 and 1983, the model results indicate continued substantial excess demand for foreign exchange, given the actual exchange rate policy in those two years. The projection for 1984 is for more of the same, although the actual extent of excess demand is expected to decline, primarily as a result of improved export earnings.

In the presence of excess demand for foreign exchange, the Yugoslavs have relied on a complicated set of rationing rules to allocate the available supply among competing users. The CGE model contains an elaborate specification of how these rules operate and captures their effects on real economic performance in several ways. First, would-be importers who are unable to import all that they desire are forced to substitute domestic goods. Since most imports are intermediate inputs into the production process and since domestic goods are difficult to substitute for imported goods, a shortage of foreign exchange has a direct real effect on domestic output and growth. Second, the model reflects the fact that import rationing schemes cause uncertainties and interruptions in the flow of crucial imports to domestic users with consequent disruptions in domestic production and growth. The model captures these second effects in its assumptions about the exogenous rate of growth of total factor productivity. For 1982 and 1983, the rates of total factor productivity growth are actually negative (-4.0 and -2.0 percent)

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1 For more discussion of the workings of the rationing rules in the CGE model, see Robinson and Tyson [1983] and World Bank [1983].
in manufacturing, respectively) reflecting the sharp slowdown in domestic output that occurred, despite continued growth in both labor and capital inputs. The rate of total factor productivity growth is expected to remain negative through 1984 (at -2.0 percent a year).

Finally, the model assumes that there are real output costs associated with the rent-seeking activities engendered by Yugoslavia's import rationing mechanisms. The existence of substantial unsatisfied demand for foreign exchange implies the existence of substantial scarcity or rental income, which provides powerful incentives for "rent seeking" behavior as would-be importers seek access, through nonmarket means, to foreign exchange at the overvalued official exchange rate. Such rent-seeking behavior generates real costs as resources that might otherwise be used in production are diverted to rent-seeking activities. In the Yugoslav institutional setting, these activities include such things as enterprise lobbying for import allocations in communities of interest, negotiating complex hidden arrangements for the sale of foreign exchange at a premium rate among enterprises, and political lobbying to restrict the flow of foreign exchange across regional boundaries. The CGE model assumes that these activities waste domestic resources and reduce output.

The effects of the actual 1982-83 foreign exchange shortages and the projected 1984 shortage are apparent in the 1981-1984 growth rates generated in the base run simulation, which are given in Table 1. The base run results show an average annual growth rate of 1.4 percent for gross domestic product (GDP), 1.6 percent for personal consumption, and -2.3 percent for gross fixed investment. These growth rates are dramatically lower than the average annual growth rates for these sectors in the pre-1980 period. See Krueger (1974) for a discussion of the theory of rent seeking.
growth rates of 5.9 percent for GDP, 7.2 percent for private consumption, and 6.1 percent for gross fixed investment realized in the 1976-1980 period; and they are lower still than comparable rates for the 1971-1975 period.  

To assess the impact of adverse changes in external trade and capital market conditions on Yugoslav economic performance during the 1981-1984 period, the results of the base run simulation can be compared with the results of appropriately specified counterfactual simulations. In the first counterfactual simulation, called C-1, we assume a relaxation of capital market constraints that allows Yugoslavia to increase its net foreign borrowing to reduce sharply import rationing in 1982 and 1983 and to eliminate rationing altogether by 1984. In addition to increasing borrowing, simulation C-1 assumes that the relaxation of the foreign exchange constraint and the concomitant increase in crucial imports would lead to an increase in total factor productivity growth of one percentage point a year in the nonagricultural sectors. All other assumptions are the same as in the base run.

Table 2 presents cumulative trade flows and balance of trade figures for the simulations, and Table 3 presents various macro variables for 1984. To achieve the objective of eliminating import rationing by 1984, the model results indicate the need for additional net cumulative borrowing of $5.1 billion between 1982 and 1984. The substantial increase in borrowing required to eliminate the excess demand for foreign exchange by 1984, even with a major real devaluation in 1983 and a projected improvement in export growth in 1984, attests to the severity of the foreign exchange crisis during the 1982-83 period.

1See World Bank [1983], p. 362.
### TABLE 1
Counterfactual Simulations: Growth Rates, 1981-1984

<table>
<thead>
<tr>
<th>Variable</th>
<th>Simulation Base run</th>
<th>C-1</th>
<th>C-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross domestic product</td>
<td>1.4</td>
<td>3.1</td>
<td>3.6</td>
</tr>
<tr>
<td>Private consumption</td>
<td>1.6</td>
<td>3.4</td>
<td>3.4</td>
</tr>
<tr>
<td>Gross fixed investment</td>
<td>-2.3</td>
<td>2.2</td>
<td>1.3</td>
</tr>
<tr>
<td>Exports</td>
<td>2.0</td>
<td>2.0</td>
<td>6.4</td>
</tr>
<tr>
<td>Imports</td>
<td>-1.3</td>
<td>2.3</td>
<td>2.6</td>
</tr>
<tr>
<td>Real wage, manufacturing</td>
<td>-1.1</td>
<td>0.2</td>
<td>0.7</td>
</tr>
</tbody>
</table>

- Exports and imports include services. All variables are in real terms (1981 prices).

### TABLE 2
Counterfactual Simulations: Cumulative Trade Flows, 1982-1984

<table>
<thead>
<tr>
<th>Variable</th>
<th>Simulation Base run</th>
<th>C-1</th>
<th>C-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports</td>
<td>47.89</td>
<td>47.89</td>
<td>53.24</td>
</tr>
<tr>
<td>Imports</td>
<td>50.79</td>
<td>50.79</td>
<td>52.50</td>
</tr>
<tr>
<td>Balance of trade</td>
<td>-2.19</td>
<td>-2.90</td>
<td>0.74</td>
</tr>
<tr>
<td>Variable</td>
<td>Base run</td>
<td>C-1 percent</td>
<td>C-2 percent</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>----------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Private consumption (as product)</td>
<td>53.5</td>
<td>53.7</td>
<td>53.6</td>
</tr>
<tr>
<td>Fixed investment/gross domestic product</td>
<td>24.0</td>
<td>26.8</td>
<td>23.5</td>
</tr>
<tr>
<td>Exports/gross domestic product</td>
<td>27.7</td>
<td>26.3</td>
<td>29.5</td>
</tr>
<tr>
<td>Imports/gross domestic product</td>
<td>26.3</td>
<td>27.9</td>
<td>27.7</td>
</tr>
<tr>
<td>Foreign savings/&lt; total savings</td>
<td>-4.8</td>
<td>5.1</td>
<td>-6.3</td>
</tr>
<tr>
<td>Enterprise savings/&lt; total savings</td>
<td>54.0</td>
<td>48.6</td>
<td>54.7</td>
</tr>
<tr>
<td>Government savings/&lt; total savings</td>
<td>19.3</td>
<td>17.8</td>
<td>19.9</td>
</tr>
<tr>
<td>Enterprise savings/&lt; value added</td>
<td>18.2</td>
<td>17.9</td>
<td>17.9</td>
</tr>
<tr>
<td>Real wage index (1984=100)</td>
<td>96.6</td>
<td>100.6</td>
<td>102.1</td>
</tr>
</tbody>
</table>

*a National accounts rates are of magnitudes in current domestic prices.

*p Economywide, including agriculture and services.

**c In manufacturing.
Reflecting the model's treatment of the direct and indirect costs of a foreign exchange shortage and the rationing mechanisms it sets in motion, the C-1 simulation indicates the effects of the additional borrowing on Yugoslav economic performance. The simulation results show 1981-1984 growth rates of 3.1 percent for GDP, 3.4 percent for private consumption, and 2.2 percent for gross fixed investment (Table 1). Even with substantial additional borrowing, aggregate growth rates remain much lower than those realized in the 1970s. This is, in part, the result of the projected slow growth in investment, albeit at a positive rate, in the C-1 simulation. Equally important, however, are the assumptions about total factor productivity which is projected to continue to decline during the period, although at slower rates than in the base run. While an improvement over the base run, these assumptions are, nonetheless, very conservative in that total factor productivity is not assumed to increase in the short run at rates realized in the 1970s. The fundamental underlying assumption is that past disruptions and continued nonmarket administrative interventions in the economy would prevent realization of improvements in efficiency, even if the shortage of intermediate imports had been relaxed.¹

Although the C-1 simulation indicates that Yugoslavia would have been able to grow more rapidly in the 1981-1984 period if it had been able to borrow more, it says nothing about the wisdom of such a borrowing strategy. Additional external loans during this period would have added to Yugoslavia's debt-servicing problems in the future, and a prudent borrowing strategy would

¹See Nishimizu and Page [1982], who have measured total factor productivity growth by sectors and regions in Yugoslavia, and discuss reasons why productivity growth has been so slow there; see also World Bank [1983].
have required a comparison of the real cost of external funds with the expected real benefits from their use. The C-1 simulation is instructive, none-the-less, because it gives an idea of the growth-borrowing trade-off that confronted Yugoslav policymakers during the 1981-1984 period.

A comparison of the additional borrowing in the C-1 simulation with an estimate of Yugoslavia's cumulative interest payments in 1982 and 1983 also suggests the effects on the Yugoslav economy of the shortening of maturities and the climb in interest rates in international capital markets. Yugoslavia paid an estimated $2.1 billion in interest in 1982 and is projected to pay about the same amount in 1983. Relative to the outstanding stock of debt, these figures convert to an effective interest burden of about 12 percent in both years. Similar figures for the 1979-80 period indicate that interest payments were only 6.5 percent of the outstanding stock of debt in those years. If, in the absence of worsening credit market conditions, Yugoslavia had been able to maintain the same relationship between interest payments and debt in the 1982-83 period, its interest payments would have amounted to about $2.3 billion. Seen from this vantage point, about half of the additional funds that would have been required for Yugoslavia to eliminate its foreign exchange shortage by 1984 can be attributed to the effects of deteriorating conditions in external credit markets.

In the second counterfactual simulation, called C-2, we assume that Yugoslav exports grew at an average annual rate of 6.4 percent in 1982 and 1983. Such performance implies a reasonable (nonrecessionary) growth in world trade and assumes that Yugoslavia would have been able to maintain its share in world markets. This performance is in sharp contrast to the base run in which the world recession leads to no projected growth in world trade in 1982 and
1983 and only very slow growth of Yugoslav exports (2 percent a year). We also assume, as in C-1, that the Yugoslavs would have been able to borrow any additional funds required to eliminate their foreign exchange shortage by 1984 under these more optimistic export earning assumptions.

In addition, in simulation C-2, we assume a further increase in total factor productivity growth of one percentage point a year in the nonagricultural sectors (yielding rates of -2.0, 0.0, and 0.0 percent for 1982, 1983, and 1984, respectively). This latter assumption reflects the view that increased exports would have improved productivity through a combination of better resource allocation and, implicitly, a lessening of administrative interference in market incentives. Thus, the scenario does not involve just an improvement of world market conditions for Yugoslav exports but also assumes a Yugoslav response to the improved export opportunities.

The results presented in Table 2 indicate that the more rapid export growth in simulation C-2 yields additional cumulative export earnings of $5.35 billion between 1982 and 1984 and that additional cumulative foreign borrowing of $1.45 billion would have been needed in the same period—all compared to the base run. The GDP growth is better in simulation C-2, but consumption growth is the same as in C-1 and investment growth is lower (Table 1). The reason for this mixed aggregate performance is that the increased export earnings are used partly to offset the increased borrowing generated in simulation compared to C-1, which represents about 6 percent of GDP in 1984.

Once again, the results attest to the severity of the foreign exchange constraints facing Yugoslavia in the 1981-1984 period. In the C-2 scenario, Yugoslavia is able to reduce the constraint through both additional export
earnings and additional borrowing. This is a preferable solution compared to the pure borrowing scenario of the C-1 simulation because it implies a smaller debt-servicing burden in the future.

Table 3 provides some macro indicators for 1984 for the base run and the two counterfactual simulations. As one would expect, the higher borrowing simulation (C-1) increases total investment and the share of foreign savings in total savings. The higher export simulation (C-2) leads to roughly the same investment share in GDP as in the base run and a similar structure of savings. Manufacturing real wages are also highest in this simulation, as would be expected with a significant increase in manufactured exports.

Finally, it is important to note that a comparison of the C-2 results with the base run simulation provides only a rough estimate of the cumulative effects of adverse changes in external credit and trade conditions on the Yugoslav economy between 1981 and 1984. The comparison undoubtedly overstates these external effects because the C-1 simulation implicitly assumes that Yugoslavia's actual export performance in 1982-83 was largely the result of adverse external conditions. In fact, an overvalued dinar and other domestic policies that produced a bias in incentives against exports played a large role. The counterfactual simulations are optimistic in that they assume that Yugoslav exporters would have been able to respond to the improvement in export opportunities.

In making future projections of Yugoslav performance, it is necessary to project the policy choices that will be implemented. In this section we explore the implications of a variety of scenarios, focusing on the trade-offs
among different constraints and macroeconomic policies. In all these experiments, we start from the assumption that Yugoslavia will implement successfully a change in development strategy toward a more open economy with increased exports. Also, we assume gradually improving world conditions, especially with regard to Yugoslav export markets. Tables 4 to 6 give the results.

In the first experiment (F-1), the change in development strategy is modeled by assuming that policymakers quickly remove the historical bias in incentives against exports. After the large real devaluation in 1983, it is assumed that Yugoslavia will maintain a constant price level deflated exchange rate throughout the projection period (to 1990). The macro assumption is that policymakers do not try to use the exchange rate to counteract inflation but use nominal devaluations to correct for any differential between Yugoslav inflation and inflation in her trading partners. It is also assumed that import rationing is quickly eliminated, although the levels of official tariffs are assumed to remain unchanged.

As discussed earlier, in the forward-running version of the model, exports are determined endogenously with explicit foreign demand curves for Yugoslav goods. In simulation F-1, the result is that exports grow at an average annual rate of 6.5 percent for the 1983-1990 period (Table 4). Compared to the experience of other semi-industrial countries, this export growth rate is quite moderate. However, given past Yugoslav performance and the confused incentive structure, it is probably best to err on the conservative side in forward simulations.

Experiment F-1 assumes that there is a very slight fall in the share of investment in GDP over the 1983-1990 period and that the share of foreign
TABLE 4
Forward Simulations: Growth Rates, 1983-84 and 1984-1990

<table>
<thead>
<tr>
<th>Variable</th>
<th>Simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F-1</td>
</tr>
<tr>
<td><strong>Growth rates (1983-84)</strong></td>
<td>percent</td>
</tr>
<tr>
<td>Gross domestic product</td>
<td>2.9</td>
</tr>
<tr>
<td>Private consumption</td>
<td>2.7</td>
</tr>
<tr>
<td>Gross fixed investment</td>
<td>0.4</td>
</tr>
<tr>
<td>Exports</td>
<td>8.0</td>
</tr>
<tr>
<td>Imports</td>
<td>6.3</td>
</tr>
<tr>
<td>Nominal wage, manufacturing</td>
<td>26.2</td>
</tr>
<tr>
<td>Real wage, manufacturing</td>
<td>0.6</td>
</tr>
<tr>
<td>Gross domestic product deflator</td>
<td>25.6</td>
</tr>
<tr>
<td><strong>Growth Rates (1984-1990)</strong></td>
<td></td>
</tr>
<tr>
<td>Gross domestic product</td>
<td>4.1</td>
</tr>
<tr>
<td>Private consumption</td>
<td>3.5</td>
</tr>
<tr>
<td>Gross fixed investment</td>
<td>3.6</td>
</tr>
<tr>
<td>Exports</td>
<td>6.3</td>
</tr>
<tr>
<td>Imports</td>
<td>3.9</td>
</tr>
<tr>
<td>Nominal wage, manufacturing</td>
<td>17.5</td>
</tr>
<tr>
<td>Real wage, manufacturing</td>
<td>1.6</td>
</tr>
<tr>
<td>Gross domestic product deflator</td>
<td>15.3</td>
</tr>
</tbody>
</table>

\*National accounts variables are in real terms (1981 prices).
TABLE 5
Forward Simulations: Average Annual Trade Flows, 1984-1990

<table>
<thead>
<tr>
<th>Variable</th>
<th>Simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F-1</td>
</tr>
<tr>
<td>Exports</td>
<td>25.22</td>
</tr>
<tr>
<td>Imports</td>
<td>22.91</td>
</tr>
<tr>
<td>Balance of trade</td>
<td>2.31</td>
</tr>
<tr>
<td>Cumulative borrowing differential&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.00</td>
</tr>
</tbody>
</table>

<sup>a</sup>Total difference in the cumulative balance of trade over the seven-year period from simulation F-1.
TABLE 6

Forward Simulations: Selected Indicators, 1990

<table>
<thead>
<tr>
<th>Variablea</th>
<th>Simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F-1</td>
</tr>
<tr>
<td>Indices (1983 = 100)</td>
<td></td>
</tr>
<tr>
<td>Gross domestic product</td>
<td>130.9</td>
</tr>
<tr>
<td>Private consumption</td>
<td>126.1</td>
</tr>
<tr>
<td>Capital stock</td>
<td>146.1</td>
</tr>
<tr>
<td>Real wage, manufacturing</td>
<td>108.6</td>
</tr>
<tr>
<td>Gross domestic product deflator</td>
<td>293.9</td>
</tr>
</tbody>
</table>

Ratios (percent)b

<table>
<thead>
<tr>
<th></th>
<th>F-1</th>
<th>F-2</th>
<th>F-3</th>
<th>F-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private consumption/gross domestic product</td>
<td>53.1</td>
<td>54.9</td>
<td>52.7</td>
<td>51.8</td>
</tr>
<tr>
<td>Fixed investment/gross domestic product</td>
<td>22.9</td>
<td>19.2</td>
<td>19.3</td>
<td>19.2</td>
</tr>
<tr>
<td>Exports/gross domestic product</td>
<td>34.0</td>
<td>36.1</td>
<td>38.5</td>
<td>39.8</td>
</tr>
<tr>
<td>Imports/gross domestic product</td>
<td>28.7</td>
<td>28.8</td>
<td>29.1</td>
<td>29.3</td>
</tr>
<tr>
<td>Foreign savings/total savings</td>
<td>-19.3</td>
<td>-30.4</td>
<td>-39.14</td>
<td>-43.4</td>
</tr>
<tr>
<td>Enterprise savings/total savingsc</td>
<td>48.3</td>
<td>46.5</td>
<td>56.3</td>
<td>61.4</td>
</tr>
<tr>
<td>Government savings/total savingsc</td>
<td>28.4</td>
<td>32.8</td>
<td>32.5</td>
<td>32.4</td>
</tr>
<tr>
<td>Enterprise savings/value addedc</td>
<td>15.0</td>
<td>12.6</td>
<td>15.3</td>
<td>16.7</td>
</tr>
</tbody>
</table>

*a National accounts variables are in current domestic prices.
*b National accounts variables are in current domestic prices.
*c Economywide, including agriculture and services.
savings in total savings falls significantly as Yugoslavia repays its foreign debt (Table 6). These projections reflect stated Yugoslav policy objectives. It is assumed that total factor productivity growth will recover by 1985, gradually increasing to one percentage point a year by 1987 and remaining at that rate. This projected increase is assumed to follow from the shift in development strategy, as has occurred in other countries pursuing such policies.\(^1\) The assumed increase in total factor productivity growth, in fact, is quite small when compared to that in other semi-industrial countries.\(^2\) The result is that the GDP growth rate is 3.9 percent a year for the 1983-1990 period with some acceleration in the latter part of the period.

Simulation F-1 represents an optimistic scenario but is conservative in many of its behavioral assumptions. The fundamental optimistic assumption is that the Yugoslavs are able to implement a shift in incentives to achieve a more open development strategy. Given this shift in policy, the concomitant assumptions about world conditions and the responsiveness of the economy are conservative, especially when compared to the experience of other semi-industrial countries that have faced similar difficulties, for example, Turkey.

Simulation F-1 is also based on fairly conservative assumptions about the ability of Yugoslav policymakers to maintain macro balance. The fixed investment rate, which the Yugoslavs are seeking to lower, is assumed to decline slightly--to 22.9 percent of GDP in 1990 (down from about 26 percent in the 1981-1985 period). The projected inflation rate is assumed to be 16.2 percent

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\(^1\)See Nishimizu and Robinson [1983] for evidence of this relationship. Balassa [1982] also discusses why one would expect links between an open development strategy and faster productivity growth.

\(^2\)See Chenery [1984] for a survey of evidence from a number of semi-industrial countries.
a year on average over the 1983-1990 period with significant deceleration over time (Table 4). The assumed maintenance of a roughly constant price level deflated exchange rate leads to balance of payments and debt-repayment projections that are consistent with projections by Yugoslav authorities and international agencies. Given the projections of real investment and the balance of payments, domestic savings adjusts to achieve macro balance. In simulation F-1, the major adjustment is through changes in government savings which are projected to increase as a share of total savings. In this simulation the government does not implement a strong incomes policy (i.e., it is unwilling to restrict enterprise payments to workers) and, hence, permits a small, gradual increase in real personal income of about 1.1 percent a year. Thus, these macro projections reflect a continued policy effort to control government expenditure (collective consumption and nonproductive investment) and a relaxation of administrative controls on personal incomes.

We have also done a number of simulations with the CGE model to explore the implications for future Yugoslav performance of different assumptions about the macroeconomic policy options available to policymakers. In these experiments we have specified a different macro-equilibrating mechanism (or macro "closure") in the model than that used in the historical simulations. In these experiments, the aggregate investment rate out of GDP, the exchange rate, and the level of personal income of workers are set exogenously. The aggregate price level adjusts endogenously to achieve a savings-investment balance. The implicit assumption is that the government, by controlling the level of nominal personal income, is able to control the distribution or savings decisions of enterprises. The price level adjusts so that, through inflation, real incomes are made consistent with macroeconomic equilibrium.
The inflationary mechanism implicit in this specification is a kind of "cost push," but inflation is also sensitive to the level of investment demand. For a given level of investment, an increase in personal income will lead to higher prices. However, for a given level of nominal income, increased investment will also lead to higher prices, lower real income, and, hence, higher enterprise saving.

This view of the inflationary mechanism in Yugoslavia is rather special in that it reflects particular Yugoslav institutional features. For example, the way personal incomes are set by enterprises is assumed to be independent of decisions about employment, so that inflation has no feedback on aggregate employment. There is evidence that this macro specification is appropriate for Yugoslavia, but one would not want to apply it to other countries indiscriminately.¹

In addition to simulation F-1, which might be considered as a forward base run, we have done three other simulations which explore the trade-offs among macro forces and policy choices. All these experiments start from F-1 and are thus also conditional on its major policy assumptions: (1) a similar exchange rate policy, (2) an export incentive system that allows exporters to respond to change in prices, and (3) improvements in world conditions after 1983. The simulations all start from the same 1983 solution and include the same behavioral specification discussed above regarding endogenous foreign capital flows and inflation.²

Simulation F-2 assumes a lower investment rate out of GDP than in F-1, starting in 1984 and continuing throughout the period. The fixed investment rate falls to 19.2 percent (in 1990) compared to 22.9 percent in F-1.

¹See Tyson [1977]; also, see Horvat [1971] and Tyson [1980].
Simulation F-3 adds to F-2 a policy regime limiting nominal wage increases. As a consequence of wage restraint, the rate of growth of nominal wages is 4.7 percentage points lower in 1984 and about 1 percentage point lower thereafter.

Simulation F-4 adds to F-3 higher total factor productivity growth assumed to accompany the shift in development strategy. The total factor productivity growth rates are -1.0, 1.5, 1.5, and 1.5 percent a year for the nonagricultural sectors in 1984, 1985-86, 1987-88, and 1989-90. The comparable rates for the other simulations are -2.0, 0.5, 1.0, and 1.0 percent a year.

The impact effect of these experiments hits in 1984, and then the economy moves along a different path for the rest of the period. The results are given in Tables 4 to 6. Table 4 indicates clearly the impact of the different scenarios in 1984. Compared to F-1, the fall in investment in the other experiments is dramatic—a minus 10-11 percent growth rate in 1984 compared to a 0.4 percent rise in F-1. The impact of the wage restraint in simulations F-3 and F-4 is also evident.

In simulation F-2, the decline in investment is significant. The investment share in GDP is about 4 percentage points lower throughout the period, and the capital stock in 1990 is about 5 percent lower than that in the F-1 simulation. The policy has the desired effect on the balance of trade. Lower investment leads to slower inflation which, given the fixed nominal exchange rate, leads to a real devaluation in 1984. Exports increase and, due largely to lower growth, import demand decreases. The net result is that cumulative net foreign capital inflows are $15.5 billion less than in simulation F-1 (Table 5). The slower inflation actually leads to higher real wages in 1984,
since the nominal wage growth is roughly the same as in F-1. However, the slower GDP growth over the period leads to slower real wage growth as well, finally eroding most of the initial gain in real wages (see Table 6).

In simulation F-3, the assumed wage restraint policy leads to a lower inflation rate in 1984 but lower growth of real wages compared to F-2. The lower inflation leads to an even higher real devaluation in 1984 and a higher export growth rate. The net effect is a much greater change in cumulative foreign capital inflows ($23.2 billion less than in F-1 and $7.7 billion less than in F-2). The wage restraint policy is thus successful in that, coupled with the decrease in investment, it leads to even better balance-of-payments performance. GDP growth is lower in 1984, although the difference is slight by the end of the period. Real wages, however, never recover and remain significantly lower at the end of the period.

The final simulation, F-4, assumes that the shift in development strategy to increased exports and reliance on market mechanisms leads to higher total factor productivity growth. In this more optimistic scenario, exports increase even more as total output is higher. GDP growth is higher than in F-1 and much higher than in F-2 and F-3. Higher exports lead to improved balance-of-trade performance, with cumulative net foreign capital inflows of $3.2 billion lower than F-3 (and $26.6 billion lower than F-1). Real wages, of course, also grow faster than in F-3 and F-1.

Table 6 indicates that the four scenarios have quite different implications for the composition of savings. They all show a dramatic increase in the share of government savings over time and a dramatic decline in the share of foreign savings. The better the trade performance, the more debt repayment
and the higher the negative share of foreign savings in total savings. In simulations F-1 and F-2, the share of enterprise savings falls over time. In the two wage restraint scenarios (F-3 and F-4), enterprise shares of total savings increase slightly over time, although enterprise savings as a share of total value added ends up in 1990 slightly lower than in 1984.

The results from the various forward scenarios indicate the importance of links between a change in incentive policies and supporting macro policies in determining the success of a new development strategy. A real devaluation is needed early in the period in order to remove the bias in incentives against exporting which has been very strong in the Yugoslav system. The real devaluation will work only if enterprises can respond to the shift in relative prices and reallocate resources to increase the production of tradables—both exports and import substitutes. A real devaluation, however, cannot be achieved without first achieving control over macro balances. The reduction of aggregate investment is a major part of the macro package. A nominal incomes policy is also useful because it lowers inflation and so supports a real devaluation early in the period that will not be eroded quickly over time.

Note that, in contrast to an IMF policy package, the goal of an incomes policy is not to reduce real wages (and so improve "competitiveness") but to help control inflation and support a real devaluation. The evolution of real incomes over time depends on the success of the whole in development strategy. In particular, it depends on the speed of recovery in total-factor productivity growth and capacity utilization and on policies with regard to the speed of repayment of foreign debt which will affect total absorption.
Conclusion

The forward-run experiments are cautiously optimistic in their assumptions about Yugoslav policy choices through the end of the 1990s. All of the experiments are optimistic about Yugoslavia's ability to pursue an appropriate exchange rate policy, thereby eliminating the excess demand for foreign exchange and the complicated rationing schemes that have been used in the past and are in place currently. As a result, the bias in incentives against exports is removed, and the attendant productivity and rent-seeking costs of these schemes disappear. All of the forward runs are cautious in their assessment of the likely consequences of these developments for both export and productivity performance. If the recent experience of other semi-industrial countries is any guide, the actual consequences should be even more favorable than those assumed in the simulations.

As far as macro policy is concerned, all of the forward simulations reflect Yugoslavia's stated policy objective to reduce its external indebtedness through the end of the 1990s. Consistent with its experience in the 1981-1983 period, and in earlier stop phases of its recurrent stop-go cycles, Yugoslavia is likely to continue to pursue this objective through a combination of austerity measures to cut domestic investment and/or to increase domestic saving. Austerity measures are likely to continue to include administrative efforts to reduce domestic expenditure and some form of regulation of enterprise decisions with regard to personal incomes and savings. The forward simulations analyze the implications of differences in the severity and composition of such austerity measures for economic performance. The results illustrate the trade-offs between the growth of domestic investment
and real wages—indicators of domestic absorption—on the one hand and the balance of payments and debt repayment on the other. None of the macro policy assumptions are unrealistically severe—at least in the light of actual 1981-1983 performance.

Despite the assumption of continued domestic austerity measures, all of the forward runs show improvements in overall indicators of economic growth and absorption relative to the 1981-1983 period. The recovery implied in the results critically depends on the assumption that Yugoslavia successfully introduces a more open, export-oriented development strategy. As the historical scenario of the 1981-1984 period suggests, austerity in the absence of such a strategy is likely to produce continued economic stagnation.

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1As of this writing (December, 1983), there are some worrisome signs that continued policy errors in the system of foreign exchange allocation will undermine the shift in incentives necessary to support the new strategy.


