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EVALUATION OF THE INVESTMENT ALLOCATION WITH THE SEMI-INPUT-OUTPUT METHOD: THE CASE OF YUGOSLAVIA'S BALANCE OF PAYMENTS ADJUSTMENT IN 1980-86

Andrej Hartman
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Andrej Hartman was a participant in the MA Programme (Economic Policy and Planning) at the Institute of Social Studies, 1988/89.

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TABLE OF CONTENTS

1. INTRODUCTION

1.1. Objective and Methodology of the Research

After the outburst of the foreign exchange crisis in 1979, Yugoslavia entered a period of economic crisis, characterized by a slowdown of economic growth, accelerating inflation and falling standards of living. After eight years of severe adjustment, the prospects for recovery and sustained economic growth are still not to be seen. Which factors are responsible for the failure to get out of stagnation? The persistence of the crisis points to certain medium- and long-term factors, and one of the first to think of is the system of investment allocation. The main objective of this research is to evaluate the efficiency of the allocation of investment resources in Yugoslavia during the 1980-1986 period in the context of balance of payments adjustment.

The investment pattern in this period developed under strong influence of policies adopted to tackle the balance of payments problem. As a general theoretical framework to explain their impact upon the economy in general and upon the investment in particular, the absorption approach to the balance of payments adjustment is used. In order to evaluate the efficiency of investment allocation, the actual investment pattern is compared with an "optimal" pattern, obtained from the application of the semi-input-output model to Yugoslavia.

The paper is structured as follows. The rest of chapter 1 provides a brief description of economic developments prior to 1980 that led to the present economic crisis, and of economic performance during the 1980-1986 period. Chapter 2 introduces the essentials of the absorption approach to the balance of payments and the principal policies that are used for the correction of the external disequilibrium. Chapter 3 presents a description of the semi-input-output model, the specification and the results of the basic model for Yugoslavia. After giving a brief account of the investment allocation framework, chapter 4 evaluates the actual investment pattern by comparing it with the solution of the semi-input-output model. The main findings of the paper and some policy recommendations are summarized in chapter 5.

1.2. Historical Background: From an Economic Miracle to the Brink of Bankruptcy

By any standards Yugoslavia's development achievements in three decades after the World War II. have been remarkable. After about ten years of the post-war reconstruction, the country entered a period of rapid economic development accompanied by profound structural changes, transforming an economically backward and agrarian society into a semi-industrialized country (some main indicators of past economic developments are presented in Table 1). Rapid economic growth (during some sub-periods ranking among the highest in the world), based on the strategy of accelerated industrialization, was the principal characteristic of the country's economic performance until this decade.

Table 1: Main Macroeconomic Indicators of the 1956-1986 Period

	1956-64	1965-72	1973-79	1980-86
Real growth rates (%)				
Gross social product	8.0	5.3	6.1	1.3
Gross social product per capita	6.8	4.3	5.1	0.3
Gross social product in industry	12.2	6.4	7.5	3.0
Gross social product in agriculture	3.2	1.5	3.3	1.5
Employment	5.6	2.0	3.9	2.6
Industrial employment	6.8	2.5	4.9	3.2
Labor productivity	2.4	3.3	2.2	-1.3
Real personal incomes (social sector)	7.0	5.7	1.8	-3.0
Gross investment in fixed assets	12.1	3.5	8.0	-5.9
Merchandise exports	12.8	6.8	2.1	2.5
Merchandise imports	11.1	8.6	5.5	-6.0
Nominal growth rates (%)				
Retail prices	5.6	15.7	18.2	50.8
Share in gross social product (%)				
Gross investment in fixed assets	31.8	30.1	34.1	27.0

Source: Statistical Yearbook of Yugoslavia, Federal Institute of Statistics, various issues.

Between 1956 and 1979, annual growth in real gross social product[1] averaged 6.5 percent and 5.5 percent per capita, an outcome fostered by a dynamic expansion of industrial production. Growing at 9.0 percent annually over the period 1956-1979, industry became the dominant productive activity in the economy, accounting for almost 40 percent of total gross social product in 1980. The principal policy for achieving rapid pace of industrialization, extensivelly employed throughout the post-war period, was the mobilization of a large share of domestic resources for investment in fixed assets. As a result, investment rate was as high as 32 percent over the entire period and never declined below 30 percent. This heavy reliance upon investment was a salient feature of the country's development strategy which, as will be discussed later, had an immediate bearing on the developments that subsequently led to the economic crisis of the 1980s.

An integral part of the industrialization strategy was a growing integration with the world economy. Although balance of payments difficulties arose from time to time, mainly as a consequence of the over-riding and invariable priority that was attached to the economic growth objective, until early seventies merchandise exports and imports grew faster than gross social product. This pattern developed as a result of an explicit policy to pursue import substitution and export promotion simultaneously (see Chittle, 1977), although the emphasis placed upon each of the two strategies changed from one period to another in correspondence with the changes in domestic development goals and external economic conditions.

Institutional changes that have been introduced in several stages until 1964 were geared towards a gradual transformation of the economic system from a centrally planned to a more market oriented system. Extensive economic reforms that were initiated in 1965 represented the culmination of this process, shaping the basic institutional framework for subsequent two decades. The primary objective of the reforms was to establish the market as the principal mechanism for allocation of resources, and to open the economy towards world markets. A substantial decentralization and destatization took place by transferring many functions from the federal to the lower levels of government, and to enterprises and banks. The fiscal and financial systems

were reformed. The multiple exchange rate was replaced by a single exchange rate, tariffs and import controls were reduced, and a substantial devaluation took place. The structure of relative prices was altered to reflect world prices. The decision to open the country to foreign investment in 1967 was also part of the same liberalization process.

The second half of the 1960s and early 1970s, until the beginning of the first oil crisis, were characterized by a continuing substantial rate of economic growth, although the pace already showed signs of deceleration. Priorities continued to be long-term development goals; short-term demand-oriented stabilization policies were confined to a very limited set of available policy instruments. For example, the fragmentation of budgetary authorities greatly handicapped the role of fiscal policy as an instrument of economic policy. In addition, the philosophy that budgets should be balanced created the pro-cyclical nature of fiscal policy (Horvat, 1971, p.157). Monetary policy could also exert only a limited impact upon macro-economic variables, which was among other factors due to a widespread practice of financial indiscipline (see Knight, 1984) and to the absence of a capital market. Economic management, significantly handicapped by the reduction of policy instruments, thus failed to cope with the developments that ensued from the liberalization of the economy. The consequences were reflected in the overall performance of the economy - despite the long-term growth of output, inflation, unemployment and balance of payments difficulties became deeply entrenched problems of the Yugoslav economy.

During this period, the growth path of the economy has become closely linked with the balance of payments situation as the logical consequence of the opening of the economy to the outside world. Exports still grew faster than gross social product, but began to lag behind the growth of imports. Instead of moderating the expansion of imports, intensive process of import substitution boosted imports of intermediate goods which more than compensated for the decreasing share of imported final goods. Strong dependency upon flows of intermediate goods from abroad has become a salient structural feature of the economy ever since. Over the period, Yugoslavia ran only moderate deficits in the current account, but the structure of the latter

gradually changed. The share of merchandise exports consistently declined in favor of non-factor services (tourism, transport) and workers' remittances, while the share of merchandise imports remained relatively stable. As a result, the trade balance was in constant and substantial deficit, which was covered by the surplus in non-factor services and current transfers from abroad.

The relationship between merchandise imports, exports and domestic economic growth developed into a specific pattern, which has caused cyclical fluctuations in the Yugoslav economy (see Horvat, 1971). A typical cycle began by an expansion of exports, both compared to the growth of output and imports. When export expansion translated itself into domestic growth, this in turn required an increased inflow of imported intermediates, and created induced demand for imports of consumption goods. With increased domestic final demand, crowding out of exports occurred - producers tended to divert tradeables from foreign to domestic markets where it was easier to sell than abroad. The down-turning point of the cycle started - economic growth rates slackened as a result of foreign exchange shortages and tighter domestic demand policies. The slowdown again stimulated exports, and the economy entered a new cycle.

The stop-go pattern of economic growth continued during the seventies, but this time coincided with the adverse effects of the external shocks. In 1973-1975 and 1978-1979, increases in oil prices worsened Yugoslavia's terms of trade; the world-wide recession reduced demand for Yugoslav exports and cut down workers' remittances; increases in real interest rates in international financial markets in the later period placed an additional burden on the balance of payments. The adjustment strategy that Yugoslavia chose to cope with deteriorating external conditions was an ambitious restructuring of the economy achieved by an acceleration of investment. The aim was to maintain historically high rates of output and employment and at the same time to reduce vulnerability of the economy to external shocks. An import substitution trade strategy was believed to be the most appropriate strategy to achieve both objectives simultaneously. First, the Yugoslav economy has become strongly dependent upon imported intermediates since the 1965

reforms. With rising oil prices it was felt that the increased dependence upon imports tended to diminish long-term perspectives of economic growth. Second, export pessimism developed as a result of the recession and growing protectionist barriers in most important trading partners in Western Europe, and increasing competition from other industrializing countries.

In accordance with this general orientation, in the 1976-1980 planning period Yugoslavia embarked upon the strategy of accelerated investment effort directed towards the priority sectors, predominantly in the raw materials and infrastructure base of the economy. The share of total fixed investment in gross social product (in current prices) rose to 36.9 percent over the 1976-1980 period, compared to 32.1 percent in the previous five-year period. Domestic savings, though, could not keep pace with the rapid expansion of fixed investments (underlying causes of such investment over-spending are analyzed in Burger, 1984) and the savings gap had to be filled with foreign savings. A recourse to foreign borrowing was further stimulated by the increased liquidity in the international financial markets. These developments were mirrored in the external balance. As a consequence of investment-led domestic growth, heavy purchases of capital goods from abroad additionally burdened the import bill (which has been already rapidly growing due to oil price increases), which in combination with sluggish growth of exports produced historically high deficits in the current account. In 1977-1980, the current account deficit averaged US$ 2,198 million, reaching the peak of US$ 3,661 million in 1979 (equivalent to 6 percent of gross social product). Total gross external debt in convertible currencies escalated from US$ 6.6 billion in 1975 to US$ 18.8 billion in 1980, with the debt-servicing ratio (repayments of principal and interest as a percent of total current account receipts in convertible currencies) reaching 21.6 percent. With reduced access to foreign loans (due to general hardening of lending terms in international capital markets and eroding creditworthiness of Yugoslavia) and dried up foreign exchange reserves, a severe foreign exchange crisis emerged in 1979 and marked the beginning of Yugoslavia's worst and longest economic crisis.

1.3. Economic Performance in 1980-1986: The Stagflationary Trap

The gravity of the balance of payments crisis dictated a marked tightening of domestic economic policies since late 1979, and the implementation of a package of macroeconomic stabilization policies in 1980 which was the first in a series of stabilization programs that have been initiated since. Their principal objective was to fill the foreign exchange gap and enable transfers of resources to the rest of the world, required to service the accumulated foreign debt. The performance of the economy during the 1980-1986 period (see Table 2) reflected the effects of the policies put in place to pursue this objective .

Table 2: Selected Macroeconomic Indicators of the 1979-1986 Period

	1979	1980	1981	1982	1983	1984	1985	1986
Real growth rates (%)								
Gross social product	7.0	2.2	1.4	0.5	-1.0	2.0	0.5	3.5
Private consumption	5.2	0.7	-1.0	-0.1	-1.7	-1.0	0.0	4.5
Public consumption	7.9	-1.0	-4.8	-0.7	-5.1	-0.2	1.9	4.6
Fixed investment	6.4	-5.9	-9.8	-5.5	-9.7	-9.6	-3.7	3.5
Employment	4.3	3.2	3.0	2.3	1.9	2.1	2.5	3.0
Number of job seekers	2.5	3.0	3.0	6.6	5.6	7.1	6.6	4.5
Labor productivity	2.6	-1.0	-1.6	-1.8	-2.8	-0.1	-1.0	0.5
Real personal incomes (social sector)	0.0	-7.5	-5.0	-3.3	-10.3	-6.1	2.8	10.1
Merchandise exports	4.0	11.0	5.0	-9.0	0.0	8.0	7.0	-3.0
Merchandise imports	18.0	-10.0	-13.0	-14.0	-7.0	-5.0	2.0	6.0
Nominal growth rates (%)								
Retail prices	21.9	30.4	46.0	29.5	39.1	56.7	75.7	88.1
Share in GSP (%)								
Fixed investment	38.4	35.1	31.0	29.2	25.3	23.0	23.1	22.2

Table 2 continued

	1979	1980	1981	1982	1983	1984	1985	1986
Others								
Trade balance (billions of US dollars)	-7.2	-6.1	-4.8	-3.1	-2.2	-1.7	-1.6	-2.0
Current account balance (millions of US dollars)	-3661	-2291	-750	-464	274	504	833	1100
Debt servicing ratio (% of current account receipts)	20.0	21.6	23.7	26.7	34.2	36.8	38.6	39.5

Source: Statistical Yearbook of Yugoslavia, Federal Institute of Statistics, various issues.
OECD Economic Surveys 1984/1985 and 1987/1988: Yugoslavia, OECD (for indicators under the heading "Others").

Except for the year 1986, when there was an upturn in the rate of economic growth and of real domestic final expenditure (as a result of the policy-induced revival of domestic demand coinciding with the fall of oil prices and world interest rates), the economy experienced a long period of stagflation, unparalleled in the country's history. The real growth of gross social product averaged 1.3 percent, while inflation accelerated from 30 percent in 1980 to 88 percent in 1986. Despite slack economic conditions, employment continued to grow at rates much higher than those of output growth. The "social role" of enterprises which makes lay-offs extremely difficult, coupled with strong social pressure to alleviate unemployment, explain the continuous growth in numbers employed. As a result, labor productivity was on a downward trend throughout the period 1980-1985, adding to stagflationary tendencies. Unemployment nevertheless kept increasing because of the growth in labor force and continuous outflow from agriculture.

Domestic demand grew rapidly throughout the period in nominal terms, but declined in real terms in the period 1980-1984; in 1985 and 1986 it also grew in real terms. The structure of domestic demand was also altered substantially. By far the most significant cutbacks were in fixed investment; next largest fall in real terms was in public consumption, while

private consumption was the least affected, although the decline in real personal income per worker was much sharper.

Despite unfavorable international environment in the beginning of the 1980s (rising oil prices, increased interest rates in international financial markets, the recession in the world economy), adjustment policies succeeded to produce dramatic improvements in the external balance. The current account deficit which amounted to US$ 3.7 billion in 1979 was transformed into a small surplus in 1983 (US$ 274 million), which continued growing consistently in the subsequent years so as to reach US$ 1,100 million in 1986. Until 1985, this improvement was achieved primarily by large reductions in imports, which caused supply bottlenecks, and in addition to the effects of domestic real demand compression adversely affected output performance. On the other hand, export volumes did not increase rapidly nor consistently, which was partly due to depressed export markets and partly to deficiencies of domestic foreign exchange rationing schemes. The significant improvement of the current external balance has stemmed the rise in foreign indebtedness since 1981. Since then, the total gross external debt in convertible currencies remained roughly stable at US$ 18.5 billion (about one half of gross social product). The debt servicing ratio, though, continued to increase from 21.6 percent of total current account receipts in convertible currencies in 1980 to almost 40 percent in 1986. To cope with this debt burden, Yugoslavia was forced to seek a debt relief package with its creditors in 1983 under the umbrella of the IMF, which was followed by similar packages in subsequent years.

2. THE BALANCE OF PAYMENTS ADJUSTMENT

2.1. Introduction

Various alternative ways of analyzing the balance of payments and adjustment-related problems have been proposed, each of them having its roots in a particular school of economic thought. Three broadly defined approaches to balance of payments may be distinguished: the traditional or elasticities approach, the Keynesian, and the monetary approach (Gowland, 1983, p.70). The central and common feature of all the theories is the proposition that the adjustment effect - the improvement of the balance of payments deficit - is brought about by a change of the domestic price level relative to prices in trade-related economies. As a consequence, demand for exports tends to rise and conversely for imports to fall, both effects leading to an improvement in the balance of payments deficit. It is the mechanism by which the change in relative prices is achieved that marks the fundamental distinction between the three approaches. The traditional approach relies mainly on the price mechanism in line with the classical view on the functioning of the economy; the second, drawing on the basic postulates of the Keynesian theory of income determination, emphasizes the relative income movements; and the third, having the quantity theory of money at its core, views the balance of payments adjustments primarily as monetary phenomena.

There is no doubt that all three theoretical approaches need to be taken into account when formulating a consistent framework for adjustment policies. It is, however, beyond the scope of this presentation to discuss each of them separately and in detail. Instead, a brief theoretical account of the adjustment process in terms of a synthesis of the traditional and the Keynesian approach, known as the "absorption approach", will be given. The concepts introduced by this approach became standardized categories in the literature on the balance of payments adjustment.

2.2. The Theoretical Framework: The Absorption Approach to the Balance of Payments

The absorption approach was first formulated by Alexander (1952) and is primarily concerned with the short-term effects of devaluation upon the balance of payments. The advantage of the approach is that it provides a general analytical framework for studying the behaviour of the economic system as a whole, taking into account both the price and income aspects of the adjustment process. It is devised in aggregate terms and allows the inclusion of a theory of money in the adjustment analysis as well. The approach, though, abstracts from capital movements.

The starting point of the analysis is the following basic national accounting identity (using conventional symbols):

$$Y = C + I + G + X - M \tag{1}$$

Rearranging eq. (1) gives

$$X - M = Y - (C + I + G) \tag{2}$$

Using new symbols B and A it can be written

$$B = Y - A \tag{3}$$

Equation (3) shows explicitly that the foreign balance (B) equals the difference between output (Y) and total domestic expenditure or absorption (A). Obviously, a deficit in the foreign balance can be corrected either by increasing real domestic output or by reducing domestic absorption. A change in the foreign balance equals then

$$dB = dY - dA \tag{4}$$

The change in absorption (dA) depends upon two sets of factors - those which cause it to vary in relation to income and those which are independent of the income level. The impact of the first set of factors is given by the marginal propensity to absorb (c), which can be defined as the sum of the

propensities to consume and to invest, well-known from the Keynesian analysis. The second set of factors captures changes in absorption coming from any other cause than the change in real income (dD). In algebraic terms it can be written (following the exposition in Scammell, 1975, p.47):

$$dA = cdY - dD \tag{5}$$

Combining eq. (4) and (5) gives

$$dB = (1 - c)dY + dD \tag{6}$$

Eq. (6) represents the crux of the absorption approach. It states that the change in the foreign balance depends upon three components - one resulting from changes in real income (dY), one from the marginal propensity to absorb (c) and one from the direct effects on absorption (dD).

So far nothing has been said about the driving force that starts the adjustment process. From equation (3) it is apparent that the deficit can be corrected either by increasing output or by reducing expenditure. Following this distinction, policies to cure a balance of payments deficit are traditionally divided into expenditure-switching and expenditure-reducing policies (Sodersten, 1970, p.272).

2.3. Expenditure-Switching Policies

The purpose of expenditure-switching policies is to switch demand away from foreign goods to domestic output. For the success of these policies it is essential that they ultimately induce a reallocation in resources away from non-tradeable to tradeable (export and import-competing) sectors. For this reason, the ability of the economy to supply the additional output is critical to the outcome of adjustment. Theoretically, only if the economy is operating below full capacity utilization and the supply elasticities are sufficiently high, the expenditure switching does not create inflationary pressures. In practice, however, and particularly in developing countries, a number of "structural" factors reduces these elasticities which usually gives rise to a combination of an increase in output and in general price

level. In condition of full employment, though, expenditure-switching generates nothing else but inflation.

Expenditure-switching policies may be divided in two categories, general and selective. The principal example of the former is devaluation. Its impact upon balance of payments deficit will be now discussed in the absorption approach framework.

Devaluation works through changing the relative price-level in a country vis-a-vis other countries. By lowering the price of domestic currency in terms of foreign currencies, it generates price incentives which tend to lower domestic demand for imports and raise foreign demand for exports. On the supply side, by improving internal terms of trade in favor of export and import-substituting sectors, depreciation improves competitiveness of these sectors and raises the incentive to produce for exports and substitute for imports.

The total effect of depreciation upon real income is determined in two stages: the first is the change in the foreign balance (X-M) induced by depreciation, the second the multiplicative effect of (X-M) upon income. The first stage opens the question of conditions which have to be met for a devaluation to have a positive effect upon the trade deficit. The traditional approach, formulated in the Marshall-Lerner condition, states that the sum of the elasticity of demand for a country's exports and of its demand for imports has to be more than unity. The assumptions of this theorem are rather restrictive: high supply elasticities in the depreciating country (which implies that the economy operates below full-employment) and equilibrium in the trade balance when depreciation takes place. It also has to be borne in mind that demand and supply elasticities are conventionally defined ceteris paribus, but with devaluation other prices and incomes certainly change; therefore, "the use of partial elasticities in connection with devaluation can easily be misleading" (Sodersten, 1970, p.284).

If a positive change in (X-M) does take place, the Keynesian-type income multiplier mechanism is set in motion. By how much income increases depends on the increase of (X-M) and the value of the foreign trade multiplier, which reflects the general structure of the economy and the capacity of the rest of the world to absorb the increase in exports from the devaluing country. The crucial condition for this process to expand income is the existence of unemployed resources in the economy.

The net effect of the increase in income on the balance of trade does not comprise the total amount of increase in production, but the difference between this and the induced increase in total absorption. The value of the marginal propensity to absorb (c) is therefore of strategic importance in determining the income effect of depreciation upon the trade deficit. Only if it is less than unity does a positive change in income improve the foreign balance.

If it is estimated that the adjustment mechanism will fail to bring about the desired results because of a low degree of sensitiveness of the most important variables, selective expenditure-switching policies may be adopted. The list of policies that can be classified under this heading is practically inexhaustible. They can be broadly divided into commercial and financial controls, but often fiscal instruments and tariffs are also applied for the same purpose. Usually their main task is to restrict imports when import elasticity is low.

The efficacy of selective policies as compared to devaluation is still a controversial issue closely associated with the everlasting debate on the efficiency of the market mechanism. Summarizing the debate, Bird concludes that "those who believe in the superior allocative efficiency of the price system oppose controls and prefer market-related policies, while those who emphasize market failures in the areas of monopoly, externalities and income distribution are more likely to favor them" (1985, p.228). The arguments put forward in favor of controls are: first, they exert a prompt and direct effect on imports; second, they may be imposed selectively, primarily to cut down on imports of unessentials, thus making the most effective use of scarce foreign exchange; and third, controls do not rely on a fall in output to induce a reduction of imports (ibid., p.228). Counter-arguments emphasize the adverse effects of controls on resource-use efficiency because they increase the monopolistic position of domestic producers and encourage inefficient import substitution. Yet the most persuasive objection to applying controls is the fact that they supress rather than solve the balance of payments problem and may eventually result in a deterioration of the external balance. It may be concluded with Bird that while controls "may in some cases provide a useful short-run tourniquet in an emergency, they do not generally offer a cost-effective means of correcting deficits in the long run" (ibid., p.230).

The absorption approach analysis clearly demonstrates that the aggregate income effects of a depreciation upon the correction of the trade deficit depend basically on two conditions: the existence of under-employment and on the low value of the marginal propensity to absorb. If the first condition is not fulfilled, output cannot be increased in the short run by the devaluation induced extra demand. Then the alternative is to reduce domestic absorption, either by policy measures lowering the marginal propensity to absorb (c) or through the direct effect on absorption (dD). The latter consists of secondary effects, caused by a rise in prices following a devaluation at full employment. As they are not of primary importance for the analysis in this paper, they will not be discussed here.

2.4. Expenditure-Reducing Policies

When an economy operates at full employment level a short-term increase in output is ruled out by definition. A correction of the balance of payments deficit can be achieved only through a reduction of the marginal propensity to absorb by applying expenditure-reducing adjustment policies. Contractionary effects upon domestic demand can be achieved by restrictive fiscal and monetary policies, familiar from the more orthodox macroeconomic theory; heterodox policy approach suggests also the use of income policies. By deflating domestic income these policies reduce demand for imports which may be sufficient to correct a deficit. In addition, by changing internal terms of trade between domestic and foreign goods, they tend to improve the competitiveness of the export and import-competing sectors and consequently induce a switch of demand from foreign to domestic output. There is often an implicit assumption that a contraction of domestic demand automatically boosts exports. It will do so only provided that the goods freed by the drop of domestic absorption are demanded by foreigners. In the extreme case, if the reduction of domestic expenditure releases non-tradeables only, the effect on the external balance will be negligible, whereas the economy will be driven into recession and unemployment. For this reason, when switching effects are required, expenditure-switching policies are superior. The main purpose of employing expenditure-reducing policies is therefore to reduce domestic absorption to the level which is required to support expenditure-switching policies.

2.5. Supply-Side Policies

Until early seventies, excessively expansionary domestic demand was typically considered the primary cause of deteriorating current accounts, and policies discussed in the previous two sections were deemed satisfactory to cope with the problem. With the dramatic rises of oil prices in 1973 and 1979 many oil-importing developing counties were suddenly faced with severe and persistent balance of payments problems. Once a recourse to reserves of foreign exchange and external borrowing had been exhausted, they had no choice but to resort to the conventional weaponry of adjustment policies consisting of short-term and demand-oriented corrective measures. The effects these policies produced turned out to be extremely costly in terms of lost output, employment and welfare. As a response to these developments new approaches to the balance of payments adjustment were proposed. They appear under different names, such as "structural adjustment" (used particularly by the World Bank and the IMF), "a real economy" strategy or "adjustment with growth" (Killick et al., 1984), "structural policies" (Bird, 1985, p.230). They are all based on the explicit recognition of the fact that in a case of severe disequilibrium in the balance of payments, the problem of adjustment cannot be successfully resolved only by restraining demand but also by stimulating supply.

The emphasis on supply-side adjustment as an alternative to the traditional demand management places more weight on development objectives, such as economic growth and employment, which were usually left out in the balance of payments adjustment programs. The arguments provided in favor of the supply-oriented adjustment point out that such a strategy " would permit equilibrium to be restored at a higher overall level of economic activity and it would minimize the conflicts between the policy objectives of stabilisation, growth and social welfare" (Killick et al., 1984, p.272). Even the International Monetary Fund which has been frequently criticized for the oversimplistic and too narrow views on the balance of payments adjustment recognized that "economic growth and external equilibrium are therefore complementary and mutually supporting objectives of economic policy" (IMF, 1987, pp.7-8). It admits, however, that the growth aspects of adjustment programs have only recently received increased attention (ibid., p.27). Killick rightly comments that the IMF "did not satisfactorilly bridge

the gap between the Fund's intelectual recognition of the need for a changed approach to adjustment and its traditional practices" (1984, p.294).

Supply side policies may be defined as "measures designed to increase directly the incentive or ability of the domestic productive sector to supply real goods and services at a given level of aggregate nominal domestic demand" (IMF, 1987, p.29). Another definition, proposed by Balassa in the context of adjustment to external shocks, describes structural adjustment policies as "policy responses to external shocks, carried out with the objective of regaining the pre-shock growth path of the national economy" (1981, p.1). Linking the policy prescriptions with the causes of the balance of payments difficulties, Bird also emphasizes that "where deficits are caused by underlying structural deficiencies, the long-run solution to payments problems rests on structural adaptation" (1985, p.230). The role of growth of domestic output in the context of structural adjustment is twofold: on one hand it may be seen as a basic objective of development per se, and on the other (as the absorption approach discussed in the previous section explicitly demonstrated) it may act as a way of improving the balance of payments deficit.

The increase in the current level of output may be seen as coming from two sources: from the improved utilization of the existing capacity, and from the growth in that capacity. By reference to this distinction, IMF (1987, p.30) classifies supply-side policies under two broad headings.

The first one includes measures to improve "the efficiency with which labor, capital and other scarce resources are allocated among competing uses" (IMF, 1987, p.30) which aim primarily at reducing various distortions, which in the neoclassical terminology refers to the discrepancy between prices and marginal costs. Measures of this kind are particularly attractive since they attempt to increase the output from a given amount of resources without requiring additional investment. However, obstacles to eliminating distortions are often deeply rooted in structural characteristics of developing countries (Killick et al., 1984, p.286) and must be taken full account of when designing policies to remove them.

The second group of policies aims at increasing the growth of productive capacity over the medium-term. This can be achieved by a higher rate of investment and by the choice of investments that yield a higher rate of return. In this category fall incentives to raise the rate of fixed capital

formation in the domestic economy and to increase the rate of return to such capital, choice of the optimum set of public sector investments, expansion of education and manpower training programs, and stimulation of technological innovation (IMF, 1987, p.30).

To tackle the basic causes of the balance of payments disequilibrium, major structural changes are required, usually extending over a longer period of time. As the period of adjustment is lenghtened and the purpose of measures required expands, it is no longer possible to distinguish between the adjustment process and the development process. Policies designed to deal with payments deficits and chronic shortages of foreign exchange "are part of the development effort... The task then becomes one of building adjustment into the country's development strategy and planning" (Killick et al., 1984, p.299).

If this view is assumed correct, it has several important implications for practical policy-making. First, the complexity and the long-term nature of the balance of payments problems necessitates a package of measures which has to be tailored to the specific economic situation, institutional framework, political and social characteristics of a country in question. That is why a variety of measures from the arsenal of development policies can be used to deal with the structural adjustment in a particular country. Second, it offers a justification to apply the theoretical approaches and their policy prescriptions that have been originally devised for development purposes also in the context of medium-term adjustment. One of such methods, the semi-input-output method, will be introduced in the following chapter.

2.6. Adjustment Policies Pursued in Yugoslavia in 1980-1986

Since the beginning of the foreign exchange crisis in 1979, the most immediate macroeconomic goal was to reduce the unsustainable current account deficit in the face of cutoffs in foreign lending; later, the objective was to generate sufficient surpluses in the current account in order to cope with the debt-servicing burden. Unfavorable international economic conditions in the early 1980s and large macroeconomic imbalances and structural disequilibria, inherited from the previous period, made the task extremely difficult. Every possible policy tool was employed that could produce the desired effects upon the balance of payments in the shortest time possible,

from traditional expenditure-reducing and expenditure-switching policies to the physical rationing of some consumer goods in the first years after the outbreak of the crisis. The coordination of these measures, however, was poor, which was most clearly manifest in the rising inflation.

Expenditure-reducing policies consisted of restrictive fiscal, monetary and income policies. They aimed at containing the nominal growth of domestic absorption since under the conditions of unbridled inflation this was the only way to achieve cut-offs in real domestic expenditure.

Because fiscal deficits in Yugoslavia do not exist, in line with the traditional budgetary philosophy, the thrust of fiscal policy was to reduce revenues and expenditures at the same time. Lacking more market oriented fiscal instruments, the limits on public sector revenues were imposed every year between 1980 and 1986, thus automatically cutting down the expenditures. In addition, ceilings on the investment spending of the public sector were set. The policies succeeded in reducing public sector expenditure in real terms as well as in relation to gross social product. However, this was almost exclusivelly due to the sharp decline in real net personal incomes and investment expenditure in the public sector.

Monetary restraint which has always played an important role in demand management, constituted one of the crucial components of the stabilization packages in the 1980-1986 period. However, its effects fell far short of expectations. The acceleration of inflation in this period is witness to the failure of monetary policy to constrain the growth of nominal aggregate demand. The main factors underlying this failure could be found in serious institutional deficiencies of the financial system and lax financial discipline, which were compounded by the existence of substantial household deposits in foreign currencies (devaluations automatically increased their value in domestic currency, thus having the same effect as actual money creation) and alternative channels of finance in the form of inter-enterprise credit, over which monetary authorities had no control. These factors undercut the attempts to control monetary expansion and contributed to the largely accomodating stance of monetary policy. Interest rates, contrary to declared objectives, remained strongly negative during the entire 1980-1986 period - initially because of the fear that positive real levels would increase financial costs of the enterprise sector, and consequently fuel inflation, and later on because of inappropriate formulas for

calculating real interest rates in conditions of the accelerating inflation. Ceilings on domestic bank credit and net domestic assets, together with the expansion of "selective credits" for priority needs (export, agriculture) nevertheless contributed to a drop in the share of investment credit, with most immediate effects on real fixed investment.

Income policy was directed primarily toward restraining the growth of personal incomes in enterprises. Since 1980, this policy was implemented through adoption of quantitative guidelines on the distribution of enterprise income, set out in social compacts between the government and enterprises in the social sector. As a result, the rate of growth of net personal incomes was kept consistently below the increase in the cost of living until 1985, when a more relaxed policy stance was adopted. The effects of income policy were more pronounced on the cost side, enabling the enterprise sector to raise the gross saving rate, than on the aggregate expenditure side. Despite a sharp decline in real personal incomes, private consumption hardly fell between 1980 and 1985; with the year 1986 included, it in fact registered even a small real growth over the entire 1980-1986 period. This discrepancy between the growth rates of real personal incomes and private consumption was due to the rapid increase in non-wage sources of household income, particularly pensions, transfers from abroad and net interest earnings (the latter two benefited mainly from the exchange rate depreciation) and reduced household savings rates.

Expenditure-switching policies implemented in 1980-1986 were a combination of general, market-based policies, such as depreciation of the exchange rate, and selective policies, which mostly relied on administrative controls.

Over a number of years before 1980, the ability to finance the large current account deficits by foreign savings removed the need to maintain a competitive real exchange rate. The nominal exchange rate had been lagging behind domestic inflation, causing a substantial appreciation of the domestic currency in real terms vis-a-vis the currencies of Yugoslavia's major trading partners. In the period 1980-1986 exchange rate policy became one of the pillars of the adjustment strategy. A sizeable depreciation of the dinar in the middle of 1980, as a part of the first stabilization package, followed by smaller adjustments of the real exchange rate in the course of the year, only offset the over-valuation of the dinar from previous years. In

1982 and 1983 the dinar was further depreciated in real terms, and since then the nominal rate followed, with some fluctuations, the differential between domestic and foreign inflation. During 1984-1986, the real exchange rate vis-a-vis a basket of currencies was maintained below its 1979 level by 40 to 45 percent (calculated from OECD, 1984 and 1988).

The exchange rate policy was complemented by a combination of export incentives and import restrictions. The former consisted of more selective measures, such as preferential access to bank loans, subsidized interest rates, tax rebates and preferential access by exporters to foreign exchange. Given the severity of the foreign exchange constraint, adjustment in the balance of payments relied most heavily upon restrictions of imports. Rather than by increasing tariff barriers, they were implemented through the rationing of foreign exchange. In the absence of an official market for foreign exchange, allocation of foreign exchange was based on a complicated set of rules, under which access to foreign exchange depended essentially on the ability to earn it. Thus, enterprises that needed foreign exchange to purchase imported inputs were forced to export. As a result, both efficient as well as inefficient exports were stimulated. Similarly, administrative, more or less ad hoc allocation of foreign exchange fostered inefficient substitution of imports. This pattern led to significant distortions in the structure of foreign trade that did not reflect Yugoslavia's comparative advantage.

3. THE SEMI-INPUT-OUTPUT METHOD

3.1. Introduction

One of the crucial development problems is identifying the optimal pattern of international trade for a given country, which is a part of the general issue of efficient resource allocation. In the theory of international trade there has been no more influential explanation of the international trade pattern then that proposed by the theorem of comparative advantage. It was first formulated in terms of absolute advantage by A. Smith two centuries ago, and developed subsequently by D. Ricardo as a comparative advantage principle. The idea of comparative advantage is one of the oldest and at the same time most controversial paradigms in economics which is nevertheless still being extensively used to explain the pattern of international trade, although in modern economics it has taken on much more sophisticated forms. Probably the most popular theoretical approach based on the idea of comparative advantage is that proposed by Hecksher and Ohlin. Using some rather restrictive assumptions, it demonstrates that the optimal resource allocation in the economy is attained when a country exports commodities which are intensive in the use of that country's relatively abundant factor of production and imports commodities which are intensive in the use of a relatively scarce factor. The theorem has been widely criticized on the grounds of its restrictive assumptions and inconsistency of its predictions with empirical evidence. It has to be admitted, however, that the explanatory power of the theorem is greatly improved if the basic model (having only two factors of production, labor and capital) is expanded to include other factors of production, such as natural resources and quality of human capital (MacBean, 1978, p.130).

Despite serious criticisms of the Hecksher-Ohlin theorem several analytical tools have been developed and applied with the aim of determining a country's comparative advantage. Many of them are based on input-output analysis since it is the only source that provides basic and consistent information on inter-industry relations in the economy. The most important

issues for which input-output analysis is particularly well-suited are the measurement of import intensity of import substituting industrialisation, the measurement of the contribution of import substitution and export promotion to economic growth, and identifying the determinants of the pattern of international trade; the programming extension of the basic input-output model enables the calculation of comparative advantage in terms of shadow prices (a survey of these methods is given in Bulmer-Thomas, 1982, pp.234-251). The author also provides some of their main shortcomings (ibid., pp.245-246). For example, the method of calculating import intensity of import substitution is appropriate if one is interested in the net foreign exchange saving implied by a unit expansion of a particular sector; but the method cannot tell anything on the efficiency with which imports are substituted by domestic production. Or similarly, the method of determining relative factor intensity of imports and exports in line with Hecksher-Ohlin theorem is problematic due to two reasons. First, the assumptions of the theorem are considerably restrictive which consequently makes the relevance of empirical results highly questionable. Second, inter-dependency between the calculation of comparative advantage and the pattern of foreign trade allows for no changes in the pattern of trade. Yet a historically given trade pattern is of little use when comparative advantage is being studied. This problem can be solved by using programming techniques, but simpler methods exist. One of the most interesting is the semi-input-output method that will be described at length in the following section.

3.2. The Semi-Input-Output Method

The semi-input-output method was developed by Tinbergen (1967, pp.92-99) and later elaborated by a number of authors, among which Kuyvenhoven may be credited to have contributed a major share of refinements to the method. The method was originally designed in the framework of development planning as an aid to appraise sectors so as to achieve "efficiency in accumulation, production and foreign trade in underdeveloped countries having a minimum of statistical information" (Hansen, 1972, p.XII). Based on the principle of

comparative advantage it is best suited to underdeveloped countries with open economies. It belongs to the family of multisectoral models and represents a special case of traditional Leontieff input-output analysis.

As a development planning method it reflects Tinbergen's approach of planning in stages which distinguishes a macro, sector (middle) and project stage (Tinbergen, 1967). The semi-input-output method can be applied at both the sector and project level of planning. In the present paper only the sector level implications will be dealt with. In brief, the main purpose of the sectoral approach as opposed to the macro or project level is to secure a consistency check on the planned sectoral targets as well as that of the economy as a whole. Results obtained at this stage are also valuable at the project level, particularly when shadow prices are used to appraise individual projects.

The genuine feature of Tinbergen's semi-input-output approach is the division of sectors between national and international sectors (he also distinguishes regional and local sectors but they are not relevant for the present analysis) which is similar to the division between non-tradeables and tradeables used by Little and Mirlees (1969, p.92). The classification criterion is based on the level of transportation costs of the products concerned; those with relatively high transportation costs fall in the category of national goods while all others are grouped as international goods. To the former group may be also added sectors whose output is never internationally traded for technical, cultural or institutional (legal) reasons. Typical examples of national sectors are construction, domestic trade, transport, housing, utilities, education and all kinds of services. In many economies their production represents a sizeable part of gross domestic product. As Kuyvenhoven reports, in selected countries of the European Community their share in total value added amounts to 55-65 percent and 47-54 percent in total output; in selected developing countries these shares show a wider variation, mainly depending on the relative importance of primary activities: 34-64 percent of total value added and 34-54 percent of total output (1980, p.259).

The classification based on tradeability of products creates the distinct character of the semi-input-output method. In a completely open economy where all commodities can be traded, the problem of efficient resource allocation may be solved by mere adherence to the prescriptions of the comparative advantage principle. With the introduction of the national sectors, however, this approach is no longer possible. An increase in demand for products of the national sectors by definition cannot be met by imports; it must be satisfied through production expansion in the national sectors themselves. As increased demand for national goods to a large extent stems from capacity enlargements in the international sectors, these must be accompanied by proportionate capacity expansions in the national sectors (assuming no excess capacity in the latter exist). In Tinbergen's words:

> If an addition of new capacity to an international industry is contemplated, by the carrying out of a definite project in an international sector, this will result in an increase in the demand for a number of national products, and a consequent need for expansion of capacity in the sectors responsible for these products (1967, p.95).

In a world of perfectly competitive foreign trade, demand for the output of international sectors can be always met by imports. As Kuyvenhoven argues, the existence of demand for international products is not a sufficient condition to create productive capacity as it is in the case of the national goods (1980, p.259). It follows that the investment in an international sector should be made together with the complementary investments required in the national sectors if equilibrium in the economy is to be maintained. The complementary investments in the national sectors together with the contemplated investment in an international sector are referred to as the "bunch" of investments. Any investment in an international sector must be therefore appraised as a whole bunch, not in isolation.

The implications of this approach with regard to the treatment of inter-industry relations are quite interesting: inter-dependencies among international sectors are deemed irrelevant for production and investment decisions. To calculate the exact capital requirements of different investment bunches only the information on inter-industry relations contained in

the sub-matrix of the national sectors is required, hence the name semi-input-output method.

In order to evaluate whether an investment in an international sector is attractive or not, in relation to investments in other international sectors, a criterion of selection must be established. Tinbergen proposes such a criterion that would reflect the contribution of the bunch of investments to the development aims as well as the use it makes of certain scarce resources (1967, p.96). It needs to be stressed that the choice of the criterion is absolutelly independent of the semi-input-output method itself, and in principle, any criterion may be applied. With reference to the semi-input-output method it is only important that the selection criterion refers to the bunch, and not to an isolated investment. In most empirical studies applying the semi-input-output method, the criterion is formulated as a cost-benefit ratio, measuring the total increase in generated value added per unit of total capital requirements of the bunch. Two implicit assumptions are contained in this criterion, viz. that capital is the only scarce factor of production, and that there are no differences between the social value attached to consumption and saving. The highest ranking sectors measured by the bunch criterion are the most appropriate candidates for export promotion or import substitution, given open trade possibilities. If, however, the possibility of increasing exports at given prices is expected to become limited (when world demand for certain commodities is falling or is price inelastic) or import substitution restricted, this situation can be in principle handled rather easily. The international sector where such a situation occurs is simply included among the national sectors, and the procedure of appraising sectors is repeated, giving a new ranking of the remaining international sectors (see Kuyvenhoven, 1980).

3.3. The Semi-Input-Output Model

This chapter introduces the structure of the basic semi-input-output model and describes the procedure to derive the solution as well as the selection criterion.

According to Kuyvenhoven (1972, p.2), the basic semi-input-output model rests on the following assumptions:

(1) Sectors produce either national or international goods.
(2) Sectors are connected by input-output and capital-output relations (implying that all traditional assumptions of input-output analysis apply to this model).
(3) Capacities in all sectors are fully utilized.
(4) Gestation periods are sufficiently small to be neglected.

The following algebraic derivation of the semi-input-output model is based mainly on Kuyvenhoven (1972, pp.2-4; 1974, pp.188-192; 1980, pp.260-261). A combination of three sources was chosen in order to make the derivation as tractable as possible without running the risk of oversimplification. The variables in the model refer to changes over a planning period from 0 to 1. The starting point is a simple input-output system with M productive sectors, for which the basic sectoral balance equation in matrix notation can be written as:

$$x = A\,x + f + j + e \qquad (1)$$

where

- x = vector of changes in output during the planning period
- A = matrix of input-output technical coefficients
- f = vector of changes in final consumption other than for fixed capital formation and net exports
- j = vector of changes in fixed capital formation
- e = vector of changes in net exports

Eq.(1) states that the output of sector i is equal to its deliveries of intermediate goods to other productive sectors plus deliveries to final demand categories, of which all but net exports and fixed capital formation are considered exogenous.

Fixed capital formation in the initial period is assumed to be known, whereas in the terminal period it is given by the accelerator-type relationship. Vector of increases of capital goods deliveries over the period can then be written:

$$j = h\,B\,x - \hat{j} \qquad (2)$$

where

h = capital stock-flow conversion factor

B = matrix of partial capital-output ratios

$\hat{j}$ = vector of fixed capital formation in the initial period

Aggregate investment in the terminal year can be derived from eq.(2) simply by summing up columnwise across the sectors:

$$i'j = h\,b\,x \qquad (3)$$

where

b = vector of sectoral capital-output ratios

i' = sum vector

Eq.(2) deserves some further comments since it is a distinguishing constituent element of dynamic input-output models. From input-output analysis it is known that static models are characterized by treating all the components of final demand as exogenous variables. To dynamize a model, investment expenditure has to be made endogenous. This is usually done by applying the accelerator principle which is based on the assumption of fixed relationship between demand for capital goods and changes in sectoral output; the factor of proportionality is the well known capital-output

ratio. In eq.(2) it is expressed in the form of the matrix of partial capital-output ratios (B). Element b_{ij} of this matrix denotes investment of good i per unit of output of sector j. To construct this matrix, deliveries of capital goods by sector of origin must be allocated to sectors which purchase them for their own investment purposes (what is obtained is the so-called investment matrix), and then divided through by the output of these sectors. Capital-output ratios may be average or incremental, depending on whether or not capacity exists at the beginning of the planning period (for more instructive details on input-output models with endogenous investment see Bulmer-Thomas, 1982).

The product of the matrix of partial capital-output ratios (B) and the vector of changes in output (x) in eq.(2) gives investment throughout the planning period. To obtain investment in the terminal year, the ratio of investment in the terminal year to total investment over the period is needed. This ratio is known as a capital stock-flow conversion factor; in this model it is assumed uniform for all the sectors.

Substituting eq.(2) into eq.(1) gives:

$$x = A^{*}x - \dot{j} + f + e \tag{4}$$

where

$$A^{*} = A + hB$$

showing that deliveries of intermediate and capital goods of sector i per unit output of sector j are now expressed in one single matrix.

Now we apply assumption (1) and divide M productive sectors in I international and N national sectors (M = I + N). Eq.(4) can be partitioned into an international and a national part, which yields equations for production increases in the international and the national sectors, respectively:

$$x_I = A^{*}_{II}\, x_I + A^{*}_{IN}\, x_N - \dot{j}_I + f_I + e_I \tag{5}$$

$$x_N = A^*_{NI}\, x_I + A^*_{NN}\, x_N - j_N + f_N \qquad (6)$$

where subscripts refer to the order of vectors and matrices.

Note that net exports do not appear in eq.(6), as by assumption the national sectors do not enter foreign trade.

The general solution of the model for the changes in output of the national sectors caused by production expansion x_I in the international sectors can be found by solving eq.(6):

$$x_N = [I_{NN} - A^*_{NN}]^{-1}\, [A^*_{NI}\, x_I - j_N + f_N] \qquad (7)$$

Now suppose that output in the k-th international sector increases by an amount $(x_I)_k$. To calculate the impact of this particular production increase on the output changes of the national sectors, the output levels of all other international sectors must be kept unchanged (due to assumed absence of interdependencies among the international sectors). This requires that vector x_I from eq.(7) is replaced by a vector with all the elements zero except for the element $(x_I)_k$, giving

$$x_N = [I_{NN} - A^*_{NN}]^{-1}\, [(A^*_{NI})_k\, (x_I)_k - j_N + f_N] \qquad (8)$$

where

$(A^*_{NI})_k$ = the k-th column of matrix A^*_{NI}

The last equation embodies two distinguishing features of the semi-input-output method. First, non-tradeability of national goods makes output changes of the national sectors dependent solely upon production expansion in an international sector (domestic current consumption is considered

exogenous). And second, the assumption of free trade breaks the inter-industry linkages among the international sectors which are no longer relevant for the determination of output in the national sectors. This may be seen from matrix A_{NN} which consists only of the national part of input-output and partial capital-output matrices.

The only remaining step consists of calculating the elements of the criterion to appraise the bunch of investment. As mentioned already in the previous section, the criterion is usually defined as an increase in total value added resulting from a capacity expansion in the k-th international sector per bunch of investments.

First we define value added generated in the k-th international sector plus the corresponding increase in the national sectors, resulting from the production expansion $(x_I)_k$ in the k-th international sector:

$$V = (V_I)_k \, (x_I)_k + V_N \, x_N \tag{9}$$

where

V = total value added

$(V_I)_k$ = the k-th member of the vector of value added coefficients for the international sectors

V_N = vector of value added coefficients for the national sectors

The bunch of investment necessary to realize the production expansion in the k-th international sector can be calculated from eq.(3):

$$K = h \, (b_I)_k \, (x_I)_k + h \, b_N \, x_N \tag{10}$$

where

K = total capital requirements of the bunch of investment

$(b_I)_k$ = the k-th member of the vector of capital-output ratios

for the international sectors

b_N = vector of capital-output ratios for the national sectors

Substituting eq.(8) in eq.(9) and (10) yields:

$$V = (V_I)_k\ (x_I)_k + V_N\ [I_{NN} - A^*_{NN}]^{-1}\ [A^*_{NI}\ (x_I)_k - j_N + f_N] \qquad (11)$$

$$K = h(b_I)_k\ (x_I)_k + h\ b_N\ [I_{NN} - A^*_{NN}]^{-1}\ [A^*_{NI}\ (x_I)_k - j_N + f_N] \qquad (12)$$

The bunch selection criterion can be now derived easily from eq.(11) and (12) by taking first derivatives with respect to $(x_I)_k$:

$$r_k = \frac{(V_I)_k + V_N\ [I_{NN} - A^*_{NN}]^{-1}(\ A^*_{NI})_k}{h\ (b_I)_k + h\ b_N\ [I_{NN} - A^*_{NN}]^{-1}\ (A^*_{NI})_k} \qquad (13)$$

The last expression represents the core of the semi-input-output model. A unit production expansion in the k-th international sector directly generates $(V_I)_k$ units of value added and requires $(b_I)_k$ units of investment, both per unit of output of sector k. In order to generate sufficient intermediate and capital goods deliveries from the national sectors to the k-th international sector, production in the national sectors must expand by an amount $(I_{NN} - A^*_{NN})^{-1}(A^*)_{NI}$. The value added effect and the bunch investment effect in the national sectors are obtained by premultiplying the production increase by vector of value added coefficients V_N, and by a product of a capital-stock flow conversion factor h and vector of sectoral capital-output ratios for the national sectors b_N, respectively. Matrix $[I_{NN} - A^*_{NN}]^{-1}$ indicates that direct and indirect production effects are accounted

for, but in contrast to the traditionally defined Leontieff inverse only interdependencies among the national sectors are relevant for output determination. The k-th column of vector A^{*}_{NI} captures the sector-specific linkages of the k-th international sector with the national sectors. Because each international sector requires different amounts of intermediate and capital goods deliveries per unit of its own output, the resulting aggregate value added and investment costs of the bunch differ for different international sectors. It is interesting to compare the bunch criterion in eq.(13) with a situation where no national sectors are assumed to exist. In that case, the second terms in the numerator and denumerator in eq.(13) vanish, reducing the criterion to a simple ratio of sectoral value added to capital $(V_I)_k/h\ (b_I)_k$. According to this direct criterion, sectors are being appraised in isolation, and the correspondent ranking normally differs from the ranking on the basis of the bunch criterion.

The above presentation introduced the essentials of the basic semi-input-output model based on a set of simplifying assumptions. In a number of theoretical and empirical studies these assumptions have been relaxed to a certain extent, thus making the model more realistic and amenable to practical applications. Some of the extensions of the basic model will be sketched below.

For example, prices in the basic model are normalized to equal unity so that volumes and values are made to coincide. By introducing sets of prices for primary factors and international goods it is possible to determine the prices of the national goods and express the selection criterion in value terms (see Kuyvenhoven, 1976, pp.68-69). Depending on the purpose of the appraisal, market or accounting (shadow prices) may be applied.

In the basic model, final private consumption by sector is treated as exogenous, which is equivalent to assuming sectoral private consumption pattern independent of the sectoral distribution of production. As different bunches of investments generate different increases in sectoral value added, it is more realistic to expect that the composition of induced consumer demand for the national goods will change in accordance with the changes in

sectoral value added. These effects can be included in the selection criterion by making private consumption endogenous (see Kuyvenhoven, 1976, p.70).

The basic model does not distinguish between the construction and operation period of a new capacity, and furthermore, the construction period is assumed so small to be neglected and the operation period to extend only over one year. As in fact the new capacity generates a flow of goods during its entire life-time, it should be correct to include these effects on the benefit side of the bunch criterion. The solution for the case the above mentioned assumptions are relaxed is shown in Kuyvenhoven (1972).

Another refinement of the method introducing limited trading and production possibilities as well as minimum size requirements of new capacities is presented in Cornelisse and Versluis (1969).

3.4. Application of the Semi-Input-Output Model to Yugoslavia

3.4.1. Purpose and Motives of the Application

In this section the semi-input-output model as formulated in the previous chapter will be applied to Yugoslav data. Although a variety of traditional input-output techniques have found their application in theoretical and empirical studies of the Yugoslav economy since 1955 when the first input-output table for the country was published, the present paper represents the first attempt to apply the semi-input-output model on the Yugoslav economy. However, it has to be emphasized from the very beginning that, strictly speaking, the application refers to the method, but not to the purpose of it. The semi-input-output method was developed originally as a planning method for ex-ante investment allocation decisions, and as such used in empirical studies that applied the method to various countries. In contrast to these examples, the main purpose of this particular application is to evaluate ex-post the efficiency of the investment allocation in Yugoslavia over the 1980-1986 period in the context of balance of payments adjustment.

The general argument for applying a method exclusively meant for the planning purposes is given in section 2.5. The specific reasons and motives that led to the choice of the semi-input-output method may be summarized as follows:

(1) One of the most serious problems Yugoslavia has been faced with in the last decade has been rapidly deteriorating efficiency in investment and international trade with devastating consequences on economic growth, employment and living standards. The interdependence of the allocation of investment resources and foreign trade calls for a method that explicitly links both issues.

(2) The domination of import substitution over export promotion orientation in the 1970s, that was even reinforced by the short-term balance of payments adjustment in the first half of this decade, was closely associated with unsufficient emphasis on comparative advantage considerations. This is far from saying that strictly following the prescriptions forwarded by the simple comparative advantage theorem is the only or best possible solution; but saying that comparative advantage is totally irrelevant for a country where foreign exchange and capital shortages are as acute as in Yugoslavia during the 1980s, is taking another extreme view. A method having comparative advantage as a point of departure will be therefore more appropriate in circumstances when comparative advantage considerations by virtue of external constraints must be given greater weight in development decisions.

(3) The fact that the balance of payments and debt crisis are mutually dependent bears most important implications for the adjustment process. Under these circumstances the balance of payments adjustment cannot be managed only as a short-term problem handled by demand oriented policies. Obligation to repay the accumulated debt necessitates that the balance of payments surplus is generated over a longer period of time. Short-term adjustment policies must be therefore complemented by medium- and long-term strategies. This need evidently calls for such theoretical approaches as well as analytical techniques that par exellence address themselves to medium- and long-term problems.

(4) It has been pointed out in the introduction to the semi-input-output method that it was particularly suitable for underdeveloped countries with open economies. However, this in principle does not preclude its use in the case of a country like Yugoslavia, which, strictly speaking, is neither an underdeveloped country nor can be characterized as a completely open economy. According to the level of development achieved, Yugoslavia is conventionally classified as a semi-industrialized country. Nevertheless, many characteristic features of Yugoslav economy are still common with most developing countries; one such characteristic which is relevant for the applicability of the semi-input-output model is abundance of labour relative to capital. As far as the second condition, viz. the openness of the economy is concerned, evidence testifies that developments in the last decade were influenced by more or less autarkic tendencies, largely due to the excessively import-substitution oriented strategy. Using the semi-input-output model under such circumstances would, in a fashion analogous to a counterfactual simulation, to use an expression from the economic modelling terminology, provide an alternative solution which the actual developments in the 1980s can be confronted with.
(5) One of the rather technical preconditions for a meaningful application of the semi-input-output model are strong inter-industry linkages and well developed domestic capital goods sectors, or in input-output terms, matrices of technical input-output and partial capital-output ratios should have as little zero entries as possible. These conditions are fully met in the case of the Yugoslav economy - it has a wide industrial base with strong intersector linkages and relatively well developed capital goods production.

3.4.2. The Basic Framework

In this chapter the basic semi-input-output model together with the selection criterion as formulated in section 3.3. will be applied to Yugoslav data. In comparison with the basic model, two modifications are introduced. First, imports are differentiated into competitive and non-competitive

imports, assuming that all intermediate and capital goods imports are non-competitive. As a consequence, matrix of technical input-output coefficients refers to domestic intermediate deliveries only, and similarly, matrix of partial capital-output ratios to domestic capital goods deliveries. Second, for the sake of simplicity, the capital stock-flow conversion factor is omitted from the selection criterion. Since in the basic model this factor is assumed constant for all sectors, it makes no difference whether it appears in the formula or not - the ranking of sectors is not affected.

One last thing that needs to be added refers to the treatment of inventory changes. In contrast to some empirical applications of the semi-input-output method (see for example Kuyvenhoven's application to Nigeria, 1980) that distinguish investment in fixed assets and in working capital, the present model for Yugoslavia treats investment in inventories as part of exogenous final expenditure. This simplification is dictated by the simple fact that the necessary data are not available.

The main source of data is Yugoslav input-output table in producers' prices for 1980 (Federal Institute of Statistics, 1988) which is the most recent year for which the table is available. The use of a single input-output table implicitly assumes that the product mix, technical coefficients, relative factor and product prices remain constant throughout the time period analyzed.

The classification of the sectors in the semi-input-output model model is based on the classification scheme embodied in the 1980 input-output table, consisting of 48 sectors. Sectors are defined as groups of products and services. The precondition for a meaningful application of the input-output table, namely the product homogeneity, is met in the Yugoslav table by applying proper procedures already at the stage of collecting the basic statistical data (see Federal Institute of Statistics, 1988, p.32). Only two minor modifications of the original classification were made: three branches belonging to the sector construction were aggregated into one sector, and sector scrap and waste was included among other productive services (to make the classification scheme compatible with the classification in other data sources, used in the calculations).

To establish which sectors are national and which international, as a first approximation an empirical approach was adopted by defining as national those sectors which showed the lowest values of exports and imports to total output. The following sectors emerged as national: Electrical Energy (1), Quarrying (20), Building Materials (21), Animal Feeds (32), Printing (34), Water Works (38), Construction (39), Trade (41), Arts and Crafts (43), and Public Utilities (44). Given the level of aggregation, the national sectors are much the same as those expected from theoretical considerations; the results also coincide with the classifications applied in Kuyvenhoven (1980) and Pronk and Schreuel (1969). On the basis of this evidence it was concluded to classify all the earlier mentioned sectors as national and the rest as international (the sectoral classification scheme is presented in Appendix I, Table 1).

As far as economic significance of the national sectors is concerned, their relative share in aggregate output amounts to 31.6 percent and 41.1 percent in aggregate value added. The difference between both figures is attributable to a considerably higher value added coefficients in the national sectors (on aggregate 59.7 percent) than in the international sectors (on aggregate 38.4 percent). Compared to empirical estimates for other countries, the results at first glance point to a strikingly lower empirical importance of the national sectors in Yugoslavia vis-a-vis other countries. The explanation for this discrepancy lies in the conventions adopted by the Yugoslav national accounting system which apply also to the classification scheme of input-output tables. Estimates of gross domestic product according to the SNA concepts yield approximately 15 percent higher figure than gross social product. As practically all non-productive sectors would fall in the category of the national sectors were the SNA classification scheme applied, the resulting value added share of the national sectors of 56 percent does not differ significantly from the estimates obtained for other countries.

To compute the selection criterion expressed by eq.(13) in section 3.3., the following matrices and vectors were calculated :

(1) A_{NI} = sub-matrix of input-output coefficients , excluding intermediate imports; element a_{ij} denotes intermediate input from national sector i per unit output of international sector j

(2) A_{NN} = sub-matrix of input-output coefficients, excluding intermediate imports; element a_{ij} denotes intermediate input from national sector i per unit output of national sector j

(3) B_{NI} = sub-matrix of partial average capital-output ratios, excluding capital goods imports; element b_{ij} denotes capital stock of national good i held by international sector j per unit output of international sector j

(4) B_{NN} = sub-matrix of partial average capital-output ratios, excluding capital goods imports; element b_{ij} denotes capital stock of national good i held by national sector j per unit output of national sector j

(5) V_I = vector of value added coefficients for the international sectors

(6) V_N = vector of value added coefficients for the national sectors

(7) b_I = vector of average capital-output ratios for the international sectors

(8) b_N = vector of average capital-output ratios for the national sectors

The above vectors and matrices are presented in Table 2 and Table 3 of Appendix I. Matrices (1), (2) and vectors (5), (6) were calculated directly

from the 1980 input-output table, after having rearranged the sectors according to the division between the international and national sectors.

Since neither investment matrix in the first place, nor basic raw data required to compute partial capital-output matrices (3) and (4) are available from the Yugoslav statistical sources, the procedure recommended by Bulmer-Thomas (1982, pp.177-178) was followed. Instead of calculating partial incremental capital-output matrix, capital stock matrix was constructed. The task was facilitated by the fortunate fact that only two national sectors produce capital goods, viz. construction and trade, the latter being included only for the sake of achieving consistency of valuation in producers' prices. The information required was obtained from data on fixed assets in constant 1972 prices (Federal Institute of Statistics, 1982), which are further disaggregated into three categories: equipment, buildings and the rest. As buildings are entirely domestically produced, their value by sector may be directly allocated to construction, thus obtaining the first row in the capital-stock matrix. The only remaining problem was to calculate trade margins embodied in capital stock of the international sectors. First the average trade margin rate was computed as a share of trade in domestic investment expenditure on the basis of data from the input-output table; assuming that trade margins are charged only for purchases of equipment and that their rates are uniform across the sectors, it was possible to calculate trade margins in absolute terms by multiplying the average margin rate with the value of equipment held by each sector. Having computed both rows of the capital-stock matrix (all other rows having zero elements), each element was divided by gross social product in constant 1972 prices of the corresponding sector.

Vectors of sectoral capital-output ratios (7) and (8) are of average type and were calculated from the same same data on fixed assets and gross social product in constant 1972 prices. In order to check for the eventual presence of any strong tendencies in partial capital-output ratios and sectoral capital-output ratios, a series of ratios and matrices over the period 1976-1980 was computed. As there was no apparent evidence of such tendencies over the observed period, the ratios from 1980 were chosen for the calculations.

Finally, it should be added that while matrices and vectors derived from the input-output table refer to the entire economy, matrices (3) and (4) as well as vectors (7) and (8) were calculated from data for the social sector only (as this type of data for the private sector do not exist). Applying them at the level of the whole economy implicitly assumes that partial and sectoral capital-output ratios in the social and the private sector are equal. However, given a very low share of the private sector in total gross social product (in 1980 it amounted to 14 percent), this assumption bears no significant consequence for the results of the model.

3.4.3. Results

For the existing 35 international sectors, attractiveness was computed according to two selection criteria: the bunch criterion, measuring a sector's contribution to an increase in value-added per bunch of investment, and the direct value added to capital criterion. To establish a relative measure of attractiveness, sectors were ranked according to each of the two criteria. The results are presented in Table 3.

Table 3 : Ranking of International Sectors According to the Bunch Criterion and the Direct Criterion

No.	Sector	Value of Bunch Criterion (1)	Order of Rank (2)	Value of Direct Criterion (3)	Order of Rank (4)
45	Other Productive Services	0.4561	1	0.8913	1
35	Miscellaneous Manufactures	0.3968	2	0.4342	2
28	Footwear and Other Leather Products	0.3872	3	0.3548	3
26	Finished Textile Products	0.3838	4	0.3526	4
14	Machinery, nonelectrical	0.3735	5	0.3046	5
37	Forestry	0.3729	6	0.2695	6
33	Tobacco	0.3592	7	0.2173	9
19	Processing of Chemicals	0.3590	8	0.2346	7

Table 3 continued

No.	Sector	Value of Bunch Criterion (1)	Order of Rank (2)	Value of Direct Criterion (3)	Order of Rank (4)
23	Furniture and Fixtures	0.3566	9	0.2194	8
42	Catering and Tourism	0.3516	10	0.1289	20
17	Electrical Machinery	0.3513	11	0.2009	10
13	Metal Fabrication	0.3490	12	0.1938	11
27	Leather and Fur	0.3452	13	0.1399	19
12	Manufacture of Nonmetallic Minerals	0.3431	14	0.1680	12
11	Nonmetallic Mineral Ore Extraction	0.3431	15	0.1472	16
36	Agriculture	0.3427	16	0.1652	13
2	Extraction of Coal	0.3405	17	0.1531	14
22	Sawmills and Wood Board	0.3402	18	0.1401	18
4	Extraction of Crude Petroleum & Gas	0.3382	19	0.1188	22
29	Rubber	0.3375	20	0.1426	17
16	Shipbuilding	0.3352	21	0.1078	24
8	Nonferrous Ore Mining	0.3348	22	0.1152	23
40	Transport and Communication	0.3346	23	0.1022	25
15	Transport Equipment	0.3335	24	0.1217	21
25	Yarns and Fabrics	0.3330	25	0.1490	15
31	Beverages	0.3322	26	0.0944	26
30	Food Processing	0.3245	27	0.0647	28
6	Iron Ore Mining	0.3223	28	0.0700	27
18	Manufacture of Chemicals	0.3157	29	0.0565	29
7	Iron and Steel	0.3144	30	0.0367	32
24	Paper	0.3126	31	0.0559	30
3	Coal Processing	0.3073	32	0.0143	34
10	Processing of Nonferrous Metals	0.3073	33	0.0461	31
5	Crude Petroleum Refining	0.3029	34	0.0264	33
9	Nonferrous Metals	0.3004	35	0.0090	35

Source: Calculated on the basis of data in Appendix I, Table 2 and Table 3.

Comparison of sector rankings derived from the bunch criterion with those from the direct criterion reveals a relatively similar pattern of the attractiveness. The observation is confirmed by the value of the Spearman rank correlation coefficient between both rankings which equals 0.955 (in his application of the semi-input-output model to Nigeria, Kuyvenhoven obtained the value of 0.962; 1980, p.277). The differences between both rankings that do appear are obviously the result of the complementary bunch

effects arising from the specification of the semi-input-output model. Out of 35 international sectors, both criteria yield identical rankings for ten sectors, six of which are the highest ranking (the Spearman rank correlation coefficient decreases to 0.920 if these are excluded). Nevertheless, some major reversals in the attractiveness may be detected when the latter is measured according to the bunch criterion as opposed to the direct criterion. The most substantial relative improvement occurs in Catering and Tourism (42) - (rank 20 according to the direct criterion and 10 according to the bunch criterion), followed by Leather and Fur (27), Extraction of Crude Petroleum and Gas (4), and Shipbuilding (16). The most significant decrease in the attractiveness show Yarns and Fabrics (25) - (rank 15 according to the direct criterion and rank 25 to the bunch criterion), and to a lesser extent Agriculture (36), Extraction of Coal (2), Rubber (29), and Transport Equipment (15). An improvement in the attractiveness occurs when an international sector requires relatively large inputs, both on current and capital account, from relatively "cheap" national sectors (having high value added to capital ratio), such as Water Works (38), Construction (39) and Trade (41). Conversely, strong dependencies upon intermediate and capital goods from relatively "expensive" national sectors, like Electrical Energy (1) and Public Utilities (44), result in a deterioration of an international sector's attractiveness.

The results of the semi-input-output model will serve as the "optimal" investment pattern to be be applied in the following chapter as an alternative against which the actual investment pattern in Yugoslavia during the 1980s will be confronted with.

4. THE ROLE OF THE INVESTMENT ALLOCATION IN THE ADJUSTMENT PROCESS IN 1980-1986

4.1. Investment Allocation Framework

This chapter introduces some of the basic features of the Yugoslav resource allocation system, particularly those pertaining to the sectoral allocation of investment in the period after 1976. Being basically a review of developments in recent history, it highlights some crucial deficiencies of the mechanisms that have been institutionalized before the outburst of the current economic crisis, and which have contributed a large share to it. Looking back at these developments might seem somewhat out of place, given the main purpose of this paper. The reason for doing so lies in the fact that the main institutional characteristics of investment allocation from the pre-crisis period did not undergo any significant transformation in order to adjust them to the drastically changed economic environment of the 1980s.

In postwar Yugoslavia, the system of the allocation of investment resources underwent the same process of institutional change as the rest of the socioeconomic system - basically from a centrally controlled to a decentralized system of investment decision making. After the 1965 reforms, enterprises became in principle the sole initiators of investment projects, ultimately led by market signals. However, this whole period was characterized by the excess demand for investment resources, which created a constant need for a kind of a rationing mechanism. This was due partly to the postulate that only a combination of market and planning could bring about efficient allocation of resources and partly to the weaknesses in economic management. According to Schrenk (1979, p.178), the most important factors that contributed to the persistent investment-saving gap were: ambitious investment plans, a low aversion to risk, substantial investment in social infrastructure, negative real interest rates, enterprises' objective to maximize personal incomes and, finally, the incidence of taxes and social contributions, which increased the price of labour relative to

capital. Some of these factors are pertinent to the self-managed economy (see Vanek, 1977), others, especially the negative real interest rates, are a manifestation of what has been called "financial repression", commonplace in many developing countries.

Although the rationing schemes changed from time to time, mainly as a response to disappointing results of the previous ones, their deficiencies have never been resolved satisfactorilly. The main tool for rationing, applied at the macro level, was channelling investment resources towards priority sectors as stipulated in five-year plans. Priorities were assigned to sectors where the largest structural imbalances were estimated to exist. Imbalances corresponded roughly to three types of structural weaknesses as perceived by planners: high import dependency, bottlenecks in the sectors producing raw materials and intermediate goods, and excess capacities in other sectors, many of them rapidly expanding. The priority sectors enjoyed preferential treatment both with regard to easy access to investment credits, as well as with respect to the interest rate being much lower than ordinary lending rates. As reliance of enterprises on finance channelled through the banking sector increased, the system of investment allocation became heavily influenced by priorities (they accounted for 57 percent of total realized productive investment in 1976-1980 and 63 percent of planned investment in 1981-1985), and the role of the national medium-term plans in allocating investment became extremelly important, which cannot be claimed for their other functions.

The system as described above had some potential weaknesses which, needless to say, in practice turned into real and serious drawbacks, adversely affecting efficiency of investment allocation.

First, as it happens in every rationing system, the pressures to gain the priority status have grown very strong. The immediate benefits to an individual enterprise that could be reaped from obtaining such a priority frequently exceeded the gains that could be obtained from the enterprise's own productive efforts. As a result, sectoral lobbies sprang up and with the help of local and regional centers of political influence often succeeded in their efforts to gain the privileged status of priority for the sectors they

represented. Besides stimulating "directly unproductive profit seeking activities" (see The World Bank, 1987, p.76), the system of priorities has contributed to increasing regionalization and fragmentation of the economy while discouraging indigenous development efforts, including efforts to promote domestic technological capability.

As one might expect, medium-term plans contained long lists of priority sectors, which under no circumstances could be financed with the available amount of investment resources, especially since priorities by and large tended to concentrate on heavy capital-intensive sectors. Projects in priority sectors were also poorly designed and implemented, causing cost overruns, delays and long gestation periods. These, in turn, inflated investment costs and investors tried to pass on the increased costs to the price of their output. Another important factor, at least in the 1976-1980 period, which is well known from the theory of economic cycles, was the inability of capital goods producing sectors to meet, in the short-run, the increased demand for their output.

Second, using a sector as the unit of aggregation for the selection of priorities is highly questionable. Assigning priority to a whole sector involved a large number of potential projects, not all of which merited preferential treatment. The sectoral aggregation is frequently adopted for analytical purposes, but for practical policy-making purposes with far-reaching consequences a more disaggregated scheme should be used.

Third, although astonishingly sophisticated formal procedures for harmonization of investment decisions among various agents have been worked out, the selection of priorities and the choice of projects within a priority sector were not based on any country-wide rigorous analytical methodology. Findings of the World Bank mission to Yugoslavia warned as early as in 1976 (Schrenk et al., 1979, p.189) that the absence of a formal analytical framework (such as cost-benefit analysis) for choosing among alternative options could lead to misallocations; what has been then described as a potentiality, materialized in subsequent years on such a scale as never before, in fact, a number of prestigious and unprofitable

"political" projects (see also Burger, 1974, p.8) had to be closed down after a few years of loss making.

4.2. Investment and the Adjustment Process in 1980-1986

The adjustment in the balance of payments in mid 1980s, documented in section 1.3., was achieved mainly by a reduction of domestic absorption, of which a disproportionately large share was borne by real fixed investment. Total real investment in fixed assets fell every year between 1980 and 1985, and by 1986 it was only 67 percent of its 1979 level. As a result, the share of fixed investment in gross social product (calculated from data in current prices) dropped from 38.4 percent in 1979 to 22.2 percent in 1986.

Such a rapid contraction of fixed investment was dictated by the foreign exchange crisis and therefore by the need to shift from net capital inflows, which had been used to finance domestic investment in excess of domestic saving in the period before 1980, to net capital outflows in a very short period of time. In addition, short-term adjustment policies that were put in place to cope with the balance of payments problem reinforced the strain on fixed investment. This impact can be explained by the mechanism of the adjustment process which worked through demand and supply-side effects. The former were primarily the consequence of expenditure-reducing policies in the form of credit controls which were most immediately available for demand management. They exerted the swiftest and largest impact on investment spending rather than on other final expenditure categories. A large decline of investment rate and relative constancy of the consumption ratio has been also a common characteristic of the adjustment process in the majority of highly indebted countries (see Cardoso and Fishlow, 1989, p.92). Expenditure-switching policies, stimulating a shift of demand from non-tradeables (national goods) to tradeables (international goods), affected particularly the sectoral composition of investment. The supply-side effects stemmed from the import compression coupled with the increase in the price of imported inputs. Owing to high import dependency of production and limited response to the price changes, these effects contributed to deep and

persistent stagflation. The slowdown in the rate of growth of output, in turn, fed back through the accelerator mechanism on investment expenditure.

A fall in real fixed investment was accompanied by a significant change in the structure of investment, occurring at two levels. First, there was a shift from non-productive investment (like housing, education, health etc.) to productive investment, thereby increasing the share of the latter from 71.3 percent in 1979 to 75.0 percent in 1986. Second, also within productive investment the relative importance of sectors changed considerably.

To analyze the effects of adjustment on structural change in productive investment, the period 1976-1986 was divided into two subperiods, the first extending from 1976 to 1980 and the second from 1981 to 1986. Although the year 1980 marks the beginning of the adjustment period, it was nevertheless included in the pre-crisis period for two reasons: first, the structure of investment was not yet affected by measures of adjustment policies due to time lags, and second, the periodization chosen corresponds to the medium-term planning periods. A comparison of sectoral shares in both subperiods[2] (see Appendix II, Table 4) reveals a considerable fall in the share of the national sectors in total productive investment, from 31.2 percent in 1976-1980 to 27.0 percent in 1981-1986. Among the major national sectors the largest reductions are registered in Construction (39) and closely linked Quarrying (20) and Building Materials (21), and Trade (41); an outcome that is in perfect accordance with the adjustment mechanism described above - investment in these two sectors is so severely curtailed because they are both national sectors and at the same time produce investment goods. The pattern where the brunt of adjustment falls upon investment in construction and public investment has been also observed in other highly indebted countries (see Edwards, 1989, p.252).

On the other hand, the majority of the international sectors made substantial gains in the structure of total productive investment. Some of them even registered high rates of growth in real terms between 1979 and 1986, for example Extraction of Coal (2), Iron Ore Mining (6), Iron and Steel (7), Electrical Machinery (17), Manufacture of Chemicals (18), Finished Textile Products (26), Leather and Fur (27), Footwear and Other Leather Products

(28), Forestry (37), Catering and Tourism (42). Only a few sectors had their investment shares reduced, most notably Transport and Communication (40) since investment there is directed essentially towards the infrastructural base.

The above analysis of structural change in investment clearly shows that the sectoral pattern of investment in 1981-1986 differed significantly from the one in the previous five-year period, thus the conclusion that despite a sharp decline of the overall investment rate, short-term adjustment policies did succeed in transferring investment resources from the non-tradeable to the tradeable sectors. The crucial question whether investment resources were allocated to the "right" tradeable sectors will be subject of the following section.

4.3. Allocative performance in 1981-1986

The previous chapters presented a number of different issues, providing a theoretical and empirical basis for examining some aspects of the adjustment process in Yugoslavia. The purpose of this section is to bring together the various pieces of the analysis in order to assess the efficiency of the investment allocation in the 1981-1986 period.

The method that will be applied consists in comparing the actual change in the structure of investment in 1981-1986 with the theoretical "optimal" pattern derived from the semi-input-output model. As the latter is given in the form of ranking, there is no other way of making the analysis amenable to empirical testing but to express the change in sectoral investment pattern in the same manner. To this purpose, a ratio of a share in total productive investment in 1981-1986 over the 1976-1980 period was calculated (and multiplied by 100) for each sector. The ratios, showing the rate of change in sectoral shares, were then ranked in decreasing order so as to obtain an indicator of the intensity of structural change. Values below 100 indicate a decrease, and those above 100 an increase of a sectoral share in total productive investment in 1981-1986 over the 1976-1980 period. Indicators of attractiveness of investment in international sectors, given

by the solution of the semi-input-output model, and of the intensity of structural change in investment, together with corresponding rankings, are presented in Table 4.

Table 4: Ranking of International Sectors According to Attractiveness and Intensity of Structural Change in Investment

No.	Sector	Value of Bunch Criterion (1)	Order of Rank (2)	Change in Invest-ment (3)	Order of Rank (4)
2	Extraction of Coal	0.3405	17	175.6	4
3	Coal Processing	0.3073	32	34.5	35
4	Extraction of Crude Petroleum & Gas	0.3382	19	121.9	15
5	Crude Petroleum Refining	0.3029	34	88.3	26
6	Iron Ore Mining	0.3223	28	351.0	1
7	Iron and Steel	0.3144	30	136.8	11
8	Nonferrous Ore Mining	0.3348	22	89.2	25
9	Nonferrous Metals	0.3004	35	55.0	34
10	Processing of Nonferrous Metals	0.3073	33	95.6	21
11	Nonmetallic Mineral Ore Extraction	0.3431	15	109.8	18
12	Manufacture of Nonmetallic Minerals	0.3431	14	80.5	30
13	Metal Fabrication	0.3490	12	101.5	20
14	Machinery, nonelectrical	0.3735	5	128.2	13
15	Transport Equipment	0.3335	24	117.5	16
16	Shipbuilding	0.3352	21	112.3	17
17	Electrical Machinery	0.3513	11	138.6	9
18	Manufacture of Chemicals	0.3157	29	174.5	5
19	Processing of Chemicals	0.3590	8	89.7	24
22	Sawmills and Wood Board	0.3402	18	55.4	33
23	Furniture and Fixtures	0.3566	9	93.2	22
24	Paper	0.3126	31	61.7	32
25	Yarns and Fabrics	0.3330	25	105.5	19
26	Finished Textile Products	0.3838	4	153.3	6
27	Leather and Fur	0.3452	13	194.3	3
28	Footwear and Other Leather Products	0.3872	3	198.6	2
29	Rubber	0.3375	20	85.3	28
30	Food Processing	0.3245	27	91.4	23
31	Beverages	0.3322	26	66.6	31
33	Tobacco	0.3592	7	86.2	27

Table 4 continued

No.	Sector	Value of Bunch Criterion (1)	Order of Rank (2)	Change in Invest-ment (3)	Order of Rank (4)
35	Miscellaneous Manufactures	0.3968	2	135.4	12
36	Agriculture	0.3427	16	137.0	10
37	Forestry	0.3729	6	145.9	7
40	Transport and Communication	0.3346	23	81.5	29
42	Catering and Tourism	0.3516	10	127.9	14
45	Other Productive Services	0.4561	1	136.0	8

Source: Table 3 and Appendix II, Table 4.

To measure the degree of correlation between both rankings, the Spearman rank correlation coefficient was calculated, giving the value of 0.43. The result suggests that in statistical terms there is no significant correlation between both variables. A tentative conclusion may be therefore drawn that in the 1981-1986 period investment in sectors which generate higher returns per unit of total capital requirements did not prevail. A more detailed examination of the results in Table 4 shows that among the sectors that registered the largest increases in their investment shares, quite a few do not meet the test of being attractive for investment. Sectors that particularly stand out are Extraction of Coal (2), Iron Ore Mining (6), Iron and Steel (7), Manufacture of Chemicals (18), and Leather and Fur (27). Most of these sectors are highly capital-intensive (hence also the low value of the investment selection criterion), having very high shares in total productive investment (see Appendix II, Table 4). At the same time there are several sectors with a relatively high value of the investment selection criterion to which unsufficient resources were allocated. Typical examples are Machinery (14), Processing of Chemicals (19), Furniture and Fixtures (23), Miscellaneous Manufactures (35), and Other Productive Services (45). In contrast to the first group, they have relatively low shares in total investment and low values of capital-output ratio. Finally, there are also cases where investment efforts have been properly oriented towards most attractive sectors, for example Finished Textile Products (26), and Footwear

and Other Leather Products (28) or, looked from the other side, where investing in unattractive sectors was cut down - Coal Processing (3), Crude Petroleum Refining (5), Nonferrous Metals (9), Processing of Nonferrous Metals (10), and Paper (24).

To asses properly the impact of this investment pattern on the efficiency of the investment allocation the relative weight of different sectors in total productive investment needs to be taken explicitly into account. The fact that the unattractive sectors have much higher aggregate share in total productive investment than the attractive ones implies that the reallocation of investment in favor of the former negatively affects the aggregate growth of output. This impact is twofold. First, direct contribution of capital-intensive sectors to the growth of total value added is generally relatively low (which of course does not mean that investing in such sectors should be a priori regarded as "inefficient"). Second, by increasing their already high investment shares, investment in other sectors is disproportionately squeezed out. In consequence, aggregate capital-output ratio rises, thus tending to decrease the potential growth rate of output (for a given amount of investment), which in turn reduces available resources for investment even further. In fact, the persistence of poor output performance in Yugoslavia may be largely explained by such a mechanism.

The foregoing considerations provide an additional argument in support of the preliminary conclusion made on the basis of the correlation analysis. Altogether, there are reasonably strong grounds to conclude that the pattern of investment in the tradeable sectors as developed in 1981-1986 contributed to deteriorating efficiency in the use of investment resources.

5. CONCLUSIONS AND POLICY RECOMMENDATIONS

Methodologically, the kinds of questions addressed in this paper are very difficult to analyze without making use of comprehensive economic models. Using simpler approaches, such as the semi-input-output model, should be regarded as the first step toward the formulation of a wider and more realistic framework. Nevertheless, the step is worth taking as it does indicate the directions where to look for the roots of the problems analyzed. However, some caveats are in order due to the limitations of the analysis.

First, the analysis is primarily concerned with the static efficiency of investment allocation and does not take into account wider-ranging considerations such as dynamic comparative advantage, externalities of various kinds, technological implications and non-economic aspects, such as national defense or regional development. Second, it is based on a sector as a unit, which may conceal a wide range of intra-sectoral variations. It is therefore possible that projects in apparently unprofitable activities might nevertheless be profitable. And third, as always, results are to be interpreted within the limitations set by the assumptions of the method used. Given these qualifications, results and conclusions derived should be taken more as guidelines than precise policy prescriptions.

Since the beginning of the foreign exchange crisis in 1979, Yugoslavia's adjustment efforts were geared primarily towards restoring the balance of payments equilibrium to which end all available policy tools have been employed. The costs of adjustment have been extremely high in terms of lost output, rising inflation, increased unemployment and lower standards of living. Not minimizing the extremely complicated and difficult situation with which Yugoslavia was faced in the beginning of the 1980s, but which was no different from the one faced by other highly indebted countries, the results of the analysis suggest that the adjustment costs would have been lower had investment resources been reallocated in favor of sectors with higher rates of return. The implication is that the failure to achieve a

more efficient allocation of scarce investment resources is one of the major factors explaining Yugoslavia's inability to overcome the economic crisis.

Although a detailed evaluation of adjustment policies is beyond the scope of this paper, the analysis here conducted can help to detect certain features of the adjustment strategy that Yugoslavia adopted since 1980. It has been pointed out earlier in the paper that the correction of the external account was accompanied by a shift of investment resources from the non-tradeable to the tradeable sectors, principally as a result of traditional short term adjustment policies (expenditure-reducing and expenditure-switching). However, this is only a necessary condition for sustained medium-term growth. The sufficient condition, critically important for achieving external balance with satisfactory growth of investment and output, namely improving the efficiency of resource allocation, was not met. This obviously points to the failure to employ supply-side policies as a part of adjustment packages. It follows that the adjustment strategy that Yugoslavia implemented can be characterized as being predominantly short-term oriented, lacking the critical element of any structural adjustment. This outcome can be ascribed to two causes: the initial diagnosis of and the response to the balance of payments crisis took too narrow a view of the complexity of the adjustment process; later on, there was strong reluctance to accept the short-term consequences of supply-side measures aiming at improving the efficiency of resource allocation, and consequently output and productivity performance in the medium term. As Yugoslavia will have to continue producing an export surplus for a number of years to service its foreign debt, the pattern of production must be altered and consequently that of investment.

The analysis presented in this paper offers some guidelines for policies directed to improving the investment allocation mechanism.

Generally, given the level of development Yugoslavia has achieved, a more open and export oriented development strategy is the only alternative in order to improve the efficiency of resource allocation. In fact, attempts to deal with structural imbalances by import-substituting policies have proved extremely detrimental to long-run development perspectives.

More specifically, major institutional changes should take place in the system of allocation of investment resources. The system of assigning priorities in investment to entire sectors should be abandoned, and more emphasis put on the screening of investment proposals through both capital pricing mechanism and criteria for investment selection. The former requires at least that interest rates become positive in real terms, and the latter the adoption of some country-wide analytical techniques of project evaluation.

Although methods such as cost-benefit analysis have been in existence for almost two decades and have become commonly used in many developing countries, they have not been used in Yugoslavia so far. Obvious neglect or ignorance of methods for project appraisal is even more surprising in the light of the fact that they would be ideally suited to the institutional framework in Yugoslavia. Even taking full account of their limitations, these techniques could supplement other methods of project evaluation at the micro level, while at the macro level they should be applied as an indispensable analytical tool for designing investment policies. Furthermore, more advanced analytical methods developed in recent years, such as computed general equilibrium models, offer new possibilities to be exploited for project evaluation purposes (particularly for the derivation of shadow prices).

Finally, no matter what kind of analytical methods for investment selection is applied, the principle that lies at the heart of the semi-input-output method, namely the complementarity of investment in tradeable (international) and non-tradeable (national) sectors, should be always fully utilized.

NOTES

1. The Yugoslav system of national accounts follows a somewhat different definitions and concepts from those adopted in UN SNA. The basic principle of the Yugoslav national accounting system is that income is generated only by "productive activities", which include all the activities that produce goods and only some that produce services (such as transport, trade, catering and tourism), but exclude the so-called "non-productive" services like education, science, health, administration, defense, banking and housing. Accordingly, only output of productive sectors is included in the measure of national output, gross social product (GSP).

2. The structure of investment in fixed assets by productive sector is here calculated from data in current prices, although data in constant prices would be more appropriate to this analysis. Unfortunately, the latter are not available. Using data in current prices implicitly assumes that relative prices of investment goods remain unchanged during the period under consideration.

APPENDIX I

Table 1: SECTORAL CLASSIFICATION SCHEME USED IN THE SEMI-INPUT-OUTPUT MODEL FOR YUGOSLAVIA

No.	Sector	No.	Sector
	INTERNATIONAL SECTORS		NATIONAL SECTORS
2	Extraction of Coal	1	Electrical Energy
3	Coal Processing	20	Quarrying
4	Extraction of Crude Petroleum and Gas	21	Building Materials
5	Crude Petroleum Refining	32	Animal Feeds
6	Iron Ore Mining	34	Printing
7	Iron and Steel	38	Water Works
8	Nonferrous Ore Mining	39	Construction
9	Nonferrous Metals	41	Trade
10	Processing of Nonferrous Metals	43	Arts and Crafts
11	Nonmetallic Mineral Ore Extraction	44	Public Utilities
12	Manufacture of Nonmetallic Minerals		
13	Metal Fabrication		
14	Machinery, nonelectrical		
15	Transport Equipment		
16	Shipbuilding		
17	Electrical Machinery		
18	Manufacture of Chemicals		
19	Processing of Chemicals		
22	Sawmills and Wood Board		
23	Furniture and Fixtures		
24	Paper		
25	Yarns and Fabrics		
26	Finished Textile Products		
27	Leather and Fur		
28	Footwear and Other Leather Products		
29	Rubber		
30	Food Processing		
31	Beverages		
33	Tobacco		
35	Miscellaneous Manufactures		
36	Agriculture		
37	Forestry		
40	Transport and Communication		
42	Catering and Tourism		
45	Other Productive Services		

SOURCE: Inter-Industry Relations of the Economy of the SFR Yugoslavia in 1980, Federal Institute of Statistics.

TABLE 2: MATRICES AND VECTORS USED FOR THE SEMI-INPUT-OUTPUT MODEL FOR YUGOSLAVIA - THE INTERNATIONAL PART

A_{NI} - MATRIX OF TECHNICAL INPUT- OUTPUT COEFFICIENTS

	2	3	4	5	6	7	8
1 Electrical Energy	0.0338	0.0264	0.0096	0.0060	0.0289	0.0320	0.0614
20 Quarrying	0.0015	0.0000	0.0001	0.0000	0.0037	0.0013	0.0020
21 Building Materials	0.0019	0.0000	0.0002	0.0010	0.0058	0.0009	0.0042
32 Animal Feeds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
34 Printing	0.0017	0.0004	0.0008	0.0007	0.0110	0.0005	0.0011
38 Water Works	0.0016	0.0000	0.0005	0.0001	0.0000	0.0000	0.0000
39 Construction	0.0092	0.0003	0.0017	0.0004	0.0065	0.0018	0.0055
41 Trade	0.0135	0.0284	0.0046	0.0259	0.0367	0.0226	0.0156
43 Arts and Crafts	0.0522	0.0172	0.0311	0.0039	0.1133	0.0401	0.0173
44 Public Utilities	0.0085	0.0009	0.0015	0.0038	0.0179	0.0263	0.0097

V_I - VECTOR OF VALUE ADDED COEFFICIENTS

2	3	4	5	6	7	8
0.7213	0.1699	0.8741	0.0891	0.5416	0.1698	0.4655

b_I - VECTOR OF CAPITAL-OUTPUT RATIOS

2	3	4	5	6	7	8
4.7126	11.8859	7.3572	3.3722	7.7394	4.6261	4.0418

B_{NI} - MATRIX OF PARTIAL CAPITAL-OUTPUT RATIOS

	2	3	4	5	6	7	8
39 Construction	1.9954	5.1321	3.7581	1.1665	3.1356	1.8796	1.9678
41 Trade	0.2638	0.6403	0.3650	0.2209	0.4700	0.2519	0.1894

$A^*_{NI} = A_{NI} + B_{NI}$

	2	3	4	5	6	7	8
1 Electrical Energy	0.0338	0.0264	0.0096	0.0060	0.0289	0.0320	0.0614
20 Quarrying	0.0015	0.0000	0.0001	0.0000	0.0037	0.0013	0.0020
21 Building Materials	0.0019	0.0000	0.0002	0.0010	0.0058	0.0009	0.0042
32 Animal Feeds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
34 Printing	0.0017	0.0004	0.0008	0.0007	0.0110	0.0005	0.0011
38 Water Works	0.0016	0.0000	0.0005	0.0001	0.0000	0.0000	0.0000
39 Construction	2.0046	5.1324	3.7598	1.1668	3.1422	1.8814	1.9734
41 Trade	0.2773	0.6687	0.3696	0.2468	0.5066	0.2745	0.2050
43 Arts and Crafts	0.0522	0.0172	0.0311	0.0039	0.1133	0.0401	0.0173
44 Public Utilities	0.0085	0.0009	0.0015	0.0038	0.0179	0.0263	0.0097

SOURCE: own calculations based on data from Inter-Industry Relations of the Economy of the SFR Yugoslavia in 1980, Federal Institute of Statistics, and Appendix II, Table 1 and Table 2.

TABLE 2 CONTINUED

A_{NI} - MATRIX OF TECHNICAL INPUT- OUTPUT COEFFICIENTS

	9	10	11	12	13	14	15
1 Electrical Energy	0.0758	0.0146	0.0426	0.0252	0.0158	0.0100	0.0079
20 Quarrying	0.0004	0.0002	0.0009	0.0027	0.0012	0.0001	0.0000
21 Building Materials	0.0023	0.0024	0.0040	0.0045	0.0015	0.0012	0.0006
32 Animal Feeds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
34 Printing	0.0003	0.0005	0.0045	0.0038	0.0020	0.0035	0.0010
38 Water Works	0.0002	0.0007	0.0012	0.0002	0.0004	0.0010	0.0003
39 Construction	0.0009	0.0010	0.0033	0.0044	0.0134	0.0166	0.0053
41 Trade	0.0179	0.0289	0.0184	0.0344	0.0401	0.0320	0.0314
43 Arts and Crafts	0.0087	0.0100	0.0210	0.0369	0.0145	0.0164	0.0137
44 Public Utilities	0.0106	0.0044	0.0023	0.0041	0.0060	0.0073	0.0109

V_I - VECTOR OF VALUE ADDED COEFFICIENTS

9	10	11	12	13	14	15
0.1239	0.2497	0.5744	0.4371	0.4030	0.4145	0.2821

b_I - VECTOR OF CAPITAL-OUTPUT RATIOS

9	10	11	12	13	14	15
13.7177	5.4214	3.9023	2.6020	2.1048	1.3609	2.3173

B_{NI} - MATRIX OF PARTIAL CAPITAL-OUTPUT RATIOS

	9	10	11	12	13	14	15
39 Construction	5.2794	1.8918	2.0232	1.0014	0.7466	0.4649	0.8995
41 Trade	0.7152	0.3320	0.1765	0.1541	0.1339	0.0888	0.1373

$A^*_{NI} = A_{NI} + B_{NI}$

	9	10	11	12	13	14	15
1 Electrical Energy	0.0758	0.0146	0.0426	0.0252	0.0158	0.0100	0.0079
20 Quarrying	0.0004	0.0002	0.0009	0.0027	0.0012	0.0001	0.0000
21 Building Materials	0.0023	0.0024	0.0040	0.0045	0.0015	0.0012	0.0006
32 Animal Feeds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
34 Printing	0.0003	0.0005	0.0045	0.0038	0.0020	0.0035	0.0010
38 Water Works	0.0002	0.0007	0.0012	0.0002	0.0004	0.0010	0.0003
39 Construction	5.2803	1.8928	2.0265	1.0058	0.7600	0.4815	0.9048
41 Trade	0.7331	0.3609	0.1949	0.1884	0.1741	0.1208	0.1686
43 Arts and Crafts	0.0087	0.0100	0.0210	0.0369	0.0145	0.0164	0.0137
44 Public Utilities	0.0106	0.0044	0.0023	0.0041	0.0060	0.0073	0.0109

TABLE 2 CONTINUED

A_{NI} - MATRIX OF TECHNICAL INPUT- OUTPUT COEFFICIENTS

	16	17	18	19	22	23	24
1 Electrical Energy	0.0085	0.0133	0.0407	0.0099	0.0185	0.0144	0.0504
20 Quarrying	0.0001	0.0000	0.0003	0.0007	0.0001	0.0003	0.0002
21 Building Materials	0.0008	0.0010	0.0024	0.0012	0.0023	0.0065	0.0016
32 Animal Feeds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
34 Printing	0.0022	0.0027	0.0024	0.0062	0.0009	0.0043	0.0089
38 Water Works	0.0017	0.0002	0.0007	0.0003	0.0008	0.0005	0.0024
39 Construction	0.0032	0.0053	0.0043	0.0027	0.0041	0.0121	0.0025
41 Trade	0.0338	0.0205	0.0383	0.0328	0.0134	0.0226	0.0241
43 Arts and Crafts	0.0167	0.0125	0.0302	0.0098	0.0118	0.0110	0.0145
44 Public Utilities	0.0045	0.0056	0.0094	0.0084	0.0087	0.0044	0.0130

V_I - VECTOR OF VALUE ADDED COEFFICIENTS

16	17	18	19	22	23	24
0.3992	0.3505	0.2270	0.3222	0.3803	0.4055	0.2831

b_I - VECTOR OF CAPITAL-OUTPUT RATIOS

16	17	18	19	22	23	24
3.7049	1.7443	4.0198	1.3730	2.7142	1.8477	5.0598

B_{NI} - MATRIX OF PARTIAL CAPITAL-OUTPUT RATIOS

	16	17	18	19	22	23	24
39 Construction	1.7475	0.7161	1.4861	0.5312	1.2718	0.8188	1.7281
41 Trade	0.2001	0.0997	0.2250	0.0815	0.1411	0.1025	0.3215

$A^*_{NI} = A_{NI} + B_{NI}$

	16	17	18	19	22	23	24
1 Electrical Energy	0.0085	0.0133	0.0407	0.0099	0.0185	0.0144	0.0504
20 Quarrying	0.0001	0.0000	0.0003	0.0007	0.0001	0.0003	0.0002
21 Building Materials	0.0008	0.0010	0.0024	0.0012	0.0023	0.0065	0.0016
32 Animal Feeds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
34 Printing	0.0022	0.0027	0.0024	0.0062	0.0009	0.0043	0.0089
38 Water Works	0.0017	0.0002	0.0007	0.0003	0.0008	0.0005	0.0024
39 Construction	1.7508	0.7214	1.4924	0.5339	1.2759	0.8309	1.7307
41 Trade	0.2339	0.1201	0.2633	0.1144	0.1544	0.1251	0.3456
43 Arts and Crafts	0.0167	0.0125	0.0302	0.0098	0.0118	0.0110	0.0145
44 Public Utilities	0.0045	0.0056	0.0094	0.0084	0.0087	0.0044	0.0130

TABLE 2 CONTINUED

A_{NI} - MATRIX OF TECHNICAL INPUT- OUTPUT COEFFICIENTS

	25	26	27	28	29	30	31
1 Electrical Energy	0.0239	0.0078	0.0094	0.0051	0.0203	0.0108	0.0127
20 Quarrying	0.0000	0.0001	0.0000	0.0001	0.0001	0.0004	0.0001
21 Building Materials	0.0008	0.0004	0.0005	0.0005	0.0008	0.0009	0.0008
32 Animal Feeds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
34 Printing	0.0025	0.0058	0.0058	0.0088	0.0017	0.0046	0.0113
38 Water Works	0.0003	0.0004	0.0003	0.0006	0.0005	0.0005	0.0010
39 Construction	0.0024	0.0025	0.0035	0.0032	0.0031	0.0024	0.0047
41 Trade	0.0188	0.0125	0.0397	0.0249	0.0274	0.0175	0.0256
43 Arts and Crafts	0.0115	0.0077	0.0087	0.0091	0.0266	0.0075	0.0110
44 Public Utilities	0.0105	0.0049	0.0065	0.0031	0.0433	0.0043	0.0083

V_I - VECTOR OF VALUE ADDED COEFFICIENTS

25	26	27	28	29	30	31
0.3960	0.4306	0.2497	0.3707	0.2849	0.1847	0.3106

b_I - VECTOR OF CAPITAL-OUTPUT RATIOS

25	26	27	28	29	30	31
2.6583	1.2214	1.7850	1.0449	1.9977	2.8542	3.2916

B_{NI} - MATRIX OF PARTIAL CAPITAL-OUTPUT RATIOS

	25	26	27	28	29	30	31
39 Construction	0.8149	0.4501	0.8940	0.4486	0.7243	1.3376	1.5894
41 Trade	0.1867	0.0771	0.0903	0.0601	0.1264	0.1480	0.1640

$A^*_{NI} = A_{NI} + B_{NI}$

	25	26	27	28	29	30	31
1 Electrical Energy	0.0239	0.0078	0.0094	0.0051	0.0203	0.0108	0.0127
20 Quarrying	0.0000	0.0001	0.0000	0.0001	0.0001	0.0004	0.0001
21 Building Materials	0.0008	0.0004	0.0005	0.0005	0.0008	0.0009	0.0008
32 Animal Feeds	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
34 Printing	0.0025	0.0058	0.0058	0.0088	0.0017	0.0046	0.0113
38 Water Works	0.0003	0.0004	0.0003	0.0006	0.0005	0.0005	0.0010
39 Construction	0.8173	0.4526	0.8975	0.4518	0.7274	1.3399	1.5902
41 Trade	0.2055	0.0896	0.1306	0.0850	0.1538	0.1656	0.1895
43 Arts and Crafts	0.0115	0.0077	0.0087	0.0091	0.0266	0.0075	0.0110
44 Public Utilities	0.0105	0.0049	0.0065	0.0031	0.0433	0.0043	0.0083

TABLE 2 CONTINUED

A_{NI} - MATRIX OF TECHNICAL INPUT- OUTPUT COEFFICIENTS

	33	35	36	37	40	42	45
1 Electrical Energy	0.0084	0.0067	0.0068	0.0021	0.0096	0.0191	0.0076
20 Quarrying	0.0001	0.0000	0.0002	0.0014	0.0026	0.0002	0.0005
21 Building Materials	0.0003	0.0007	0.0008	0.0024	0.0012	0.0004	0.0033
32 Animal Feeds	0.0000	0.0000	0.0602	0.0025	0.0000	0.0000	0.0000
34 Printing	0.0205	0.0317	0.0006	0.0019	0.0034	0.0045	0.0257
38 Water Works	0.0004	0.0001	0.0023	0.0016	0.0008	0.0017	0.0009
39 Construction	0.0033	0.0017	0.0016	0.0092	0.0077	0.0078	0.0132
41 Trade	0.0275	0.0415	0.0219	0.0101	0.0425	0.0712	0.0084
43 Arts and Crafts	0.0070	0.0087	0.0138	0.0193	0.0396	0.0135	0.0121
44 Public Utilities	0.0026	0.0115	0.0011	0.0024	0.0049	0.0121	0.0127

V_I - VECTOR OF VALUE ADDED COEFFICIENTS

33	35	36	37	40	42	45
0.2735	0.4195	0.5200	0.7766	0.5551	0.5278	0.7940

b_I - VECTOR OF CAPITAL-OUTPUT RATIOS

33	35	36	37	40	42	45
1.2587	0.9661	3.1479	2.8815	5.4320	4.0935	0.8908

B_{NI} - MATRIX OF PARTIAL CAPITAL-OUTPUT RATIOS

	33	35	36	37	40	42	45
39 Construction	0.6077	0.4291	1.5428	2.0991	2.6252	3.1349	0.5179
41 Trade	0.0650	0.0545	0.1336	0.0685	0.2837	0.0877	0.0374

$A^*_{NI} = A_{NI} + B_{NI}$

	33	35	36	37	40	42	45
1 Electrical Energy	0.0084	0.0067	0.0068	0.0021	0.0096	0.0191	0.0076
20 Quarrying	0.0001	0.0000	0.0002	0.0014	0.0026	0.0002	0.0005
21 Building Materials	0.0003	0.0007	0.0008	0.0024	0.0012	0.0004	0.0033
32 Animal Feeds	0.0000	0.0000	0.0602	0.0025	0.0000	0.0000	0.0000
34 Printing	0.0205	0.0317	0.0006	0.0019	0.0034	0.0045	0.0257
38 Water Works	0.0004	0.0001	0.0023	0.0016	0.0008	0.0017	0.0009
39 Construction	0.6109	0.4308	1.5444	2.1082	2.6328	3.1427	0.5311
41 Trade	0.0926	0.0960	0.1555	0.0785	0.3262	0.1589	0.0459
43 Arts and Crafts	0.0070	0.0087	0.0138	0.0193	0.0396	0.0135	0.0121
44 Public Utilities	0.0026	0.0115	0.0011	0.0024	0.0049	0.0121	0.0127

TABLE 3: MATRICES AND VECTORS USED FOR THE SEMI-INPUT-OUTPUT MODEL FOR YUGOSLAVIA - THE NATIONAL PART

A_{NN} - MATRIX OF TECHNICAL INPUT- OUTPUT COEFFICIENTS

	1	20	21	32	34	38	39
1 Electrical Energy	0.1101	0.0367	0.0344	0.0048	0.0069	0.0086	0.0051
20 Quarrying	0.0002	0.0328	0.0295	0.0001	0.0000	0.0105	0.0160
21 Building Materials	0.0020	0.0399	0.0578	0.0000	0.0001	0.0211	0.0704
32 Animal Feeds	0.0000	0.0000	0.0000	0.0312	0.0000	0.0000	0.0000
34 Printing	0.0012	0.0019	0.0025	0.0014	0.0312	0.0029	0.0008
38 Water Works	0.0020	0.0042	0.0010	0.0000	0.0003	0.0556	0.0016
39 Construction	0.0124	0.0198	0.0179	0.0009	0.0029	0.0639	0.1923
41 Trade	0.0253	0.0281	0.0474	0.0343	0.0265	0.0157	0.0557
43 Arts and Crafts	0.0186	0.0354	0.0245	0.0067	0.0060	0.0282	0.0160
44 Public Utilities	0.0054	0.0115	0.0063	0.0011	0.0023	0.0198	0.0052

V_N - VECTOR OF VALUE ADDED COEFFICIENTS

1	20	21	32	34	38	39
0.5007	0.5369	0.4129	0.1219	0.4699	0.6411	0.4133

b_N - VECTOR OF CAPITAL-OUTPUT RATIOS

1	20	21	32	34	38	39
10.7770	2.0615	3.2577	7.2898	2.1266	10.8718	0.9314

B_{NN} - MATRIX OF PARTIAL CAPITAL-OUTPUT RATIOS

	1	20	21	32	34	38	39
39 Construction	6.6116	0.6334	1.3810	3.6438	0.7328	9.3682	0.1964
41 Trade	0.3818	0.1424	0.1794	0.3678	0.1419	0.1518	0.0754

$A^*_{NN} = A_{NN} + B_{NN}$

	1	20	21	32	34	38	39
1 Electrical Energy	0.1101	0.0367	0.0344	0.0048	0.0069	0.0086	0.0051
20 Quarrying	0.0002	0.0328	0.0295	0.0001	0.0000	0.0105	0.0160
21 Building Materials	0.0020	0.0399	0.0578	0.0000	0.0001	0.0211	0.0704
32 Animal Feeds	0.0000	0.0000	0.0000	0.0312	0.0000	0.0000	0.0000
34 Printing	0.0012	0.0019	0.0025	0.0014	0.0312	0.0029	0.0008
38 Water Works	0.0020	0.0042	0.0010	0.0000	0.0003	0.0556	0.0016
39 Construction	6.6240	0.6532	1.3989	3.6447	0.7357	9.4321	0.3886
41 Trade	0.4070	0.1705	0.2269	0.4021	0.1684	0.1675	0.1311
43 Arts and Crafts	0.0186	0.0354	0.0245	0.0067	0.0080	0.0282	0.0160
44 Public Utilities	0.0054	0.0115	0.0063	0.0011	0.0023	0.0198	0.0052

SOURCE: own calculations based on data from Inter-Industry Relations of the Economy of the SFR Yugoslavia in 1980, Federal Institute of Statistics, and Appendix II, Table 1 and Table 2.

TABLE 3 CONTINUED

A_{NN} - MATRIX OF TECHNICAL INPUT- OUTPUT COEFFICIENTS

	41	43	44
1 Electrical Energy	0.0085	0.0190	0.0731
20 Quarrying	0.0000	0.0002	0.0062
21 Building Materials	0.0012	0.0037	0.0228
32 Animal Feeds	0.0000	0.0000	0.0000
34 Printing	0.0031	0.0028	0.0046
38 Water Works	0.0001	0.0015	0.0032
39 Construction	0.0076	0.0084	0.0307
41 Trade	0.0064	0.0708	0.0346
43 Arts and Crafts	0.0068	0.0378	0.0232
44 Public Utilities	0.0041	0.0091	0.0241

V_N - VECTOR OF VALUE ADDED COEFFICIENTS

41	43	44
0.8877	0.5144	0.4775

b_N - VECTOR OF CAPITAL-OUTPUT RATIOS

41	43	44
0.7534	1.9157	7.6111

B_{NN} - MATRIX OF PARTIAL CAPITAL-OUTPUT RATIOS

	41	43	44
39 Construction	0.4672	0.8616	6.0888
41 Trade	0.0279	0.1057	0.1563

$A^*_{NN} = A_{NN} + B_{NN}$

	41	43	44
1 Electrical Energy	0.0085	0.0190	0.0731
20 Quarrying	0.0000	0.0002	0.0062
21 Building Materials	0.0012	0.0037	0.0228
32 Animal Feeds	0.0000	0.0000	0.0000
34 Printing	0.0031	0.0028	0.0046
38 Water Works	0.0001	0.0015	0.0032
39 Construction	0.4748	0.8701	6.1195
41 Trade	0.0344	0.1765	0.1909
43 Arts and Crafts	0.0068	0.0378	0.0232
44 Public Utilities	0.0041	0.0091	0.0241

APPENDIX II

Table 1: GROSS SOCIAL PRODUCT IN THE SOCIAL SECTOR BY SECTORAL ORIGIN
AT CONSTANT 1972 PRICES
(Millions of Dinars)

No.	Sector	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
1	Electrical Energy	7574	8515	8983	9549	10425	10506	10669	11300	12076	12372	12872
2	Extraction of Coal	2728	2842	2871	3034	3288	3552	3695	3885	4134	4441	4485
3	Coal Processing	308	306	309	305	333	637	649	772	772	780	771
4	Extraction of Crude Petroleum and Gas	826	858	887	893	893	968	975	929	894	933	938
5	Crude Petroleum Refining	2020	2355	2551	2825	2805	2536	2604	2557	2570	2426	2744
6	Iron Ore Mining	345	351	371	391	376	344	370	355	368	309	475
7	Iron and Steel	4035	4439	4940	5331	5373	5965	5807	6209	6670	6941	7014
8	Nonferrous Ore Mining	2081	2110	2134	2134	2177	2129	2196	2332	2496	2456	2407
9	Nonferrous Metals	1033	1045	1060	1099	1038	989	947	967	1006	1075	1100
10	Processing of Nonferrous Metals	796	895	998	981	1063	1055	1101	1018	1103	1220	1241
11	Nonmetallic Mineral Ore Extraction	587	607	602	626	604	645	665	670	656	734	760
12	Manufacture of Nonmetallic Minerals	2172	2348	2612	2819	2927	3284	3363	3343	3912	4164	4325
13	Metal Fabrication	9718	10413	11911	12836	13758	14322	14095	13628	13957	14176	14321
14	Machinery, nonelectrical	6197	6786	7980	9141	9474	10136	10347	10411	10679	11408	11894
15	Transport Equipment	6184	6919	7629	8372	8419	8548	8580	8583	9124	9294	9677
16	Shipbuilding	1551	1411	1252	1211	1220	1246	1271	1337	1652	1741	1694
17	Electrical Machinery	5758	6786	7848	8526	8736	9166	9234	9291	9960	10916	11604
18	Manufacture of Chemicals	3836	4292	4919	5206	5653	6090	6022	6448	7360	7568	7966
19	Processing of Chemicals	5196	6163	7034	7772	8265	8903	8693	9055	9124	9360	9879
20	Quarrying	1227	1390	1606	1717	1773	1738	1692	1701	1640	1680	1723
21	Building Materials	3971	4493	4846	5213	5514	5559	5455	5446	5440	5119	5114
22	Sawmills and Wood Board	2574	2828	2940	3164	3146	3107	3176	3127	3305	3319	3384
23	Furniture and Fixtures	4770	5355	5594	6117	6446	6532	6354	6369	6682	6414	6890
24	Paper	1884	2187	2382	2595	2707	2670	2820	2885	3002	3014	3101
25	Yarns and Fabrics	5544	6058	6119	6439	6720	6968	6771	6867	7158	7310	7661
26	Finished Textile Products	7951	8135	8562	9425	10021	10479	10372	10397	11205	11743	12621
27	Leather and Fur	927	957	959	982	1028	1126	1057	1038	1085	1175	1181
28	Footwear and Other Leather Products	2372	2421	2484	2652	2871	3153	3177	3295	3680	3876	4127
29	Rubber	1396	1684	1848	2075	2133	2272	2153	2211	2285	2431	2419
30	Food Processing	8275	8874	9788	10651	10662	11029	11047	11217	12085	11793	11940
31	Beverages	1998	2250	2364	2635	2791	2969	3352	3141	2988	2930	3079
32	Animal Feeds	314	369	428	437	452	473	445	490	508	438	459
33	Tobacco	2576	2687	2631	2885	2791	2906	2940	3130	2706	2916	2944
34	Printing	1699	1793	1928	2048	2141	2168	2158	2143	2179	2290	2457
35	Miscellaneous Manufactures	619	673	731	815	797	898	832	788	904	908	1133
36	Agriculture	11892	12745	12770	13459	13661	14037	15469	15574	17199	16224	17651
37	Forestry	2793	3044	3008	3077	2978	3117	3315	3324	3448	3458	3455
38	Water Works	926	1065	1065	1087	1108	1140	1150	1162	1135	1148	1171
39	Construction	26595	29257	33061	36367	36367	34478	31620	27021	25822	25542	25193
40	Transport and Communication	23941	25473	28021	29085	30191	30525	29666	30061	31240	32309	33861
41	Trade	52496	56694	62591	66346	67009	65374	65907	64452	62859	62564	64140
42	Catering and Tourism	7723	8262	8774	9301	9394	9469	9724	9856	10051	10274	9555
43	Arts and Crafts	4624	4943	5306	5542	5753	5880	6153	6200	6294	6508	5815
44	Public Utilities	1377	1434	1580	1705	1723	1766	1823	1842	1719	1772	1628
45	Other Productive Services	8924	9578	10632	11695	11695	12020	12355	12090	11471	11941	12205
	Total	252333	274090	298909	320565	328699	333076	332266	328917	336603	341650	351274

SOURCE: Statistical Yearbook of Yugoslavia, Federal Institute of Statistics, various issues.

Table 2: TECHNICAL STRUCTURE OF FIXED ASSETS IN THE SOCIAL SECTOR, BY PRODUCTIVE SECTOR AT CONSTANT 1972 PRICES
(Millions of Dinars)

No.	Sector	1976			1977			1978		
		Total	Buildings	Equipment	Total	Buildings	Equipment	Total	Buildings	Equipment
1	Electrical Energy	86381	56448	27287	89887	58519	28467	98375	62285	32100
2	Extraction of Coal	11915	5406	6346	12609	5601	6755	13777	5945	7551
3	Coal Processing	1925	887	987	1925	887	987	3043	1215	1657
4	Extraction of Crude Petroleum and Gas	5645	2962	2565	5782	3150	2533	6049	3272	2679
5	Crude Petroleum Refining	7691	2983	4567	8123	3045	4898	8552	3170	5193
6	Iron Ore Mining	2797	1120	1673	2784	1126	1647	2810	1133	1665
7	Iron and Steel	16491	7136	8772	21297	8581	11770	22629	9426	12070
8	Nonferrous Ore Mining	7536	3855	3540	7895	4017	3663	9360	4403	4266
9	Nonferrous Metals	8971	3729	4863	10009	4121	5423	10243	4195	5412
10	Processing of Nonferrous Metals	4668	1558	2858	5789	2284	3226	5778	2111	3265
11	Nonmetallic Mineral Ore Extraction	2226	1142	1049	2390	1245	1100	2425	1256	1122
12	Manufacture of Nonmetallic Minerals	5616	2238	3289	6180	2494	3585	6611	2593	3855
13	Metal Fabrication	19201	7056	11869	21034	7672	13042	23582	8850	14792
14	Machinery, nonelectrical	8881	2901	5801	9866	3320	6333	10856	3694	6895
15	Transport Equipment	14986	6153	8655	16273	6487	9492	16961	6696	9915
16	Shipbuilding	4542	2083	2444	4682	2149	2514	4849	2204	2617
17	Electrical Machinery	11655	5220	6074	12660	5520	6716	13686	5785	7377
18	Manufacture of Chemicals	17260	6962	9985	18188	7308	10281	19177	7594	10887
19	Processing of Chemicals	7656	2709	4588	9022	3322	5263	10037	3678	5851
20	Quarrying	2274	736	1494	2760	913	1784	3219	980	2169
21	Building Materials	12332	5300	6876	13100	5626	7286	15247	6585	8342
22	Sawmills and Wood Board	5544	2966	2554	6160	3190	2925	7129	3685	3348
23	Furniture and Fixtures	8917	3781	5032	9510	4164	5218	10337	4536	5639
24	Paper	10071	3976	5847	10953	4116	6474	11555	4274	6861
25	Yarns and Fabrics	14665	4498	9976	15596	4761	10604	16554	4977	11313
26	Finished Textile Products	9271	3343	5778	9983	3635	6170	10866	3903	6753
27	Leather and Fur	1531	846	662	1703	870	810	1808	891	889
28	Footwear and Other Leather Products	2477	1002	1453	2630	1067	1538	2818	1134	1656
29	Rubber	3134	1202	1944	3623	1346	2199	3806	1403	2315
30	Food Processing	21295	10526	10490	23387	11486	11432	24830	12141	12190
31	Beverages	6560	3260	3139	7221	3470	3566	7809	3708	3885
32	Animal Feeds	2918	1290	1593	3167	1392	1737	3358	1490	1619
33	Tobacco	3120	1511	1562	3212	1538	1624	3338	1593	1693
34	Printing	2931	1019	1867	3470	1126	2306	3928	1328	2563
35	Miscellaneous Manufactures	400	177	222	556	237	315	648	278	363
36	Agriculture	35917	17760	14574	37903	18705	15255	40325	19912	16378
37	Forestry	7030	5449	1462	7513	5783	1588	7980	6046	1732
38	Water Works	10257	9090	1116	11036	9652	1322	11461	9971	1437
39	Construction	25594	6541	19002	27669	6665	20932	30074	6779	23196
40	Transport and Communication	126180	64311	61434	137933	69793	67550	147371	73607	72966
41	Trade	38409	24079	13681	41248	25746	14751	44498	27648	15966
42	Catering and Tourism	32438	25311	6503	34048	26473	6843	35866	27724	7265
43	Arts and Crafts	6933	3295	3530	7899	3776	4006	8865	4182	4547
44	Public Utilities	10670	8553	1846	11058	8840	2210	11616	9176	2317
45	Other Productive Services	7113	4268	2829	8129	4806	3258	9062	5259	3710
	Total	654084	336658	303698	707862	360028	331398	763168	382215	360481

SOURCE: Fixed Assets of the Economy of the Social Sector of the SFR Yugoslavia 1952-1981 at 1972 Prices, Federal Institute of Statistics, Table 3-1.

Table 2 continued

No.	Sector	1979			1980		
		Total	Buildings	Equipment	Total	Buildings	Equipment
1	Electrical Energy	108048	66303	37281	112350	68925	38491
2	Extraction of Coal	14719	6335	8046	15495	6561	8388
3	Coal Processing	3364	1338	1844	3958	1709	2062
4	Extraction of Crude Petroleum and Gas	6326	3331	2897	6570	3356	3152
5	Crude Petroleum Refining	9300	3296	5784	9459	3272	5993
6	Iron Ore Mining	2844	1159	1666	2910	1179	1709
7	Iron and Steel	24275	9941	12823	24856	10099	13091
8	Nonferrous Ore Mining	8456	4284	3863	8799	4284	3987
9	Nonferrous Metals	13455	5012	6842	14239	5480	7180
10	Processing of Nonferrous Metals	6154	2168	3519	5763	2011	3413
11	Nonmetallic Mineral Ore Extraction	2327	1186	1080	2357	1222	1031
12	Manufacture of Nonmetallic Minerals	7124	2806	4128	7616	2931	4361
13	Metal Fabrication	26532	9824	16498	26956	10272	17623
14	Machinery, nonelectrical	12077	4056	7713	12893	4404	8133
15	Transport Equipment	17928	6974	10506	19509	7573	11176
16	Shipbuilding	4784	2207	2548	4520	2132	2361
17	Electrical Machinery	14437	5953	7916	15238	6256	8420
18	Manufacture of Chemicals	20267	8078	11416	22724	8412	12301
19	Processing of Chemicals	10892	4084	6259	11348	4390	6518
20	Quarrying	3614	1199	2325	3655	1123	2442
21	Building Materials	17067	7350	9092	17963	7615	9568
22	Sawmills and Wood Board	8129	3930	4059	8539	4001	4292
23	Furniture and Fixtures	11275	4975	6102	11910	5278	6390
24	Paper	12091	4291	7282	13697	4678	8417
25	Yarns and Fabrics	17471	5305	11861	17864	5476	12135
26	Finished Textile Products	11710	4244	7226	12240	4510	7470
27	Leather and Fur	1836	899	907	1835	919	903
28	Footwear and Other Leather Products	2913	1233	1649	3000	1288	1668
29	Rubber	4104	1475	2524	4261	1545	2607
30	Food Processing	28663	13561	14816	30432	14261	15266
31	Beverages	8704	4237	4177	9187	4425	4426
32	Animal Feeds	3380	1643	1686	3295	1647	1608
33	Tobacco	3454	1649	1746	3513	1696	1755
34	Printing	4257	1469	2747	4553	1569	2938
35	Miscellaneous Manufactures	718	316	395	770	342	420
36	Agriculture	41580	20474	16975	43003	21076	17652
37	Forestry	8367	6187	1856	8561	6251	1972
38	Water Works	11916	10286	1572	12046	10380	1627
39	Construction	32347	6874	25330	33872	7141	26516
40	Transport and Communication	154745	75764	77947	163999	79256	82841
41	Trade	47805	29346	17370	50485	31309	18105
42	Catering and Tourism	37021	28443	7598	38454	29449	7969
43	Arts and Crafts	10300	4665	5461	11021	4957	5682
44	Public Utilities	12318	9602	2690	13114	10491	2604
45	Other Productive Services	9822	5730	3984	10418	6057	4233
	Total	810918	402988	391528	861269	421208	411296

Table 3: INVESTMENT IN FIXED ASSETS IN THE SOCIAL SECTOR, BY PRODUCTIVE SECTOR
(Millions of Dinars at Current Prices)

No.	Sector	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
1	Electrical Energy	21844	22001	30401	31957	37153	47680	57101	68351	93984	186504	325924
2	Extraction of Coal	2620	4847	6210	5864	6572	7863	10826	22179	47645	104273	188806
3	Coal Processing	897	1063	755	343	351	1004	1279	953	581	524	1746
4	Extraction of Crude Petroleum and Gas	1223	1790	2049	770	1521	2592	3047	4994	8730	25935	26034
5	Crude Petroleum Refining	1427	2340	3797	5703	6776	9936	10654	10483	9451	15020	21668
6	Iron Ore Mining	68	95	226	346	730	1126	1634	3770	4684	7064	5973
7	Iron and Steel	6780	5536	5804	5292	7484	14566	17482	17400	20694	92995	237922
8	Nonferrous Ore Mining	1954	2845	4022	5333	8794	11275	13524	8999	12242	16787	30147
9	Nonferrous Metals	3620	3763	4215	3211	10547	8710	6806	8596	9840	10632	28663
10	Processing of Nonferrous Metals	953	1139	629	679	955	1051	983	766	7356	13776	11195
11	Nonmetallic Mineral Ore Extraction	219	588	792	823	1040	1342	1706	2625	2518	6005	7437
12	Manufacture of Nonmetallic Minerals	1362	1353	2304	4154	3993	4917	5685	3727	6585	14227	28885
13	Metal Fabrication	4534	5931	8488	10449	13848	16110	20889	23103	37064	58070	112486
14	Machinery, nonelectrical	1658	2052	3562	5938	6623	9648	11806	14884	18299	34297	66121
15	Transport Equipment	1783	2318	3072	5762	8388	8624	9448	13776	18263	33642	66928
16	Shipbuilding	876	463	657	406	537	665	1350	2084	3175	6329	19127
17	Electrical Machinery	1695	2507	3395	5826	8439	10854	11149	12732	19164	44829	105213
18	Manufacture of Chemicals	3980	5400	8676	9855	17756	32841	36085	51893	73796	90605	98535
19	Processing of Chemicals	2120	2393	3522	5476	6614	7543	7101	9001	13944	26781	46062
20	Quarrying	557	625	946	1441	1512	1573	1710	1691	2056	4789	8649
21	Building Materials	3955	4574	5448	5040	7100	7283	6843	6158	6748	12538	23849
22	Sawmills and Wood Board	1216	1833	2503	3696	3869	2958	3128	3604	4626	10748	21871
23	Furniture and Fixtures	1074	2120	3018	4604	4462	5143	5866	6668	10268	21226	41630
24	Paper	2362	3652	3805	3090	3014	4159	6239	5646	9314	8539	20619
25	Yarns and Fabrics	2157	1876	3539	3482	4343	3629	5242	8628	15721	33077	53616
26	Finished Textile Products	1602	2100	2931	3342	3389	4609	7252	10605	17280	39081	81250
27	Leather and Fur	139	265	250	303	529	592	961	1953	2095	4830	10496
28	Footwear and Other Leather Products	353	431	670	992	1269	1633	2615	3014	6616	12267	27360
29	Rubber	753	758	928	1961	2266	2428	1843	2586	3684	7239	22054
30	Food Processing	4928	8313	14756	16135	14782	18817	25424	36064	44858	74744	104980
31	Beverages	1283	1790	1990	2170	2584	3145	3035	4176	4507	7147	20649
32	Animal Feeds	358	376	568	554	876	678	1255	2540	2856	4690	8475
33	Tobacco	269	460	368	633	525	404	756	1014	1707	3427	8337
34	Printing	872	635	1092	1886	1911	1942	1427	2473	2219	4636	15321
35	Miscellaneous Manufactures	218	180	217	364	306	353	1498	1516	1302	2325	3252
36	Agriculture	6140	8364	10182	11652	14558	20295	32518	45234	65399	108369	167830
37	Forestry	1306	1686	2282	2800	3287	5451	7880	9080	12603	24886	50633
38	Water Works	1120	2336	4018	3789	4530	6661	9284	14018	17330	24899	38242
39	Construction	4905	9525	11215	13849	14968	19766	19002	23161	30709	72099	124677
40	Transport and Communication	26414	35153	49755	61907	69399	76859	88015	117268	150165	287815	503457
41	Trade	5615	9186	12989	18386	20386	23232	23943	23400	31027	64296	142374
42	Catering and Tourism	4578	5698	6924	9665	11804	17125	23528	24839	38896	65147	164935
43	Arts and Crafts	1063	1400	2345	3051	3879	4986	5501	6829	9430	18709	32440
44	Public Utilities	4721	6521	9228	13547	18068	23026	30923	33579	50368	78216	172387
45	Other Productive Services	1339	2725	3325	5820	5542	6000	8505	11187	23847	53012	82158
	Total	139110	181626	247870	302446	367361	460494	554768	687251	973646	1839046	3380962

SOURCE: Statistical Yearbook of Yugoslavia, Federal Institute of Statistics, various issues.

Table 4: STRUCTURE OF INVESTMENT IN FIXED ASSETS IN THE SOCIAL SECTOR, BY PRODUCTIVE SECTOR

(percent)

No.	Sector	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1976-1980 Total	1981-1986 Total	1981-1986 as a ratio of 1976-1980
1	Electrical Energy	15.7	12.1	12.3	10.6	10.1	10.4	10.3	9.9	9.6	10.1	9.6	12.2	10.0	82.4
2	Extraction of Coal	2.0	2.7	2.5	1.9	1.8	1.7	2.0	3.2	4.9	5.7	5.6	2.2	3.8	175.6
3	Coal Processing	0.6	0.6	0.3	0.1	0.1	0.2	0.2	0.1	0.1	0.0	0.0	0.3	0.1	34.5
4	Extraction of Crude Petroleum and Gas	0.9	1.0	0.8	0.3	0.4	0.6	0.5	0.7	0.9	1.4	0.8	0.7	0.8	121.9
5	Crude Petroleum Refining	1.0	1.3	1.5	1.9	1.8	2.2	1.9	1.5	1.0	0.8	0.6	1.5	1.3	88.3
6	Iron Ore Mining	0.0	0.0	0.1	0.1	0.2	0.2	0.3	0.5	0.5	0.4	0.2	0.1	0.4	351.0
7	Iron and Steel	4.9	3.0	2.3	1.7	2.0	3.2	3.1	2.5	2.1	5.1	7.0	2.8	3.8	136.8
8	Nonferrous Ore Mining	1.4	1.6	1.6	1.8	2.4	2.4	2.4	1.3	1.3	1.0	0.9	1.7	1.6	89.2
9	Nonferrous Metals	2.6	2.1	1.7	1.1	2.9	1.9	1.2	1.3	1.0	0.6	0.8	2.1	1.1	55.0
10	Processing of Nonferrous Metals	0.7	0.6	0.3	0.2	0.3	0.2	0.2	0.1	0.8	0.7	0.3	0.4	0.4	95.6
11	Nonmetallic Mineral Ore Extraction	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.2	0.3	0.3	109.8
12	Manufacture of Nonmetallic Minerals	1.0	0.7	0.9	1.4	1.1	1.1	1.0	0.5	0.7	0.8	0.9	1.0	0.8	80.5
13	Metal Fabrication	3.3	3.3	3.4	3.5	3.8	3.5	3.6	3.4	3.8	3.2	3.3	3.4	3.5	101.5
14	Machinery, nonelectrical	1.2	1.5	1.4	2.0	1.8	2.1	2.1	2.2	1.9	1.9	2.0	1.6	2.0	128.2
15	Transport Equipment	1.3	1.3	1.2	1.9	2.3	1.9	1.7	2.0	1.9	1.8	2.0	1.6	1.9	117.5
16	Shipbuilding	0.6	0.3	0.3	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.6	0.3	0.3	112.3
17	Electrical Machinery	1.2	1.4	1.4	1.9	2.3	2.2	2.0	1.8	2.0	2.4	3.1	1.6	2.3	138.6
18	Manufacture of Chemicals	2.9	3.0	3.5	3.3	4.8	7.0	6.5	7.6	7.6	4.9	2.9	3.5	6.1	174.5
19	Processing of Chemicals	1.5	1.3	1.4	1.8	1.8	1.6	1.3	1.3	1.4	1.5	1.4	1.6	1.4	89.7
20	Quarrying	0.4	0.3	0.4	0.5	0.4	0.3	0.3	0.2	0.2	0.3	0.3	0.4	0.3	67.1
21	Building Materials	2.8	2.5	2.2	1.7	1.9	1.6	1.2	0.9	0.7	0.7	0.7	2.2	1.0	43.2
22	Sawmills and Wood Board	0.9	1.0	1.0	1.2	1.1	0.6	0.6	0.5	0.5	0.6	0.6	1.0	0.6	55.4
23	Furniture and Fixtures	0.8	1.2	1.2	1.5	1.2	1.1	1.1	1.0	1.1	1.2	1.2	1.2	1.1	93.2
24	Paper	1.7	2.0	1.5	1.0	0.8	0.9	1.5	0.8	1.0	0.5	0.6	1.4	0.9	61.7
25	Yarns and Fabrics	1.5	1.0	1.4	1.1	1.2	0.8	0.9	1.3	1.6	1.8	1.6	1.3	1.3	105.5
26	Finished Textile Products	1.1	1.2	1.2	1.1	0.9	1.0	1.3	1.5	1.8	2.1	2.4	1.1	1.7	153.3
27	Leather and Fur	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.3	0.3	0.1	0.2	194.3
28	Footwear and Other Leather Products	0.3	0.2	0.3	0.3	0.3	0.4	0.5	0.4	0.7	0.7	0.8	0.3	0.6	198.6
29	Rubber	0.5	0.4	0.4	0.6	0.6	0.5	0.3	0.4	0.4	0.4	0.6	0.5	0.4	85.3
30	Food Processing	3.5	4.6	6.0	5.3	4.0	4.1	4.6	5.2	4.6	4.1	3.1	4.7	4.3	91.4
31	Beverages	0.9	1.0	0.8	0.7	0.7	0.7	0.5	0.6	0.5	0.4	0.6	0.8	0.5	66.6
32	Animal Feeds	0.3	0.2	0.2	0.2	0.2	0.1	0.2	0.4	0.3	0.3	0.2	0.2	0.3	115.2
33	Tobacco	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	86.2
34	Printing	0.6	0.3	0.4	0.6	0.5	0.4	0.3	0.4	0.2	0.2	0.4	0.5	0.3	64.2
35	Miscellaneous Manufactures	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.1	0.1	0.1	0.1	0.2	135.4
36	Agriculture	4.4	4.6	4.1	3.9	4.0	4.4	5.9	6.6	6.7	5.9	5.0	4.2	5.7	137.0
37	Forestry	0.9	0.9	0.9	0.9	0.9	1.2	1.4	1.3	1.3	1.3	1.5	0.9	1.3	145.9
38	Water Works	0.8	1.3	1.6	1.3	1.2	1.4	1.7	2.0	1.8	1.3	1.1	1.2	1.6	126.7
39	Construction	3.5	5.2	4.5	4.6	4.1	4.3	3.4	3.4	3.2	3.9	3.7	4.4	3.6	83.0
40	Transport and Communication	19.0	19.4	20.1	20.5	18.9	16.7	15.9	17.1	15.4	15.6	14.9	19.6	15.9	81.5
41	Trade	4.0	5.1	5.2	6.1	5.5	5.0	4.3	3.4	3.2	3.5	4.2	5.2	3.9	75.9
42	Catering and Tourism	3.3	3.1	2.8	3.2	3.2	3.7	4.2	3.6	4.0	3.5	4.9	3.1	4.0	127.9
43	Arts and Crafts	0.8	0.8	0.9	1.0	1.1	1.1	1.0	1.0	1.0	1.0	1.0	0.9	1.0	110.2
44	Public Utilities	3.4	3.6	3.7	4.5	4.9	5.0	5.6	4.9	5.2	4.2	5.1	4.0	5.0	124.3
45	Other Productive Services	1.0	1.5	1.3	1.9	1.5	1.3	1.5	1.6	2.4	2.9	2.4	1.4	2.0	140.8
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	National Sectors	32.4	31.5	31.6	30.9	30.0	29.8	28.3	26.5	25.3	25.6	26.4	31.2	27.0	86.5
	International Sectors	67.6	68.5	68.4	69.1	70.0	70.2	71.7	73.5	74.7	74.4	73.6	68.8	73.0	106.1

SOURCE: Table 3, Appendix II.

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