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The Impact of External Economic Disturbances
on Yugoslavia: Theoretical and Empirical Explorations

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THEORETICAL AND EMPIRICAL EXPLORATIONS

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I. INTRODUCTION

To some observers, including many Yugoslavs, a study of Yugoslavia's response to recent international disturbances may seem out of place in a conference analyzing the impact of these disturbances on the economies of Eastern Europe. As is widely recognized, neither the economic nor the political system of Yugoslavia conforms to the models usually deemed appropriate to the study of contemporary Eastern Europe. For many questions, including those questions of concern at this conference, Yugoslavia is better understood as a small, developing, protected, market economy than as a planned economy of the East European variety. In particular, the nature and extent of Yugoslavia's links with the rest of the world through commodity, factor and financial markets and the structure of its foreign trade and exchange systems are more similar to those which characterize developing market economies, such as Greece, Spain, Portugal, Turkey, and Israel, than to those which characterize small, trade-dependent, planned economies, such as Hungary, Czechoslovakia, and Romania.

Despite the obvious economic and political differences between Yugoslavia and the countries of Eastern Europe, it is frequently instructive to study Yugoslavia within the context of Eastern Europe because the Yugoslav system has evolved from the traditional planned-economy model and, consequently, it represents a possible path for future economic transformation within Eastern Europe. There are many lessons about the benefits and pitfalls of decentralizing economic reforms which the countries of Eastern Europe can learn from Yugoslavia's pioneering experience. Several such lessons relate to the problems encountered on the road towards currency convertibility and greater integration in the world economy, a road which Yugoslavia has faithfully but tortuously followed since the mid-1960s, and a road which many of the trade-dependent countries of Eastern Europe are very cautiously exploring today. At no time have these problems been

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more severe than during the recent years of international economic crisis. Therefore, it seems particularly useful to compare the impact of recent international economic disturbances on Yugoslavia and on the planned economies of Eastern Europe. This enables us to determine their relative sensitivity to these disturbances, and their relative ability to mitigate, offset or otherwise cope with the negative economic consequences of these disturbances.

With this general motivation in mind, in this paper we examine the effects of recent external disturbances on the Yugoslav economy during the 1970-76 period, using the general framework of the transmission and response model formulated in the paper by Tyson and Kenen (1978). Following that framework, in Section II, we first describe the nature and extent of Yugoslavia's ties with the rest of the world in commodity and factor markets. This allows us to identify the potential channels of impact through which international disturbances influence the Yugoslav economy. Next, in Section III, we analyze Yugoslavia's transformation structure--the structural and institutional features of its economic system that determine the manner and extent to which foreign disturbances change price and quantity signals affecting domestic economic decisions. Section IV focuses on the propagation mechanisms in the Yugoslav economy or the ways in which the initial effects of external disturbances are propagated internally by endogenous responses of economic agents to these signals. In this section, we present empirical evidence on the extent and relative importance of (Keynesian) demand-multiplier effects, direct and indirect price effects working through the system of wage and price determination, and monetary effects in the propagation process. Finally, in Section V, we analyze the containment policies adopted by the Yugoslav authorities to mitigate the unwanted domestic and balance-of-payments effects produced by international disturbances and domestic responses. We conclude, somewhat pessimistically that, at least in the short

run relevant for policy analysis, there exist significant tradeoffs between price stability, domestic growth targets, and external balance in the Yugoslav economy, as is true in most other market economies. Consequently, in Yugoslavia as elsewhere, there was little that could be done to shield the domestic economy effectively from the at once inflationary (price-raising) and deflationary (output-depressing) effects of the 1974 supply stock in world oil and commodity markets, and the further deflationary effects produced by continued recessionary conditions throughout the world economy.

II. YUGOSLAVIA'S LINKS WITH THE REST OF THE WORLD--CHANNELS OF IMPACT

The transmission and response framework, developed fully in Tyson and Kenen (1978), divides the process by which international economic disturbances are transmitted to the domestic economy of a particular country into five stages: generation, channels-of-impact, transformation, propagation, and containment. The generation stage in the 1970's consisted of stagflation in advanced Western economies--a combination of inflation and stagnation. The significant rises in commodity and fuel prices contributed heavily to the inflation and played a role in the stagnation, as well. It is beyond the scope of this paper, however, to analyze the cause behind the stagflation phenomenon. We concentrate on the transmission of this stagflation to Yugoslavia, and deal with the channels-of-impact stage in this section, and the other three stages in the following three sections of the paper.

The channels of impact in the case of Yugoslavia were primarily commodity market and factor market channels. The two primary channels, discussed briefly in this section and then analyzed econometrically in the next section, consist of changes in the foreign-currency prices of Yugoslavia's tradeables and in the quantities of its traded goods demanded by its major trading partners. The next most important channel, treated briefly in Section III, consists of changes in the demand for Yugoslav labor in the West, with the concurrent impact of these changes on the amount of workers' remittances, an important component of the Yugoslav balance of payments. Changing economic conditions in the West also affected the demand for the services of the Yugoslav tourist industry. Capital market channels were of much lesser significance, due to strict government controls over capital market transactions. Yugoslav enterprises and banks can, to a rather limited degree, respond to changes in world capital markets by altering the mix between domestic and foreign credit sources. They

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cannot invest abroad in response to changing demand conditions on world capital markets or engage in currency arbitrage or similar types of capital market transactions. Thus, the direct impact of world stagflation on the Yugoslav capital account was extremely limited.

The impact of external disturbances through commodity market channels depends on the degree of openness of the economy, the commodity mix in its international trade, and its geographical distribution.

Yugoslav imports accounted for about 30 percent of its gross domestic material product, a trade ratio that is in line with that of other market economies of similar size and level of development, such as Greece or Portugal, but lower than that of most advanced Western countries of comparable size.

The second thing to note about Yugoslavia's foreign trade performance is the persistence of a substantial balance of trade deficit, as the figures in Table 1 reveal. During the 1970-76 period, the trade deficit ranged between a low of 0.7 billion dollars in 1972 and a high of 3.1 billion dollars in 1974. These overall figures mask the fact that the major share of this deficit occurs in trade with Yugoslavia's Western trading partners. For example, in 1973 and 1974, three-fourths of the total deficit arose in this segment of Yugoslav trade, and in 1975 the proportion rose to 89 percent.

The trade deficit in Yugoslavia is offset to an important extent by two items in the invisibles account: earnings from tourism and remittances from workers temporarily employed abroad. Between 1971 and 1975, receipts from these sources equaled about 63 percent of receipts from total merchandise exports. As a result of earnings from these two items, the current account deficit has been significantly smaller than the balance of trade deficit as the figures in Table 1 illustrate. Because of the importance of these items in Yugoslavia, they serve as potential channels by which international economic

Table 1

Balance of Payments (Year-End; Millions of U.S. Dollars)

	1971	1972	1973	1974	1975	1976
A. Current account	-388	415	491	-1,226	-925	150
Exports f.o.b.	1,972	2,238	2,887	3,874	7,965	4,878
Imports f.o.b.	-3,240	-2,965	-4,186	-7,022	6,872	-7,767
Trade balance	-1,268	-727	-1,299	-3,148	-2,907	-2,489
Services: Credit	1,518	1,801	2,565	3,017	3,298	------
Transportation	247	255	701	318	459	------
Travel	392	463	628	714	748	------
Workers' remittances	708	889	1,726	1,469	1,679	------
Other	175	194	300	512	457	------
Services: Debit	-786	-819	-992	-1,353	-1,576	------
Transportation	-291	-287	-357	-560	-621	------
Travel	-279	-245	-257	-56	-64	------
Investment income	-169	-173	-222	-290	-336	------
Other	-87	-118	-154	-447	-527	------
Private unrequited transfers	149	161	218	267	221	------
Government unrequited transfers	-1	-1	-1	-1	-1	------
B. Long-term capital (net)	587	489	614	496	827	------
C. Short-term capital (net)	-290	-397	-718	171	-77	------
D. Counterpart items (monetization of gold and allocation of SDR's)	25	28	------			
E. Reserves and related items	70	-539	-727	599	115	------
Foreign exchange and other claims	-47	-543	-647	742	210	------
Use of IMF credit	73	19	-75	147	19	------
Other	44	-15	-65	114	-94	------

disturbances influence the domestic economic situation. For example, the stagnation in Western Europe in 1974-75 encouraged a marked slowdown in the annual rate of growth of tourism earnings from an average of 29 percent in 1971-73 to an average of 8.4 percent in 1974-75; and in the annual rate of growth of worker remittances from an average of 39.2 percent in 1971-73 to 11.2 percent in 1974-75. Slowdowns in receipts from these sources exacerbated the problem of financing the growing trade deficit in these years.

Because of the commodity composition of Yugoslavia's foreign trade, described in Table 2, the worldwide inflation in 1974 caused a net deterioration of 10.5 percent in Yugoslavia's net barter terms of trade. This overall deterioration was the result of an adverse shift in the terms of trade for fuel and raw materials, products for which Yugoslavia is a net importer. As the data in Table 3 reveal, the terms of trade worsened noticeably for these product categories and for food in 1974. Only in chemicals, processed materials, and machinery and equipment did the terms of trade improve, but not sufficiently to offset an overall deterioration. As shown in Table 3, 1974 was the only year in which Yugoslavia suffered a serious terms of trade loss; its terms of trade improved in 1975, and again in 1976.

The domestic impact of the worldwide inflation was somewhat moderated by the fact that over half of Yugoslav imports and exports consist of machinery and other manufactured products whose world prices rose at a slower rate than did fuel and material prices in 1974. The total of the food, raw material, and fuel categories accounted for over one-third of imports only in that one year, when the prices of these goods rose dramatically. Both before and after 1974, these categories accounted for about 30 percent or less of total imports.

Machinery and other manufactured goods play an even more dominant role in Yugoslav export trade. In every year between 1971 and 1976, these two categories accounted for about two-thirds of Yugoslav exports. In contrast, raw

Table 2

Commodity Composition of Yugoslav Exports and Imports
(SITC Classification, %'s in current prices)

	1971	1972	1973	1974	1975	1976
Imports						
Food, drink, tobacco	9.1	9.5	11.3	8.8	5.5	8.7
Raw materials	9.6	10.4	10.8	13.3	9.6	9.4
Fuels	5.9	5.4	7.9	12.6	12.3	14.7
Chemicals	9.1	10.8	10.0	10.8	10.8	10.7
Semi-manufactures	28.2	26.1	24.0	24.0	22.7	18.5
Finished Manufactures	36.5	36.2	35.4	29.7	37.7	37.0
Other	1.6	1.6	.6	.8	1.4	1.0
Exports						
Food, drink, tobacco	17.6	17.5	16.1	10.8	11.7	12.7
Raw materials	8.2	8.2	9.6	9.5	6.9	8.8
Chemicals	7.1	6.4	6.2	10.1	9.3	7.2
Semi-manufactures	27.2	27.0	28.5	32.7	29.0	27.4
Finished Manufactures	38.5	39.6	38.1	35.3	42.0	42.5
Other	1.4	1.3	1.5	1.6	1.1	1.4

Source: OECD, Yugoslavia, Annual Survey, 1977, Table K, Appendix.

Table 3

Yugoslavia: Export and Import Prices and Terms of Trade, 1971-76
(Annual percentage changes)

	1971	1972	1973	1974	1975	1976
Export Price Index	5.3	5.0	20.6	31.6	9.0	4.3
Food	4.6	14.7	30.8	-2.0	4.0	n.a.
Raw materials	8.5	3.9	64.2	14.9	-2.1	n.a.
Fuels	9.8	2.2	23.9	75.4	8.0	n.a.
Chemicals	4.3	4.1	5.9	85.2	3.0	n.a.
Machinery and equipment	12.9	2.8	16.7	19.1	24.0	n.a.
Processed materials	-3.5	1.8	17.9	51.5	4.0	n.a.
Import Price Index	3.8	7.4	17.2	47.1	5.0	2.8
Food	3.3	0	40.3	14.9	7.0	n.a.
Raw materials	-4.2	8.7	26.0	58.7	0	n.a.
Fuels	28.6	0	29.6	285.7	4.0	n.a.
Chemicals	-1.7	1.7	17.2	47.0	2.0	n.a.
Machinery and equipment	8.1	13.4	11.8	17.6	11.0	n.a.
Processed materials	-1.6	1.6	16.1	38.9	11.0	n.a.
Terms of Trade	1.4	-2.2	2.9	-10.5	3.8	1.5
Food	1.3	14.7	-6.8	-14.7	-2.8	n.a.
Raw materials	13.3	-4.4	30.3	-27.6	-2.1	n.a.
Fuels	-14.6	2.2	-4.4	-38.6	3.9	n.a.
Chemicals	6.1	2.4	-9.6	26.0	1.0	n.a.
Machinery and equipment	4.4	-9.3	4.4	1.3	11.7	n.a.
Processed materials	-1.9	.2	1.6	9.1	-6.3	n.a.

Sources: 1971-1975, SZS, Statisticki Godisnjak, 1976, pp. 232-233.
1976, OECD, Yugoslavia, Annual Survey, 1977, Table I, Appendix.

materials and fuels amounted to only about 10% of total exports. When this is combined with the fact that total Yugoslav exports are considerably smaller than total imports, it becomes clear why Yugoslavia was not able to gain a net benefit from the 1974 commodity price increases in world markets.

The stagflation in the West caused a significant drop in the share of OECD countries in Yugoslav exports, as shown in Table 4. From a range of 53 percent to 57 percent in 1971-73, their share dropped to a range of 36 percent to 47 percent in 1974-76. The shares of centrally planned economies and less developed economies both increased to absorb the exports Yugoslavia was unable to sell in the West. The trend in Yugoslav imports was similar but the changes were less dramatic. Yugoslavia continued to import 60 percent or more from the West through 1975, and the proportion only dropped below that level in 1976, due to a significant rise in imports from the centrally planned economies.

The impact of fuel and raw material price increases was somewhat reduced by the fact that significant proportions of some key imports, such as crude oil, coal, coke, cotton fiber, and chemical fertilizers were imported from CMEA countries, and the prices of the imports of coal, coke, and cotton fiber from CMEA rose less rapidly than in world markets (see Fallenbuchl, Neuberger, and Tyson, 1977, pp. 88-89).

Table 4

Yugoslav Foreign Trade by Geographical Area
(Percent of Total Trade and Annual Percent Changes)

| | 1971 | | 1972 | | 1973 | | 1974 | | 1975 | | 1976[1] | |
	% Total	% Change	% Total	% Change	% Total	% Change	% Total	% Change	% Total	% Change	% Total	% Change
Exports to												
OECD	52.9	2.0	56.9	32.5	55.7	24.8	46.6	11.6	35.7	-18.1	41.7	40.3
EEC	35.6	-1.5	36.2	25.3	35.7	25.8	27.4	2.5	22.8	-10.9	27.2	42.7
CPE's[2]	36.7	22.2	36.1	21.1	34.0	20.0	41.6	63.0	47.2	21.7	42.3	5.9
LDC's	10.4	-2.1	7.0	-15.9	10.3	86.7	11.8	52.9	17.1	54.3	16.0	14.6
Imports from												
OECD	65.8	8.0	65.4	-1.3	62.5	33.5	60.5	61.8	60.8	2.5	54.8	-14.8
EEC	44.1	7.6	44.0	-0.8	42.2	33.9	40.0	53.3	41.1	4.8	39.1	-9.2
CPE's[2]	23.9	31.2	24.8	3.1	24.8	39.3	23.3	57.1	24.8	8.7	30.6	13.6
LDC's	10.3	11.7	9.8	-5.4	12.7	81.1	16.2	134.1	14.4	9.1	14.6	9.0

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[1] Preliminary

[2] CPE's include members of CMEA, P.R. of China and Albania.

Sources: OECD, Yugoslavia, Annual Survey, 1976, Table I, Appendix and 1977, Table 5.

III. THE TRANSFORMATION STRUCTURE OF THE YUGOSLAV ECONOMY

1. An Overview of the Foreign Exchange and Foreign Trade Systems

The economic policies and institutions that regulate Yugoslavia's inter-
national economic activity determine how changes in external price and quantity
signals working through commodity and factor-market channels with the rest of
the world are transformed or translated into changes in domestic economic vari-
ables. The most important of these policies and institutions, which together
form what Kenen and Tyson call the transformation structure, include Yugoslavia's
exchange-rate regime, the system of taxes and subsidies applied to the domestic
prices of traded goods, and the regulations and controls that shape decision-
making in international trade and factor market transactions.

The exchange-rate regime in Yugoslavia, as in other market economies, pro-
vides a critical link between price developments on world markets and domestic
price changes. During the 1970-76 period which is the focus of this paper, this
regime was significantly modified. Prior to mid-1973, the dinar exchange rate
was fixed in terms of the dollar by the National Bank of Yugoslavia and was
periodically and discontinuously adjusted in response to persistent deficits in
the balance of payments. In June, 1973, reflecting the gradual move towards
greater exchange-rate flexibility throughout the world, the Yugoslav authorities
introduced a regime of managed flexibility for the dinar. Under the new regime,
which still exists today, dinar exchange rates are determined on a controlled
foreign exchange market within Yugoslavia in which authorized banks participate.
The National Bank intervenes in this market to keep cross-rates in line with
exchange rate developments on world currency markets and to keep dinar exchange
rates in line with developments in the balance of payments. In formulating the
appropriate intervention strategy, the Yugoslav authorities are particularly
concerned with fluctuations in the dinar-dollar and dinar-DM rates, because the

dollar and the DM together account for about two-thirds of total receipts on current account and over one-half of total payments to the rest of the world. The dollar is the dominant currency in foreign exchange earnings on the trade account; while the DM is the prevailing currency in receipts from invisibles, due primarily to remittances and secondarily to earnings from tourism (Živano-vic, 1976).

This situation poses complex problems for the Yugoslav authorities who must adjust the dinar-dollar and dinar-DM rates in response to divergent trends in earnings from visibles and invisibles and to periodic fluctuations in the dollar-DM rate on world markets. For example, when the dollar depreciates rela-tive to the DM, if the dinar-dollar rate remains fixed, the dinar automatically depreciates relative to the DM. This development tends to slow the flow of remittances to the extent that Yugoslav workers residing abroad decide to hold the appreciating DM in expectation of its further appreciation.[1] On the other hand, if the Yugoslav authorities decide to hold the dinar-DM rate fixed, as the dollar depreciates relative to the DM, then the dinar automatically appreci-ates relative to the dollar, and this tends to make Yugoslav exports less competi-tive on many world markets. In response to changes in the dollar-DM rate and these consequent policy dilemmas, the Yugoslavs have alternately pegged the dinar to the dollar and to the DM, thereby instituting a kind of "dual-pegging regime." For example, in mid-1973, when their trade position was relatively strong, they pegged to the DM and allowed the dinar-dollar rate to appreciate somewhat. At the end of 1974, in reaction to a sharply deteriorating trade account, they adjusted the dinar rate for all convertible currencies downward by about 7% and, thereafter, they pegged to the dollar through the end of 1976. The implications of this dual-pegging strategy for the trade-weighted effective exchange rate for the dinar are shown in Figure 1. Overall, the effective

Figure 1

Relationship of Effective Exchange Rate
to Dollar and DM Exchange Rates
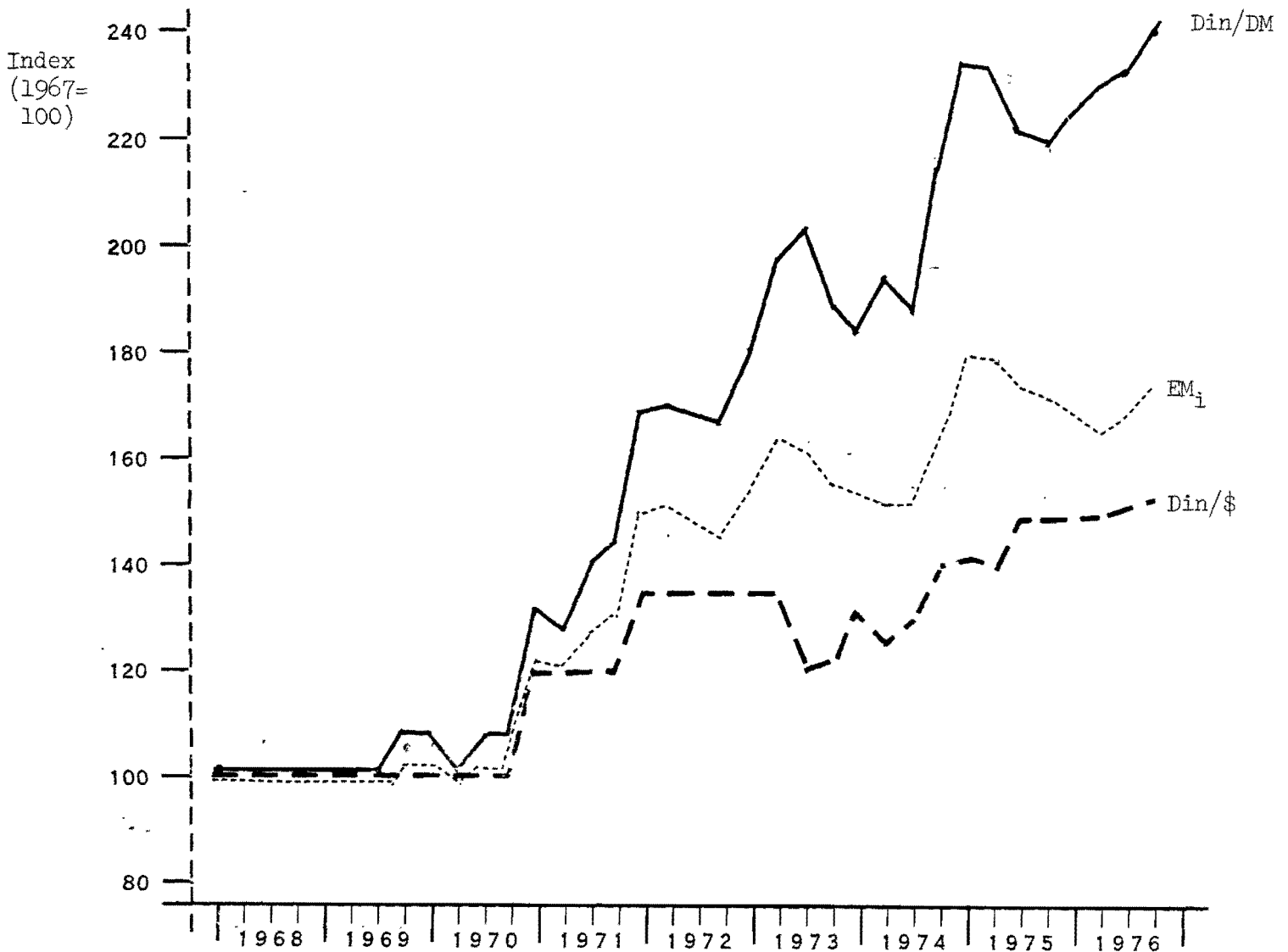
Din/DM - Dinar/DM exchange rate
EM_i - Effective exchange rate of dinar for Yugoslav imports
Din/$ - Dinar/dollar exchange rate

Notes and Sources: Methodology for calculating effective exchange rates based
on R.R. Rhomberg, "Indeces of Effective Exchange Rates," International Monetary
Fund Staff Papers, March 1976, pp. 88-112.

     Data on exchange rates from International Financial Statistics and data
on export and import weights from Statistički Godišnjak; see Notes to
Table 5 for further details.

exchange rate for imports depreciated by approximately 7% over the 1973-76 period.

The second ingredient in Yugoslavia's transformation structure is the set of taxes, tariffs and subsidies that relate foreign currency prices and domestic market prices of traded goods. In contrast to the planned economies of Eastern Europe, all of which utilize a variable tax-subsidy scheme to insulate domestic prices from world prices changes to a large extent, Yugoslavia has pursued a general policy of keeping tariffs, taxes and subsidies on traded goods relatively constant. Therefore, price changes in international markets, not offset by adjustments in the relevant dinar exchange rates, usually result in equivalent changes in the domestic prices of traded goods and related substitutes within Yugoslavia. Occasionally, however, taxes and tariffs are altered as a matter of policy to insulate domestic prices to some extent. For example, in 1974, import duties and import taxes on oil, gas, ferrous metals and a few other raw materials were reduced in an effort to moderate domestic price increases following world price increases of these commodities. These adjustments, however, were explicit and temporary policies introduced to contain the domestic effects of world price developments. As such, they are properly interpreted as containment policies rather than as part of Yugoslavia's transformation structure. In contrast, automatic adjustments in variable taxes and subsidies to maintain domestic price stability as international prices fluctuate are a distinguishing feature of the transformation structure in planned economies.

In fact, the difference between Yugoslavia and planned economies in this respect is even greater than suggested here. Not only does Yugoslavia fail to pursue an automatic tax-subsidy scheme to divorce domestic prices from international prices, but it actually facilitates the links between domestic and

international prices of some commodities by its price control policies. In line with these policies, the domestic prices of these goods are administratively and automatically linked to international prices by formulas that use world prices, prevailing exchange rates, and fixed taxes, tariffs and subsidies to calculate domestic (producer) prices.[2] By employing price formulas of this type, the Yugoslav authorities attempt to keep domestic relative prices in line with world relative prices for important traded commodities.

As opposed to the other East European economies which closely control foreign trade activity, Yugoslavia provides relative freedom for individual enterprises to make their own foreign trade decisions. Taken together, the exchange rate system and the system of tariffs, taxes and subsidies provide a general set of price signals that guide these decisions. The Yugoslav authorities, however, do use additional policy tools, usually of a selective nature, to regulate the volume and composition of imports and exports in response to developments in the balance of payments. For example, in years of increasing deficit, quantitative restrictions and foreign exchange quotas are used to limit imports and selective credit policy is used to finance the importation of certain critical commodities. Under these circumstances, additional incentives for exports, most frequently in the form of preferential rediscount credit to finance the production and sale of exports, are also put into operation.

The final element of Yugoslavia's transformation structure is the set of policies regulating international transactions on factor markets. Two such markets are important in the Yugoslav case: the labor market and the capital market. In the late 1960's, large numbers of Yugoslav workers began to migrate to Western Europe in search of employment opportunities and/or higher wages. Overall, the Yugoslav official attitude towards the blossoming migration was permissive: individual workers were relatively free to migrate, although after

1973 legislation was introduced to control the outflow of skilled labor from domestic jobs to better-paying jobs abroad. Available figures suggest that the annual outflow peaked in 1972-73, when an estimated 800,000-1,000,000 Yugoslav workers (nearly 20% of the resident domestic labor force) were employed abroad. Thereafter, as labor market conditions deteriorated in Western Europe in the wake of the 1973-74 recession, the net outflow of labor became a net inflow, on the order of 50,000 workers in 1974 and 100,000 workers in 1975. In total, the number of workers employed abroad dropped to approximately 620,000 by the end of 1976.

The outmigration of labor was significant to the Yugoslav economy for two reasons. First, it served as a temporary outlet for Yugoslav workers unable to find jobs at home. Second, it provided Yugoslavia with an important source of convertible foreign exchange earnings from workers' remittances. For both of these reasons, it is not surprising that the gradual slowdown and reversal in the labor outflow proved to be an important channel through which international disturbances affected the Yugoslav economy. Unfortunately, there was little the Yugoslav government could do to close off the channel of impact. Clearly, Yugoslav officials were powerless to stave off the flow of workers necessitated by depressed conditions in the West, an inflow which aggravated the domestic employment problem and was largely responsible for the increase in the number of unemployed workers to a record 637,000 by the end of 1976. In addition, the return of migrant workers meant an automatic slowdown in remittances, the rate of growth of which was largely determined by the growth in the number of workers employed abroad, as the following simple regression suggests:

$$gRE_t = .049 + .751 \ (gLEA_{t-3}) \qquad R^2 = .63$$
$$\qquad (3.10) \quad (4.69) \qquad\qquad \rho = .44 \qquad\qquad (1)$$

where gRE is the quarterly rate of remittances;

$gLEA_{t-3}$ is the quarterly rate of growth of labor employed abroad, lagged three quarters;

and ρ is the autocorrelation coefficient estimated using a Cochrane-Orcutt technique.

By all estimates, including these, the growth of workers' remittances and their share in total receipts of convertible foreign exchange probably peaked in the 1973-74 period. At this point, the Yugoslav authorities can only rely on the continuation and strengthening of existing financial incentives, in the form of preferential interest rates, preferential tax treatment and the like, to encourage the remittance of workers' foreign exchange accounts currently held abroad.

In contrast to its generally permissive stance toward the inflow and out-flow of labor across national borders, the Yugoslav government has maintained strict controls on capital market transactions as part of its transformation structure. In this respect, it is similar to the economies of Eastern Europe and to many economies of the developing world, as well. Capital market con-trols serve to restrict the impact on Yugoslavia of changes in world capital market conditions. Within the confines of these controls, Yugoslav banks and enterprises authorized to participate on world credit markets are allowed to contract for both short-term and long-term loans, provided certain conditions are satisfied. For example, long-term loans can be arranged for the purchase of investment equipment as long as the enterprise demonstrates that it will have enough foreign exchange to repay the loan, and as long as it deposits a specified percentage of the loan in a blocked dinar account. Subject to condi-tions of this nature, Yugoslav enterprises and banks can shift between domes-tic and foreign credit sources in response to differentials in domestic and foreign credit terms, and potential substitution of this kind serves as a

channel whereby international capital market conditions can influence the Yugo-slav economy.

Although capital inflow decisions are relatively decentralized and free, the outflow of capital from Yugoslavia is strictly controlled, and Yugoslav individuals and institutions alike are generally forbidden to participate in world currency and securities markets.[3] Consequently, the outflow of domestic capital in response to changing returns on foreign securities and/or currency markets does not serve as a channel whereby international capital market disturbances influence the Yugoslav economy.

Overall, in light of the evidence presented in Table 1 and in view of the above discussion, it seems correct to assert that changing conditions on international financial markets were not an important channel through which the worldwide disturbances were transmitted to Yugoslavia during the 1973-76 period. The Yugoslavs remained in a relatively strong position as borrowers with a debt-service ratio of no more than .20 through the end of 1976. In general, Yugoslav banks and enterprise borrowers did not encounter any restrictions on borrowing on world credit markets, as spreads on Yugoslav loans remained relatively high (around $1\frac{1}{2}$% above LIBOR).[4] For Yugoslav borrowers, disturbances on world credit markets influenced the terms rather than the availability of foreign loans. Only in the area of joint ventures did the Yugoslavs perceive a shortfall in the availability of foreign capital due to recessionary conditions and adverse business expectations in Western Europe. Recent available data, taken from a variety of sources, indicate a slowdown in the rate of contracting of new long-term industrial cooperation agreements from an average of about 75 per year between 1968 and 1972 to an average of about 45 per year between 1973 and 1976. Similarly, the number of joint venture contracts dropped from a high of 24-26 per year during the 1972-1974 period to an average of 14

per year in 1975 and 1976.[5] Unfortunately, it is difficult to assess the extent to which the disappointing number of industrial cooperation and joint venture agreements during the 1974-76 period was the consequence of recessionary conditions in the West or the consequence of more fundamental factors discouraging these agreements in the Yugoslav environment.[6]

2. An Empirical Look at the Role of Commodity Market Linkages in the Transmission of Disburbances to Yugoslavia

The international disturbances of the 1973-74 period severely disrupted and depressed market conditions in all of the Western industrial economies that traditionally served as buyers for Yugoslav exports. As the figures in Table 4 reveal, the OECD countries accounted for more than one-half of Yugoslavia's export trade prior to these disturbances. In turn, OECD economies provided Yugoslavia with approximately two-thirds of its imports, and the trade imbalance with the OECD accounted for virtually all of Yugoslavia's trade deficit.

These broad commodity-market linkages with the West made Yugoslavia vulnerable to the oil-induced recessions that began to overtake the industrial market economies by 1974. To evaluate the effects of these recessions on the Yugoslav economy and to determine the relative effectiveness of certain policy options, such as devaluation, to counteract these effects, a more complete understanding of the factors determining Yugoslavia's export and import trade is required.

On the import side, the analysis is straightforward. As noted earlier, the bulk of Yugoslavia's imports are production related--raw material and fuel inputs, semi-processed manufactured inputs and capital goods. Imports of this nature are highly sensitive to the state of domestic production--when domestic output is expanding, imports expand to provide the required inputs;

when domestic output is stagnant or declining, imports correspondingly slow down or decline. This suggests that import demand is dependent to a large degree on the state of the domestic economy. The upward thrust of domestic prices that accompanies a domestic expansion in Yugoslavia tends to reinforce the links between import demand and domestic economic conditions. When domestic prices increase relative to world prices, Yugoslav enterprises tend to substitute foreign sources of supply for domestic sources of supply with consequent implications for import demand.

For a small country like Yugoslavia, where the supply of imports can reasonably be assumed to be infinitely elastic at exogenously determined world prices, the analysis presented here suggests a traditional import demand specification of the following form:

$$\ln IMR_t = \alpha_0 + \alpha_1 \ln NP_t + \alpha_2 \ln \left(\frac{PWM}{PD}\right)_t + u_t \tag{2}$$

where ln stands for the natural logarithm;

IMR is the real volume of imports;

NP is an index of nonagricultural production;

PWM is an index of the world prices of Yugoslav imports adjusted by an index of the import-weighted effective exchange rate for the dinar to yield an index of the dinar price of Yugoslav imports;

PD is an index of domestic producer (wholesale) prices of industrial goods;

and α_1 and α_2 are the income and relative price elasticities, with $\alpha_1 > 0$ and $\alpha_2 < 0$ the expected signs.[7]

This specification implicitly assumes that importers are always on their demand functions--that actual imports are always at their desired level. This assumption, however, is not particularly realistic in a short-run analysis such as the one pursued here. Under these circumstances, the usual procedure is to

introduce the possibility of behavior out of equilibrium by specifying a partial

adjustment model for imports in which the change in imports is related to the

difference between the demand for imports in period t and actual imports in

period t-1.[8] This partial adjustment model introduces a geometric lag struc-

ture into the determination of actual imports and yields an estimated equation

of the form:

$$\ln IMR_t = \gamma\alpha_0 + \gamma\alpha_1 \ln NP_t + \gamma\alpha_2 (\frac{PWM}{PD})_t + (1-\gamma) IMR_{t-1} + \gamma u_t \qquad (3)$$

where γ is the adjustment coefficient and $\gamma\alpha_1$ and $\gamma\alpha_2$ are the short-run income

and price elasticities.

One final modification of this equation seems warranted in the case of Yugo-

slavia. A variable is introduced to capture the effects of the periodic imposi-

tion of quantitative controls on import behavior. Following Mencinger (1975),

this variable is a measure of the balance of trade deficit expressed as a per-

centage of total imports and lagged three quarters. The underlying rationale

is that when the trade deficit becomes excessive relative to total imports, the

Yugoslav authorities gradually apply quantitative restrictions on imports and

foreign exchange.[9]

Adding this modification yields the estimating equation

$$\ln IMR_t = \gamma\alpha_0 + \gamma\alpha_1 \ln NP_t + \gamma\alpha_2 (\frac{PWM}{PD})_t + \alpha_3(\frac{BT}{IM})_{t-3} + (1-\gamma) IMR_{t-1} + \gamma u_t \qquad (3a)$$

The statistical estimates of the import demand function are presented in

row 1 of Table 5. Because of the inclusion of the lagged dependent variable

among the explanatory variables, a nonlinear maximum likelihood technique was

used to solve simultaneously for consistent estimates of the equation parameter

and of the autocorrelation coefficient.[10] This technique was applied within

the maintained hypothesis of a first-order autoregressive structure for the

error term. A χ^2 test on the validity of this hypothesis indicated that it

could not be rejected at the 5% level of significance.

Table 5

Import and Export Equations, 1968I-1976II

Equation Number	Independent Variables							R^2	SE	ρ

I. Dependent Variable: $\ell n\ IMR_t$

Equation 1:

$$C \quad \ell n\ NP_t \quad \ell n(\tfrac{PWM}{PD})_t \quad (\tfrac{BT}{IM})_{t-3} \quad \ell n\ IMR_{t-1}$$

	C	$\ell n\ NP_t$	$\ell n(\tfrac{PWM}{PD})_t$	$(\tfrac{BT}{IM})_{t-3}$	$\ell n\ IMR_{t-1}$	R^2	SE	ρ
1	1.589	.7873	-.5721	-.4659	.6493	.97	.046	.47
	(1.67)	(2.83)	(-2.00)	(-3.59)	(3.50)			

II. Dependent Variable: $\ell n\ EXP_t$

Equation 2:

$$C \quad \ell n\ WIP_t \quad \ell n(\tfrac{PX}{PW})_{t-2} \quad T$$

	C	$\ell n\ WIP_t$	$\ell n(\tfrac{PX}{PW})_{t-2}$	T	R^2	SE	ρ
2	5.176	.9378	-.2218	.0060	.96	.075	.67[a]
	(4.54)	(3.52)	(-1.91)	(2.06)			

Equation 3a:

$$C \quad \ell n\ WIP_t \quad \ell n(\tfrac{PX}{PW})_{t-2} \quad T \quad \ell n\ NP_t \quad \ell n\ IFG_{t-1} \quad (\tfrac{BT}{IM})_{t-3}$$

	C	$\ell n\ WIP_t$	$\ell n(\tfrac{PX}{PW})_{t-2}$	T	$\ell n\ NP_t$	$\ell n\ IFG_{t-1}$	$(\tfrac{BT}{IM})_{t-3}$	R^2	SE	ρ
3a	-4.72	1.628	-.1380	-.0252	1.406	.4088	.1285	.96	.073	.42[a]
	(-1.49)	(5.49)	(-1.61)	(-2.32)	(2.68)	(2.28)	(1.06)			

Table 5 (Continued)

Import and Export Equations, 1968I-1976II

[a] Corrected for first-order serial correlation using the Cochrane-Orcutt technique. ρ is the autocorrelation coefficient.

Sources and Definitions of Variables: Where not otherwise specified, the data are provided by Ekonomski Institut Pravne Fakultete, Ljubljana. IMR is nominal imports deflated by an import price index. EXR is nominal exports deflated by an export price index. NP is an index of nonagricultural production, 1975 = 100. PWM is the product of an index of world (dollar) prices of Yugoslav imports, 1975 = 100 and an index of the import-weighted effective exchange rate of the dinar, 1975 = 100. The effective exchange rate is calculated vis a vis the currencies of France, Germany, the United States, the United Kingdom, Italy and Austria, with each country's average share in Yugoslav imports over the 1971-75 period. The effective exchange rate series was calculated by the authors using actual exchange rate data from the International Monetary Fund's International Financial Statistics, various issues, and from data on Yugoslav trade from Statistički Godišnjak, various issues. PD is an index of producer prices of industrial goods, 1975 = 100. BT is the nominal trade deficit in millions of dinars. IM is nominal imports in millions of dinars. WIF is the weighted average of industrial production indexes in the United Kingdom, the United States, Germany, Italy, France and Austria taken from OECD, Main Economic Indicators, various issues. The weights are average country shares in total Yugoslav exports, 1971-1975. PX is an index of world (dollar) prices of Yugoslav exports. PX is the product of an index of Yugoslav export prices in dollars, calculated at a constant conversion rate of 17 dinars to the dollar, and an index of actual dinar-dollar exchange rate relative to the above conversion rate. PW is a weighted average of unit value indexes (in dollars) for exports of manufacturing goods from the United Kingdom, the United States, Germany, Italy and France. These indexes were provided by R. Dornbusch (Massachusetts Institute of Technology) and were originally calculated from data in the United Nations' Monthly Bulletin of Statistics, various issues. The weights for PW are average country shares in total Yugoslav exports, 1971-1975. T is a time trend. IFG is an index of inventories of finished goods in the industrial sector, 1975 = 100. All data are seasonally adjusted. SE is the standard error of the equation. The figures in parentheses are "t" statistics.

The estimates of the import demand function are based on quarterly data for the 1968I-1976II period. Initially, a longer sample period running from 1962I through 1976II was adopted, but the statistical results did not support the import demand model described here. In retrospect, this finding is not surprising since as Bajt (1978) has recently pointed out, there was an apparent structural change in the relationship between domestic production and imports in Yugoslavia sometime in 1967-68, apparently in response to the greater degree of trade liberalization and the greater influence of market signals following the 1965-66 economic reform.

The statistical results of the simple import demand model are encouraging--the model explains 97% of the variance in real imports and the estimated coefficients are of correct sign and reasonable magnitude. The short-run income and relative price elasticities of import demand are .79 and -.33, respectively, while the long-run elasticities after actual imports have had a chance to adjust to desired levels are 2.26 and -.94, respectively.[11] As far as the income elasticities are concerned, these findings are consistent with the prevalent view expressed by Bajt (1978) and others that the short-run income elasticity of import demand is less than unity while the long-run income elasticity is significantly greater than unity. Nevertheless, a long-run income elasticity of 2.26 seems quite high, and probably reflects the increase in the import content of domestic production which apparently occurred during the sample period.

The estimated price elasticities of import demand were important, because they indicate that both in the short run and in the long run an increase in the relative price of imports dampens import demand. Of special importance is the fact that the estimated results do not rule out a price elasticity of unity in the long run. This finding has implications for the potential effectiveness of devaluation as a tool to correct the trade balance, since a price elasticity

of this magnitude suggests that the partial-equilibrium Marshall-Lerner condi-

tions are satisfied, even in the absence of a significant price elasticity for

the supply of Yugoslav exports.

The estimates of the import demand function provide insight into some of

the channels whereby the international disturbances of 1973-74 affected the

Yugoslav economy. Two opposing forces influenced import demand during this

period. On the domestic side, the Yugoslav government's continued commitment

to the expansionary economic policy introduced in mid-1973 fueled import de-

mand on the income side.[12] Working against this force was the large increase

in the world prices of Yugoslav imports which, combined with relative stability

in the effective exchange rate for the dinar, raised the relative price of

imports and encouraged the substitution of domestic goods for imports. On

balance, the forces operating to stimulate demand on the import side prevailed,

and real imports increased by about 15% in 1974. Then in 1975, in response to

the beginnings of a policy-induced economic slowdown in mid-year and to the

imposition of quantitative controls on imports--controls which served to reduce

import demand directly, as the estimated coefficient on the balance of trade

constraint in the import demand equation suggests--real imports fell by approxi-

mately 3%.

The factors determining the export behavior of the Yugoslav economy are

difficult to identify and model for several reasons. First, as most existing

studies (Pertot, 1973; Mencinger, 1975; OECD, 1977) indicate, Yugoslav exports

are characterized by substantial fluctuations in both commodity composition

and geographic destination. These fluctuations are the consequence of both

internal and external conditions. Internally, there seem to be few sectors

that specialize in production for foreign markets. Instead, in the absence of

a specific export orientation, enterprises seek out external buyers in response

to changes in the relative profitability of domestic and foreign sales. Consequently, domestic market conditions play an important role in promoting or discouraging exports, and export supply as well as export demand variables should be considered when modeling export performance. On the domestic front, exports are also influenced by periodic changes in economic policy to promote foreign sales, changes which because of their discontinuous and temporary nature tend to make successful estimation of simple export supply and demand functions quite difficult.[13]

Internationally, Yugoslav exports are influenced by a number of demand side variables. As far as export trade with the West is concerned, traditional factors such as income or production conditions in Western market economies and the relative prices of Yugoslav goods in these markets can be expected to influence the demand for Yugoslav exports. On the other hand, because Yugoslavia is not a member of the EEC, its export trade with the West is periodically disturbed by special protective policies, such as the imposition of quantitative limits or outright bans on the sale of its products in EEC countries.[14] Partly in response to these policies and partly in response to general long-run difficulties in developing strong export markets in the West, Yugoslavia also directs a fluctuating but nonetheless substantial and expanding share of its exports to planned economies in the East. The resulting instability in the geographic orientation of Yugoslav export trade in recent years is apparent from the figures in Table 4. Clearly, it is difficult to model the factors behind Yugoslavia's aggregate export performance in its Eastern markets both because for many commodities Yugoslav exporters turn to these markets only when other more economically desirable Western market channels are blocked and because the conditions encouraging or discouraging Eastern demand for Yugoslav exports are difficult to identify.

Despite the instabilities in the geographic and commodity composition of Yugoslavia's export trade, it is possible to obtain a preliminary assessment of how recent international disturbances affected Yugoslavia's export perform- ance using some simple export demand functions appropriately modified for Yugoslavia's particular characteristics. Traditionally, export demand func- tions are estimated for individual economies under the assumption that export supply is infinitely price elastic in the short run. This assumption leads to a log-linear, constant-elasticity export demand function of the form

$$\ln EXR_t = \beta_0 + \beta_1 \ln WIP_t + \beta_2 \ln \left(\frac{PX}{PW}\right)_t + \sigma_t \qquad (4)$$

Where EXR is the real volume of exports;

> WIP is an indicator of economic conditions on external markets, measured
> as the weighted average of seasonally adjusted industrial production
> indexes for Yugoslavia's major Western trading partners (the United
> Kingdom, the United States, Germany, Italy, France and Austria), where
> the weights are average country shares in total Yugoslav exports over
> the 1971-75 period;
>
> PX is the world price of Yugoslav exports;
>
> PW is an indicator of world prices on external markets measured as the
> weighted average of unit value indexes for manufactured exports of
> Yugoslavia's major Western trading partners where the weights are the
> export shares used to calculate WIP;
>
> and β_1 and β_2 are the income and relative price elasticities, with $\beta_1 > 0$
> and $\beta_2 < 0$ the expected signs.[15]

Frequently, this simple model is modified using the partial-adjustment formu- lation described earlier to allow for the possibility of a short-run discrep- ancy between actual and desired exports.

Preliminary experimentation with quarterly data on Yugoslav exports for

the 1968I-1976II period yielded reasonable results for a simple export demand

function like equation (4), when allowance was made for a two-quarter lag be-

tween a change in the relative price of Yugoslav exports and the demand for

them and when a time trend was included among the explanatory variables to

capture the effects of quality changes and changes in commodity and geographic

composition on aggregate exports.[16] The partial-adjustment specification was

not supported by the data. The results for this simple demand model, shown in

line 2 of Table 5 show an estimated income elasticity for Yugoslav exports of

.94 while the estimated price elasticity, only significant at the 10% level of

significance, is -.22. These results must be viewed with some caution, how-

ever, because they rest on the assumption that supply-side conditions have no

impact on Yugoslav exports in the short run. Although a complete test of the

assumption requires a full-scale structural model of supply and demand func-

tions for Yugoslav exports, a conditional but nevertheless indicative test can

be based on the specification of a reduced-form equation in which export per-

formance is explained by a variety of predetermined supply and demand variables.

Guided by previous empirical work by Bajt (1978) and Mencinger (1975), several

such reduced-form equations were estimated using different indicators of domes-

tic market conditions in Yugoslavia. The best specification is reported in

Row 3a of Table 5. In this equation, the income and relative price variables

used in the estimation of equation (4) are combined with three additional ex-

planatory variables: $\ln NP_t$, the log of an index of nonagricultural production

which serves as an indicator of general supply conditions in Yugoslavia;

$\ln IFG_{t-1}$, the log of an index of inventories of finished goods lagged one

quarter which serves as an indicator of general demand conditions in Yugoslavia;

and $(BT/IM)_{t-3}$, the ratio between the trade deficit and nominal imports lagged

three quarters which serves as a proxy for the periodic introduction of export

promotion policies by the Yugoslav government in response to a deteriorating

balance of trade position. The first two of these variables are significant

and have expected signs and reasonable magnitudes: In response to a 1% in-

crease in nonagricultural production (supply) in Yugoslavia, exports are pre-

dicted to increase by 1.4%. In response to a 1% increase in inventories of

finished goods in Yugoslavia, indicating a decline in domestic demand, imports

are predicted to increase by about .4%. The latter effect captures the widely

reported tendency of Yugoslav enterprises to seek out foreign purchasers when

domestic demand is slack.

The inclusion of the supply-side variables in the export equation changes

the estimates of the income and price elasticities of demand for Yugoslav ex-

ports. The income elasticity increases to about 1.6, while the price elastic-

ity declines to -.14. Unfortunately, however, the price elasticity measure is

no longer significant even at the 10% level of significance. Consequently, in

light of the results discussed here, it is impossible to say anything conclusive

about the price elasticity of demand for Yugoslav exports. Further empirical

work is required with different sample periods, different indicators of demand

and supply conditions, and an export series that is adjusted to exclude Yugo-

slav exports to planned economies, the determinants of which are certain to

differ from the determinants of Yugoslav exports to market economies. In the

absence of such work, it is important to note that in a recent empirical study

of annual Yugoslav exports using a reduced form equation with supply and demand

side variables, Bajt (1978) found that a 1% devaluation of the dinar increased

real exports by about 1.8% and a 1% increase in retail prices in Yugoslavia

reduced real exports by about 1.5%. These findings are consistent with the

existence of a significant price elasticity of demand for Yugoslav exports.

While maintaining an agnostic position on the price sensitivity of world

demand for Yugoslav exports, it is nonetheless instructive to examine whether
and for how long periodic devaluations of the dinar have lowered the relative
prices of Yugoslav exports measured in world prices. Such devaluations are
one of the major policy tools used by the Yugoslavs to improve their competi-
tive position, thereby stimulating lagging exports. On a monetarist or pure
arbitrage view, however, devaluations will not have a sustained relative price
effect because given the law of one price in international markets, world
prices of Yugoslav exports will be determined by world market conditions, not
by domestic cost-price conditions and dinar exchange rates. Recent evidence by
Dornbusch and Krugman (1977), Kravis and Lipsey (1977) and others does not sup-
port the monetarist argument. Instead, the evidence tends to support the Keyne-
sian view that exchange rate adjustments have an important persistent effect
on relative prices or competitiveness.

In the case of Yugoslavia, the evidence presented in Figure 2 lends sup-
port to the Keynesian position. The figure shows the effective exchange rate
index for the dinar and the relative price index for Yugoslav exports used in
the estimation of equation (4), both with a base 1970 = 100. The major devalu-
ations of the dinar in the first and fourth quarters of 1971 and in the fourth
quarter of 1974 are clearly apparent. Equally apparent is the relative price
advantage gained by Yugoslavia following these devaluations. The basic conclu-
sion is that the recent devaluations, far from simply matching differentials
in inflation rates between Yugoslavia and its major Western trading partners,
in fact produced a significant and persistent improvement in Yugoslavia's com-
petitive position.[17] What remains to be determined in future research is the
extent to which the relative price advantage resulting from devaluations stimu-
lated Western demand for Yugoslav exports.

Based on the analysis in this section on the determinants of Yugoslavia's
export performance, it is possible to provide a preliminary estimate of how

Figure 2

Relationship of Effective Exchange Rate
to Prices of Yugoslav Exports
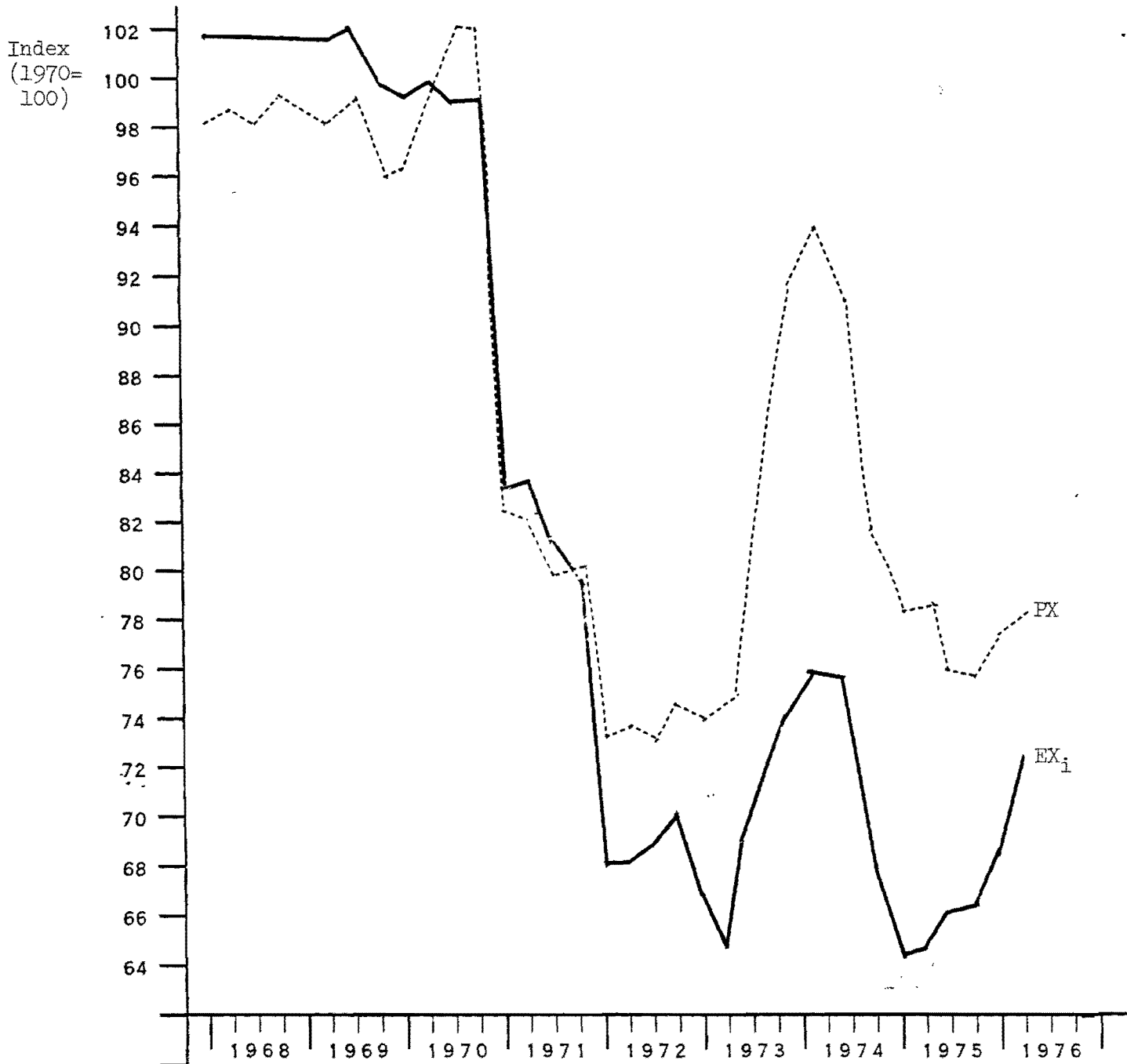
Index
(1970=
100)

PX — Index of world (dollar) prices of Yugoslav exports
EX_i — Effective exchange rate of dinar for Yugoslav imports

Notes and Sources: See Figure 1.

international disturbances in Western market economies influenced the demand
for Yugoslav exports. In 1974, the weighted index of industrial production in
Yugoslavia's major market trading partners increased by 1.2% while in 1975,
this index declined by 7.2%. Using the estimated income elasticities of .94
and 1.6 in Rows 2 and 3 of Table 5 , these figures predict a ceteris paribus
increase in Yugoslav exports by 1.1%-1.9% in 1974 and a ceteris paribus de-
crease by 6.8%-11.5% in 1975. The actual results were a 3.0% increase in 1974
and a 5.2% decrease in 1975. These calculations suggest that a large part of
the drop in Yugoslav exports in 1975 can be traced to the collapse of Western
markets in the wake of oil-induced recessions.

IV. INTERNAL PROPAGATION MECHANISMS IN THE YUGOSLAV ECONOMY

1. An Overview

The nature and extent of Yugoslavia's links with Western commodity and factor markets and the policies and institutions of its transformation structure determined how the international economic disturbances beginning in 1973-74 initially affected the Yugoslav economy. As the preceding discussion suggests, the main effects were the collapse of foreign demand for Yugoslav exports occasioned by the deepening recession in Western markets, the reversal of labor migration flows and the associated slowdown in remittances, the sharp increases in the world prices of Yugoslavia's traded commodities, and the accompanying deterioration in Yugoslavia's terms of trade. (See Tables 1 and 3 .)

The existing set of foreign trade and exchange institutions forming the transformation structure could not and did not insulate the domestic economy from the changing price and quantity signals produced by these initial effects. In particular, the authorities did not attempt to revalue the dinar to offset the effects of rising world prices on the domestic price level, because revaluation threatened to aggravate Yugoslavia's persistent trade imbalance with the West, nor did they introduce tax-subsidy adjustments to break the link between domestic and foreign relative prices. As far as exchange rate policy was concerned, the Yugoslav response was initially passive: the official dinar-dollar rate remained nearly constant between mid-1973 and the last quarter of 1974, and changes in the effective exchange rate for the dinar were the consequence of fluctuations in exchange rates among convertible currencies on world exchange markets.

The initial price and quantity effects of the international disturbances produced further domestic effects within Yugoslavia as consumers, enterprises, and government agencies responded to altered market signals. Within the context

of the transmission and response model, propagation is defined to include all of the various ways whereby these further effects developed and were spread throughout the economy by the discretionary actions of economic agents other than the state itself. In general, several potential propagation mechanisms can be identified: demand multiplier effects operating through changes in aggregate demand produced by changes in the trade balance; supply multiplier effects operating through changes in the degree of repressed inflation produced by changes in the trade balance; direct and indirect domestic price effects produced as domestic prices and wages adjust to change in the world prices of traded commodities; resource reallocation and substitution effects produced as domestic agents react to changing price and non-price indicators of relative commodity scarcity; and real balance effects operating through changes in the domestic real money supply induced by changes in the flows of international reserves not offset by domestic stabilization policies. The importance of each of these potential mechanisms is a function of the economic system of the particular country in question. For example, in centrally planned economies, the major propagation mechanisms are supply multiplier effects and resource reallocation effects while in market economies, such as Yugoslavia, demand multiplier effects, direct and indirect price effects, related resource reallocation and substitution effects, and real balance effects all play a role in the propagation of disburbances.

2. Demand Multiplier Effects

Demand multiplier effects refer to the impact of changes in the goods and services account on aggregate demand for domestic output, with implications for real domestic activity levels and/or prices. In the Yugoslav case, the sharp deterioration in this account in 1973, and especially in 1974, undoubtedly exercised a contractionary influence on aggregate demand, an influence that was

aggravated by an estimated real income loss of about 6% caused by the deteri-
oration in the terms of trade in 1974. A full-scale macroeconometric model
would be required to assess fully the effects of the resulting demand contrac-
tion on domestic activity levels and prices. Nevertheless, in the absense of
such a model, a provisional evaluation of the evidence suggests that the con-
tractionary impulses emanating from the foreign sector did not significantly
affect real output and employment levels. As the figures in Table 10 reveal,
output and employment growth remained strong throughout 1974, reflecting the
continued pursuit of expansionary economic policies introduced in mid-1973.
The maintenance of these policies effectively contained the contractionary
effects of shortfalls in foreign demand for Yugoslav goods.

As is traditionally the case in Yugoslavia, stimulation of the domestic
economy during this period was not accomplished by countercyclical fiscal pol-
icy but largely by selective monetary and other measures encouraging produc-
tive investment. During 1972 and the first half of 1973, the government had
introduced a number of financial regulations, including a law imposing minimum
self-financing rates for enterprise investment, a law requiring enterprise to
build-up advance deposits before initiating investment projects, and a law re-
quiring enterprises to set aside obligatory dinar deposits in the amount of
investment credits obtained from abroad, all of which sharply curtailed enter-
prise investment expenditure. These restrictions, combined with very large
increases in the money supply--by about 42% in 1972 and 38% in 1973 (see
Table 8)--led to a dramatic growth in enterprise liquidity (cash-holdings)
which increased by 60% in 1972 and by another 76% in 1973. Under these cir-
cumstances, the Yugoslav government was able to stimulate an investment boom
simply by relaxing some of the existing restrictions on enterprise expendi-
tures. As a result of the abolition of these restrictions and of continued

growth in the money supply by another 25%, real investment increased by about

9% in 1974. The comparable increases in 1972 and 1973 were only 3.5% and 2.5%,

respectively.

3. Direct and Indirect Price Effects

The worldwide inflation of oil and other raw material prices in 1973-74

appeared as a supply shock to the Yugoslav economy--an exogenous increase in

the world prices of essential raw material imports that shifted the domestic

aggregate supply curve upward and to the left. By its very nature, this shock

generated at once inflationary (price-increasing) and deflationary (output-

depressing) effects. As already noted, the deflationary effects of the supply

shock and of incipient recessionary tendencies in Western Europe were ini-

tially contained by expansionary domestic policies. The very success of these

policies, however, intensified the inflationary pressures coming from the sup-

ply side of the economy.

Increases in the world prices of Yugoslav imports tended to produce domes-

tic inflationary pressure through several channels. First, in the absence of

an offsetting dinar revaluation, inflation in these prices tended to increase

the domestic prices of imports and of production and consumption substitutes

through the operation of market arbitrage. Second, Yugoslav dependence on raw

materials and fuel imports (see Table 2) in production meant that exogenous

increases in their prices substantially increased production costs. Given the

practice of cost-markup pricing in Yugoslavia, an increase in the cost of im-

ported inputs implied an increase in the prices of many domestically produced

goods requiring these inputs. Taken together, the arbitrage and cost-markup

channels were responsible for the direct or short-run domestic price effects

of the international inflation. Further effects, sometimes referred to as in-

direct or second-round effects, were the consequence of the interaction of

rules of income (wage) and price determination in Yugoslavia.

As is widely recognized, the degree and even the direction of the indirect price effects produced in the wake of a supply shock depend on the rules or practices linking wages, costs and prices in the domestic economy. If wages are particularly sensitive to inflationary expectations or to actual cost-of-living increases, and/or if prices are largely cost-determined rather than demand-determined, then these effects may be significant and widespread. Indeed, under these conditions, such effects may prove to be the major manifestation of the international disturbances in the domestic economy. Moreover, when these conditions are satisfied, any attempt by the domestic economic authorities to contain the direct and indirect inflationary effects of the disturbance through restrictive aggregate demand policies necessitate slowdowns or actual declines in real activity and employment levels, at least in the short run.

In the absence of an economy-wide macroeconometric model, a simple set of aggregate wage and price equations can be used to obtain a preliminary assessment of the direct and indirect price effects of the 1973-74 international supply shock on the Yugoslav economy. The price equation is based on a simple cost-markup formulation, modified to allow the level of aggregate demand to exert a direct influence on the inflation rate, distinguishable from the indirect influence of demand working through production costs. The equation is of the following form:

$$gWP_t = a_0 + a_1 gW_t + a_2 gPM_{t-1} + a_3 ED_{t-1} + u_t \tag{5}$$

where gWP_t is the quarterly rate of growth of producer (wholesale) prices
for industrial goods;

gW_t is the quarterly rate of growth of worker incomes (wages) in the socialist productive sector;

gPM_{t-1} is the quarterly rate of growth of the prices of Yugoslav imports lagged one quarter;

ED_{t-1} is an indicator of the level of aggregate demand lagged one quarter;

and $a_1 > 0$, $a_2 > 0$, and $a_3 > 0$ are the expected sign.[18]

Equations of this general form have been estimated previously by Bajt (1977), Mencinger (1975) and Tyson (1977), and the statistical results support the general model of modified cost-markup pricing on which the specification rests.[19] In the pricing equation, the coefficient of the import price variable, which measures the elasticity of domestic prices with respect to import prices, provides an estimate of the direct or first-round effect of increases in the dinar prices of Yugoslav imports on domestic prices. Thus, this coefficient allows us to assess how changes in the foreign prices of Yugoslav imports and/ or changes in the dinar exchange rate affect the domestic rate of inflation in the short run.

In theory, gPM measures the rate of growth of import prices in domestic currency units or dinars, which can be expressed as

$$gPM = k(gR + gPWM)$$

where gR is the rate of change of the effective exchange rate for the dinar, measured in dinars per unit of foreign currency; gPWM is the rate of change of Yugoslav import prices measured in foreign currency; and k is a constant that depends on the price elasticity of Yugoslavia's import demand and the price elasticity of export supply abroad. (See Kwack, 1974, and Branson, 1972, for a theoretical derivation of k.)

In the estimation, because data on import prices in dinars were not available and because a reasonable value for k in the Yugoslav case was unknown, two alternative approaches were tried. In the first, k was set equal to unity

and gPM was constructed using available series for gPWM and gR. In the second, gPWM was used as the independent import price variable. Only the second approach yielded reasonable results which are reported here. The poor performance of the first approach is due in large measure to the fact that the gR series tends to move discontinuously, reflecting periodic devaluations, the price effects of which are largely spread out in time both preceding (in anticipation) and following the exchange rate adjustment. The formulation thus assumes that in the short-run perspective appropriate for macroeconomic analysis, changes in the exchange rate are a source of inflationary pressure and hence are properly thought of as price-determining, although in the long run, these same exchange rate changes are themselves endogenous and largely determined by relative inflationary pressures in Yugoslavia and in its major trading partners.[20]

To assess the indirect price effects of external inflation on the Yugoslav economy, the pricing equation must be coupled with a wage equation indicating how domestic prices and incomes are tied together. Following Bajt (1977), Mencinger (1974), and Tyson (1977), the reduced form wage equation adopted here has the following form:

$$gW_t = b_0 + b_1 gY_{t-2} + b_2 gRP_t^e + b_3 LM_t + V_t \tag{6}$$

where gY_{t-2} is the quarterly rate of growth of net income per worker in the

socialist productive sector, lagged two quarters;

RP_t^e is a measure of the expected rate of inflation calculated as the

actual rate of inflation in overall retail prices lagged one quarter;

LM_t is a measure of labor market demand;

and $b_1 > 0$, $b_2 > 0$, and $b_3 > 0$ are the expected signs.[21]

This formulation rests on the view that workers in self-managed enterprises adjust their wages in response to lagged changes in enterprise net income per

worker (similar to a measure of enterprise profitability), changes in inflationary expectations, and the state of the labor market.

Because the retail price variable used as a proxy for inflationary expectations in the wage equation differs from the producer price variable which is the dependent variable in the price equation, a final equation linking the two price variables is required to solve the simultaneous wage-price system and derive an estimate of the total direct and indirect effects of import price increases on the Yugoslav economy. In the interests of simplicity, the linking equation is of the following form:

$$gRP_t = c_1 gWP_t + c_2 gRPS_t + c_3 gRPA_t + \gamma_t \tag{7}$$

where gRPS is the quarterly rate of growth of the retail price of services;

and gRPA is the quarterly rate of growth of the retail price of agricultural goods.[22]

An import price variable of the form (gPM_{t-1}) was also included among the regressions to test for the possibility of a direct arbitrage link between import prices and the retail prices of traded goods and their substitutes. This variable did not prove significant and was excluded from the equation reported in Table 6.

Equations (5), (6), and (7) can be solved to yield the following long-run relationship between the rate of inflation of domestic producer prices and the rate of growth of import prices:

$$gWP^* = \frac{a_2}{1 - a_1 b_2 c_1} gPM^* = \alpha gPM \tag{8}$$

where * refers to constant period-to-period equilibrium growth rates (Goldstein, 1974). By construction, α, the coefficient on the import price variable in this expression, which measures the long-run elasticity of domestic prices with respect to import prices, provides an estimate of the total direct

Table 6

Determinants of the Rate of Growth of Prices, 1962I-1976III

Equation Number	Independent Variables					Summary Statistics R^2 SE ρ

I. Ordinary Least Squares

Dependent Variable: g^{WP}_t

1	C	g^W_t	g^{PM}_{t-1}	ED^a_{t-1}		
	.4066	.2644	.2082	2.06		.80 1.1 .76[c]
	(.526)	(3.28)	(2.97)	(1.89)		

2	C	g^W_t	g^{PM}_{t-1}	ED^b_{t-1}	T	
	3.056	.2490	.1526	-.1437	.2280	.84 0.9 .52[c]
	(2.32)	(3.41)	(2.48)	(-4.23)	(4.81)	

Dependent Variable: g^{RF}_t

3	g^{WP}_t	g^{RPS}_t	g^{RPA}_t			
	.4728	.7602	.2586			.95 .006 DW = 1.29
	(10.00)	(8.97)	(8.03)			

II. Instrumental Variables

Dependent Variable: g^{WP}_t

4	C	g^W_t	g^{PM}_{t-1}	ED^a_{t-1}		
	-.4003	.4172	.2123	2.74		.79 1.1 .73[d]
	(-.401)	(2.75)	(2.94)	(2.02)		

5	C	g^W_t	g^{PM}_{t-1}	ED^b_{t-1}	T	
	2.640	.2899	.1518	-.1785	.2238	.84 1.0 .56[d]
	(1.62)	(2.32)	(2.45)	(-3.99)	(4.81)	

Dependent Variable: g^{RP}_t

6	g^{WP}_t	g^{RPS}_t	g^{RPA}_t			
	.5363	.2899	.2850			.96 .006 .78[d]
	(7.18)	(6.01)	(7.67)			

Table 6 (Continued)

Determinants of the Rate of Growth of Prices, 1962I-1976III

[a] $EP_{t-1} = 1/(r-CAPU)_{t-1}$ where CAPU is a measure of capacity utilization and r is a critical maximum level of capacity utilization. The nonlinear form of this demand indicator allows for the possibility that the sensitivity of wholesale prices to excess demand depends on the level of excess demand — the higher the level of excess demand, or the closer to its critical maximum value "r", the greater the sensitivity of prices to product market conditions. In the reported results, a value of 98.0 was assigned to r because this value yielded the best overall performance among several possible values for r which were experimented with.

[b] ED_{t-1} = An index of inventories of finished goods in the manufacturing sector, 1975 ∅ = 100, lagged one quarter.

[c] Corrected for serial correlation using the Cochrane-Orcutt technique. ρ is the autocorrelation coefficient. DW is the Durbin-Watson statistic.

[d] Corrected for serial correlation using Fair's (1970) instrumental variables technique for simultaneous equation estimation with first-order autoregressive disturbances.

Table Definitions and Sources: Data provided by Ekonomski Institut Pravne Fakultete, Ljubljana. The dependent variable gWP_t is $\mathcal{L}n\ WP_t - \mathcal{L}n\ WP_{t-1}$ where WP is an index of producer prices in the industrial sector, 1975 ∅ = 100. The dependent variable gRP_t is $\mathcal{L}n\ RP_t - \mathcal{L}n\ RP_{t-1}$ where RP is an index of general retail prices, 1975 ∅ = 100. $gW_t = \mathcal{L}n\ W_t - \mathcal{L}n\ W_{t-1}$ where W is the net wage bill in the socialist productive sector divided by the number of workers employed in the socialist productive sector. $gPM_{t-1} = \mathcal{L}n\ PM_{t-1} - \mathcal{L}n\ PM_{t-2}$ where PM is an index of world prices of Yugoslav imports, 1975 ∅ = 100. T is a time trend. $gRPS_t = \mathcal{L}n\ RPS_t - \mathcal{L}n\ RPS_{t-1}$ where RPS is an index of the retail price of services, 1975 ∅ = 100. $gRPA_t = \mathcal{L}n\ RPA_t - \mathcal{L}n\ RPA_{t-1}$ where RPA is an index of the retail prices of agricultural goods. All data are seasonally adjusted. SE is the standard error of the equation. The figures in parentheses are "t" statistics.

and indirect effect of import price increases on the domestic inflation of producer prices. As long as $(a_1 b_2 c_1) < 1$, this coefficient will be greater than a_2, the coefficient measuring the direct effects of foreign inflation on domestic inflation.

Tables 6 and 7 contain ordinary least squares (OLS) and instrumental variables (TSLS) estimates of equations (5), (6), and (7).[23] The tables present selected equations that employ different indicators of the state of labor and product market demand. In most cases, the equations yield satisfactory results--reasonably high R^2's, in comparison with results obtained elsewhere for quarterly wage and price equations, low standard errors, and statistically significant coefficients with correct signs and reasonable magnitudes.

Both the OLS and TSLS results reported in Table 6 provide preliminary support for the view that the course of wholesale price inflation in the Yugoslav industrial sector is largely shaped by the course of production costs, in particular wages and the cost of imported inputs. In addition, however, the results indicate that the state of demand on product markets exerts an independent influence on prices over and above the influence exerted through demand-induced increases in production costs.

The OLS and TSLS estimates differ noticeably only in their measures of the elasticity of prices with respect to wages. In the OLS equations, this elasticity is between .25 and .26 while in the TSLS equations, it is somewhat higher, ranging between .29 and .42. Both sets of estimates are in line with previous measures of .33 found by Mencinger (1975) and .42-.49 found by Tyson (1977). In both the OLS and TSLS equations, the coefficients of the import price variables indicate that a 1% increase in import prices gives rise to a short-run increase of .15%-.21% in domestic producer prices. As noted earlier,

Table 7   34a

Determinants of the Rate of Growth of Wages, 1962I-1976III

Equation Number	Independent Variables				Summary Statistics		
					R^2	SE	ρ

I. **Ordinary Least Squares**

1	C	g^Y_{t-2}	RP^e_t	LM^a_t			
	-.77	.1005	.5208	18.24	.70	1.6	.45[c]
	(-.70)	(2.83)	(4.95)	(2.74)			

2	C	g^Y_{t-2}	RP^e_t	LM^b_t			
	-2.55	.0574	.4210	.3607	.70	1.5	.66[c]
	(-3.24)	(1.61)	(3.74)	(2.39)			

II. **Instrumental Variables**

3	C	g^Y_{t-2}	RP^e_t	LM^a_t			
	-1.77	.1019	.8113	20.70	.65	1.7	.78[d]
	(-1.75)	(2.68)	(5.11)	(3.20)			

4	C	g^Y_{t-2}	RP^e_t	LM^b_t			
	1.76	.0647	.6787	.3589	.68	1.6	.59[d]
	(1.84)	(1.79)	(3.09)	(2.28)			

[a] $LM_t = 1/NU$ where $NU = (U-V)/(Z+V)$ and U is the number of registered, unemployed workers, V is the number of job vacancies and Z is a measure of total nonagricultural employment.

[b] $LM_t = \ln Q_{t-3} - \ln Q_{t-4}$ where Q is an index of nonagricultural production, 1975 Ø = 100.

[c] Corrected for serial correlation using the Cochrane-Orcutt technique. ρ is the autocorrelation coefficient.

[d] Corrected for serial correlation using Fair's(1970) instrumental variables technique for simultaneous equation estimation with first-order autoregressive disturbances.

Sources and Definitions of Variables: Data provided by Ekonomski Institut Pravne Fakultete, Ljubljana. The dependent variable is $\ln W_t - \ln W_{t-1}$ where W is the net wage bill in the socialist productive sector divided by the number of workers employed in this sector. $g^Y_{t-2} = \ln Y_{t-2} - \ln Y_{t-3}$ where Y is the difference between gross enterprise sales and enterprise material costs divided by the number of workers in the socialist productive sector. $RP^e_t = \ln RP_{t-1} - \ln RP_{t-2}$ where RP is an index of general retail prices, 1975 Ø = 100. All data are seasonally adjusted. SE is the standard error of the equation. The figures in parentheses are "t" statistics.

these coefficients measure the direct effect of foreign inflation on domestic prices. Once again, the coefficient estimates are consistent with previous estimates of .16 reported by Mencinger and .19-.20 reported by Bajt (1977). They are also consistent with estimates of the total (direct and indirect) import content of production, estimates of which range between .16 and .20 according to recent calculations based on the Yugoslav input-output table (Sekulič and Babič, 1975).

Turning next to the wage equations, both the OLS and the TSLS estimates support the following general conclusions:

1) The rate of growth of wages is sensitive to labor and/or product market conditions, as measured alternatively by the inverse of the current unemployment rate adjusted for job vacancies, or by the rate of growth of nonagricultural production lagged three quarters;

2) When used as an explanatory variable along with the inverse of the unemployment rate, the rate of growth of net income per worker lagged two quarters exerts a significant positive impact on the rate of growth of wages; and

3) The expected rate of inflation is a significant determinant of the rate of growth of wages.

The OLS and TSLS results differ importantly only in their estimates for the elasticity of wages with respect to inflationary expectations. In the OLS results, the elasticity measures range between .42 and .52, and confidence intervals for these measures rule out a long-run unitary elasticity. In the TSLS results, the elasticity estimates are significantly higher, ranging from .64 to .81, and the relevant confidence intervals in these cases do not rule out a long-run elasticity of unity. Because, in the absence of money illusion, theory suggests a unitary elasticity between wages and the expected rate of

inflation, the TSLS results appear preferable on both theoretical and statistical grounds.

The coefficient estimates of the wage and price equations can be combined to produce a measure of α, the long-run elasticity of domestic prices with respect to import prices. Using two alternative TSLS estimates, α is calculated to range between .17 and .26.[24] In both cases, α is quite close to a_2, the short-run elasticity of domestic prices with respect to import prices, and is noticeably below unity, indicating that in the long run a 1% increase in import prices produces less than a 1% increase in domestic wholesale prices.[25]

In the price-wage model analyzed here, the indirect price effects of an import price increase appear to be quite small, largely because wages are linked to a general retail price index that includes the prices of services and other nontradeables which are not affected--at least within the specified equations--by increases in import prices. As a consequence, such increases produce indirect effects only as they cause increases in retail prices that in turn feed into wage increases and further producer price increases.[26]

Overall, the statistical results reported here indicate that increases in import prices produce a significant total effect on domestic prices within Yugoslavia. An α measure of .17-.26 suggest that the 48% increase in Yugoslavia's import prices in 1974 could be expected to produce a domestic inflation rate of 8.2%-12.0% in the long run. Even in the short run, an imported inflationary impulse of this magnitude could be expected to produce a domestic inflation rate of 7.2%-10.0%, fully 25%-34% of the actual inflation rate in producer prices of industrial goods in 1974. The basic conclusion warranted by this evidence is clear: direct and indirect price effects played a critical role in the internal propagation of recent international disturbances in Yugoslavia.

4. Real Balance Effects

Real balance effects--changes in domestic expenditures resulting from
changes in the real domestic money supply caused by changes in the balance of
payments and consequent variations in international reserve flows--are fre-
quently identified as a third major propagation mechanism operating in market
economies, such as Yugoslavia. The strength of these effects in Yugoslavia,
as elsewhere, depends on several factors including:

1) The extent to which the monetary authorities sterilize the potential
monetary consequences of changes in international reserve flows by offsetting
variations in the rate of domestic credit creation; and

2) The extent to which changes in the real domestic money supply, and
resulting discrepancies between actual and desired levels of real cash bal-
ances, produce changes in domestic expenditures with implications for domes-
tic prices and/or real activity levels.

It is difficult to test precisely the extent of sterilization activities
in a given economic system, and Yugoslavia is no exception in this regard.
Although it is relatively easy to measure the "primary" money effect of changes
in international reserves on the domestic money supply, the task of quantify-
ing the "secondary" effect stemming from the rise of bank liquidity and the
resulting expansion of credit and bank deposits is difficult and requires a
complete econometric model of the banking system's behavior. Despite these
difficulties, however, it seems important to provide some preliminary evidence
on the extent of sterilization in Yugoslavia, since as Table 8 reveals, changes
in international monetary reserves have been large and erratic relative to
changes in total reserve or base money and to changes in the domestic money
supply in recent years.

The sterilization hypothesis for the primary money effect of international

Table 8

Basic Determinants of the Change
in the Money Supply

		1971	1972	1973	1974	1975	1976
Δ in net foreign assets of NB	(1)	-2.6	9.2	5.2	-10.6	-2.1	15.0
Δ in net domestic assets of NB	(2)	11.6	8.8	9.4	15.1	17.6	26.8
Δ in reserve money	(3)	9.0	17.9	14.7	4.5	15.4	41.8
(1)/(3)	(4)		51.4%	35.4%	-235.6%	-13.6%	35.9%
Δ in money supply	(5)	5.7	17.3	22.6	20.5	33.4	81.4
(3)/(5)			103.5%	65.0%	22.0%	46.1%	51.4%

Sources: IMF, IFS, June 1978, p. 398.
          1971 - June 1974, p. 402

disturbances can be roughly tested with the help of the following National Bank identity:

$$\Delta BM = \Delta DC + \Delta R$$

where ΔBM is the change in reserve or base money, ΔDC is the change in the net domestic credits of the National Bank and ΔR is the change in net foreign assets of the National Bank.[27] According to this hypothesis, the National Bank will offset unanticipated and undesired variations in international reserve money by adjustments in its net domestic credit position. Superficially, the data presented in Table 8 do not support this conclusion at least for years of international reserve inflow. For example, in 1972 and again in 1976, large and unanticipated surpluses on current account and consequent large, unanticipated changes in the net foreign asset position of the National Bank did not produce any perceptible reduction in the net domestic credits of the National Bank.[28] Indeed, in both years and particularly in 1976, large increases in National Bank domestic credits reinforced the monetary effects of the unanticipated reserve inflows and produced unplanned increases in domestic reserve money by 48.5% in 1972 and 46.8% in 1976. In 1976, the consequence of failure to sterilize unanticipated reserve inflows was a rate of growth of the money supply by a staggering 60%, noticeably in excess of the growth rate of 18% planned for that year.

The evidence on the sterilization of monetary outflows produced by balance of payments deficits is more ambiguous, particularly in 1974, when a large reserve outflow was associated with a noticeable slowdown in the rates of growth of base money and the money supply, despite a large increase in domestic credits of the National Bank. Yet even in this year, the National Bank apparently attempted to sterilize some of the effects of the reserve outflow by adjusting upward its target growth rate for domestic credit by

about 57% in mid-year. This new target and a revised money supply growth target of 26%, slightly in excess of the original 22-24% target, were roughly achieved, indicating some degree of success in this partial sterilization effort. Evidence of sterilization in 1975 is even more compelling. In that year, the National Bank once again adjusted its domestic credit targets in response to the monetary drain of the balance of payments, and by year-end, the domestic money supply had increased by 32.6%, instead of the planned 26%.

Overall, the evidence seems to warrant the tentative conclusion that there was an asymmetry in the sterilization activities of the National Bank during the 1970-76 period. Large reserve outflows produced by balance of payments deficits were sterilized to some degree by variations in the volume of domestic credit creation while large reserve inflows produced by balance of payments surpluses were not sterilized to any significant extent. This asymmetry is understandable once some of the specific features of the Yugoslav monetary system are brought into the picture. Most important in this regard was the National Bank's continued role in the selective allocation of credit among competing users during the period under consideration. Because of barriers to regional capital mobility, the absence of a well-developed market for financial securities, and the persistence of below-equilibrium interest rates, the National Bank played a major role in the selective allocation of credit through most of the 1970-76 period. To make matters worse, the Bank established both the quantity of central bank credits and the purposes for which they would be allocated at the beginning of each year. In addition, the Bank remained the major source of credit to the federation, to several quasi-independent federal funds and to other government bodies throughout Yugoslavia. Prior credit commitments for selective purposes and for government bodies severely restricted the National Bank's ability to adjust domestic

credit creation in response to unanticipated foreign exchange inflows. Unable to adjust domestic credit, the Bank was forced to rely on increases in reserve requirements to try to sterilize these inflows (Goljanin, 1974). The evidence indicates that this policy response was not sufficiently strong to accomplish this objective. In years of rapid reserve flow, such as 1972, 1973, and 1976, the money supply growth rate always exceeded its target level.

One final institutional peculiarity complicating the sterilization task in Yugoslavia should be noted. During the 1971-76 period, as previously, the Yugoslav authorities frequently imposed a requirement that enterprises planning to import establish in advance a non-interest-bearing, non-monetary (blocked) dinar account, the amount of which was determined by the dinar amount of the import transaction. Dinars placed in these accounts represented a withdrawal from the domestic money supply. When the balance of trade and/or the current account improved, however, this so-called import deposit requirement was relaxed, and funds moved out of the non-monetary accounts into money deposits. This movement of funds tended to reinforce the expansionary effects of the improving foreign reserve position on the domestic money supply and necessitated an even greater sterilization effort by the National Bank (Dimitrijevic, 1973).

Summarizing the above discussion, it seems reasonable to conclude that the foreign reserve outflows accompanying the international disturbances of 1974-75 were sterilized to a significant degree by adjustments in domestic credit creation. Thus, real balance effects were probably not a major propagation mechanism for these disturbances. The same conclusion does not apply, however, to the years of unanticipated surplus--1972, 1973, and 1976--when large money inflows exerted a significant expansionary effect on the domestic money supply with consequent implications for domestic prices and real

activity levels. Indeed, the large money supply increases in these years require an evaluation of their role in the persistent inflation and balance-of-payments problems which have been modeled so far largely as consequences of international disturbances.

Within a monetarist framework, both of these problems can be explained as the product of excessive money supply creation in a small, open economy. Given a stable demand function for real cash balances and initial equilibrium in the money market, an increase in the money supply caused by domestic credit creation, international reserve inflows or a combination of the two, can be expected to cause an increase in product demand and expenditure, either directly as economic agents dishoard to rid themselves of unwanted cash balances or indirectly as interest rates fall (or credit market conditions become more expansionary) and stimulate interest-sensitive categories of expenditure.[29] Increases in expenditure will, in turn, cause domestic prices and wages to increase with consequent implications for the domestic rate of inflation. The external implications of the monetary disequilibrium depend on additional assumptions about the economy.

Assuming the small country conditions are satisfied--the economy is a price taker on all international markets--and assuming fixed exchange rates, the excess supply of money will spill over into an international payments deficit that, in the absence of offsetting sterilization measures, will automatically restore money and product market equilibrium. If, on the other hand, the monetary authorities attempt to sterilize the outflow, their efforts will simply maintain the existing domestic disequilibrium, inflation will continue, and a balance of payments deficit will persist. Clearly, at some point in the process, the deficit will tend to become insupportable, necessitating either monetary policy adjustments or an exchange rate devaluation to restore monetary

equilibrium.[30]

In either case, monetarist theory predicts that in the long run a small
open economy operating in a world of fixed exchange rates is powerless to con-
trol either its domestic supply or its domestic inflation rate: both are
finally determined by the international situation. In contrast, if the econ-
omy has a flexible exchange rate regime, then the domestic authorities can
control one domestic policy variable--the domestic rate of inflation--by con-
trolling the rate of growth of domestic credit creation. Under this regime,
a domestic monetary disequilibrium caused by excessive monetary growth will
generate domestic inflation and a consequent depreciation of the exchange rate
that will automatically keep the world prices of domestically produced goods
in line with the world prices of the same goods produced elsewhere.

The monetarist models outlined here become considerably more complex once
one allows for flexibility in real domestic supply conditions, the existence
of nontraded goods, imperfect price arbitrage, international capital mobility,
inflationary expectations, and the like. (See, for example, Swoboda, 1977,
and Krugman and Dornbusch, 1977.) Nonetheless, in their simplest form, these
models suggest rough tests about the long-run links between domestic money sup-
ply growth rates, domestic inflation rates, and exchange rate adjustments.
In particular, the models suggest that over long periods of time in an economy
with flexible exchange rates (or with fixed exchange rates and systematic
sterilization of monetary outflows) there should be a rough equality between
the domestic rate of inflation and the rate of growth of the domestic money
supply adjusted for the trend rate of growth of real output. In addition,
the monetarist analysis also suggests that over long periods of time, changes
in the exchange rate (either discontinuous ones in an adjustable peg system or
continuous ones in a regime of full flexibility) should reflect relative

differences in the degree of inflationary pressure between a single country and its major trading partners. These two long-run implications of simple monetarist models can be tested for the Yugoslav case with the data reported in Table 9.

The evidence on the simple monetarist model of long-run inflation is mixed. Over the four-year period 1968 to 1972, the predicted equality between the average annual rate of inflation and the difference between the average annual rate of growth of the domestic money supply and the average annual rate of growth of real output is observed. In contrast, over the 1972-76 period, the average annual domestic inflation rate is only about 20%, nearly 14.0 percentage points below the rate of inflation predicted by the simple monetarist model. Over the entire 1968-76 period, the model does somewhat better--the average annual inflation rate of 15.9% is about 6 percentage points below the predicted inflation rate. Overall, and particularly for the 1972-76 period, the monetarist explanation of inflation is not very convincing.

Although there are probably several reasons for this, the most important appear to be the apparent instability of money demand on Yugoslavia, especially in the enterprise sector, and the continuous, albeit uneven, operation of price controls. As far as money demand is concerned, the imposition of policy measures to quell illiquidity tendencies in 1972 and 1976 markedly increased enterprise demand for money at given levels of transactions. This factor was crucial in 1976, when stringent new accounting requirements encouraged the enterprise sector to increase its holdings of cash by a staggering 110%, thereby counteracting, in large measure, the inflationary potential of the large expansion of the money supply in that year.[31]

The impact of price controls on the inflation rate is more difficult to assess. In general, the empirical evidence suggests that these controls have

Table 9

Monetarist Models of Inflation and Exchange Rate Determination

I. Inflation Models		1968-1972	1972-1976	1968-1976
Average annual rate of growth (%) of				
money supply	(1)	19.5	38.5	28.7
nonagricultural production	(2)	8.5	4.7	6.5
(1) - (2)	(3)	11.0	33.8	22.2
retail prices	(4)	11.8	20.1	15.9

II. Exchange Rate Determination[a]	1968-1972	1972-1976	1968-1976
Correlation coefficient between percentage change in dinar exchange rate and			
(a) relative percentage change in retail (consumer) prices	-.877[c]	-.959[b]	-.916[c]
(b) relative percentage change in money supply	-.259	-.692	-.484

[a] The countries covered in this test are France, the United Kingdom, the United States, Germany, Italy and Austria.

[b] Significant at the 99 percent level.

[c] Significant at the 95 percent level.

Sources: Data for money supply, retail (consumer) prices and exchange rates taken from, IMF, International Financial Statistics, various issues.

distorted the timing of price increases and the pattern of relative prices

and have done little to reduce the aggregate inflation rate. Most observers

agree, however, that in 1976 widespread and enforced controls significantly

curtailed the open inflation rate (Bajt, 1976), and this may partly explain

why the actual inflation rate over the 1972-76 and 1968-76 periods was below

the one predicted by the monetarist model.

Simple monetarist or purchasing-power theories of exchange rate determi-

nation in the long run fare somewhat better than the monetarist model of

domestic inflation. These simple theories are tested by calculating correla-

tion coefficients between the simple percentage change in the value of the

dinar vis a vis the currencies of Yugoslavia's six major trading partners and

(a) the difference between the rate of inflation in Yugoslavia and in these

six countries; and (b) the difference between the rate of growth of the money

supply in Yugoslavia and in these six countries. If it is true that exchange

rate movements reflect relative inflationary pressures and relative rates of

money growth among countries, then the exchange rate changes should be nega-

tively correlated with both (a) and (b). The results reported in Table 9

indicate that for the time periods considered--1968-72, 1972-76, and 1968-76--

there exists a statistically significant negative correlation between relative

inflation rates and dinar exchange rates.[32] These findings lend support to

the monetarist hypothesis that movements in exchange rates, particularly in the

long run, are determined by relative inflationary pressures. Because the cor-

relation coefficients between relative rates of money expansion and dinar

exchange rates, although of correct sign, are insignificant at acceptable

levels of significance, however, it is impossible to draw the further conclusion

that relative inflationary pressure, and hence exchange rates, are determined in

the long run by relative rates of growth of the money supply. Apparently, the

links between monetary expansion and inflation in Yugoslavia and in its trad-
ing partners are too weak, at least during the time periods examined here, to
support this general conclusion.

Finally, it should be noted that the observed negative correlation be-
tween relative rates of inflation and exchange rate changes says nothing about
the direction of causality underlying the relationship. As noted earlier,
exchange rate changes can be thought of as largely price-determining in the
short run, and in such a time perspective changes in exchange rates may cause
changes in relative inflation rates. In the long run, however, the prevalent
view is that exchange rates are adjusted to maintain a rough purchasing power
parity among countries with differing domestic rates of inflation.

V. CONTAINMENT MEASURES IN THE YUGOSLAV ECONOMY AND SOME CONCLUSIONS

In the preceding sections of this paper we have examined the initial effects of recent international disturbances on the Yugoslav economy and how these effects were internally propagated by the response of economic decision makers to changing price and quantity signals. We now turn to survey some of the policy measures introduced by the Yugoslav government to minimize or contain the undesired economic consequences produced by these disturbances and domestic reactions.

In 1974, when the force of the international supply shock first hit, containment measures within Yugoslavia were relatively weak, as a result of three elements in the underlying economic strategy pursued by Yugoslav policy makers. First, the Yugoslav authorities remained committed to a general policy of linking domestic prices of traded goods to world prices in order to achieve a rational domestic price structure. Any containment measure aimed at breaking these links, such as the introduction of a variable tax-subsidy scheme, was clearly at odds with this objective. Second, from mid-1973 to mid-1975, expansionary macroeconomic policies were pursued to foster economic growth and employment. Continued commitment to these policies made it impossible to counter the domestic inflationary pressures produced by the world supply shock, and by the consequent propagation of these pressures through domestic price and wage adjustments. Third, because of stagnating real wages in 1972 and 1973, the Yugoslav government was either unable or reluctant to adopt a strict incomes policy to control these pressures at the expense of labor incomes.

Under these circumstances, the Yugoslav response to the supply shock was necessarily an accommodating one. The Yugoslav authorities contained the contractionary effects of the deterioration in the balance of trade and the terms of trade and the contractionary effects of the net foreign reserve outflow,

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while allowing the inflationary consequences of the supply shock to spread

through the domestic economy. The results of this policy mix were predictable.

First, as indicated in Table 10, the primary objective of achieving a rapid

growth rate was realized in 1974 and the first half of 1975. Second, the over-

all inflation rate increased sharply between 1973 and 1974. Third, the combi-

nation of rapid domestic inflation and growth along with stagnating demand in

world export markets caused a dramatic increase in the trade deficit.

By the third quarter of 1974 it was clear to the authorities that the few

containment policies they had introduced, such as reductions in tariffs, and

small reductions in turnover taxes on a few commodities, were too weak and too

isolated to contain the inflationary pressures produced by the international

crisis. Simultaneously, it was gradually becoming clear that they had serious-

ly underestimated the balance of payments consequences of their expansionary

policies and of the deepening stagnation in Western markets.

The first major policy response to the balance of payments problem was

the dinar devaluation in the fourth quarter of 1974. Two related responses

introduced around the same time were the reimposition and broadening of direct

controls on imports and the gradual redirection of exports toward Eastern CMEA

markets. As a consequence of these policy measures, the trade deficit declined

somewhat between the second half of 1974 and the first half of 1975, but its

absolute magnitude remained unsustainable. Reserve losses continued, and Yugo-

slavia's net long-term indebtedness to the rest of the world climbed sharply.

By mid-1975, Yugoslavia, like other countries (e.g., the United Kingdom

and Italy) which at first attempted to contain the contractionary effects of

the world supply shock, discovered that the cost of continued accommodation was

too high. The government was forced to adopt contractionary macroeconomic poli-

cies and to enforce and broaden the scope of price controls. As the data in

Table 10

Indicators of Macroeconomic Performance, 1971-1976

	1971	1972	197?	1974	1975	1976
Annual rates of growth (percent)						
Real social product	8.1	4.3	4.9	8.5	7.7	4.1
Nonagricultural production	8.2	6.2	7.9	10.0	6.2	7.0
Industrial production	10.7	8.1	5.8	10.9	5.4	7.1
Industrial producer prices	14.8	9.7	13.2	29.9	22.0	6.3
Raw materials	18.4	10.3	12.5	38.9	27.0	n.a.
Investment goods	13.2	5.2	9.9	12.4	22.0	n.a.
Consumption goods	12.7	12.5	13.9	22.0	21.0	n.a.
Industrial retail prices	14.7	17.9	16.7	29.9	26.0	7.6
Agricultural retail prices	17.7	16.4	21.1	16.3	27.0	17.5
Retail prices of services	14.3	10.9	16.9	20.5	26.0	17.6
Cost of living index	15.7	16.9	20.7	20.5	24.0	11.1
Nominal wages	27.4	17.2	14.7	28.2	24.0	15.5
Real wages	6.5	1.0	-5.1	6.4	-1.0	n.a.

Sources: 1971-1975 growth rates calculated from data in Table 106-9 and
Tables 122-2 through 122-6, Statistički Godišnjak, 1976. 1976 growth rates
calculated from data in Statistical Appendix of National Bank of Yugoslavia,
Quarterly Bulletin, October, 1977.

Tables 1 and 10 indicate, this policy reversal successfully reduced both the trade deficit and the rate of inflation. Indeed, in 1976, inflation fell to its lowest level in the 1970's, and as a consequence of the reduced trade deficit, and the partial revitalization of earnings from remittances and tourism, the current account moved from a deficit of nearly one billion dollars to a small surplus.

These economic successes were not without cost, however. In 1976, the rate of growth of real industrial output fell to its lowest level in the 1970's, and the number of registered, unemployed workers reached a record 637,000. Ultimately, then, the international supply shock of 1973-74, aggravated by consequent stagnation throughout Western Europe, compelled the Yugoslavs to sacrifice their domestic output and employment goals, at least temporarily.

The Yugoslav experience during the 1973-76 period clearly illustrates the tradeoffs between price stability, domestic employment and output targets, and external balance, that exist in a market economy with wage and price rigidities.[33] In such an economy, the employment and output costs of controlling the inflationary pressures generated by an international supply shock are substantial. Since wage and price rigidities lie at the root of these tradeoffs, an incomes policy suggests itself as a useful addition to government containment policies. Certainly, an effective incomes policy in 1974 and 1975 would have reduced the inflationary impact of international disturbances at given levels of output and employment. This is not to say, however, that such a policy could have completely eliminated this impact. Given the magnitude of the world price increases in 1974, and the primary nature of the particular commodities involved, there was no way for the Yugoslavs to offset completely the externally generated inflation. The use of either an incomes policy or a contractionary fiscal and monetary policy sufficient to accomplish this task would have required a politically unacceptable contraction in employment, output, and real incomes.

<u>Notes</u>

1. Of course, if Yugoslav workers do not expect further appreciation, then a once-for-all appreciation of the DM relative to the dinar will either increase the remittance flow or leave it unchanged. As Živanovic (1976) argues, however, the concern of Yugoslav policy-makers has been that an appreciation of the DM-dinar rate tends to produce expectations of further appreciation.

2. An example best illustrates how the administrative link between domestic and world market prices operates. In a 1973 social agreement on prices of nonferrous metals and products, domestic prices were set to equal average world futures' prices quoted during the past six months, evaluated at the official exchange rate and increased 3% for tariff protection (Karli 1974).

3. The only exceptions to the general rule forbidding such participation are certain authorized banks that have permission to carry out arbitrage transactions on foreign exchange markets, and Yugoslav citizens who remit foreign exchange from abroad and are allowed to use it in Yugoslavia or abroad on their own behalf.

4. On the other hand, the external disturbances transmitted through the trade and other current account channels which caused a serious deterioration in the Yugoslav balance of payments in 1974 and early 1975 brought on a virtual drying up of the Euromarket for Yugoslav borrowers in the first half of 1975 (Brainard and Brookhouse 1977).

5. The evidence reported here is based on the current doctoral dissertation research of Mr. Peter Cory, a graduate student in the Berkeley economics department.

6. Some of these factors include the frequent changes in and uncertainty surrounding enterprise organization and company law following the 1974 Constitution and the new Law on Associated Labor, and some new regulations that have made the conditions for official approval of joint venture and other cooperation agreements more stringent.

7. There are two reasons for specifying the equation in logarithms: (1) it allows imports to react in proportion to a rise and a fall in the explanatory variables; and (2) on the assumption of constant elasticities, it avoids the problem of drastic declines in the elasticity as imports rise. The log-linear specification of import demand is quite commonplace in existing empirical literature. (Leamer and Stern, 1970)

8. The rationale for the partial adjustment formulation is that there are costs involved in the adjustment of imports to a desired flow and that only part of the adjustment is realized within a given period. A further rationale is that many imports are linked to contracts extending over a period of time and thus cannot respond promptly to changes in demand. (Khan, 1974)

9. In a more recent study of Yugoslav imports, Bajt (1978) uses the simple balance of trade deficit with a two period lag to reflect the effects of these quantitative restrictions.

10. Ordinary least squares estimation does not produce consistent estimates when a lagged dependent variable is included among the explanatory variables and when the error term is serially correlated. Furthermore, in the presence of a lagged dependent variable among the regressions, the Durbin-Watson statistic to test for serial correlation is biased upward.

11. This adjustment to long-run values takes approximately 1.8 quarters.

12. For more on the details of this policy stance, see Section IV.2 of this paper.

13. Indeed, the erratic nature of domestic export policy and of its influence on export performance has led Mencinger(1975) to argue that Yugoslav exports might be best treated as exogenously determined in the short run.

14. For example, the imposition of a ban by the EEC on beef imports from Yugoslavia in 1974 resulted in a 38% decline in the total quantity of meat exports and cost the Yugoslavs about $96 million in export earnings. (Tyson 1976)

15. Because a unit value index for manufactured goods was not available for Austria, PW was calculated using data for the United Kingdom, the United States, Germany, Italy and France only. Also, a general world commodity price index published by The Economist was experimented with as an alternative measure of PW, but the overall performance of the estimated equations was poorer when this price measure was used.

16. The sample period was adopted to be consistent with the best sample period for imports. Longer sample periods running from 1962 I through 1976 II were also tried, but the estimated results did not support the simple specification. Once again, this finding is not surprising, since as Bajt (1978) has pointed out, the evidence suggests a structural change in Yugoslavia's export performance shortly after the 1965 economic reform.

17. See Section IV.4 of this paper for some evidence on the monetarist view that the predominant factor determining dinar exchange rate changes in the long run is the inflation rate in Yugoslavia relative to inflation rates in its trading partners.

18. The lag structures used in the price and wage equations were chosen after experimentation with various simple and polynomial distributed lags on the explanatory variables. The text reports results for the lag structures that yielded the best overall statistical performance.

19. Although a cost-markup rationale usually lies behind the inclusion of an import price variable in an aggregate price equation, another explanation for such a specification focuses on a possible imitation effect in the international transmission of inflation. On this view, domestic prices are formed either according to the evolution of internal costs or according to the external price level reflected in import prices. (See Dramais 1977) According to this theory, prices in fairly oligopolistic markets, are formed dichotomously as

$$gWP_t = \max \{ \ a_0 + a_1 gW_t + a_2 gPM_t + a_3 ED_t; \ gPM_t \ \}$$

This theory may have some applicability in Yugoslavia where price controls administratively link the domestic prices of several traded goods with their world prices.

20. See the section on real-balance effects for some evidence on the role of differential inflation rates in the determination of the Yugoslav exchange rate in the long run. For a further discussion of the distinction between the price-determining nature of the exchange rate in the short run and its price (inflation) determined nature in the long run, see Dornbusch and Krugman (1976).

21. A polynomial distributed lag of actual prices during the preceding three quarters was also experimented with as a measure of the expected rate of inflation. However, the results were nearly identical with those obtained using the simple lagged rate of inflation, and only the latter results are reported in the text.

22. In more complete macroeconometric models of the Yugoslav economy, such as those formulated by Bajt (1977) and Mencinger (1975) both RPS and RPA are endogenous variables. In our simple, reduced form model, they are treated as predetermined variables.

23. In the absence of a full scale econometric model, an instrumental variables procedure was employed to adjust for possible simultaneous-equation bias.

24. The lower estimate is calculated using the price equations in rows 5 and 6 of Table 6 and the wage equation in row 4 of Table 7. The higher estimate is calculated using the price equations in rows 4 and 6 of Table 6 and the wage equation in row 3 of Table 7.

25. In a simultaneous wage-price model like the one estimated here, α will equal one only when the following strict conditions are satisfied: (1) $c_3 = 1$ or an increase in producer prices gives rise to the same percentage increase in retail (consumer) prices; (2) $b_2 = 1$ or nominal wages adjust fully to changes in the expected rate of inflation; (3) $a_2 = (1-a_1)$ or the coefficients of the wage and import variables in the price equation sum to one, indicating that producer prices are a weighted average of labor costs and import prices; and (4) in the long run $a_4 = b_3 = 0$ or there is no independent pressure of demand conditions in the product and labor markets. See Ball, Burns and Lawry 1977.

26. In a more detailed specification, in which the retail prices of services and agricultural commodities were treated as endogenous variables, partly determined by exogenous changes in import prices, the indirect effects of such changes would probably be larger.

27. The bulk of Yugoslavia's foreign exchange reserves are held by the National Bank, so variations in international reserves show up mainly in the National Bank's balance position.

28. The National Bank's money and credit plan for 1976 was based on a projected net outflow of 4 billion dinars due to an expected current account deficit. Instead, a current account surplus produced a base money increase of 15 billion dinars. (OECD 1977)

29. In Yugoslavia, where interest rates are relatively constant, and credit is largely rationed according to non-price criteria, excessive money creation would tend to stimulate expenditure indirectly by increasing credit availability rather than by reducing the cost of borrowing.

30. It should be noted, however, that the exchange rate devaluation will be effective only if the domestic nominal money supply does not adjust upward in response to the devaluation-induced domestic price increase.

31. For some empirical evidence on how illiquidity measures affected enterprise demand for money, see Tyson (forthcoming).

32. The correlation results reported here are similar to those reported by Kemp (1976) in his study of the relationship between relative inflation rates in the U.S. and Europe and dollar exchange rates.

33. These tradeoffs exist whether a fixed or flexible exchange rate system is adopted; this conclusion is discussed in Neuberger and Tyson (1977a, p. 15).

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