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WEALTH EFFECTS OF INFLATION AND DEVALUATIONS IN YUGOSLAVIA: WHO GAINS AND WHO LOSES?*

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1. INTRODUCTION

In this paper we estimate the wealth effects of inflation and currency depreciation in Yugoslavia in the period 1963—1986. The motivation for this study comes from the 1986/1987 *OECD Economic Survey of Yugoslavia,* where, among other results, a proposition is advanced that a 10 percent depreciation of the Dinar raises the value of households' wealth by around 2 percent of gross social product (p. 37). In the light of earlier works in this area (Mates, 1984; Mihaljek, 1987a), that generally established a *negative* impact on households' financial assets of devaluations coupled with high domestic inflation, the sign and the magnitude of this OECD estimate are quite surprising, and they deserve a serious reexamination. This is also true because of important policy implications that this kind of result by a leading institution might have in Yugoslavia. Residents in the less developed republics and autonomous provinces also hold less foreign exchange per capita. If devaluations represent a transfer of wealth to holders of foreign exchange, then the exchange rate policy might contribute to the widening of the gap between the developed and the underdeveloped republics and autonomous provinces. At the same time, devaluations are necessary in order to stimulate export industries, and thereby economic growth and the repayment of the foreign debt. Consequently, if the results of the OECD study are correct, policy makers might be caught in a serious dilemma, having to trade off growth and efficiency against the status quo in regional distribution of wealth.

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In this paper we show that the OECD uses a methodology which leads to substantial overestimates of wealth effects of devaluations, and no less important underestimates of wealth effects of inflation. In place of the *accounting* approach to wealth effects, we propose a study of the households' saving behavior in an *optimizing* framework, arguing that foreign exchange accounts play the role of financial assets, while the Dinar accounts serve mainly for transactions purposes. We then estimate various saving elasticities for the period 1963—1986, and we use these elasticities in calculating the wealth effects of inflation, devaluations, and other factors that affect the real household wealth. We find that over the period 1963—1986, the wealth effects of devaluations represent, on average, 0.014 percent of real gross social product, while in the 1980s, when they were most pronounced, the wealth effects of devaluations amounted to less than 0.2 percent of gross social product, which is ten times less than the estimate put forward by the OECD. Since the key to empirical results lies in the methodology and the data used, we must first cast a critical look at the background of the OECD estimates. This is done in Section 2, where we also survey the results of two other studies in this area. In Section 3 we describe the model and the estimation techniques used in this paper, while in Section 4 we present the main results of our analysis. We conclude with some thoughts on the policy implications of our results.

2. THREE APPROACHES TO WEALTH EFFECTS OF INFLATION AND DEVALUATIONS IN YUGOSLAVIA

Until recently the phenomenon of foreign exchange accounts has received very little attention by economists and policy makers in Yugoslavia. So far two different opinions about the foreign exchange accounts have crystallized. One group of economists considers them to be pure transactions accounts, used almost exclusively for consumption expenditures like foreign travel and occasional purchases of imported goods at a special foreign exchange discount. Another group of economists sees in foreign exchange accounts a special form of financial assets, a Yugoslav equivalent of otherwise nonexistent stocks and bonds (Mihaljek, 1987b).

Both approaches seem to bear some empirical relevance. On the transactions side, foreign exchange is often used for private domestic payments, especially for real estate transactions, various productive services, and for the accommodation of foreign tourists, in spite of the fact that the 1977 Law on Foreign Trade and International Payments explicitly forbade private payments in foreign currency. Also, the average size of foreign exchange deposits is likely to be relatively small, since the large-size deposits are often placed in foreign banks, or are kept "under the mattress", for fear they might be converted to Dinar accounts if the balance-of-payments crisis becomes more acute.

A careful observer of the Yugoslav economy cannot deny, however, that many agents regard their foreign exchange holdings as a specific kind of financial asset. Financial markets in Yugoslavia are at a very

primitive stage of development, the only financial assets for the households being the savings accounts in domestic and foreign currencies. Also, interest rate competition among the commercial banks for all practical purposes is nonexistent — a fact that was repeatedly emphasized in the OECD study as well. Occasionally, bonds are issued to finance major infrastructure projects, but there are no secondary markets where they could be traded prior to maturity. Labor-managed firms, which constitute the bulk of the economy and are socially owned, are not yet issuing bonds or stocks of equity capital. Privately-owned firms tend to be small, family undertakings, which raise capital through an informal network of relationships and acquaintances, since banking venture capital simply does not exist.

In such circumstances private agents see their savings accounts as their only available financial assets, and they are willing to invest in them as long as they are likely to yield a rate of return which, on the average, will enable them to maintain or possibly increase their purchasing power. Thus, although the amounts kept in foreign exchange accounts are in all likelihood small, it seems reasonable to regard them as a mechanism for the maintenance of purchasing power, i. e., as a specific form of financial asset, the demand for which depends, among other factors, on the rate of return they yield.

The OECD study reaches similar conclusions in a somewhat different framework of analysis, and it repeatedly underlines the importance of the households' foreign exchange holdings for the domestic economic policy. But, as we shall see below, the OECD study looks at the foreign exchange holdings in Yugoslavia exclusively from the perspective of central bankers, and sees in them nothing more than a source of sizeable central bank losses and purchasing power transfers, which are undermining the effectiveness of exchange rate policy. This narrowing of the issue also has some consequences for the empirical estimates of wealth effects that are, in our opinion, quite misleading as guidelines for economic policy.

2.1. CENTRAL BANK LOSSES AND PURCHASING POWER TRANSFERS

The OECD estimates of central bank losses and purchasing power transfers are obtained in a simple accounting framework. The net worth of the central bank (W) is by definition equal to the sum of the net foreign position (E · F) and the net position vis-à-vis the residents, both in foreign exchange (E · R) and dinars (D), all these items being expressed in domestic currency, i.e. multiplied by the exchange rate (E);

$$W = D + E \cdot R + E \cdot F \tag{1}$$

Abstracting from interest income, differentiating totally, and letting the "hats" denote the percentage rates of change, the rate of change of net worth ($\dot{W}$) is then written as:

$$\dot{W} = \hat{E} \cdot E \cdot R + \hat{E} \cdot E \cdot F \tag{2}$$

where we used the fact that $E \cdot \dot{R} + E \cdot \dot{F} + \dot{D} = 0$, i.e. that at any given point in time, financial transaction must balance (identically). The OECD analysis proceeds by claiming that "any central bank losses as determined by (2) are necessarily reflected in gains for the other sectors when measured in the same unit of account", and that "for this reason expression (2) could be considered equivalent to a public sector deficit arising from transfer payments, proportional to the percentage rate of depreciation of the domestic currency, $\hat{E}$" (p. 77). It is unclear what is meant by "gains for the other sectors when measured in the same unit of account". These "other sectors" are not necessarily domestic agents, especially if the unit of account is foreign exchange. Furthermore, there is no way of differentiating (at this level of aggregation) between the alleged transfers to the household, firm, banking and public sectors, all of whom are the holders of foreign exchange and central bank assets, primarily loans, and all of whom are domestic residents, hence the receivers of these "direct transfers".

It is argued further that even the part of losses vis-à-vis the *non-residents* represents an (indirect) transfer to residents, since the central bank absorbs the burden that would otherwise have fallen on that sector (p. 77). If one really wanted to push this view to the extreme, then all central bank losses should be counted as transfers to domestic residents, including those arising from external shocks like oil-price increases of the 1970s, or the volatility of exchange rates between the currencies of major industrial countries during the 1980s. Even more importantly, if we adopt this view then the central bank losses resulting from inconsistent policies — e.g., partial opening of the capital account in the 1970s, when the Dinar was chronically overvalued, or the policy of negative real interest rates — could in principle be justified on welfare grounds, since they induced a huge transfer of purchasing power to domestic residents.

The OECD study recognizes that the identity (2) denotes *nominal* losses, and that a measure of *real* losses is obtained upon deflating (2) by an appropriate price index (e.g. the GSP deflator). The inflation-adjusted measure of transfers thus also includes the erosion of the value of the outstanding central bank liabilities resulting from inflation. Using the small letters to denote nominal variables deflated by a price index (P), the inflation-adjusted rate of change of net worth ($\dot{W}_A$) is then given by:

$$\dot{W}_A = -\hat{P} \cdot d + [\hat{E} - \hat{P}]\, r \cdot E + [\hat{E} - \hat{P}]\, f \cdot E \qquad (3)$$

It can easily be seen from this expression that when the central bank's net Dinar position vis-à-vis the residents is positive ($d > 0$), the inflation-adjusted losses are an increasing function of the inflation rate. Note, however, that the central bank's failure to adjust the rate of depreciation to the rate of inflation (i.e., the failure to set $\hat{E} > \hat{P}$), also decreases the central bank's net worth, and hence increases its losses, a fact that is overlooked in the OECD study.

Without further elaborating on the OECD methodology, let us single out two basic objections to this kind of analysis. First, it relies on accounting identities rather than behavioral relations, and as every economist knows, identities are useless for economic analysis unless we make some assumptions about the behavior of variables that they relate.[1] Thus, no theory or policy recommendation can be based on identity (1) unless we advance some refutable hypotheses about the behavior of its constituent parts. Second, the empirical work based on identities of a high level of aggregation such as (1) is bound to run into serious data problems, not only because these identities include all kinds of error and omission items,[2] but also because by focusing on the bookkeeping aspects of the problem, we are sweeping under the rug many activities that do not appear in the books. Two examples in the present context are: (i) forced sales of the government debt to the banking sector, accomplished by imposing an elaborate system of reserve requirements, or comprehensive restrictions on the deposit and lending rates of interest, that allow the central bank to give credit subsidies to the preferred claimants without having such subsidies appear in the official accounts; and (ii) the inflation tax.[3] Our feeling is that the inclusion of these revenue items would give a different picture of central bank transfers of purchasing power, which only underscores the highly questionable nature of policy implication based on the accounting approach to wealth effects.[4]

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[1] The best historical example of this fact is the famous quantity equation, $MV = PQ$. Until Fisher, in his pathbreaking study *The Purchasing Power of Money* (1913), made the explicit assumptions about the interrelations between the price level P, the transactions velocity V, the quantity of money M, and the economy's output Q, and singled out P as the dependent variable, the quantity equation was a vacuous statement of a relation that was true by definition, namely, of the equality between money expenditures (MV) and the volume of transactions (PQ).

[2] Most prominent in this context in Yugoslavia are the so-called *positive and negative exchange rate differences*. At the beginning of each year the Federal Executive Council used to announce the "official" exchange rate, at which all foreign exchange transactions had to be recorded. Banks and business firms kept a parallel account, too, where these transactions were recorded at the market rate. At the end of a business year the two accounts were compared, and they almost invariably showed losses. As pointed out by Čičin-Šain (1987), negative exchange rate differences became one of the main sources of losses in the banking sector, amounting to 6,000 billion Dinars (13.22 billion Dollars) in 1986 (*ibid*, Table 2, p. 18a).

[3] One source of inflation tax in Yugoslavia was the institution of the obligatory surrender of foreign exchange earnings on the part of exporters (see Mihaljek, 1985). In order to purchase the foreign exchange retained from exporters, the central bank often had to create fictional purchasing power, over and above the regular budgetary receipts earmarked for intervention in the economy. This injection of extra purchasing power clearly represented an inflation tax.

[4] Looking at the Data in the *OECD Survey*, we see, for example, that in 1985 total debt servicing amounted to $5.5 billion (Table 6, p. 16), or Din 2306 billion at the end-of-period exchange rate. In consolidated public sector accounts (Table 8, p. 18), we can find that Din 385.4 billion of regular budgetary receipts were used for intervention in the economy in 1985. Under the assumption that this entire amount went for purchases of foreign exchange from exporters, we still cannot account for Din 1920.42 billion, or 83 percent of resources for this purpose.

Our analysis overcomes both these effects, because we study the relations derived from a model of rational, optimizing saving behavior, and because we make explicit the data we use.

2.2. GAINS AND LOSSES FROM INFLATION AND DEPRECIATION

Mates (1984) derived the wealth effects of inflation and devaluations from the national income accounts, adjusting the alternative specifications of financial assets and liabilities of population for the rates of inflation and Dinar depreciation in a given year. On the side of financial assets he worked both with data on money holdings and with income and savings data, while the main liabilities he considered were repayments of consumer and housing loans. Once all the data on financial receipts and outlays were appropriately deflated, changes in real wealth of population in a given year were obtained as a sum of positive and/or negative changes in the real value of financial assets and liabilities. Two main results obtained by Mates in this context are as follows:

1. Foreign exchange savings (approximated by holdings of German Marks, which represent almost 70 percent of the foreign exchange portfolio of population) yielded an average real return of 4.5 percent in the period 1974—1981, while Dinar denominated savings received a *negative* real return of 24 percent in the period 1977—1983. Given the relative shares of domestic and foreign exchange savings, the overall impact of inflation and depreciation on financial savings in the overlapping period was negative.

2. At the same time, inflation was decreasing the real value of financial *liabilities* of population, on average by 31 percent per year in the 1977—1983 period. However, this could not compensate for the losses stemming from the negative real return on cash holdings and savings deposits, so the overall impact of inflation and depreciation on household financial wealth was *negative* in each year in this period.

This approach to wealth effects of inflation and depreciation is correct from the accounting point of view, and it will be used in parts of our study as well. However, since all calculations are done ex post, they are limited to analysis of past gains or losses from inflation and devaluations, without being able to address the really interesting policy questions. Also, Mates did not derive an entirely correct measure of real returns on foreign exchange accounts. Namely, in calculating the real rate of return on foreign exchange accounts, Mates implicitly used Fisher's formula for the real interest rate:

$$i^* = (i - \dot{P})/(1 + \dot{P}) \tag{4}$$

where i^* is the real interest rate, i is the nominal interest rate, and $\dot{P}$ is the expected rate of inflation. Mates used the Dinar rate of depreciation (the percentage change of the Din/DM exchange rate) in place of i, and called i^* "the real return factor from the DM exchange rate". The real rate of return on foreign exchange savings was then obtained by multiplying i^* with the nominal interest rate on short-term foreign exchange deposits, which was 7.5 percent throughout the period considered. As it will be shown below, this procedure yields an *incorrect* measure of the real rate of return on foreign exchange accounts, and given the size of this error, some of the results obtained by Mates might be put in jeopardy.

2.3. CURRENCY SUBSTITUTION IN YUGOSLAVIA

A third study in this field (Mihaljek, 1987a) set out to examine the extent of the currency substitution phenomenon in Yugoslavia, therein referred to as the "Inverse Gresham's Law". In that work the dynamics of Dinar and foreign exchange savings in Yugoslavia in the period 1964—1986 was examined in an explicit optimizing framework. A simple overlapping generations model of two-period lived consumers was built, and on the basis of equilibrium demands for domestic and foreign currency savings, a number of reduced-form equations was derived, relating the rate of growth on savings accounts to real rates of return, rates of growth of real income and remittances, and the rates of inflation, depreciation, and real interest rates on savings accounts. These reduced-form equations were then estimated on the 1964—1986 time-series data. The results of regression analysis generally confirmed the main hypothesis that higher-yielding foreign currencies suppress the lower-yielding Dinar from domestic savings portfolios. A by-product of this study were Tables I and II, which summarize a large part of the information also used in the present paper.

Data in Table I illustrate the macroeconomic importance of private holdings of foreign currencies in Yugoslavia. Foreign exchange deposits represented on average 0.8 percent of GNP prior to 1971, between 5 and 10 percent in the period 1971—1976, and up to 23 percent in the 1980s. As a percentage of total domestic savings, the share of foreign exchange deposits averaged up to 7.5 percent in the 1960s, 38 percent in the 1970s, and an astonishing 67 percent in the 1980s. As the data in Table II reveal, foreign exchange savings were not only a better store of purchasing power than the Dinar savings accounts, but were also a significant source of real income for the households in several recent years. In columns 5 and 6 of this table we calculated the real (ex-post) rates of return on domestic and foreign exchange savings. These ex-post rates of return were calculated according to the following formulas:

Table I

Domestic and foreign currency savings in Yugoslavia

Year	1	2	3	4	5*	6*	7	8
1963	2105	1902	90	139	—	—	6.2	0.3
1964	2967	2564	86	114	—	—	3.7	0.2
1965	3523	2962	84	253	—	—	6.7	0.3
1966	5863	4859	83	447	—	—	7.1	0.5
1967	7549	5920	78	686	—	—	8.3	0.7
1968	9697	7282	75	971	—	—	9.1	0.9
1969	12927	9579	74	1673	—	—	11.5	1.3
1970	16819	12180	72	3356	—	—	16.6	2.1
1971	21150	14997	70	8967	5200	58	29.8	4.4
1972	24971	17300	69	12680	6600	52	33.7	5.2
1973	31294	21318	68	17619	9000	51	36.0	5.8
1974	40277	27446	68	25846	13200	51	39.1	6.3
1975	52539	36967	70	37134	18800	51	41.7	7.4
1976	70603	51667	73	51900	25800	50	42.4	8.8
1977	90020	68757	76	73064	35300	48	44.8	9.6
1978	125260	97088	78	106703	50800	48	46.0	11.8
1979	152310	118318	78	147582	68400	46	49.2	12.7
1980	162800	128000	79	230100	110600	48	58.6	14.8
1981	194300	155800	80	319700	164000	51	62.2	14.5
1982	245800	197800	80	484300	247000	51	66.3	16.6
1983	306400	218100	71	912700	429100	47	74.9	22.5
1984	553700	366500	66	1342000	529700	39	70.8	21.2
1985	1067100	871100	82	2494300	1007700	40	70.0	22.1
1986	2069200	1217500	59	4655400	2239000	48	69.2	—
μ (%)			75.4			48.7	37.7	8.3
σ			7.0			4.4	23.8	7.3

Legend:

1 = Total deposits (short-term and long-term) in Dinar savings accounts
2 = Short-term (a vista) deposits in Dinar savings accounts
3 = Share of short-term Dinar deposits in total deposits in Dinar savings accounts
4 = Total deposits (short-term and long-term) in foreign exchange accounts
5 = Short-term (a vista) deposits in foreign exchange accounts
6 = Share of short-term foreign exchange deposits in total deposits in foreign exchange accounts
7 = Share of foreign exchange saving in total savings
8 = Share of foreign exchange savings in gross social product

All data are expressed in millions of Dinars, in current prices at the end of the year.

Source:

Federal Statistical Bureau of Yugoslavia: *Statistical Yearbook of Yugoslavia,* various editions.

* Data not available before 1971. In later calculations we approximated the share of short-term foreign exchange deposits by its average for the 1971—1986 period, which was rounded to 49 percent.

$$R^f(t) = \frac{[1 + r^f(t-1)]\,E(t)/P(t) - E(t-1)/P(t-1)}{E(t-1)/P(t-1)} \quad (5)$$

$$R^d(t) = \frac{[1 + r^d(t-1)]/P(t) - 1/P(t-1)}{1/P(t-1)} \quad (6)$$

where: $R^f(t)$ = real rate of return on foreign exchange accounts
$R^d(t)$ = real rate of return on Dinar-denominated accounts
$r^f(t)$ = nominal rate of interest on foreign exchange accounts
$r^d(t)$ = nominal rate of interest on Dinar-denominated accounts
$E(t)$ = official exchange rate at the end of period t (Dinars/U.S. $)
$P(t)$ = consumer price index at the end of period t

$r^f(t)$ and $r^d(t)$ are calculated as a weighted average of nominal interest rates on short-term and long-term saving deposits, the weights being the shares of short-term and long-term deposits in total savings. Thus:

$$r^f(t) = r_s^f(t)\,s_s^f(t) + r_l^f(t)\,s_l^f(t) \quad (7)$$
$$r^d(t) = r_s^d(t)\,s_s^d(t) + r_l^d(t)\,s_l^d(t) \quad (8)$$

where: $r_j^k(t)$ = nominal interest rate on j-term deposits in k-currency saving accounts;
j = s (short-term) or l (long-term); k = d (domestic) or f (foreign) currency

$s_j^k(t)$ = share of j-term deposits in currency k in total deposits in currency k

Similarly, the real rate of *interest* on foreign exchange accounts (unadjusted for currency depreciation) can be expressed by substituting $r^f(t)$ for $r^d(t)$ in equation (6):

$$R_l^f(t) = \frac{[1 + r^f(t-1)] - 1/P(t-1)}{1/P(t-1)} \quad (9)$$

Note the difference between the real rate of *return* on foreign exchange accounts, given by formula (5), and the real rate of *interest* on foreign exchange accounts, given by formula (9). The former expression incorporates the exchange rate changes, and hence it can be directly applied to units of foreign currency, while the latter expression tells us what is the real yield on foreign exchange accounts when the exchange rate is fixed, i.e. when the rate of depreciation is zero. For empirical purposes it is more customary to separate the exchange rate changes from real interest changes, since this enables us to measure the households' sensitivity to two different price signals.[5]

[5] One might wonder why we include both the exchange rate and the inflation rate in our formula for the real rate of return on foreign exchange accounts. Doesn't the exchange rate fluctuation already capture the effects of inflation? The answer is no, and the following example shows why. Let

From Table II, column 6, we see that Dinar saving accounts were consistently earning a negative real rate of return, with the exception of the period 1967—1969. As the inflation rate accelerated after 1979 the real rate of return became more and more negative. Foreign exchange savings (column 5 of the same table) yielded a positive real rate of return in 11 years in this period, with a peak of 57 percent in 1983. The main hypothesis based on these data is easily derived. Faced with a rapid erosion of the purchasing power of the Dinar-denominated funds, rational economic agents should have turned to foreign exchange savings accounts. However, from the data on growth rates of domestic and foreign exchange savings (columns 7 and 8, Table II) this currency substitution effect is not so obvious. For example, in years such as 1981 and 1984, foreign exchange savings decreased even though the real rates of return were quite attractive, whereas the 1970s, when the real rates of return were highly negative, saw a steady growth of foreign exchange savings. A more thorough analysis of this issue is left for Section 4, but it might be useful to indicate that the data in Table II refer only to savings in foreign exchange that were actually deposited in domestic banks and their foreign branches, and that there are strong reasons to believe that these funds constitute only a part of the total foreign exchange holdings by the Yugoslav citizens. Circumstantial evidence shows that many of Yugoslavs prefer to entrust their more substantial foreign exchange savings to foreign banks, and that because of low credibility even the announcements of government efforts to *attract* large depositors provoke suspicion and temporary bank runs.

In summary, all three studies reviewed suggest that the wealth effects of inflation and devaluations potentially are very important in Yugoslavia. This implies the need for a more policy-oriented look at the issue, which, in turn, requires the adoption of an explicit optimizing framework, on the basis of which some useful policy predictions could be made.

$E(t-1) = 400$, $E(t) = 500$, $P(t-1) = 100$, $P(t) = 200$, and $r_s^f(t-1) = 7{,}5\%$ (we neglect the long-term savings). Suppose that the only good in the economy besides the two currencies are apples, and let their price be 50 Dinars a piece. Then one Dollar buys 8 apples in period $t-1$. In period t, one Dollar deposited in a foreign exchange account is worth $500 \cdot 1.075 = 537.5$ Dinars, and the price of apples is 100 Dinars a piece, so \$ 1 buys 5.375 apples only. Thus, the real rate of return on one Dollar deposited in a foreign exchange account is $(5.375 - 8)/8 = -0.328125$, or -32.8125%. The same result is obtained by substituting the appropriate numbers in equation (5). Had we disregarded the effect of inflation, we would have calculated the real rate of return on \$ 1 in a foreign exchange account of $(500 \cdot 1.075 - 400)/400 = 0.34375$, or $+34.375$ percent. This is an underestimate of the correct measure by 67.1875 percentage points! Similarly, according to Mates' technique described by equation (4), we would have obtained $i = 0.25$, $\dot{P} = 1$, $i^* = -0.375$, and finally, the real rate of return on foreign exchange savings of $i^* \cdot 1.075 = -40.3125$ percent, which is an overestimate of the correct measure by 7.5 percentage points.

Table II *Rates of return on savings accounts and growth rates of savings in Yugoslavia*

Year	1	2	3	4	5	6	7	8	9	10	11
1963	41	12	7.5	0	—3.24	—3.97	—	—	—	—	
1964	46	12	7.5	0	—3.28	—3.94	25.6	—26.9	21.9	2.6	—3.24
1965	62	35	12.5	6.7	34.18	—20.00	—11.9	64.7	3.0	43.2	—3.28
1966	76	23	12.5	0	—11.48	—12.02	35.8	44.1	9.6	24.8	—19.49
1967	82	8	12.5	0	0.57	0.03	19.3	42.2	1.5	15.1	—11.48
1968	85	4	12.5	0	4.68	4.19	23.9	36.5	5.7	28.3	0.57
1969	91	7	12.5	0	1.36	0.90	24.5	60.9	10.8	42.7	4.68
1970	100	10	12.5	0	—1.25	—1.67	18.4	82.5	10.0	77.6	1.36
1971	115	15	17.0	36	28.12	—6.02	9.3	132.3	10.4	52.0	—1.25
1972	133	16	17.0	0	—6.22	—6.52	2.0	22.3	3.9	30.0	—5.79
1973	158	19	15.60	—8	—16.21	—8.97	5.5	17.0	0.2	21.7	—6.22
1974	198	25	17.05	9	—5.39	—13.71	2.7	17.0	4.3	—6.1	—8.69
1975	251	27	18.00	6	—9.65	—14.73	2.9	13.3	0.2	18.6	—13.44
1976	274	9	18.23	1	0.67	—1.03	23.1	28.0	11.9	1.2	—14.42
1977	311	14	18.45	1	—3.22	—4.87	12.3	24.0	9.2	—4.6	—0.60
1978	352	13	18.61	1	—3.26	—4.62	22.9	29.0	14.9	38.7	—4.38
1979	429	22	19.60	5	—6.18	—11.43	—0.2	13.5	2.3	—8.6	—10.91
1980	559	30	29.30	49	24.52	—17.17	—18.0	19.7	—4.0	28.8	—16.70
1981	813	45	41.82	43	6.45	—25.31	17.9	—4.5	—0.2	—6.1	—25.42
1982	1053	30	62.49	49	25.86	—15.64	—2.3	17.0	0.8	2.8	—15.77
1983	1471	40	125.67	101	57.23	—20.47	—10.8	34.9	—5.7	—22.6	—21.82
1984	2326	58	211.75	68	16.65	—22.71	14.3	—7.0	—7.0	26.7	—30.77
1985	4052	74	312.81	48	—7.20	—32.39	10.6	6.7	1.9	—19.4	—37.18
1986	7654	89	419.24	34	—22.53	—28.27	2.7	—1.2	9.4	—34.8	—42.20
μ		26.5		4.3	4.2	—11.3	10.0	29.0	4.6	13.5	9.31
σ		21.1		28.9	17.8	9.7	13.3	32.5	6.4	27.1	12.20

Legend:

1 = Consumer price index
2 = Annual rate of inflation, in percent
3 = Exchange rate, Dinars/U.S. Dollar, end of period
4 = Annual rate of depreciation, in percent
5 = Real rate of return on foreign exchange accounts (see formula (5))
6 = Real rate of return on Dinar savings accounts (see formula (6))
7 = Growth rate of total Dinar-denominated savings, in real terms (deflated by the CPI)
8 = Growth rate of total foreign exchange savings, in real terms (deflated by the CPI)
9 = Growth rate of income of population, in real terms (deflated by the CPI)
10 = Growth rate of remittances of guest workers, in real terms (deflated by the CPI)
11 = Real rate of interest on foreign exchange accounts (see formula (9))

Nominal interest rates:

Short-term deposits: 7.5% (both types of accounts, 1964—1986)
Long-term deposits: 9—10% (both types of accounts, 1964—1981);
9—12.5% (Dinar accounts, 1982—1986);
13%—78% (foreign exchange accounts, 1982—1986)

Sources:

Federal Statistical Bureau of Yugoslavia, *Statistical Yearbook of Yugoslavia*, various editions.
International Monetary Fund, *International Financial Statistics*, various editions.
Štiblar, 1987, p. 42 (nominal interest rates).

3. WEALTH EFFECTS IN AN OPTIMIZING FRAMEWORK

In our approach to wealth effects of inflation and devaluations in Yugoslavia we use a simple cash-in-advance model of infinitely lived agents who maximize utility of consumption subject to their intertemporal budget constraint, and subject to the constraint that consumer goods be bought for Dinars only. Like in all cash-in-advance models, we give special attention to the "buying technology", i.e., the timing and sequencing of consumers' actions is precisely determined. Initially the reason for such a rigid structure of cash-in-advance models was the desire to study the transactions role of money, which required its removal from consumer's utility function. However, in order to justify the existence of money in an environment in which it is not valued *per se*, it is necessary to impose some kind of constraint that will generate the demand for it. This is done via the cash-in-advance constraint, which basically says that goods can be bought for cash only, and that money cannot be earned and spent in the same time period without incurring some costs.[6] This still is a very crude way of intro-

[6] The pioneering work in this area is Clower (1967), in whose honor the cash-in-advance constraint often is called the Clower constraint. For a useful overview of cash-in-advance models and their applications see Sargent (1987), and Woodford (1985).

ducing money into general equilibrium framework, and many results stemming from cash-in-advance models can be replicated in a much more elegant fashion in overlapping generations models, where the demand for money arises endogenously. Over the years, however, cash-in-advance models have become more sophisticated, and today there are many questions for whose analysis they seem to be the most useful analytical framework.

One instance in which cash-in-advance models seem to be very useful is when money is held alongside the higher-yielding assetlike bonds. In such a situation agents hold money because they are required to use it for transactions purposes, even though by keeping a fraction of their portfolios in fiat currency they lose a certain amount of interest income. In our case, money held for transactions purposes is the domestic currency, consisting of cash held by the public and Dinar-denominated savings accounts, while the role of bonds is taken over by the foreign-exchange accounts. A major difference with standard cash-in-advance models is that we shall remain in *partial equilibrium* framework, studying only the households' savings decisions. This means that the money supply and the price variables will be given exogenously; also, we shall assume that they satisfy the households' money demand. The formal structure of this model is described in the next section.

3.1. THE MODEL

The physical environment of the model consists of a large number of identical households, one homogeneous consumer good, and two currencies, Dinars and a generic foreign exchange. The production side of the model is not the subject of our interest, so it suffices to assume that each household is endowed with one unit of labour, that is supplied inelastically to firms utilizing a constant-returns-to-scale technology that transforms human labor into a homogeneous consumer good. This good is non-storable, and it can be purchased for Dinars only; purchases for foreign currencies are not allowed. Foreign exchange has the character of one-period bonds, that can be purchased for Dinars (or for foreign exchange) in each period t, and converted back into Dinars (and therefore used for consumption) only in the next period. To anticipate our empirical work, we also assume that each period households receive two types of transfer: a transfer from abroad of Z units of foreign exchange; and a transfer from the home government of L units of domestic currency, which can be used for consumption only. For reasons explained below, we shall identify the foreign transfer with guest workers' remittances, and the domestic transfer with one-period consumer loans, that have be repaid a period later at the pre-announced rate of interest. The difference between new loans and the repayment of old loans can be either positive, in which case net domestic transfers are a consumption subsidy, or negative, in which case they are a lump-sum consumption tax. We assume that both foreign and domestic transfers fall like manna from heaven, so that households treat them as pure stochastic processes. Similarly, all pri-

ces, exchange rates, and interest rates that are announced at the beginnig of each period are regarded by the households as completely random. The element of uncertainty in this model can thus be described in terms of a vector of stochastic processes $\{\in(t)\}_{t=0}^{\infty}$ where $\in$ is a vector of transfers and price variables announced by the government at the beginning of each period t. For simplicity, we take $\{\in(t)\}_{t=0}^{\infty}$ to be a sequence of positive-valued identically and independently distributed random variables, that assume only a finite number of possible values $(\in^1, \in^2 \ldots, \in^s)$. The probabilities associated with these possible outcomes are denoted as $p^1, \ldots, p^s$.

Each household consists of two members: a worker and a buyer. A day in the life of a household looks like this:

6 a.m. The worker and the buyer get up and observe that they hold:
a) Dinars that were not spent the day before;
b) Foreign exchange bought the day before;
c) Income received at the end of the previous work day.

6:30 a.m. The worker and the buyer open the newpaper to learn about the foreign and domestic loans received, the consumer good prices, the exchange rate, and the interest rates. This information enables them to calculate their initial holdings of Dinars and foreign exchange for that period, and to decide on the purchases of consumer good and the foreign exchange that the buyer will make later that day. If the net domestic transfer is positive, the buyer collects it along with the foreign transfer in the bank at 7 a.m.; if it is negative, the buyer pays the stipulated amount.

7 a.m. The *worker* leaves for the factory, where he/she produces goods that are continuously delivered to the stores.
The *buyer* leaves for the bank, where he/she:
a) Receives the foreign transfer and collects or pays the domestic transfer;
b) Withdraws or deposits Dinars in the Dinar savings account;
c) Buys or sells foreign exchange in the foreign exchange account;
d) Receives interest on foreign exchange bought yesterday.

8:30 a.m. The *buyer* leaves for the downtown shopping area, where he/she shops until 3 p.m.

3 p.m. The *worker* receives daily pay according to the number of goods sold in stores;
The *buyer* returns home with the purchases.

Formally, given the initial holdings of domestic and foreign currency, households in this economy choose stochastic processes for their consumption levels C(t) and for the purchases of foreign currency F(t + 1), so as to maximize — subject to their intertemporal budget constraint and the cash-in-advance constraint — the expected value of the discounted utility of an infinite consumption stream:

$$\underset{\{C(t)\}_{t=0}^{\infty},\ \{F(t)\}_{t=0}^{\infty}}{\text{Maximize}} \quad \sum_{t=0}^{\infty} \beta^t E\{U[C(t)]\}, \quad 0 < \beta < 1 \tag{10}$$

subject to:

$$1.\ D(t) + e(t+1)F(t+1) \leqq W(t) + e(t)Z(t) + L(t) + [1 + r^f(t)]e(t)F(t) + [D(t-1) - P(t-1)C(t-1)],\ t \geqq 0 \tag{11}$$

$$2.\ P(t)C(t) \leqq D(t),\ t \geqq 0 \tag{12}$$

with $F(0) \geqq 0$ and $[D(-1) - P(-1)C(-1)] \geqq 0$

where: β = discount factor
$W(t)$ = wage income in period t, $W(t) = P(t-1)Q(t-1)$
$P(t)$ = price of consumption good in period t
$Q(t)$ = consumer goods produced in period t
$e(t)$ = nominal exchange rate in period t
$r^f(t)$ = nominal rate of interest on foreign exchange accounts
$Z(t)$ = period — t transfer from abroad
$L(t)$ = net domestic transfer in period t, expressed in Dinars:
$L(t) = l(t) - [1 + r^l(t-1)]\,l(t-1)$
$l(t)$ = Dinar value of consumption loans received in period t
$r^l(t)$ = nominal interest rate on consumption loans in period t

On the income (right-hand) side of the household's budget constraint we thus find wage payments $W(t) = P(t-1)C(t-1)$, the current value of foreign exchange deposits $[1 + r^f(t)]e(t) \cdot F(t)$, and transfers from abroad $e(t)Z(t)$, Dinars unused in the previous period, $[D(t-1) - P(t-1)C(t-1)]$, and net domestic loans $L(t)$, i.e., the difference between loans received in period t, $l(t)$, and repayments of loans received in period $t-1$, $[1 + r^l(t-1)]\,l(t-1)$. On the expenditure (left-hand) side of household's budget constraint we find (upon the substitution of (12) into (11) purchases of the consumption good $p(t)C(t)$, and purchases of foreign exchange $e(t+1)F(t+1)$.

As mentioned above, we assume that domestic and foreign transfers are determined exogenously.[7] Likewise, prices, exchange rates, interest rates and output sequences are assumed to be given stochastic

[7] Remittances of guest workers obviously satisfy this condition. Until very recently the same was true of loans, since consumer credit typically was (and to a large extent still is) rationed quantitatively, with real interest rates kept at artificially low levels, so whatever amount of the banking system's credit potential was earmarked for consumer loans by the National Bank of Yugoslavia, it was invariably purchased by the households. Furthermore, long waiting and priority lists that were often established by the creditors suggest that not all the demand for credit could be accommodated at the prevailing interest rates. More recent experience suggests, however, the following functional relationship between the demand for loans and the interest rate on loans:

$$L(t) = L^*(t) - \lambda_R{}^l\,[R^l(t) - R^{l*}(t)]$$

processes. The utility function is assumed to be increasing, twice continously differentiable, and strictly concave, so as to require smoothing of consumption over time. In order to ensure that positive amounts of the two currencies are saved, we also require that in order to survive, households must purchase strictly positive quantites of consumption good each period.

The solution of the above optimization problem can be divided into two parts. At each date t, given the initial stock of Dinars and foreign echange, the households choose the level of period -t consumption C(t) and the level of foreign exchange purchases F(t + 1) so as to maximize their instantaneous utility subject to that period's budget and the cash-advance constraint. Once this intra-period problem has been solved, one knows the maximum instantaneous utility compatible with the announced prices and initial money holdings. This indirect utility function can then be used to formulate a stochastic dynamic programming problem, the solution to which determines the policy function (sequences) {C} and {F}, and thereby {D}. In other words, {C}, {F}, and {D} are chosen so as maximize the expected value of the discounted sequence of indirect utilities.

Under the above assumptions, and for the appropriate values of the model's parameters, we can conjecture that a solution to the above optimization problem will exist, and that it will be characterized by policy functions of the following form:

$$\{C(t)\} = f\,[W(t),\ Z(t),\ L(t),\ P(t),\ e(t),\ r^{l}(t),\ \in] \tag{13}$$

$$\{D(t)\} = g\,[W(t),\ Z(t),\ P(t),\ e(t),\ r^{l}(t),\ \in] \tag{14}$$

$$\{F(t)\} = h\,[W(t),\ Z(t),\ P(t),\ e(t),\ r^{l}(t),\ \in] \tag{15}$$

Under plausible assumptions we should expect the partials of f with respect to income and transfer variables W, Z, and L to be positive, while $\partial f/\partial P$ and $\partial f/\partial r^{l}$ would normally be negative, first due to income effect, and second due to substitution effect. $\partial g/\partial W$ and $\partial g/\partial P$ are expected to be positive: currency holdings normally increase with income and the price level so as to accommodate higher transactions

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where L*(t) is the "normal" level of household loans in period, *t*, λ_{R^l} is the feedback from the bank lending rate to the household's demand for loans, and $R^{l*}(t)$ is the "normal" or expected real interest on consumer loans in period t. The exact meaning of "normality" in this context is explored in our (1987b) paper, and it is similar to the idea of long-term equilibrium values of variables in the partial-adjustment models. Thus, when the actual and the normal interest rates on loans are equal, $R^{l}(t) = R^{l*}(t)$, the demand for loans is equal to its normal value, $L(t) = L^{*}(t)$. When the actual rate is higher than the normal rate for that period, $R^{l}(t) > R^{l*}(t)$, the demand for loans shrinks by the fraction of this difference, and vice versa. Circumstantial evidence from the past few years readily confirms this pattern of household behavior: when the interest rates on consumption loans were sharply increased from their normal level of 5—15 percent in the late 1970s and the early 1980s, to the level of 50—90 percent in 1987, the demand for loans was practically driven to zero, in spite of the fact that the new interest rates still were negative in real terms.

demand. Similarly, the sign of $\partial h/\partial W$ is expected to be positive: the higher the household's income, the higher are its savings in foreign currency. On the other hand, due to currency substitution induced by higher exchange rate and higher interest rate on foreign exchange accounts, we expect $\partial g/\partial r^f$ and $\partial g/\partial e$ to be negative, with $\partial h/\partial r^f$ and $\partial h/\partial e$ positive. Finally, the efefct of foreign transfers on domestic and foreign currency demands is expected to be positive: part of the transfer will be used to increase consumption, which will require conversion of remittances into Dinars, which will increase demand for domestic currency, while the remainder of the transfer will be deposited in foreign exchange accounts. Note also that net loans do not affect the holdings of two currencies, since by assumption they can be used for consumption only. Since our interest in this model lies primarily in its application to concrete Yugoslav data, we shall not further explore its theoretical underpinnings beyond this point.

3.2. THE MODEL APPLIED

The central place in our empirical work occupies the household's budget constraint (11), especially its income (right-hand) side, that gives us a measure of household's wealth, and hence serves as a starting point in analysis of wealth effects of inflation and devaluations. After introducing some simplifying notation we derive from (11) the following expression for household's wealth in period t, which we denote by Y(t):

$$Y(t) = M(t) + S^f(t) + e(t)Z(t) + L(t) \tag{16}$$

where: $M(t) = W(t) + [D(t-1) - P(t-1)C(t-1)]$ = holdings of Dinars at the start of period t

$S^f(t) = [1 + r^f(t)]e(t)F(t)$ = foreign exchange savings at the beginning of period t

From the structure of our model it follows that holdings of Dinars and foreign exchange savings are functions of income, remittances, the price level, the exchange rate, and the nominal rate of interest on foreign exchange accounts, i.e.,

$$M(t) = M\,[W(t),\ Z(t),\ P(t),\ e(t),\ r^f(t)] \tag{17}$$

$$S^f(t) = S^f\,[W(t),\ Z(t),\ P(t),\ e(t),\ r^f(t)] \tag{18}$$

Via Fisher's formula real interest rates can be expressed as functions of the price level and the nominal interest rate, so in equations (17) and (18) we can substitute $R_i^f(t)$ for $P(t)$ and $r^f(t)$, so as to reduce the number of independent variables to only three. Next, following the actual Yugoslav practice, we can assume that Dinar holdings are kept in interest-bearing checking and savings accounts. This would make

M(t) (and thereby $S^f(t)$) a function of the real interest rate on Dinar deposits as well. However, in order to avoid multicollinearity in empirical applications of the model, we shall assume that M(t) is a function of $R^d(t)$ only, and that $S^f(t)$ is a function of $R_i^f(t)$ only, even though according to the model, both demand equations should be functions of both rate-of-interest variables. The seriousness of the multicollinearity problem is best appreciated by observing how similar the two *nominal* interest rates, and hence the two real interest rates are (Table II, columns 6 and 11). With the benefit of these remarks we can write the demand equations for two currencies in this form:

$$M(t) = M\,[W(t),\ Z(t),\ e(t),\ R^d(t)] \tag{19}$$

$$S^f(t) = S^f\,[W(t),\ Z(t),\ e(t),\ R_i^f(t)] \tag{20}$$

Next we substitute (19) and (20) back into (16), and differentiate this expression totally, suppressing for convenience the time index. After some rearrangements we get:

$$\hat{Y} = \hat{Z}\theta_z + [\hat{L}\theta_L - \hat{L}_r\theta_L] + \theta_{S^f}(\varepsilon_{S^f,w}\hat{W} + \varepsilon_{S^f,z}\hat{Z} + \varepsilon_{S^f,e}\hat{e} + \varepsilon_{S^f,Ri}\hat{R}_i^f) + \theta_M(\varepsilon_{M,w}\hat{W} + \varepsilon_{M,z}\hat{Z} + \varepsilon_{M,e}\hat{e} + \varepsilon_{M,R^d}\hat{R}^d) \tag{21}$$

"Hats" here denote the percentage change in variables, $\hat{x} = dx/x$; while θ_i denotes the share of the i-th variable in total wealth. L_r is short for $[1 + r^l(t-1)]\,l(t-1)$; and $\varepsilon_{i,j}$ denotes the elasticity of the i-th variable with respect to the j-th parameter, e.g., $\varepsilon_{S^f,z} = (\partial S^f/\partial Z) \cdot (Z/S^f)$. Next step in analysis consists in identifying the time-series data for the above variables, and estimating the above elasticities. Here we have two alternatives, both of which will be used in later estimations. First, we can express money holdings as a sum of cash in hands of the public, demand deposits of households (checking and giro accounts), and Dinar savings deposits. This formulation of M(t) is closer to the spirit of our model, but for empirical purposes it is less reliable as a measure of households' wealth, because it does not incorporate information on velocity of circulation. Thus, in times of high inflation, when transactions velocity and hence transactions demand sharply increase, we are likely to *overestimate* households' wealth. A more reliable measure of households' wealth in such circumstances are households' earnings, so our second specification of the expression for Dinar holdings includes wage income W(t) plus Dinar savings deposits $S^d(t)$. Then we can rewrite equation (21) in the following way:

$$\hat{Y} = \hat{W}\theta_w + \hat{Z}\theta_z + [\hat{L}\theta_L - \hat{L}_r\theta_L] + \theta_{S^f}(\varepsilon_{S^f,w}\hat{W} + \varepsilon_{S^f,z}\hat{Z} + \varepsilon_{S^f,e}\hat{e} + \varepsilon_{S^f,Ri^f}\hat{R}_i^f)$$

$$+ \theta_{S^d} (\varepsilon_{S^d,w} \hat{W} + \varepsilon_{S^d,z} \hat{Z} + \varepsilon_{S^d,e} \hat{e} + \varepsilon_{S^d,R^d} \hat{R}^d) \quad (22)$$

where the subscript S^d refers to savings in domestic currency. For simplicity, in the remainder of this paper we shall refer to equation (21) as the "Dinar-holdings" specification ,and to equation (22) as the "Dinar savings" specification. Next we have to identify the time-series data entering the above "hat" and θ variables. For example,

$$\hat{W}\theta_w = [\{W(t) - W(t-1)] \,/\, W(t-1)\} \cdot \{W(t-1) \,/\, Y(t-1)\} \quad (23)$$

where all variables are expressed in real terms (adjusted by the cost-of-living index), and Y is given by (16). Estimating the corresponding elasticities occupied a major part of our analysis. It follows from our model that we ought to estimate the following reduced-form equations:

$$S^f(t) = \alpha_1 W(t) + \alpha_2 Z(t) + \alpha_3 e(t) + \alpha_4 R_i^f(t) + u(t) \quad (24)$$

$$S^d(t) = \beta_1 W(t) + \beta_2 Z(t) + \beta_3 e(t) + \beta_4 R^d(t) + v(t) \quad (25)$$

$$M(t) = \gamma_1 W(t) + \gamma_2 Z(t) + \gamma_3 e(t) + \gamma_4 R^d(t) + \omega(t) \quad (26)$$

According to earlier remarks, we should expect the signs of coefficients on income and remittances to be positive in all three equations, and likewise we should expect a positive relationship between the real interest rates and savings (and, intuitively, a negative one between $R^d(t)$ and Dinar holdings). Regarding the impact of the exchange rate, our analysis suggests a positive effect on savings in foreign currencies, and a negative effect on Dinar savings and Dinar holdings, the reason being currency substitution. Since in actual estimation the coefficients on real interest rates often will turn out to be statistically insignificant, in some regression equations we shall replace the interest rates with the rates of inflation.

Once we calculate the corresponding elasticities, we shall substitute them back into equations (21) and (22) in order to find the percentage change in households' wealth in a given year. Then, using equation (22) as a more reliable measure of households' real wealth position, we shall decompose the expression for $\hat{Y}$ in the following five parts:

$$\omega = \hat{W}\theta_w + \theta_{S^f} \varepsilon_{S^f,w} \hat{W} + \theta_{S^d} \varepsilon_{S^d,w} \hat{W} = \text{Change in wealth due to change in } \textit{income} \quad (27)$$

$$\zeta = \hat{Z}\theta_z + \theta_{S^f} \varepsilon_{S^f,z} \hat{Z} + \theta_{S^d} \varepsilon_{S^d,z} \hat{Z} = \text{Change in wealth due to change in } \textit{remittances} \quad (28)$$

$$\lambda = \hat{L}\theta_L - \hat{L}_r \theta_L = \text{Change in wealth due to change in } \textit{net loans} \quad (29)$$

$$\delta = \theta_{S^f}\,\varepsilon_{S^f,e}\,\hat{e} + \theta_{S^d}\,\varepsilon_{S^d,e}\,\hat{e} \quad = \text{Change in wealth due to } \textit{depreciation} \tag{30}$$

$$\iota = \theta_{S^f}\,\varepsilon_{S^f,Ri^f}\,\hat{R}_i^f + \theta_{S^f}\,\varepsilon_{S^d,R^d}\,\hat{R}^d \quad = \text{Change in wealth due to } \textit{interest rates} \tag{31}$$

Alternatively, when working with the rate of inflation instead of the interest rate we shall write:

$$\pi = \theta_{S^f}\,\varepsilon_{S^f,P}\,\hat{P} + \theta_{S^f}\,\varepsilon_{S^d,P}\,\hat{P} \quad = \text{Change in wealth due to } \textit{inflation} \tag{32}$$

These expressions will give us the percentage change in households' real disposable wealth caused by the change in income, remittances, net loans, currency depreciation, and the interest rate or the price level fluctuation in a given year. In order to analyse the relative importance of each of these factors in terms of its wealth-increasing or wealth-decreasing impact, we shall also calculate the percentage contributions of ω,ζ, λ, δ, ι and π to total increases and decreases of wealth in a given year. Finally, we shall make our data comparable with the OECD results by calculating ω, ζ, λ, δ, ι and π as a percentage of GSP in a given year.

4. EMPIRICAL RESULTS

As outlined in the previous section, the empirical part of our work proceeds in two steps. First we estimate elasticities of foreign exchange and Dinar savings, and elasticities of Dinar holdings, with respect to income, remittances, the real rate of interest, the exchange rate, and the rate of inflation. Second, the best of these estimates are used in constructing an index of change in real household wealth, the $\hat{Y}$ from equation (22). This index is then decomposed into its five constituent parts: changes in real wealth due to changes in (i) real income (ω); (ii) the real value of remittances (ζ); (iii) the real value of net loans (λ); (iv) the rate of depreciation (δ); and (v) the real interest rate (ι), or the rate of inflation (π). Finally, these five sources of changes in real wealth are put in relation to gross social product, so as to make our figures comparable with those calculated by the OECD. The procedure we use is thus a combination of optimizing and accounting approaches to estimating the wealth effects of inflation and devaluations, and in our opinion it is the closest one can get to theoretically sound estimates of wealth effects, their empirical and policy relevance depending, of course, on the data that were used. These data all come from the *Statistical Yearbook of Yugoslavia* or the IMF *International Financial Statistics* (data on exchange rates), and in cases where they were missing (mainly for the years 1985 and 1986) we used the data published by the National Bank of Yugoslavia and the OECD, or we interpolated these values by calculating the appropriate averages (the only longer series that was obtained in this way

were the data on short-term savings in foreign currencies, which were not published before 1971). Except for the 1980—1986 period, we used *yearly* series of data, which, in our opinion, does not create any econometric problems, since the 1960s and the 1970s were fairly stable. The 1980s are macroeconomically a much more turbulent period, so in estimating the corresponding elasticities we used a representative series of *monthly* data, beginning with May 1984 and ending with May 1987. As we shall see below, in terms of the final result — the size of changes in real household wealth — the estimates from the yearly and the monthly data sets turned out to be fairly close.

An important aspect of our study is the periodization of wealth effects according to three exchange rate regimes operating in Yugoslavia since the early 1960s. These are the fixed nominal exchange rate, in force until 1973; a crawling peg, operating between 1973 and 1980; and the controlled float, in use since 1980. This periodization also conforms well with major macroeconomic and institutional changes in Yugoslavia. The 1960s and the early 1970s were the period of extensive market reforms, emerging inflation (which then stabilized at historically low levels), and great labor force migration to West European countries, with the corresponding growth of workers' remittances. The 1973—1979 period was characterized by further growth of real output and living standards, and by relatively low rates of inflation, both sustained through foreign borrowing. Finally, the 1980s are a period of the balance-of-payments crisis, unemployment, stagnation, and the accelerating inflation. Econometric tests of structural change in savings elasticities also justify this periodization.

4.1 ESTIMATES OF SAVING ELASTICITIES

The method of estimation that we use in calculating the savings elasticities are ordinary least squares, which — in spite of the fact that we worked with time-series data — give fairly robust estimates (for example, we had no incidence of positive or negative autocorrelation among the estimated regressions). In regressions that we estimated we generally specified no intercept term, the reasons for this being both theoretical (there is no justification for an "autonomous" level of saving), and econometric (the coefficient on the intercept term never turned out to be statistically significant). In order to avoid multicollinearity, stemming from the fact that all quantity variables were expressed in real terms (i.e. their nominal values were deflated by the cost-of-living index), we expressed all variables entering regression equations in terms of their logarithmic differences. This gives the estimated coefficients the following interpretation. Since, for example,

$$\begin{aligned} log\,[S^r(t) / S^r(t-1)] = {} & \beta_1\, log\,[W(t) / W(t-1)] + \\ & + \beta_2\, log\,[D(t) / D(t-1)] + \\ & + \beta_3\, log\,[e(t) / e(t-1)] + \\ & + \beta_4\, log\,[P(t) / P(t-1)] \end{aligned}$$

it follows that:

$$\beta_1 = \partial \{log [S^f(t) / S^f(t-1)]\} / \partial \{log [W(t) / W(t-1)]\}$$
$$= \{[W(t) / W(t-1)] / [S^f(t) / S^f(t-1)]\} \cdot$$
$$\cdot \{\partial [S^f(t) / S^f(t-1)] / \partial [W(t) / W(t-1)]\}$$

which is the elasticity of saving in foreign exchange with respect to changes in real wage, i.e., β_1 tells us by how many percent saving in foreign currencies changes when the growth rate of real wages increases by one percent.[8] Similarly, since the "growth rate" of the exchange rate, $e(t) / e(t-1)$, is the rate of depreciation, β_3 denotes the elasticity of saving in foreign currencies with respect to the rate of depreciation, while for the same reason β_4 denotes the elasticity with respect to the rate of inflation.

4.1.1. *The 1963—1986 period*

In Table III we present estimates of various elasticities of foreign exchange and Dinar savings, and of total Dinar holdings for the 24-year period 1963—1986. As can be seen from regressions (1)—(7), all coefficients have the expected signs, and most of them are statistically significant, which confirms our basic hypotheses on the roles of foreign exchange and Dinar savings.

Starting with regression (1), we see that only the coefficient of the real rate of interest is statistically insignificant. This also was the case in other regressions estimating the interest rate elasticity, so even though the coefficient on $R^f(t)$ always was positive, it was dropped from regression (2). This improved our estimates, and confirmed the magnitude of elasticities from regression (1), thereby implying the absence of multicollinearity. The estimated elasticities of saving in foreign exchange are 1.29 for income, 0.6966 for remittances, and 0.429 for the exchange rate. Thus, as the household's real income from employment increases by 1 percent, their saving in foreign exchange rises by 1.29 percent; as the real value of remittances from abroad increases by 1 percent, foreign exchange saving rises by about 0.7 percent; and as the exchange rate increases by 1 percent (i.e. Dinar depreciates by 1 percent), saving in foreign currencies rises by 0.429 percent.

The most sunprising result here is the magnitude of income elasticity, and looking across the first row of Table III we see that Dinar savings also are characterized by income elasticity greater than 1. Total Dinar holdings (or a rough approximation to M2 in Yugoslavia) have income elasticity less than 1, but it too is quite high. This means that saving is in general quite responsive to changes in income. A

[8] Note the difference between "saving" which is a flow concept, denoting a change in stocks (e.g., $[S^f(t)/S^f(t-1)]$ and "savings", which are a stock concept (e.g., $S^f(t)$ that is found in a statistical yearbook). Since making this distinction consistently turns out to be too tedious we shall not insist on it in this paper.

Table III

Estimates of elasticities of foreign exchange and Dinar savings, 1963—1986

Dependent variable	Foreign exchange savings		Dinar savings	Total Dinar holdings (Currency, Demand deposits, Savings)			
Elasticity	1	2	3	4	5	6	7
Income	1.242	1.293	1.224	1.221	0.962	0.953	0.826
	(2.025)	(2.144)	(4.044)	(4.14)	(4.738)	(4.694)	(3.08)
Remittances	0.7	0.697	1.14	0.145	0.1	0.11	0.119
	(4.048)	(4.076)	(1.705) n.s./s.	(1.746)	(1.929)	(1.917)	(1.824)
Interest rate	0.463	—	0.613	0.635	0.5	0.579	—
	(0.751) n.s.		(2.152)	(2.503)	(2.616)	(3.316)	
Exchange rate	0.507	0.429	—0.016	—	—0.056	—	—0.258
	(2.743)	(2.836)	(—0.194) n.s.		(—1.023) n.s.		(—2.329)
Inflation	—	—	—	—	—	—	0.177
							(1.493) n.s./s.
R^2	0.62	0.63	0.59	0.61	0.69	0.69	0.62
DW	1.73	1.59	1.2	1.24	1.23	1.38	1.34
	(No A.C.)	(No A.C.)	(Indet)	(Indet.)	(Indet.)	(Indet.)	(Indet.)
F	9.7	12.0	8.7	12.2	12.8	16.7	9.7

Numbers in parentheses are the values of the t-statistic at the 5 percent level of significance.
n.s. = Not significant at the 5 percent level of significance.
n.s./s. = Not significant at the 5 percent level of significance, but significant at the 10 percent level.
No A.C. = No autocorrelation.

direct policy implication of this fact is that in periods of growing real income, potentially significant amounts of household resources could be channelled into the economy's banking sector. In terms of the relative magnitude of foreign exchange saving elasticities, we see from regression (2) that both the income and remittances elasticities are higher than the exchange rate elasticity. This, however will change as we proceed with analysis by subperiods.

On the side of Dinar saving, we see from regression (3) that all the coefficients have the expected signs; the ones on remittances and on the exchange rate both are statistically insignificant at the 5 percent level. Since the former was statistically significant at the 10 percent level (and is almost always significant in other regressions), only the latter was dropped from regression (4), where our estimates again improved slightly.

Two results from regression (3) and (4) are noteworthy. First, in virtually all regression that we estimated the sign of the exchange rate coefficient was negative, and in most cases statistically significant. Together with the positive signs of coefficients on inflation and depreciation in regressions (1) and (2), this basically confirms the hypothesis on currency substitution. Second, unlike the foreign exchange savings, Dinar savings seem to be quite responsive to changes in the real rate of interest, and for every percentage point increase in real interest on Dinar accounts, there is a 0.635 percent increase in savings. This result — just as the strong growth of Dinar savings in the first place — seems somewhat surprising in the light of negative real interest rates on Dinar accounts (see column 6, Table II), but it confirms our earlier conjecture that a more active interest rate policy *does* succeed in attracting households' savings.

Fairly good estimates of elasticities were obtained for total Dinar holdings as well. In regression (5) the coefficient on the exchange rate again was statistically insignificant. Like with Dinar *savings*, the strongest impact on Dinar *holdings* is exerted by changes in income: for every unit increase in real income there is a corresponding increase of 0.953 percent in holdings of the domestic currency. Interest elasticity again is higher than the elasticity with respect to remittances, but the magnitudes of the two pairs of elasticities in regressions (4) and (6) are almost the same. Also, the exchange rate elasticity has the expected negative sign, so currency substitution seems to work for total holdings of Dinar as well. Finally, in regression (7) we substituted the rate of inflation for the real rate of interest. The estimated coefficient on inflation turns out to be statistically significant at the 10 percent level, and it has the expected positive sign, which indicates that money holdings increase with inflation, so as to satisfy the increased transactions demand. Note, however, that this increase is relatively small, only about 0.18 percent for every percent of inflation, which indicates that in a highly inflationary environment velocity of circulation accelerates much faster than demand for Dinars.

4.1.2. *The 1963—1973 period*

The best overall estimates of saving elasticities were obtained for the period 1963—1973 (see Table IV). With one exception, all coefficients of elasticity estimated in this period have the expected signs, and only one of them — the exchange rate elasticity of Dinar savings — is not statistically significant. The estimate of income elasticity of foreign exchange saving also does not seem to be reliable: the coefficient frequently switched signs in our regressions, and it was rarely significant. When it was dropped from regression (9), no strong improvement in our estimates was brought about, while the relative size of other elasticities changed only slightly.

As can be seen, all short-term exchange rate elasticities are higher than those for the period 1963—1986, a result which usually comes as no surprise. Also, saving in foreign currencies seems to have been quite responsive to changes in *real* interest rates on foreign exchange accounts. In light of the data in Table II, column 11, this comes as no surprise, since in the 1963—1973 period we had had three years with *positive* real interest rates on foreign exchange accounts, something that was not the case in any subsequent period.

Concerning the elasticities of Dinar savings and total Dinar holdings, the 1963—1973 period yielded our most reilable estimates. All estimated coefficients are highly significant and bear the expected signs. Their magnitude does not deviate a great deal from the long-run elasticities either, the only exception being the interest rate elasticity. As pointed out above, this is due to the fact that inflation rate was relatively low in this period, especially between 1967 and 1970. In conjunction with the fixed nominal rates of interest, this produced positive, or relatively low negative real interest rates, with a peak of 4.19 percent in 1968 (see Table II, column 6). Another noteworthy result is the negative sign and the highly significant value of the estimated coefficient on exchange rate in regression (12), something that was confirmed in all regressions with total Dinar holdings in this period.

As mentioned above, one characteristic of the 1963—1973 period was a great migration of Yugoslav workers to West European countries, which resulted from a deliberate attempt to reduce unemployment, and coincided well with the strong economic expansion in Western Europe, where more than 1 million Yugoslavs found work in this period. The economic impact of this change was best felt in the importance of remittances, whose annual growth averaged almost 40 percent between 1964 and 1973 (see Table II column 10). This was undoubtedly the main cause behind the spectacular growth of foreign exchange savings in this period (56 percent on average, 132 percent in 1971 alone). These developments are well captured by our estimate of elasticity of foreign exchange saving with respect to remittances, which is at 1.4 by far the highest among the periods considered. Note also how different are the sizes of foreign exchange (1.4) and Dinar (0.18) elasticities with respect to remittances. In fact, growth of remittances alone explains 73 percent of variation in foreign exchange savings in this period. A similar link operated on the side of Dinar savings; variations in real

Table IV

Estimates of elasticities of foreign exchange and Dinar savings, 1963—1973

Dependent variable	Foreign exchange savings		Dinar savings		Total Dinar holdings
Elasticity	8	9	10	11	12
Income	—1.047	—	1.258	1.247	0.877
	(—1.884) n.s./s.		(5.1)	(5.166)	(5.35)
Remittances	1.406	1.205	0.199	0.178	0.211
	(8.042)	(7.439)	(2.57)	(2.474)	(4.098)
Interest rate	1.687	1.483	1.107	1.27	0.674
	(2.551)	(1.946)	(3.794)	(5.884)	(3.479)
Exchange rate	0.859	0.831	—0.115	—	—0.276
	(2.811)	(2.331)	(—0.852) n.s.		(—3.074)
Inflation	—	—	—	—	—
R^2	0.94	0.91	0.92	0.92	0.94
DW	2.77	1.54	1.74	1.78	2.07
	(Indet)	(Indet)	(Indet)	(No A.C.)	(No A.C.)
F	34.2	32.6	27.3	37.6	38.6

Numbers in parentheses are the values of the t-statistic at the 5 percent level of significance.
n.s = Not significant at the 5 percent level of significance.
n.s./s. = Not significant at the 5 percent level of significance, but significant at the 10 percent level.
No A.C. = No autocorrelation.

income explain 65 percent of total variation of Dinar savings in this period. Clearly, the most important policy conclusion that can be drawn from these results is that in periods of low inflation and stable income expansion one can expect more than proportionate increases in domestic savings.

4.1.3. *The 1973—1980 period*

While the 1963—1973 period produced our best *overall* estimates of saving elasticities, the 1973—1980 period generated our most reliable estimates of elasticities of foreign exchange savings. These results are presented in Table V. Once again, all coefficients have the expected signs, but this time a number of them is not significant at the 5 percent level. In particular, the exchange rate elasticity of foreign exchange saving does not seem to be significantly different from zero (regression 13), which certainly is a surprising result. Although this elasticity has the expected positive sign in most regressions that we estimated, it was never statistically significant. This, however, was not the case on the side of Dinar savings and Dinar holdings (regressions 15—19), where the exchange rate coefficient was consistently negative, thus pointing to the importance of currency substitution. Moreover, the exchange rate elasticity of Dinar saving is quite high in this period (—0.47 and —0.38), and possibly higher than in the 1980s, when one would have expected it to be highest. One explanation of this puzzle lies in the fact the demand for foreign currencies is more easily satisfied — and hence it is more exchange-rate elastic — in periods of growing real incomes, such as the 1970s were. A brief look back at the data in column 9 of Table II will persuade us that this was indeed the case: real household income expanded at the rate of 7.1 percent between 1974 and 1979, while it actually *contracted* at the rate of —0.7 percent annually in the 1980s. Thus, falling real incomes in the 1980s have made it more difficult for the households to hedge against inflation with the aid of foreign exchange savings. By the time all necessities of life were satisfied, the average income already was exhausted, and however rapidly Dinar depreciated — i.e., however attractive the real rate of return on foreign exchange accounts may have been — one simply didn't have enough resources to invest in them.

Unlike the 1960s, when we found a strong relationship between changes in savings and the real *interest* rate, the 1970s were characterized by a statistically significant relationship between changes in savings and the *inflation* rate. As can be seen from regressions (13) and (14), the estimated coefficients on inflation (0.617 and 0.63) are highly significant, and are larger than the elasticities with respect to remittances (0.273 and 0.276). One way to interpret this result is to note that the 1970s are a decade in which the role of foreign exchange

Table V

Estimates of elasticities of foreign exchange and Dinar savings, 1973—1980

Dependent variable	Foreign exchange savings		Dinar savings	Total Dinar holdings (Currency, Demand deposits, Savings)			
Elasticity	13	14	15	16	17	18	19
Income	1.629	1.606	1.729	1.872	1.356	1.332	1.39
	(8.83)	(10.778)	(4.437)	(6.083)	(4.943)	(4.37)	(6.0)
Remittances	0.273	0.276	0.173	0.175	0.22	0.222	0.222
	(5.375)	(6.14)	(1.616) n.s./s.	(1.73) n.s./s.	(2.615)	(2.64)	(2.919)
Interest rate	—	—	—	—	0.083	—	—
					(0.333) n.s.		
Exchange rate	0.023	—	—0.466	—0.384	—0.279	—0.326	—0.293
	(0.274) n.s.		(—2.617)	(—3.124)	(—2.527)	(—2.336)	(—3.165)
Inflation	0.617	0.63	0.1	—	—	0.04	—
	(8.769)	(13.561)	(0.674) n.s.			(0.344) n.s.	
$\bar{R}^2$	0.98	0.99	0.86	0.88	0.86	0.86	0.88
DW	2.57	2.34	2.4	2.47	2.28	2.16	2.32
	(Indet)	(Indet.)	(Indet.)	(Indet.)	(Indet.)	(Indet.)	(Indet.)
F	113.2	185.1	11.8	17.5	11.3	11.3	18.3

Numbers in parentheses are the values of the t-statistic at the 5 percent level of significance.
n.s. = Not significant at the 5 percent level of significance.
n.s./s. = Not significant at the 5 percent level of significance, but significant at the 10 percent level.
No A.C. = No autocorrelation.

accounts shifted from a repository of guest workers' remittances, to a mechanism for maintenance of purchasing power.[9]

4.1.4. *The 1980—1986 period*

The 1980s presented us with the greatest number of problems in estimation of savings elasticities, particularly on the side of Dinar savings. This induced us to seek alternative sources of data, so instead of yearly time series we used monthly data on savings, published by the National Bank of Yugoslavia. The data that we had available extend from May 1984 to May 1987, thus covering a fairly representative segment of the 1980s. Four estimates from this data set are presented in Table VI.[10]

Foreign exchange savings conformed much better to the hypothesized patterns of household saving behavior in this period. Regressions (20) and (21) yielded fairly good estimates of income, depreciation, and inflation elasticities, the only surprise being the negative signs on the coefficient of inflation (—0.766 and —0.778, respectively). Since this coefficient is negative and highly significant in all regressions that we estimated, it must account for an important change in households' attitudes towards foreign exchange accounts in the 1980s. In our opinion, this result again hinges on falling real incomes in this period. In times of rising real incomes and relatively stable inflation — such as the 1970s were — foreign exchange accounts are a convenient store of purchasing power. But as inflation accelerated, real incomes were significantly reduced, so the households were forced to draw upon their foreign exchange holdings in order to finance current consumption. Perhaps best evidence to this effect is the movement of the black market exchange rate: whenever the government froze wages and liberalized prices — as was more recently the case in April of 1987 — one could buy foreign exchange at, or very close to the official exchange at, or very close to the official exchange rate, whereas normally one pays a mark-up of about 5—30 percent, depending on the time of the year and the size of transaction. This excess supply of foreign currencies must be reflected, at least partially, in the drop in foreign exchange deposits, which then gives a negative relationship between the rate of inflation and the foreign exchange savings.

That our hypothesis on the nature of foreign exchange accounts is still basically correct — the negative price level elasticity notwithstanding — is confirmed by observing the magnitude of the exchange rate

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[9] This was confirmed in a regression of foreign exchange savings on the real value of remittances, that explained only 28 percent of variation in foreign exchange savings in this period, compared to 73 percent in the earlier period. Moreover, a regression of foreign exchange savings on income and the rate of inflation yielded an R^2 of 0.92, with both coefficients positive and highly significant.

[10] Income elasticity of savings in Table VI relates to *nominal* wages, whereas in earlier tables it relates to *real* wages. This difference, however, is not too important from the point of view of changes in total wealth (see Tables VII and VIII in the next section).

Table VI

Estimates of elasticities of foreign exchange and Dinar savings, 1980—1986

Dependent variable	Foreign exchange savings (Yearly data)		Foreign exchange savings (Monthly data)		Dinar savings (Monthly data)		Total Dinar holdings (Yearly data)
Elasticity	20	21	22	23	24	25	26
Income	2.107 (1.206) n.s.	2.279 (2.069)	0.219 (0.237) n.s.	0.164 (2.093)	0.378 (1.591) n.s./s.	0.635 (2.874)	—
Remittances	—0.035 (—2.335)	—	—	—	—	—	—
Interest rate	—	—	0.570 (4.823)	—	0.539 (1.89)	—	—
Exchange rate	0.942 (2.735)	0.964 (3.579)	0.126 (1.032) n.s.	0.534 (5.589)	—0.088 (—0.282) n.s.	0.383 (1.421) n.s./s.	—0.242 (—1.691) n.s./s.
Inflation	—0.766 (—2.424)	—0.778 (—2.944)	—	—0.676 (—7.316)	—	—0.993 (—3.812)	0.172 (1.142) n.s.
$\bar{R}^2$	0.65	0.73	0.48	0.67	0.11	0.33	0.29
DW	2.43 (No A.C.)	2.45 (No A.C.)	1.89 (No A.C.)	2.19 (No A.C.)	2.02 (No A.C.)	1.83 (No A.C.)	1.39 (No A.C.)
F	3.5 n.s.	6.2	10.8	22.5	2.1	6.0	1.7 n.s.

Numbers in parentheses are the values of the t-statistic at the 5 percent level of significance.
n.s. = Not significant at the 5 percent level of significance.
n.s./s. = Not significant at the 5 percent level of significance, but significant at the 10 percent level.
No A.C. = No autocorrelation.

elasticity, which at 0.96 (regression 21) is the highest in any period considered. This means that whenever households *could* invest in foreign exchange accounts, they did so at the rate of 96 percent for every unit increase in exchange rate. This *al pari* shift into foreign currencies in the face of a rapidly depreciating Dinar is certainly a new development regarding the household saving behavior, and a potentially important source of wealth effects of the kind described in the OECD study. But from equation (30) in Section 3 we know that the exact size of this wealth effect depends on other factors as well, in particular, it depends on shares of foreign exchange and Dinar savings in total wealth, and on the exchange rate elasticity of Dinar savings. Since these "other factors" are themselves functions of the exchange rate, the *ceteris paribus* conditions implicitly assumed by the OECD accounting approach clearly do not hold, and, therefore, the relationship between the exchange rate and wealth cannot be expressed in the simple form of equation (2) from Section 2.

Another interesting feature of the 1980s is an apparent break-up of the statistical relationship between the guest workers' remittances and the two forms of saving. The coefficients on remittances in this period invariably turned out to be negative and statistically insignificant. Given that it is precisely in the 1980s that the foreign exchange accounts have assumed such a macroeconomic prominence in Yugoslavia, the question arises: Where did this tremendous inflow of foreign currencies come from? One explanation is that faced with the debt crisis and the uncertain future of foreign exchange accounts that the crisis has created, guest workers preferred to use alternative channels to send their earnings to family members in Yugoslavia, so that the official statistics simply do not capture the true extent of unilateral transfers. But against this interpretation speaks the fact that in the eighties the number of Yugoslav guest workers is almost half of what it used to be a decade ago, so even if remittances had come in through the official channels, they could not have accounted for all of the observed increase in foreign currency circulation.

Another "invisible" source of foreign exchange that is frequently mentioned are payments to the private sector by foreign tourists.[11] But even these payments do not seem to be sufficient to explain the observed growth of foreign exchange savings. It is likely, therefore, that in response to the increased demand for foreign currencies as an excellent hedge against inflation, some *autonomous* increase in foreign exchange supply has occurred, both through conventional channels (guest workers, foreign tourists), and through outright speculation

[11] The press and some political structures see in these payments one of the major causes for the small foreign-exchange receipts from tourism, and each year a lot of energy and bureaucratic ingenuity are spent in attempes to control the so called "private clearing". These attempts are, of course, unnecessary as longs as private agents *deposit* their earnings on foreign exchange accounts, and if the objective is to increase the inflow of "tourist Deutsche Marks", a much more fruitful approach would be to *attract* the depositors (e.g., by guaranteening them the absolute security of the deposits, and offering them more attractive investment opportunities), rather than discouraging them by the threat of various sanctions.

(exports of Dinars, real estate transactions with foreigners, etc.). This would certainly not be the first case whereby demand in an individual market had created its own supply.

4.1.5. *Testing for structural change in saving elasticities*

In order to provide a direct econometric evidence on changes in saving elasticities between the various periods considered, we performed a number of tests of structural change in estimated parameters. The test we used was the well-known Chow's F-test, and regressions on which the test was performed were our most reliable regression equations from Tables III—VI.

Our main finding was that the structural change in saving elasticities was much more pronounced with respect to Dinar savings than with respect to foreign exchange savings, which means that changing patterns of households' saving behavior were mainly reflected in savings in domestic currency. Foreign exchange saving has exhibited a more stable pattern of behavior over the past 24 years, since structural change seems to have occurred only in three cases: (i) in the 1963—1973 period with respect to the 1974—1980 period; (ii) in the 1973—1980 period with respect to the 1963—1972 period; and (iii) in the 1980—1986 period with respect to the 1963—1979 period. These results confirm our remarks on the changing nature of foreign exchange accounts, from the sixties, when they were mainly a repository of guest workers' remittances, to the seventies, when they became a mechanism for maintenance of purchasing power, and on to the eighties, when they have firmly established themselves as the most attractive financial asset for Yugoslav households.

4.2. ANALYSIS OF WEALTH EFFECTS

4.2.1. *Changes in wealth under alternative specifications of estimating equations*

We begin our analysis of wealth effects with Table VII, where we present estimates of $\hat{Y}$ (given by equation 22 from Section 3) calculated under alternative specification of estimating equations. For each period considered we give two alternative estimates of wealth changes, and for the 1980—1986 period we give three such estimates.

As can be seen from the year-to-year comparisons of $\hat{Y}$s in Table VII, the estimated changes in wealth differ by very small amounts, usually on the order of one hundredth of one percent. The greatest similarity of estimates holds for the sixties and the seventies, and it gradually decreases as we approach the eighties. Thus, looking horizontally across the first six columns in Table VII we hardly notice any difference in estimated values of wealth changes. In the 1980s, due to the fact that our estimates of saving elasticities come from different data sets, the differences in wealth estimates are noticed more easily.

Table VII

Changes in wealth under alternative specifications of estimating equations

Estimates	1 & 3	2 & 4	8 & 10	9 & 11	13 & 15	14 & 16	21 & 25	23 & 25	22 & 24
1965	—3.34	—3.34	—3.35	—3.35					
1966	8.84	8.84	8.83	8.83					
1967	2.42	2.42	2.42	2.42					
1968	11.09	11.09	11.09	11.09					
1969	7.82	7.82	7.82	7.82					
1970	13.7	13.7	13.71	13.71					
1971	8.47	8.47	8.47	8.47					
1972	3.95	3.95	3.95	9.94					
1973	3.34	3.34			3.33	3.33			
1974	3.73	3.73			3.74	3.74			
1975	—2.35	—2.34			—2.44	—2.45			
1976	9.06	9.06			8.86	8.86			
1977	3.26	3.23			2.95	2.95			
1978	9.4	9.4			9.43	9.43			
1979	—0.25	—0.25			—0.28	—0.29			
1980	—0.9	—0.9					—1.527	—1.543	0.968
1981	—1.22	—1.21					—1.261	—1.287	—1.251
1982	0.63	0.64					0.546	0.508	0.582
1983	—7.01	—7.0					—7.245	—7.306	—7.046
1984	0.24	0.27					—0.407	—0.433	0.1214
1985	—0.86	—0.82					—0.983	—1.031	—0.889
1986	1.23	1.28					0.733	0.659	1.214
Average	3.74	3.75	7.52	7.52	3.65	3.65	—1.45	—1.49	—1.18

But except for the equations 22 and 24, they are again on the order of few hundredths of one percent. This confirms our earlier assertion that the elasticities obtained from the monthly data set can be used as reliable estimates for this period. Some more pronounced differences in estimates of wealth changes — on average, of the order of 1/2 of one percent — arise from calculations based on long-run elasticities (first two columns of Table VII), compared to those based on short-run elasticities (last three columns of the same table). This, however, comes as no surprise, because one should normally expect the short-run elasticities to be higher.

Regarding the period-by-period changes in real wealth, the 1960s obviously were a period of significant wealth accumulation for the Yugoslav households: the average change in real wealth was about 7.5 percent annually, more than double the rate for the 1970s, and about 100 percent above the average for the entire 1963—1986 period. On the other hand, the 1980s have been a period of substantial real wealth *contraction*, on average by about —1.4 percent annually, with a trough in 1983, when the real wealth of Yugoslav households decreased by about —7.2 percent. The 1970s stand somewhere in between, with the average rate of wealth change of 3.65 percent, only sightly below the long-run average of about 3.75 percent.

The most pronounced changes in wealth seem to have occurred in 1964 (14.8%), 1968 (11%), 1970 (13.7%), and in 1976 and 1978 (9.0 and 9.4 percent, respectively). Prior to the 1980s there were only three years in which households' real wealth declined: 1965 (—3.3%), 1975 (—2.4%). and 1979 (—0.25%). Space limitations preclude us from analyzing in detail the causes for these ups and downs in real wealth, but we must note that — contrary to the implications of the OECD study — there seems to be *absolutely no evidence* of a link between devaluations and substantial changes in real wealth position of the households. Quite to the contrary, in 1965 and 1983 when some of the largest post-war devaluations (67 and 101 percent, respectively) did take place, some of the largest post-war decreases in real wealth also took place (—3.3 and —7.0 percent, respectively). The exact circumstances under which these events occurred will be analyzed below, but already the sheer force of these facts prompts us to reject the OECD results as unfounded.

4.2.2. *Anatomy of changes in wealth*

As pointed out earlier, for further analysis we selected just one pair of wealth estimates for each period. We followed the reasoning that the most reliable estimates of saving elasticities also should yield the most reliable estimates of wealth changes, and therefore in the remaining part of this paper we concentrate on four specifications of estimating equations only: 1 and 4 for the 1963—1986 period, 9 and 11 for the period 1963—1972, 14 and 16 for the period 1973—1979, and 21 and 25 for the period 1980—1986.

In Tables VIII and IX we decomposed changes in wealth derived from the four selected pairs of estimating equations into their constituent parts, described by equations (27)—(32) from Section 3, and we calculated the percentage contribution of each of these sources of real wealth changes to either a rise or a fall in real wealth for the corresponding year. Thus, e.g., data in column $\omega/\pm\Delta Y$ denote percentage contribution of the *change in real wages* to total positive (or total negative component of wealth change in a given year: 99.75 for the year 1979 means that changes in real wages accounted for 99.75 percent of all the components that *increased* total real wealth in 1979, while —73.8 for the year 1980 means that changes in real wages accounted for 73.8 percent of all the components that *decreased* total real wealth in 1980. This decomposition enables us to ascertain the exact magnitude of a given variable's contribution to changes in real wealth, and thus to concentrate on those determinants of wealth that are empirically the most relevant.

Starting with Table VIII, we see that in the period 1963—1986 the income component of wealth changes was on average 3.37 percent, the remittances component was 0.5 percent, the depreciation component 0.0177 percent, the interest rate component —0.0094 percent, while the net loans component amounted to —0.13 percent annually. Percentagewise, changes in real income accounted, on average, for 59.2 percent of all increases in real wealth and 10.7 percent of all decreases in real wealth in this period. Changes in the real value of remittances were responsible for 19.6 percent of all increases, and 23.2 percent of all decreases in real wealth over the 24-year period considered. Changes in the exchange rate — the source of real wealth changes singled out by the OECD — represented, on average, only 9.47 percent of all positive (i.e. wealth-increasing) components of wealth changes, and 1.14 percent of all wealth-decreasing components of $\hat{Y}$; the corresponding figures are 0.0017 and as much as —19 percent for the real interest rate changes. Finally, changes in the real value of net loans accounted, on average, for 11.8 percent of increases, and no less than 45.9 percent of real wealth decreases in the period 1963—1986. Thus, in terms of *positive* impacts on wealth, the ranking is wages, remittances, net loans, depreciation, and real interest, while in terms of *negative* impacts on real wealth the ranking is net loans, real interest, remittances, wages, and depreciation. Immediately we see that real wealth effects of devaluations are relatively unimportant, and this will be further confirmed in Tables X and XI, where we look at the size of these effects in relation to the size of the gross social product.

It is interesting and revealing to observe how these rankings change from period to period. In the sixties the above ranking is the same. In the seventies there are already some significant changes: net loans have overcome remittances as the second most important source of positive changes in real wealth (17.2% vs. 13.7%), while on the side of wealth-decreasing factors the ranking is remittances (—39.8%), depreciation (—33.5%), and net loans (—26.7%). It must be admitted, however, that decreases in real wealth due to exchange rate changes are numerically negligible when compared with wealth decreases in-

Table VIII

Anatomy of changes in wealth, 1963—1986. [Specification (2) and (4)]

Year	$\hat{Y}$	ω	$\omega/\pm\Delta Y$	ζ	$\zeta/\pm\Delta Y$	δ	$\delta/\pm\Delta Y$	ι	$\iota/\pm\Delta Y$	λ	$\lambda/\pm\Delta Y$
1964	14.79	17.09	100	—0.05	—2.2	0	0	—0.0024	—0.103	—2.25	—97.7
1965	—3.36	2.48	77.9	0.7	22.1	0.00053	0.035	—0.013	—0.198	—6.51	—99.8
1966	8.84	8.43	93.8	0.6	6.7	0	0	—0.0071	—3.69	—0.19	—96.3
1967	2.42	1.28	52.8	0.41	16.8	0	0	0.00002	0.00101	0.73	30.3
1968	11.09	4.75	42.8	0.84	—7.5	0	0	0.0034	0.0308	5.5	49.6
1969	7.82	8.27	85.4	1.42	14.6	0	0	0.00079	0.00816	—1.87	—100
1970	13.7	7.6	55.5	3.27	23.9	0	0	—0.0016	—100	2.82	20.6
1971	8.5	7.34	69.0	3.29	31.0	0.00477	0.045	—0.0059	—0.273	—2.16	—99.7
1972	3.95	2.66	51.3	2.52	48.7	0	0	—0.0061	—0.5	—1.23	—99.5
1973	3.34	0.15	4.4	2.25	67.2	—0.0026	—23.95	—0.0082	—76.05	0.95	28.4
1974	3.74	2.76	61.5	—0.73	—98.3	0.00323	0.072	—0.0125	—1.68	1.72	38.4
1975	—2.34	0.13	98.4	—1.99	—80.2	0.00215	1.615	—0.0131	—0.53	—0.48	—19.3
1976	9.06	7.58	83.7	0.11	1.2	0.00056	0.006	—0.0001	—100	1.37	15.1
1977	3.26	5.7	100	—0.36	—14.7	0.00059	0.01	—0.0048	—0.196	—2.08	—85.1
1978	9.4	3.09	32.9	2.65	28.2	0.00049	0.005	—0.0047	—100	3.63	38.9
1979	—0.25	1.32	99.75	—0.7	—44.5	0.0033	0.449	—0.0123	—0.78	—0.86	—54.7
1980	—0.9	—2.25	—73.8	2.11	98.4	0.0343	1.596	—0.0182	—0.6	—0.78	—25.6
1981	—1.21	—0.09	—7.2	—0.58	—46.8	0.0357	100	—0.0226	—1.82	—0.54	—44.2
1982	0.64	0.45	59.5	0.26	35.0	0.0413	5.48	—0.0118	—10.2	—0.1	—89.8
1983	—7.0	—3.2	—45.1	—2.1	—29.6	0.0953	100	—0.0145	—0.2	—1.78	—25.1
1984	0.27	—3.73	—99.6	1.95	48.7	0.0876	2.185	—0.0144	—0.39	1.97	49.1
1985	—0.82	0.97	94.4	—1.77	—95.9	0.057	5.561	—0.0236	—1.28	—0.05	—2.8
1986	1.28	4.65	99.1	—2.56	—75.2	0.0424	0.905	—0.0223	—0.65	—0.82	—24.2
Average	3.75	3.37	59.2 (—10.7)	0.5	19.6 (—23.2)	0.0177	9.47 (—1.14)	—0.0094	0.0017 (—19.0)	—0.13	11.8 (—45.9)

Table IX

Anatomy of changes in wealth, by subperiods. [*Specifications (9) and (11) for 63/72; (14) and (16) for 73/80*]

Year	$\overset{\Delta}{Y}$	ω	$\omega/\pm\Delta Y$	ζ	$\zeta/\pm\Delta Y$	δ	$\delta/\pm\Delta Y$	ι	$\iota/\pm\Delta Y$	λ	$\lambda/\pm\Delta Y$
1964	14.78	17.09	100	—0.05	—2.2	0	0	—0.0051	—0.22	—2.25	—97.6
1965	—3.35	2.48	77.8	0.71	22.1	0.00216	0.068	—0.027	—0.41	—6.51	—99.6
1966	8.83	8.42	93.3	0.6	6.7	0	0	—0.015	—7.65	—0.19	—92.4
1967	2.42	1.28	52.8	0.41	16.9	0	0	0.00012	0.005	0.73	30.3
1968	11.09	4.75	42.8	0.84	7.6	0	0	0.0076	0.069	5.5	49.6
1969	7.82	8.27	85.3	1.42	14.7	0	0	0.00186	0.013	—1.87	—100
1970	13.71	7.6	55.4	3.29	24.0	0	0	—0.0037	—100	2.82	20.6
1971	8.47	7.34	68.9	3.3	31.0	0.00924	0.0868	—0.0145	—0.67	—2.16	—99.3
1972	3.94	2.65	51.2	2.53	48.8	0	0	—0.0181	—1.46	—1.23	—98.5
Average	7.52	6.65	69.7	1.45	19.1 (—0.31)	0.00127	0.017	—0.0082	0.01 (15.8)	—0.57	11.2 (—83.9)

Year	$\overset{\Delta}{Y}$	ω	$\omega/\pm\Delta Y$	ζ	$\zeta/\pm\Delta Y$	δ	$\delta/\pm\Delta Y$	π	$\pi/\pm\Delta Y$	λ	$\lambda/\pm\Delta Y$
1973	3.33	0.147	4.1	2.25	66.9	0.00454	0.135	0.0086	0.26	0.95	28.4
1974	3.74	2.76	61.4	—0.73	—99.3	—0.00513	—0.7	0.0129	0.29	1.72	38.3
1975	—2.45	0.131	89.6	—1.98	—80.5	—0.003	—0.12	0.0151	10.4	—0.48	—19.4
1976	8.86	7.598	83.7	0.11	1.2	—0.00071	—100	0.0059	0.065	1.37	15.1
1977	2.95	5.713	99.8	—0.36	—14.7	—0.00072	—0.03	0.0097	0.17	—2.08	—85.3
1978	9.43	3.105	33.0	2.63	28.0	—0.00054	—100	0.0109	0.12	3.66	38.9
1979	—0.29	1.323	98.5	—0.69	—44.6	—0.0035	—0.22	0.0199	1.48	—0.86	—55.5
Average	3.65	2.97	67.2	0.18	13.7 (—39.8)	—0.00128	0.02 (—33.5)	0.0119	1.82	0.612	17.2 (—26.7)

Table IX (continued)

[*Specification: (21) and (25)*]

Year	$\hat{Y}$	ω	$\omega/\pm\Delta Y$	ζ	$\zeta/\pm\Delta Y$	δ	$\delta/\pm\Delta Y$	π	$\pi/\pm\Delta Y$	λ	$\lambda/\pm\Delta Y$
1980	—1.527	—2.25	—72.2	2.07	95.0	0.108	4.7	—0.088	—2.8	—0.78	—25.0
1981	—1.261	—0.09	—6.7	—0.57	—42.6	0.103	100	—0.131	—9.8	—0.55	—40.9
1982	0.546	0.45	54.5	0.26	31.5	0.115	14.0	—0.079	—43.4	—0.1	—56.6
1983	—7.246	—3.21	—44.8	—2.06	—28.8	0.257	100	—0.112	—1.6	—1.78	—24.9
1984	—0.407	—3.74	—95.1	1.9	46.4	0.223	5.5	—0.193	—4.9	1.97	48.2
1985	—0.983	0.97	86.1	—1.73	—85.3	0.149	13.3	—0.245	—12.1	—0.05	—2.5
1986	0.733	4.67	97.7	—2.5	—68.7	0.111	2.3	—0.311	—8.6	—0.82	—22.8
Average	—1.45	—0.46	34.1 (—31.2)	—0.38	24.7 (—32.2)	0.152	34.3	—0.166	—11.88	—11.9	6.9 (—24.7)

duced by the fall in real value of remittances and net loans. A seemingly paradoxical result is that changes in the rate of inflation actually increased real household wealth, on average, by 0.0119 percent annually, or 1.82 percent of all wealth-increasing factors in this period. We must remember, however, that this did not occur because inflation in itself increases real wealth (how wonderful would it be to discover such a mechanism!), but because inflation had induced the households to shift their resources into higher-yielding foreign currencies, which prevented the erosion of the purchasing power of their assets.

There are even more dramatic changes in relative rankings of wealth components in the 1980s: now the most prominent source of increases in real wealth (34.3% on average) were devaluations, which is in line with the OECD arguments. Closely second were real incomes (34.1%), in the third place were remittances (24.7%), and in the fourth net loans (6.9%). Remittances and real incomes were again on the top of the list of wealth skimmers, with —32.2 and —31.2 percent contributions, respectively, while changes in net loans came in second with —24.7 percent contribution. Inflation-induced changes stood at —11.9 percent of all negative changes in real wealth, thus emerging as an important wealth-reducing factor, too. Thus, there is no doubt that wealth effects of inflation and devaluations have been considerable in recent years, which is even more surprising given that they enter our model only through savings (compare, for example, the expressions for δ and π with those for ω and ζ).

Tables VIII and IX contain very rich data for applied policy analysis, that could explain a number of earlier observations on the sources of real wealth changes in particular years. Usually the largest part of changes in real wealth can be traced back to changes in real wages, remittances, and net loans, but in some years inflation, the interest rate, and the exchange rate changes account for a substantial part of wealth changes. This can be best appreciated by looking for the 100 percent (or —100 percent) figures in columns $\delta/\pm\Delta Y$, and $\iota/\pm\Delta Y$ in Tables VIII and IX: the exchange rate changes were the only wealth-increasing factor in 1981 and 1983, and the only wealth-decreasing factor in 1976 and 1978, while the interest rate changes accounted for 100 percent of all negative changes in wealth in 1970, 1975, and 1977. Note also that the effects of inflation is relatively small, because π measures only its impact on savings. But even in this limited capacity, we see that inflation was among the most important wealth-reducing factors in 1982 and in 1985.

How important are changes in wealth and its components in terms of the gross social product? The answer to this question is given in

Tables X and XI, where calculated real wealth change $\hat{Y}$ as a percentage of real GSP for the given year, and then decomposed this number into its constituent parts: wage-induced changes in wealth as a percentage of GSP, ω/GSP; remittances-induced changes in wealth as a percentage of GSP, ζ/GSP, etc. (A minus sign means that the corresponding factor has contributed to a reduction in real wealth; the averages however ,are taken in terms of absolute values.) From the long-run point of view (Table X), wages seem to be by far the most important force behind real wealth changes. On average, wage-induced changes in real wealth accounted for 2.7 percent of real GSP. On the second place are changes in the real value of net loans (1.16 percent of real GSP); on the third remittances (1.04 percent). They are followed by the exchange-rate-induced changes in wealth, which account for about 0.014 percent of real GSP, and the interest-rate-induced changes in wealth, that amounted to about 0.007 percent of GSP annually. Changes of real wealth itself have averaged about 3.4 percent of GSP annually. (Note that horizontal sums of averages in Tables X and XI do not add up the average in column $\hat{Y}$/GSP, because the averages are taken over the *absolute* values of a given factor's contribution to changes in wealth.) Thus, compared with the OECD estimates, wealth effects of devaluation are almost negligible in the long run.

On a period-by-period basis (Table XI), exchange rate changes turn out to be more important, but we see that the highest value of δ/GSP (year 1983) is only 0.194 percent, which is ten times less than the figure advanced in the OECD study. Moreover, in the 1970s and the 1980s, devaluations appear to be on the last place among the wealth-changing factors; in particular, wealth effects of inflation in terms of GSP on average turn out to be bigger in both periods. This is an important finding —even more so because inflation directly enters our estimates only through foreign exchange and Dinar savings (recall equation 32 from Section 3) — and it readily demonstrates that by saving, Yugoslav households on average lose more from inflation than they gain from devaluations. Note also that, contrary to the OECD argument, net loans are not a source of wealth gains for the households: as indicated by the negative signs in the λ/GSP column, the real value of loan repayments has exceeded the real value of loans received in 16 out of 24 years. Against this background, it is obvious that one should advocate policies aimed at *encouraging* foreign exchange savings, since currently they are the only source of potentially stable purchasing power for the Yugoslav households.

Table X

Changes in wealth as a percentage of gross social product, 1963—1986
[*Specification: (2) and (4)*]

Year	ω/GSP	ζ/GSP	δ/GSP	ι/GSP	λ/GSP	$\hat{Y}$/GSP
1964	8.178	—0.024	0	—0.00113	—1.079	7.074
1965	1.175	0.333	0.000529	—0.00612	—3.081	—1.579
1966	4.416	0.315	0	—0.00374	—0.098	4.63
1967	0.725	0.231	0	0.000014	0.416	1.372
1968	2.961	0.521	0	0.002129	3.428	6.912
1969	5.248	0.898	0	0.0005	—1.187	4.959
1970	5.257	2.263	0	—0.00113	1.952	9.471
1971	5.113	2.294	0.00332	—0.00412	—1.506	5.9
1972	1.884	1.789	0	—0.00436	—0.869	2.799
1973	0.104	1.601	—0.00183	—0.00581	0.678	2.376
1974	1.948	—0.517	0.00228	—0.00885	1.216	2.642
1975	0.094	—1.431	0.00155	—0.00943	—0.344	—1.687
1976	5.835	0.083	0.00043	—0.00073	1.053	6.97
1977	4.335	—0.273	0.00045	—0.00364	—1.581	2.477
1978	2.536	2.174	0.0004	—0.00387	2.995	7.701
1979	1.036	—0.548	0.00259	—0.00967	—0.674	—0.194
1980	—1.712	1.610	0.0261	—0.0138	—0.594	—0.683
1981	—0.066	—0.432	0.0265	—0.0168	—0.408	—0.897
1982	0.338	0.199	0.0311	—0.00886	—0.078	0.4812
1983	—2.409	—1.585	0.0718	—0.0109	—1.342	—5.276
1984	—2.837	1.489	0.0667	—0.011	1.5	0.206
1985	0.738	—1.35	0.0435	—0.018	—0.039	—0.626
1986	3.571	—1.973	0.0326	—0.0172	—0.634	0.982
$\lvert\mu\rvert$	2.718	1.041	0.0136	0.00718	1.163	3.387

Table XI

Changes in wealth as a percentage of gross social product, by periods
[*Specifications: (9) & (11) for 63/72; (14) & (16) for 73/79; (21) & (25) for 80/86*]

Year	ω/GSP	ζ/GSP	δ/GSP	ι/GSP	π/GSP	λ/GSP	$\hat{Y}$/GSP
1964	8.178	—0.0242	0	—0.00241	—	—1.079	7.072
1965	1.175	0.333	0.001025	—0.01276	—	—3.081	—1.584
1966	4.416	0.316	0	—0.00809	—	—0.098	4.626
1967	0.725	0.232	0	0.000069	—	0.416	1.373
1968	2.96	0.523	0	0.004762	—	3.428	6.916
1969	5.247	0.901	0	0.001181	—	—1.187	4.962
1970	5.256	2.271	0	—0.00253	—	1.952	9.477
1971	5.11	2.302	0.006436	—0.01008	—	—1.506	5.903
1972	1.882	1.797	0	—0.01283	—	—0.869	2.796
$\lvert\mu\rvert$	3.88	0.97	0.000829	0.0608	—	1.513	4.968
1973	0.104	1.597	0.00323	—	0.00614	0.678	2.367
1974	1.952	—0.515	—0.00363	—	0.00913	1.216	2.645
1975	0.0944	—1.426	—0.00216	—	0.0109	—0.344	—1.764
1976	5.847	0.0823	—0.000548	—	0.00455	1.053	6.817
1977	4.345	—0.272	—0.000546	—	0.00737	—1.581	2.242
1978	2.542	2.157	—0.00044	—	0.0089	2.995	7.723
1979	1.039	—0.544	—0.00272	—	0.0156	—0.674	—0.224
$\lvert\mu\rvert$	2.27	0.942	0.0019	—	0.00895	1.22	3.397
1980	—1.714	1.58	0.0826	—	—0.0671	—0.59	—1.163
1981	—0.066	—0.425	0.0763	—	—0.0973	—0.41	—0.938
1982	0.339	0.196	0.0867	—	—0.0598	—0.078	0.412
1983	—2.416	—1.556	0.194	—	—0.0843	—1.342	—5.461
1984	—2.851	1.443	0.17	—	—0.1467	1.5	—0.31
1985	0.741	—1.319	0.114	—	—0.1871	—0.039	—0.75
1986	3.588	—1.913	0.0857	—	—0.2389	—0.634	0.564
$\lvert\mu\rvert$	1.67	1.2	0.1155	—	0.1259	0.62	1.37

5. CONCLUDING REMARKS

If the main message of the *OECD Economic Survey of Yugoslavia 1986/87* vas that something urgently had to be done with private foreign exchange accounts in order to prevent further accumulation of losses on the part of the National Bank of Yugoslavia, then the main message of this paper seems to be that the same action is required in order to prevent a further drain in the domestic credit system, and in order to stop the decline in households' real wealth position. We believe that the results of this paper are sufficiently indicative of the great potential that both Dinar and foreign exchange savings have for mobilization of financial resources in Yugoslavia. In times of deep economic crisis, when indebtedness of the firm and the banking sectors is assuming an increasing importance, and when the pressure to repay the external debt is not receding, the realization that we might have tapped a bountiful resource of both domestic and foreign exchange finance is certainly worth exploring. So contrary to the established practice of negative real interest rates, consumer credit ceilings, restrictions and insecurity in disposal of funds deposited in savings accounts, monetary and financial policies should actively encourage the citizens to save the maximum that they can.

There are numerous ways to achieve this goal, from the more active exchange rate and interest rate policies, to the introduction of agricultural mortgage loans, to the organization of financial markets in bonds issued by the labor-managed firms. All these ideas are present in public discussions for some time now, but it seems that the political structures in the country still are reluctant to adopt them. This should not be surprising given the pattern of ecoonmic development in Yugoslavia, which certainly is not alone in the developing world in its hesitant approach to financial liberalization. In fact, financial liberalization calls precisely for the *removal* of quantitative restrictions like interest rate ceilings, comprehensive reserve requirements, and currency overvaluation, and the *reliance* on interest-rate competition among the banks in intermediation between the savers and investors, and allocation of loanable funds to socially most productive uses. These measures build up the confidence of economic agents in the perseverance of policy makers on the path of financial reform, and they serve to re-establish the credibility in economic system, both domestically and abroad. Of course, economists have little say when it comes to the choice of policy decisions, but what they can do — and what we hope to have achieved with this paper — is to demonstrate what the consequences of pursuing certain policies are.

In particular, it should be clear that in times of inflation the active exchange rate policy helps households to maintain the purchasing power of their assets, and thereby prevents the painful adjustments of consumption to falling real incomes. If there are reasons to believe that the active exchange rate policy might put more pressure on aggregate demand in the Yugoslav market, then the best way to reduce these pressures is to create profitable investment opportunities for the households, so that their earnings and savings are channeled into

productive activites of the economy, rather than the "unproductive consumption", like summer residences, expensive cars, and foreign travel. Furthermore, it was shown that the fears of aggravating the problem of regional distribution of wealth by pursuing an active schedule of depreciations are unfounded: in 1983, when the rate of depreciation has reached its record high of 101 percent, the wealth-increasing effect of devaluation has amounted only to 0.2 percent of real GSP, and the real wealth position of households has actually *decreased* in that year by more than 5 percent of GSP. On the other hand, the potential for hedging against inflation through the banking system is a valuable incentive for households to exercise their thriftiness, and thereby promote the overall growth and economic welfare.

Finally, we believe that this paper has also made a step forward in the realm of theoretical and empirical analysis of wealth effects of inflation and devaluations. In particular, it was shown that useful policy recommendations in this area can be obtained only by studying household behavior in an *optimizing* framework. We believe that the cash-in-advance model that was built for this purpose is a right direction for future research. The empirical estimates of wealth effects given in this paper always can be improved by better data, but the methodology used seems to be suitable for a much wider range of applications, and we hope that such applications will significantly improve the quality of economists' advice to policy-makers.

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IMOVINSKI EFEKTI INFLACIJE I DEVALVACIJA U JUGOSLAVIJI: KO DOBIJA A KO GUBI?

Dubravko MIHALJEK

Rezime

U ovom članku autor procenjuje vrednosne efekte inflacije i depresijacije valute u Jugoslaviji u periodu 1963—1986. godine. Povod za ovaj rad je studija 1986/1987. OECD Economic Survey of Yugoslavia, *gde se, među ostalim rezultatima, ukazuje na to da 10% depresijacije dinara povećava bogatstvo domaćinstava za oko 2% društvenog bruto proizvoda (str. 37). U svetlu ranijih radova u ovoj oblasti (Mates, 1984; Mihaljek, 1987a), koji su generalno dali* negativnu *ocenu uticaja devalvacije, zajedno sa visokom domaćom inflacijom, na finansijska sredstva domaćinstava, značaj i veličina ove procene OECD-a prilično su iznenađujući i zaslužuju ozbiljno preispitivanje. Ovo je takođe tačno zbog značajnih implikacija ekonomske politike koje ova vrsta rezultata od jedne vodeće institucije može da ima u Jugoslaviji. Stanovnici manje razvijenih republika i autonomnih pokrajina takođe imaju manje deviza po glavi stanovnika. Ukoliko devalvacije predstavljaju transfer finansijske imovine vlasnicima deviza tada bi devizna politika mogla da doprinese širenju jaza između razvijenih i nerazvijenijih republika i autonomnih pokrajina. U isto vreme, devalvacije su neophodne radi stimuliasnja izvoznih grana i samim tim privrednog rasta i otplate inostranog duga. Usled toga, ukoliko su rezultati studije OECD tačni, kreatori ekonomske politike se mogu naći u ozbiljnoj dilemi, uzimajući u obzir izbor između rasta i efikasnosti, s jedne, i održavanja status quo-a u regionalnoj raspodeli finansijske imovine, s druge strane.*

U ovom članku autor pokazuje da OECD koristi takvu metodologiju koja vodi u znatna precenjivanja imovinskih efekata devalvacija, i ne manje značajna potcenjivanja imovinskih efekata inflacije. Umesto računovodstvenog pristupa imovinskim efektima autor pred-

laže proučavanje ponašanja štednje domaćinstava u jednom modelu optimiziranja, ističući da devizna štednja igra ulogu finansijskih sredstava, dok dinarska štednja uglavnom služi za transakcije. Nakon toga, autor procenjuje razne elasticitete štednje u periodu 1963—1988. godine i koristi te elasticitete u izračunavanju efekata inflacije, devalvacija i drugih faktora koji utiču na vrednost finansijske imovine domaćinstava. U radu se daju rezultati imovinskih efekata devalvacije, koji u periodu 1963—1986. godina iznose u proseku 0,014% od realnog društvenog bruto proizvoda, dok su 1980-tih godina, kada su bili najizraženiji, imovinski efekti devalvacija činili manje od 0,2% od društvenog bruto proizvoda, što je za deset puta manje od procene OECD-a. Obzirom da suština empirijskih rezultata leži u metodologiji i korišćenim podacima, prvo se mora kritički posmatrati pozadina OECD procena. Ovo je urađeno u drugom delu, gde se takođe posmatraju rezultati druge dve studije u ovoj oblasti. U trećem delu autor opisuje model i tehnike procene korišćene u ovom članku, dok u četvrtom delu prezentira osnovne rezultate svoje analize. Rad se zaključuje razmišljanjima o implikacijama rezultata ove studije na ekonomsku politiku.