

## A NOTE ON THE STRUCTURAL STABILITY OF SAVINGS IN YUGOSLAVIA

*James E. PAYNE\**

### I. INTRODUCTION

The importance of savings as a conduit for capital accumulation and economic growth is well recognized (Eckaus, 1955). Aside from the importance of savings for economic growth, higher savings can remedy other problems encountered by developing economics.<sup>1</sup> The determination of savings is of particular interest in the case of Yugoslavia. The prevailing balance of payments difficulties and the lack of effective implementation of corrective macroeconomic policies have rendered negative real growth rates in the major economic aggregates (Vacić, 1987). In particular, in the period immediately following the 1965 Economic Reforms (1966—1972) real growth in net income per worker was 5.1 percent, the period 1973—1979 yielded 3.4 percent while the period 1980—1985 displayed negative growth of —6.7 percent (Yagci and Kamin, 1987). In the case of Yugoslavia, where negative real interest rates have been prevalent, the IMF suggested in 1980 that the discount rate set forth by the National Bank be pegged above the rate of inflation to encourage the domestic growth rate of net income per worker from savings.<sup>2</sup> Enhancing economic growth via higher domestic savings would limit the need to finance such growth through foreign savings. Thus, the task of this paper is to examine the temporal stability of savings over the post-war period 1952—1985; notably testing for the presence of structural change in savings over the period of

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\* Oakland University, Rochester, Michigan, USA.

<sup>1</sup> Weisskopf (1972) hypothesizes that savings rather than the availability of foreign exchange place an upward bound on growth. Moreover, Eckaus (1955) finds that in countries where employment is constrained by the stock of capital, a higher rate of savings, and thus higher capital formation, can allow for an increase in employment. Hirschman (1969) suggests that a higher domestic savings ratio can deter a developing economy's dependence upon foreign capital.

<sup>2</sup> Tyson (1979) in an analysis of firm illiquidity and the demand for money, provides an elaborate discussion of the secondary effect present with negative real interest rates.

1980—1985. This period was characterized by stagnating growth of output. Section II will present the model to be tested as well as the empirical results. Section III will provide concluding remarks.

## II. THE MODEL AND EMPIRICAL RESULTS

There exist various functional forms used to determine savings behavior (Mikesell and Zinser, 1973). In the case of Yugoslavia, Stiblar (1980) examines alternative savings hypotheses over differing data sources.<sup>3</sup> The methodology pursued in this endeavor will parallel the model entertained by Giannaros and Lee (1987) as well as prior work by Stiblar (1980) and Leff and Sato (1975). Friend and Taubman's (1966) savings model is employed modified to include the effects of changes in interest rates upon real per capita savings (Williamson, 1969).

$$\begin{aligned} \left(\frac{S}{N}\right)_t &= \alpha_0 + \alpha_1 \left(\frac{Y^P}{N}\right)_t + \alpha_2 \left(\frac{Y^T}{N}\right)_t = \alpha_3 \left(i_t - \frac{\Delta P}{P_{t-1}}\right) + \\ &+ \alpha_4 \left(\frac{S}{N}\right)_{t-1} + \varepsilon_1 \end{aligned} \quad (1)$$

where

$$\left(\frac{S}{N}\right)_t = \text{real per capita savings}$$

$$\left(\frac{Y^P}{N}\right)_t = \text{real per capita permanent disposable income}$$

$$\left(\frac{Y^T}{N}\right)_t = \text{real per capita transitory income}$$

$$\left(i_t - \frac{\Delta P}{P_{t-1}}\right) = \text{real interest rates}$$

<sup>3</sup> Portes and Winter (1978) find that savings behavior in centrally planned economics parallels savings behavior found in market economics.

$$\left(\frac{S}{N}\right)_{t-1} = \text{real per capita savings lagged one period.}$$

$N$  = population

$\Delta$  = first-difference operator

and the hypothesized signs for all coefficients  $\alpha_i$ 's  $> 0$  and  $\varepsilon_1$  is white noise error term with zero mean and constant variance. In order to test the presence of structural change with regard to savings behavior, appropriate dummy and interaction variables need to be introduced into equation (1). Equation (2) is a reformulated version of equation (1) to take into account the possibility of a structural break in saving behavior in the 1980's.

$$\begin{aligned} \left(\frac{S}{N}\right)_t &= \beta_0 + \beta_1 DMU8OS + \beta_2 \left(\frac{Y^P}{N}\right)_t + \beta_3 \left(\frac{Y^T}{N}\right)_t + \\ &\beta_4 \left(i_t - \frac{\Delta P}{P_{t-1}}\right) + \beta_5 \left(\frac{S}{N}\right)_{t-1} + \beta_5 DUM8OS^* \left(\frac{Y^P}{N}\right)_t + \varepsilon_2 \end{aligned}$$

where

$$DUM8OS = \begin{cases} 1.0 & \text{for the period 1980—1985} \\ 0.0 & \text{otherwise} \end{cases}$$

$$DUM8OS^* \left(\frac{Y^P}{N}\right)_t = \text{interaction variable on real per capita permanent disposable income.}$$

The coefficients of  $DUM8OS$  and  $DUM8OS^* \left(\frac{Y^P}{N}\right)_t$  can be either positive or negative depending on the direction of change during the post-1980 period.

The data to be utilized in the estimation work covers an annual time frame from 1952—1985 from the Federal Statistical Office of Yugoslavia and made available by the Economic Institut, Zagreb. The saving variable is simply domestic savings. Permanent disposable income was constructed as a 3 year average  $(Y_{t-1} + Y_t + Y_{t+1})/3$  paral-

leling the work of Friend and Taubman (1966).<sup>4</sup> The transitory disposable income component is simply deviations of permanent disposable income from actual disposable income. The distinction between permanent and transitory disposable income provides information concerning the short- and long-term adjustments of savings. Both the income and savings variables are in 1972 real per capita terms using the implicit price deflator for social product with a base 1972 = 1.00. The interest rate variable is the discount rate set forth by the National Bank of Yugoslavia.

The task at hand is to test the null hypothesis of no structural break in the period 1980—1985. The null is rejected if the interaction variable is statistically significant at the 5 percent level suggesting a structural break in real capita savings behavior. Moreover, the sign of the interaction variable will give some evidence of the influence IMF policies have had on Yugoslav savings behavior. Thus, a positive sign of the coefficient of the interaction variable would mean that the slope of the savings function increased during the post-1980 period. Table 1 presents the results of estimating equations (1) and (2) via ordinary least squares corrected for first-order autocorrelation. As seen in Table 1, both the dummy and interaction variables are highly significant concluding rejection of the null hypothesis of no structural break in Yugoslav's real per capita savings. The coefficient of DUM8OS is positive and significant at the 5 percent level demonstrating an upward shift of the intercept within the post-1980 period. As seen in Table 2 there was an upward change in the intercept from .00009 in the pre-1980 period to .02599 in the post-1980 period. The interaction variable is highly significant; however, because DUM8OS has unit values for the post-1980 period, a negative sign of the coefficient of the interaction variable would mean the slope of the savings function decreased during the 1980—1985 period. This negative sign associated with real per capita permanent income can in part be explained by the stagnation in growth encountered in the period 1980—1985 within Yugoslavia (see Gapinski, et. al. 1989). As seen in Table 1, real interest rates did not appear to be a significant determinant upon Yugoslav savings behavior. The negative parameter estimate of the real interest rate in Equation (2) of Table 1, though statistically insignificant, may suggest that preference was placed upon current consumption rather than future consumption (savings). Thus, it would suggest that negative real interest rates promote increasing indebtedness. This finding does not appear to be unique given the lack of well-developed financial markets in Yugoslavia.

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<sup>4</sup> Friend and Taubman (1966) found that more elaborate weighting schemes to determine  $Y^p$  did not yield different results. Preliminary econometric work of an autoregressive nature with respect to income yielded similar results; however, using an autoregressive process to determine permanent income consumes degrees of freedom. Thus, the simple weighting scheme of Friend and Taubman was employed.

Table 1  
 Parameter Estimates of Yugoslav Savings Model  
 Ordinary Least Squares  
 Corrected For First-Order Autocorrelation

EQUATION	CONSTANT	DUM8OS	$\left(\frac{Y^p}{N}\right)_t$	$\left(\frac{Y^T}{N}\right)_t$	$\left(i_t - \frac{\Delta P}{P_{t-1}}\right)_t$	$\left(\frac{S}{N}\right)_t$	DUM8OS* $\left(\frac{Y^p}{N}\right)_t$	$R^2_F$	DW
(1)	.00004 (.3083)		.2424 (4.167)	.8601 (3.636)	.0002 (.2890)	.6691 (7.852)		.995 1634	1.94
(2)	.00009 (7.425)	.0250 (2.902)	.3658 (4.491)	.8806 (4.172)	-.0011 (-1.412)	.4528 (3.444)	-1.435 (-2.896)	.996 1337	1.95

\* t — statistics are denoted in parentheses under the respective coefficient estimates.

Table 2  
*Yugoslav Pre-1980 and Post-1980 Savings Behavior*

Coefficient of	Constant	$\left(\frac{Y^p}{N}\right)_t$
Pre-1980 Period	.00009 = $\beta_0$	.3658 = $\beta_2$
Post-1980 Period	.02599 = $\beta_0 + \beta_1$	-1.0692 = $\beta_2 + \beta_6$
Change in coefficient	.0250 = $\beta_1$	-1.435 = $\beta_6$

### III. CONCLUDING REMARKS

The task of this note has been to examine the possible change in Yugoslav savings behavior in the economic turbulence of the 1980's. A simple savings model was presented and empirically tested. Contrary to the objective of IMF policy guidelines in eliminating negative real interest rates, savings behavior failed to react to real interest rates. Moreover, given the structural change analysis, the slope of the savings function declined during the 1980—1985 time period. However, the coefficient estimates on permanent and transitory income parallel findings by Leff and Sato (1975) in a study of five developing countries, in that the marginal propensity to save out of transitory income is higher than the marginal propensity to save out of permanent income. As Table 1 reveals, the marginal propensity to save out of transitory income is approximately three and a half times greater than the marginal propensity to save out of permanent income.

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