

TAX POLICY AND INVESTMENT DECISIONS OF THE YUGOSLAV FIRM*

HIRIK G. FURUBOTN
and
SVETOZAR A. PEJOVICH

I. INTRODUCTION

YUGOSLAVIA has the distinction of being the first socialist country to reduce administrative planning substantially and decentralize its economy without, at the same time, reinstating private property rights over the means of production.¹ The accomplishment has not gone unnoticed in Eastern Europe. Thus, the study of economic institutions in Yugoslavia may throw some light on the future of structural change in other communist countries and, at a more fundamental level, offer a point of departure for an integrated theory of socialism.

Economic readjustment in Yugoslavia, and the content and direction of currently debated reforms in many communist countries, suggest a strong common theme: the search for new institutions which retain public ownership of the means of production but generate efficient market solutions for the production and distribution of economic goods. The problems of reform are, of course, formidable and, therefore, it is not surprising to find that experimentation with policy instruments has taken various directions. One of the policy lines followed will be examined in the present paper; specifically, the objective is to show how the Yugoslav government has attempt-

*Texas A&M University. The writing of this paper was facilitated by grants from the Earhard Foundation and the Research Council of Texas A&M University.

¹The share of social ownership increased from 52 percent of total fixed assets in 1946 to 73 percent in 1964. See D. Vojnich, *Investicije i Fiksni Fondovi Jugoslavije*, Zagreb: Ekonomski Institut, 1970, p. 27.

ed to use fiscal means to promote an allocation of income between present and future consumption that is more in agreement with the community's true time preferences than the allocation made under a rigid administrative scheme.

Since the immediate focus is on the relationship between profit taxes and the investment behavior of the Yugoslav firm, the paper begins with consideration of certain institutional arrangements which influence the firm's decisions concerning wage payments and reinvestment plans. It then proceeds to analyze the effects of profits taxation before and after the 1965 reforms, and ends with some generalizations on the significance of property rights structures for economic rationality. It is important to note at the outset, however, that the analysis is based on the officially announced legal structure in Yugoslavia. Insofar as existing laws are circumvented and actual socio-economic relations are different from those stated, the conclusions of the paper must be modified correspondingly.

II. THE INSTITUTIONAL BACKGROUND

The institutional features of the Yugoslav economy that are of central importance to the argument being developed in the paper reduce to the following: (1) the laws defining the firm's right to self-management, (2) the regulations pertaining to the firm's distribution of total revenue, and (3) the conditions under which the firm may acquire, use, and dispose of capital goods. Each of these areas was discussed

by the present writers in an earlier paper² and may be summarized briefly as follows:

(1) Self-Management

Since 1950-51, Yugoslav law has accepted the principle that the employees of a firm should have relatively wide powers to manage the firm's activities. At each unit, the local collective elects a Workers' Council; this body, in turn, makes all major decisions and considers such matters as the rate and quality of output and investment, the level of employment, the hiring and firing of workers, etc. Moreover, the Workers' Council even has sufficient power to ask for the dismissal of the firm's director if the latter's performance is judged unsatisfactory.

The role of the director in the management process is of special interest. The firm's director is selected in a public contest by a commission appointed jointly by the Workers' Council and local government. He is expected to implement the decisions of the Workers' Council, organize and direct production, and generally promote efficient operation of the plant. Since he is directly responsible to both the state and the collective, the director of the Yugoslav firm can afford to be neither a dictator nor a paternalistic supervisor. Rather, he must formulate policy consistent with the state's basic objectives and, at the same time, be able to persuade the collective concerning the wisdom of his ideas on policy.³

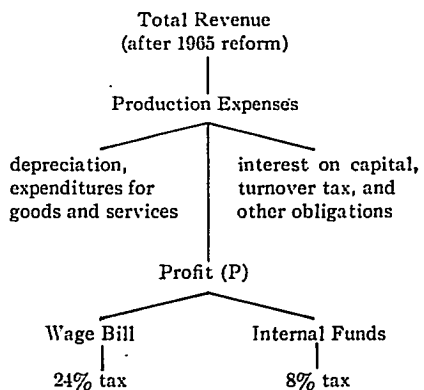
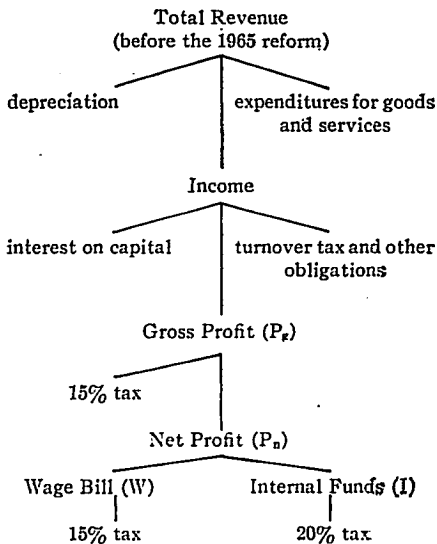
(2) The Distributional Schemes

Under the socialist organization of the economy, definite provisions of the law govern distribution of the firm's total revenue. The respective schemes of distribution before and after the 1965 reform can be established as follows:⁴

²E. Furubotn and S. Pejovich, "Property Rights and the Behavior of the Firm in a Socialist State: The Example of Yugoslavia", *Zeitschrift für Nationalökonomie*, 30, December 1970.

³John Dunlop, *Industrial Relations Systems*, New York: Holt, Rinehart and Winston, 1959; pp. 294-296.

⁴M. Spiljak, *The System of Remuneration in Yugoslavia*, Belgrade: Publishing House, 1961;



Note that the unique feature in each of these distributional arrangements is the exclusion of the wage bill from the (accounting) cost of production. This means that the actual take-home pay of the Yugoslav worker varies with: (a) the realized profits of his firm, (b) the allocation of profit between the Wage Fund and the Internal Fund, and (c) the criteria used to distribute the Wage Fund among the firm's employees. Further, as

and *Nove Mere Za Sprovođenje Privredne Reforme*, Belgrade: Knjizevne Novine, 1968.

of 1965, the Workers' Council was given direct control over the distribution of profit between the Wage and Internal Funds. The abolition of official guidelines for the Wage Fund allocation represented a major change toward greater independence of the Yugoslav firm from administrative control. And, as subsequent analysis will show, the effect of the 1965 reorganization on the firm's investment behavior was such as to require a change in tax policy. In other words, there is a sound economic explanation for the difference in Yugoslav tax structure before and after 1965.

(3) *Property Rights in Capital Goods*

The Yugoslav firm does not and, in fact, cannot own capital goods.⁵ However, the direct relation existing between the firm's profit and the average wage makes it important for the collective to control the quantity and quality of its capital stock, that is to enjoy some kind of well-defined property rights over the firm's fixed assets. The Law on the Management of Fixed Capital by Enterprises of December 1953⁶ gave the firm the *right of use* over its capital goods and, thus, provided the firm with a quasi-private property right over the means of production. In effect, the 1953 law allowed the firm to produce, buy and/or sell capital goods subject to only two basic constraints: (a) If the firm sells an asset for less than its book value the difference has to be deducted from the firm's profit and earmarked for investment. This requirement is equivalent to saying that the enterprise must maintain the values of its assets via reinvestment of depreciation allowances or otherwise; (b) The firm must pay an interest tax on the book value of its capital to the government. The purposes of this obligation are, in addition to asserting the social ownership of capital, to provide funds for administratively planned investment projects, and to induce the profit oriented firm to use capital goods effi-

⁵Fundamental characteristics of private property are: *exclusivity* of right of use of a thing and *voluntary transferability* of that right (e.g., the right to give it away).

⁶*Sluzbeni List*, Belgrade, December 1963.

ciently. Indications are, however, that the payment will be discontinued in the near future.

The preceding outline of the institutional framework within which economic activity must be conducted suggests two possible behavioral goals for the Yugoslav firm: (1) wage maximization per worker, and (2) wealth maximization per worker.⁷ It has been demonstrated elsewhere⁸ that the latter appears to be a more relevant goal. The wealth maximization hypothesis is able to offer comprehensive insight into the collective's decisions concerning output, employment and net investment. The solutions reached for these key variables in the multi-period (wealth) model are found to be mutually interdependent and strongly influenced by the property rights structure extant. Interestingly, the 1965 reform suggests that the Yugoslav government recognizes wealth maximization per worker as a fundamental objective of the firm. That is, it would make little sense for the government to abolish guidelines for the allocation of profit unless there were some confidence that the typical collective is willing to distribute part of its profit to the Internal Fund. By contrast, the wage maximization hypothesis implies that the firm will always choose to place its *entire* profit in the Wage Fund. According to the strict logic of the case, the wage maximizing firm must opt for zero net investment from its own sources, and can only be induced to deviate from such a plan by the direct action of the state.

If it is granted that wealth maximization per worker constitutes the most plausible goal for the firm, theoretical analysis can be invoked to show how optimal solutions are determinable for employment,

⁷There is lack of consensus on the behavioral goal of the socialist firm. See: E. Domar, "The Soviet Collective Farm," *American Economic Review*, 56, September 1966; E. Furubotn and S. Pejovich, "Property Right and the Behavior of the Firm in a Socialist State: The Example of Yugoslavia," *op. cit.*; P. Pelikan and R. Kocanda, "The Socialist Enterprise as a Participant in the Market," *Czechoslovak Economic Papers*, No. 9 1967; and B. Ward, "The Firm in Illyria: Market Syndicalism," *American Economic Review*, 48, September 1958.

⁸E. Furubotn and S. Pejovich, *Ibid.*

output, the wage rate, and net investment in each period to the planning horizon. Relative to the purposes of the present work, however, there is no need to go deeply into these technical considerations. Rather, attention can be concentrated more narrowly on the effects of Yugoslav tax policy on the distribution of a given profit (P) between the Wage Fund (W) and the Internal Fund (I). In all subsequent discussion, the fraction of total profit allocated to the Internal Fund is assumed to be earmarked exclusively for investment purposes.⁹

III. PROPERTY RIGHTS AND THE BEHAVIOR OF THE FIRM

Now, with this general background established, we are able to consider the role of property rights structures in shaping the behavior of the firm. Apparently, the collective's decisions relative to the allocation of profit (P) between current and future consumption are strongly influenced by the institutional scheme prevailing.

The curve K'S in diagram 1 shows how much of the firm's current profit (P) the collective would be willing to divert from current consumption to the accumulation of *owned* assets when confronted with different possible interest rates ($i \geq i^*$).¹⁰ But since savings deposits represent the only type of nonhuman earning assets the workers are permitted to own in Yugoslavia,¹¹ and since the bank rate of interest is fixed by the government at some level i^* , the portion of the curve lying above point K' does not come into effective play. The workers employed by a Yugoslav firm have an

⁹The Internal Fund consists of Reserve Fund, Collective Consumption Fund and Investment Fund. For simplicity we assume that all monies allocated to the Internal Fund are used for self-financed investment.

¹⁰For a detailed discussion see S. Pejovich, "The Firm, Monetary Policy and Property Rights in a Planned Economy," *Western Economic Journal*, 7, September 1969.

¹¹Individual citizens in Yugoslavia can own some well specified nonhuman earning assets such as repair shops, rental property, etc. The inclusion of those assets (which are quite limited) into the analysis would only complicate it without changing our results.

important investment alternative, however. They can choose to allocate some of the firm's profit to the Internal Fund! Given wise investment, the productive capabilities of the firm must be enhanced by any additional capital and, thus, higher wages can be paid to the employees in the future. One point should be clear though; when workers leave the firm, they lose all claims to the subsequent earnings of the capital despite the fact that their earlier sacrifices helped to finance the enlarged stock. Because of the latter condition, we shall refer to this type of investment by the collective as investment in *non-owned* assets.

A major behavioral implication of this quasi-ownership right is that the collective's savings schedule must be displaced upward (from K'S). For any specified time horizon, the AS₁ curve in diagram 1 is the K'S curve *adjusted* for the behavioral effects of a change in property rights (i.e., from owned to non-owned assets). This adjustment is relatively easy to make. For example, if the time horizon is five years and the bank rate of interest (i^*) is 5 per cent, the corresponding rate of return from investment in *non-owned* assets which would just be equal to i^* is 23 per cent (i.e., $r^* = 23$ per cent because the present value of 23 cents a year for five years discounted at 5 per cent is one dollar). Given the firm's obligation to maintain the value of its capital assets indefinitely, the rate of return which makes non-owned assets as desirable as savings deposits at 5 per cent is 23 per cent (for a five year time horizon).¹²

The marginal efficiency of investment schedule II indicates the return that the employees can expect from diverting current consumption to investment in non-owned assets. The schedule reflects the op-

¹²Here, the determination of r is based on the assumption that investment in non-owned assets in period one is followed by a succession of rewards (wage increments) beginning in period two and extending to some finite time horizon t . Other plausible assumptions about the reward stream are conceivable, and can be handled by following the same general line of reasoning. Note, however, that different values of r will emerge as the assumptions about the shape of the reward stream are changed.

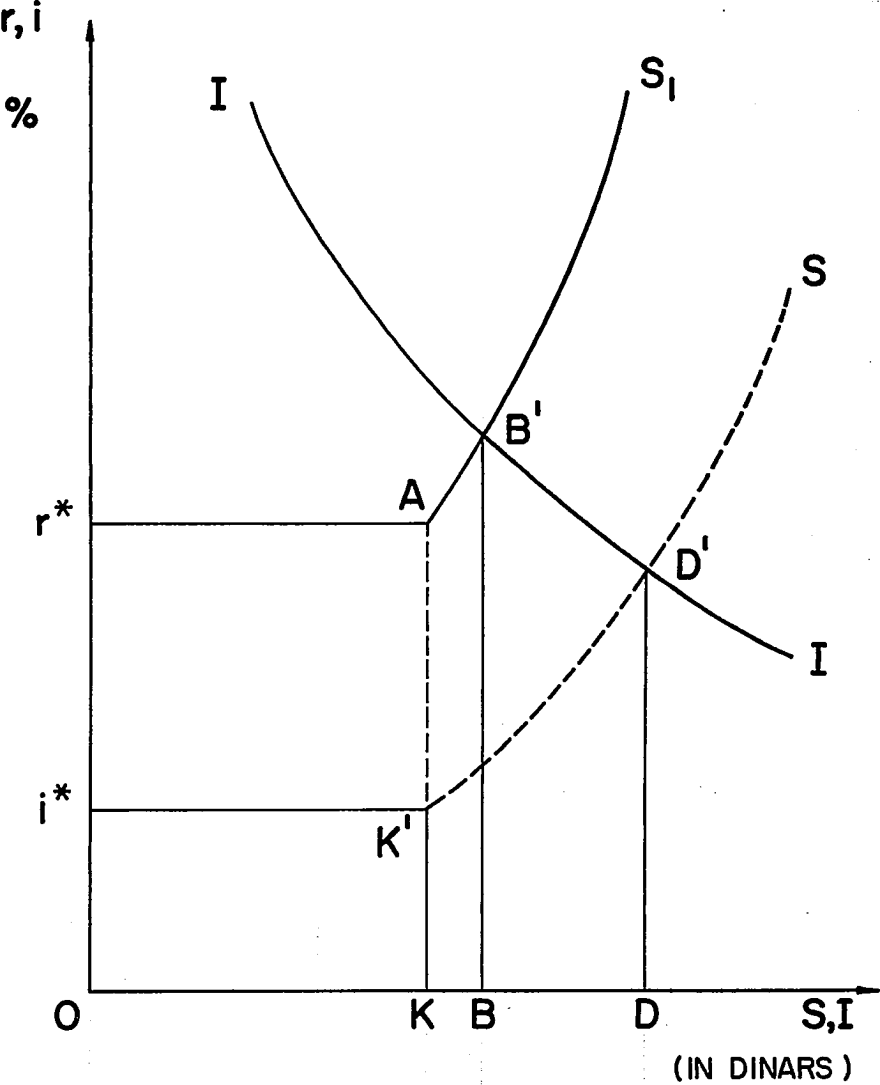


DIAGRAM I

portunities the *given firm* possesses for the use of additional capital and is based on the firm's initial position and the characteristics of the existing production function.¹³

Diagram 1 can be used to explore the effects of institutional structure on the savings-investment decision.¹⁴ We see that: (1) If the workers are granted full property rights in capital goods and are free to own the physical means of production, the rate at which income will be diverted to investment is OD. In short, the solution for the allocation of profit to investment is similar to the one that would be reached in a free market. (2) If the workers are granted quasi-ownership rights in capital and are allowed to enjoy the income from capital goods for the period of their employment by the firm, the amount of profit allocated to the Internal Fund will be OB. Under the conditions assumed in the diagram, non-owned assets promise an effectively higher rate of return than the official interest rate on savings accounts (i^*) and, thus, there is no desire on the part of the workers to allocate all the firm's profit to the Wage Fund. (3) Finally, if the workers are given no property rights over capital goods (as in the U.S.S.R.), their interests will be served best by a policy of assigning the entire profit to wages. Then the fraction of the firm's total profit that will be made available for investment, via individual savings, is OK. The latter savings are, of course, available for use anywhere in the economy and need not influence the firm's capital position directly.

It follows from the preceding discussion that a change in the structure of property rights affects the choices individuals make with respect to present and future consumption. Because existing legal institutions influence the pattern of rewards available,¹⁵ decision makers will, presumably, adjust their behavior and achieve the best posi-

¹³See below for fuller explanation of the II curve, pp. 14-16.

¹⁴S. Pejovich, "The Firm, Monetary Policy and Property Rights in a Planned Economy," *op. cit.*

¹⁵No attempt has been made to introduce considerations of risk and uncertainty into the discussion. There is no doubt, however, that these factors strongly influence asset choice.

tion consistent with the alternatives actually open. From a somewhat different perspective, we can say this: The greater the attenuation of private property rights, the lower the level of *voluntary* saving; and, if a planned rate of investment is to be realized, the greater is the need for government intervention to reduce current consumption. Recent history implies that the Yugoslav government is aware of the interconnection between property rights and saving. The next two sections of the paper will attempt to show, in some detail, how taxation policy has been used by the authorities to influence the investment behavior of the firm.

IV. TAX POLICY BEFORE AND AFTER 1965

From the scheme of revenue distribution which was in effect before 1965, we know the values of certain tax parameters:¹⁶ $T_p = .15P_g$, $T_w = .15W$, and $T_i = .20I$. Thus, the firm's total tax obligation emerges as:

$$(1) \quad T = T_p + T_w + T_i = .15P_g + .15W + .20I,$$

where T_p is the tax on gross profit (P_g), T_w is the tax on the Wage Fund (W), and T_i is the tax on the Internal Fund (I). Since $W + I$ must equal $.85P_g$, we have by substitution:

$$(2-a) \quad T = .277P_g + .05I, \text{ or}$$

$$(2-b) \quad T = .320P_g - .05W.$$

Then, dividing (2-a) and (2-b) by P_g , we obtain:

$$(3-a) \quad \frac{T}{P_g} = .277 + .05 \frac{I}{P_g}, \text{ or}$$

$$(3-b) \quad \frac{T}{P_g} = .320 - .05 \frac{W}{P_g}.$$

It follows that an increase in the wage bill relative to the internal funds earmarked for investment would decrease the percentage of tax paid from the firm's profits (T/P_g). The question is, there-

¹⁶See S. Pejovich, "Taxes and the Pattern of Economic Growth: The Case of Yugoslavia," *National Tax Journal*, 17, March 1964.

fore, how can the firm increase the ratio of W to I , given its gross profit.

Prior to the 1965 economic reform, the Yugoslav firm was expected to employ the following guideline¹⁷ for the allocation of its net profits (P_n) between the Wage and Internal Funds:

$$(4) \quad W = \frac{P_n}{1 + X \cdot Y}$$

In the formula, Y represents a productivity index and has this function: If an increase in the firm's net profits (P_n) is caused by a price rise, index Y must be adjusted so that the magnitude of W does not change. On the other hand, if higher profits are caused by productivity improvements, Y should be adjusted in such a way as to insure that the total amount of extra profit is allocated to W . Next, variable X is defined as the ratio of I to W and is calculated for each given year on the basis of data from the previous year. Using appropriate time subscripts, the basic relation is:

$$(5) \quad X_1 = \frac{K_1}{K_0} \cdot \frac{I_0}{W_0},$$

where K_t indicates the amount of capital per worker in year t .

Equation (4) suggests that, for a given level of net profit P_n^0 , the Wage Fund can be increased as a fraction of net profit by decreasing X . Then, combining (4) and (5), and making due allowance for the different time periods involved, we can write:

$$(6) \quad \frac{W_1}{P_{n1}} = \frac{1}{1 + \frac{K_1}{K_0} \cdot \frac{I_0}{W_0} \cdot Y_1}$$

The implication of (6) is clear; to increase W_1/P_{n1} , or W_1/I_1 , the firm must decrease the ratio of capital to labor in year 1 relative to year 0. In other words, the Yugoslav firm had a definite tax incentive before 1965 to search for capital saving methods of production.

The 1965 reform was responsible for some major changes in the regulations governing the operation of the firm. Government control over the allocation

¹⁷*Sluzbeni List*, Belgrade, April 18, 1962.

of net profits between the Wage and Internal Funds was ended; the tax treatment of profits was significantly revised. With respect to the latter area, it is of particular interest to note that the relative tax rates on the wage bill and on internal funds were inverted. Thus, the scheme of revenue distribution after 1965 provides the following information:

$$(7) \quad T = T_w + T_i = .24W + .08I.$$

Since the specific tax on the firm's gross profits has been eliminated, we now have:

$$(8) \quad P_g = W + I,$$

and the total tax bill can be expressed as:

$$(9-a) \quad T = .24P_g - .16I, \text{ or}$$

$$(9-b) \quad T = .08P_g + .16W.$$

When (9-a) and (9-b) are divided by P_g , the firm's tax obligation as a percentage of total profit is seen to be:

$$(10-a) \quad \frac{T}{P_g} = .24 - .16 \frac{I}{P_g}, \text{ or}$$

$$(10-b) \quad \frac{T}{P_g} = .08 + .16 \frac{W}{P_g}.$$

In contrast to the situation before 1965, the new tax structure generates incentives to divert profit to investment purposes, and to diminish the allocation to the Wage Fund—e.g., compare equations (3-a), (3-b) with (10-a), (10-b). We see that whenever one dollar of profit is assigned to the Internal Fund, the firm's tax bill is reduced by 16 cents; similarly, whenever a dollar is shifted to the Wage Fund, the tax bill rises by 16 cents.

V. PROFIT TAXES AND INVESTMENT INCENTIVES

Taxation policy in Yugoslavia was discriminatory before and after 1965 in the sense that unequal tax rates were placed on the Wage and Internal Funds. However, the type of discrimination changed. The 1965 reform did away with the 15 per cent general profit tax which had been the only non-discriminatory tax, and changed the relative rates on the Wage and Internal Funds in such

reproduction that the former was hit more heavily (i.e., $t_w > t_i$). The question that arises, of course, is why the Yugoslav government found it desirable to effect these changes.

To answer the question it is essential to recognize, first, that a major institutional shift after 1965 was the elimination of government guidelines regulating the firm's distribution of profit (P) between the Wage Fund (W) and the Internal Fund (I). Further, in considering tax effects, it will be useful to assume that the firm's only source of net investment funds is the amount of profit allocated to the Internal Fund. While it is true that bank credit has become a major source of funds for financing investment activity in Yugoslavia, the introduction of this credit variable into the model would tend to complicate the analysis without altering the results in any fundamental way.¹⁸ Whatever the level of investment supported by external funds, marginal variations in the firm's rate of capital accumulation must still be influenced by the allocation of profits (P) to the Internal Fund. It is sufficient to recognize that, in general, the greater the volume of outside investment funds available to the firm, the less the incentive for workers to divert profits to the Internal Fund and limit current wage payments.

Given this background, then, we can proceed to a discussion of the impact different tax structures exert on the collective's willingness to save and invest.

(1) Proportional profit tax

Consider a situation where a certain tax rate (t) applies equally to the Wage Fund and the Internal Fund; for convenience, the case can be referred to as one of "proportional" profit taxation. It follows that the firm's total tax bill is:

(11) $T = t \cdot W + t \cdot I = t \cdot P$,
and disposable income (Y) becomes:

(12) $\bar{Y} = (1 - t)P$.

Now, over any short period of time, the

¹⁸In 1968, the sources of gross investment were: banks 47.1 percent, firms 31.2 percent, government and other social organizations 21.7 percent. See D. Vojnich, "Investiciona Politika i Sistem Proshire Reprodukcije," *Ekonomist*, 22, December 1969, p. 857.

firm can be conceived as operating with given capital equipment (K_1) and a given labor input (L_1). Presumably, the productive activities of each period lead to a definite profit magnitude P^0 , and hence to a definite level of disposable income Y^0 . We assume that the collective, acting through the Workers' Council, makes savings decisions on the basis of this after-tax income¹⁹ (Y^0). The relevant savings function for any time period j is:

$$(13) S_j = S(r, Y_j^0).$$

As diagram 1 indicated earlier, the collective's disposition to forego present consumption for future consumption is defined by the shape and position of the curve $K'AS_1$. Of course, when $r < r^*$, the allocation to the Internal Fund will be zero and saving will be conducted through the banks.

Whether the firm adds to its initial capital stock (K_1) depends on the position of the investment demand schedule (II) relative to $K'AS_1$. The II schedule is analogous to the conventional marginal efficiency of investment function but is based on some special assumptions which must be made clear. First, it should be recognized that the investment opportunities considered are those the given firm possesses for the use of additional capital goods. When current productive operations (with inputs L_1, K_1) are such as to yield the after-tax income Y_1^0 , the collective can enjoy the average net wage rate $w_1^0 = Y_1^0 / L_1$, and contribute nothing to the Internal Fund, or elect to "invest" some fraction of Y_1^0 in *non-owned assets*. If the latter option is taken, workers agree to accept a lower after-tax wage rate in the initial period on the expectation that their sacrifice will permit capital accumulation by the firm and higher wages in the future. Assuming

¹⁹This assumption is made primarily for analytical convenience. Strict rationality requires that the collective consider future net income as well as present income in arriving at savings decisions. However, whether workers actually do undertake complex economic computations is an open question; a case can certainly be made for the view that current disposable income is weighted very heavily, if not exclusively, in savings calculations.

a two period planning horizon, the situation can be discussed in this highly simplified form. We say that any savings and investment undertaken by the collective in the first period will be rewarded by disbursements in the second period—specifically, all of the firm's after-tax profit in the second period (Y_2^0) will be made available for wage payments. Then, if the labor force in the second period²⁰ remains at the original level (L_1), the net wage rate becomes: $w_2 = Y_2^0/L_1$, $I_2 = 0$. The after-tax wage w_2 must be greater than w_1 , and will be greater than w_1 provided the investment in additional capital goods has increased the productivity of the firm and made net income Y_2^0 greater than Y_1^0 .

The crucial question concerns the magnitude of the change in disposable income ($Y_2^0 - Y_1^0$) occasioned by the investment I_1 . But the technical conditions of production determine this outcome. Given fixity of the relevant input and commodity prices, and the labor input L_1 , capital must show diminishing value productivity as more capital is added to the firm's initial stock K_1 . It follows that the rate of return r declines monotonically as I_1 (or ΔK) grows larger. With perpetual maintenance of the capital stock, the (average) rate of return yielded by a capital increment in period 1 is:

$$(14) \quad r = \frac{(1-t)(P_2 - P_1)}{I_1}$$

In general, the value of r is lower the greater the tax t , the greater the capital increment I_1 , and the smaller the initial labor input L_1 relative to the initial capital stock K_1 .

The relationships just outlined provide a somewhat fuller understanding of the curve II in diagram 1. However, to facilitate comparison with the savings function (13), equation (14) can be rewritten in the form:

$$(15) \quad I_1 = I(r, t^0, L_1^0, K_1^0)$$

²⁰Since workers in Yugoslavia cannot be dismissed from their jobs easily and since the hiring of additional employees in period two would normally tend to lower the prospective "wage payoff," the firm's labor force can be assumed to remain stable at the initial level L_1 .

Having a specific tax rate and initial input mix, the position of curve II is established; similarly, the curve's negative slope follows from the fact that current investment I_1 varies inversely with the rate of return r .

Equations (13) and (15) enable us to consider a hypothetical "market" for non-owned assets. Since equilibrium requires that $I_1 = S_1$, the intersection of $K'AS_1$ and II at point B' indicates the amount of "saving", or the allocation to the Internal Fund, which the members of the collective find ideal in light of their time preferences and the other background data. The equilibrium r lies above r^* ; hence, I_1 is greater than zero and OB dollars' worth of capital equipment is added to the firm's original stock K_1 . As a result of this investment strategy, the firm's after-tax income rises from Y_1^0 to Y_2^0 and the pattern of net wages over the two period interval is: $w_1 = (Y_1^0 - I_1)/L_1$, $w_2 = Y_2^0/L_1$. From the collective's standpoint, the income stream implied by w_1 , w_2 is preferable to any other stream that the system can offer.²¹

It is apparent from equations (13) and (15) that the proportional profit tax t has the general effect of reducing the collective's investment in either owned or non-owned assets. The tax influences the savings curve by reducing disposable income (Y_1^0); for any level of reward specified in terms of i or r , a lesser volume of savings will be forthcoming when the tax is in effect than in its absence. A behavioral relation, the propensity to save, underlies the shift of the $K'AS_1$ curve with a change in the tax rate; and because the collective will tend to make different provision for saving at different real incomes, uniform parallel move-

²¹For example, the income stream implied by the wage rates $w_1 = Y_1^0/L_1$, $w_2 = Y_2^0/L_1$ could be obtained by the workers if they followed a static wage maximization policy and allocated no profits whatsoever to the Internal Fund in period one. This strategy leads to an even flow of income, but note that any saving out of the income stream would have to be undertaken at the state banks for an effectively lower rate of return than can be had through investment in the firm.

ment of the savings curve is not to be expected. In the same general way, the investment demand schedule II is affected by the tax. Taxation diminishes the effective yield of investment at each level of K and, thus, produces a leftward shift of the curve in diagram 1. However, given the production function, an objective calculation is involved in determining the changed investment demand, and the II curve always moves in direct proportion with t .

From what has been said, it seems unlikely that the "proportional" profit tax is neutral in its effect on the relative share of net profit allocated to the Internal Fund. Since it is reasonable to assume a progressively greater leftward shift of the savings curve as tax t grows larger and disposable income lower, the I/Y ratio must tend to fall more than proportionately with unit increases in the tax rate. Nevertheless, this bias toward lesser investment by the collective need not be too serious. If the original tax rate is relatively modest and subsequent adjustments are small, the influence of t on I/Y can be approximately neutral.

(2) Discriminatory profit taxes

In the case of "discriminatory" profit taxes, distinct tax rates (t_w , t_i) hold for the Wage Fund and the Internal Fund respectively. Thus, the total tax on the firm's profits (T) can be represented as follows:

$$(16) \quad T = t_w W + t_i I,$$

and disposable income (Y) is:

$$(17) \quad Y = P^0 - T.$$

We see that the magnitude of the total tax (T) depends on the magnitudes of the tax rates (t_w , t_i) and on the allocation made of profit (P^0) between W and I .

The Yugoslav tax structure leads to an interesting choice problem. Any allocation to the Internal Fund represents a commitment on the part of the collective to savings and investment—but there is tax incentive for a move in this direction. Obviously, with t_w greater than t_i , tax T declines systematically with the volume of savings so long as the collective chooses

to direct its savings into investment in *non-owned* assets. On the one hand, then, diversion of profits to the Internal Fund is made appealing by the possibility of tax reduction and by the promise of greater future income from the investment in capital goods (i.e., non-owned assets); on the other, the allocation of profits to I has the drawback of lowering current consumption. The collective will presumably, consider the pattern of gains and losses implied by any investment strategy in relation to the workers' scheme of time preference, and reach a decision on I_1 accordingly. Further discussion of this problem will be taken up below, but, first, we must establish some preliminary relations.

For convenience, equation (16) can be rewritten in the form:

$$(18) \quad T_1 = t_i I_1 + t_w (P_1^0 - I_1).$$

Assuming, once again, that the firm is operating with the initial input combination (L_1 , K_1) and that a gross profit P_1^0 is being made, the tax in the first period (T_1) is a function of I_1 . The firm's tax obligation must lie between the theoretical minimum of $t_i P_1^0$ and the maximum of $t_w P_1^0$.

Now, if the collective is determined to save and invest a specific amount I_1 in non-owned assets, the firm's tax bill is immediately calculable from (18). Ruling out any other savings, the amount the collective has for consumption in the first period (C_1) is given by:

$$(19-a) \quad C_1 = P_1^0 - I_1 - T_1,$$

or, more concretely:

$$(19-b) \quad C_1 = (t_w - t_i - 1)I_1 + (1 - t_w)P_1^0, \\ \dots \quad t_w < 1.$$

Relation (19-b) is a linear equation with negative slope and positive intercept $(1 - t_w)P_1^0$. The latter term indicates the level of consumption possible when the Internal Fund is set at zero.

Given a two period planning horizon, the next question concerns the amount of consumption (C_2) the collective can enjoy in the *second period* when any investment I_1 has been made in the first

period. The general outlines of the situation are clear. If the labor input is held constant at L_1 and physical capital is added to the initial stock (via I_1) so that a new operating combination is formed (i.e., $K_1 + \Delta K, L_1$), the firm's profits (P_2) must increase to some extent in period 2.²² How much gross profits increase depends on the characteristics of the production function, the initial position (L_1^0, K_1^0), and the amount of investment in incremental capital undertaken in period 1 (i.e., the real equivalent ΔK implied by I_1). The collective is, however, concerned with the after-tax profits (Y_2) that will emerge as a consequence of investment I_1 . Unless a repetition of the first period problem is to appear, something definite has to be said about the proposed level of I_2 (and T_2).

The matter is easily settled. Since we have assumed a two period horizon, we have, in effect, indicated that the workers do not plan to continue their "investment" in the firm beyond period one. In other words, I_2 must be equal to zero and the outcome is fully determinate.²³ If original intentions are followed, the workers will "liquidate" their investment in non-owned assets—i.e., the firm must cooperate by diverting all profits (P_2) to the Wage Fund (W_2). Of course, the maximum tax has to be paid (i.e., $T_2 = t_w P_2$), but C_2 is larger than it would be if investment were extended for another period (i.e., if $I_2 > 0$). The equation for consumption in period two becomes:

$$(20-a) \quad C_2 = (1 - t_w) P_2,$$

or, since gross profit in period two (P_2) depends on the variable I_1 , we can write:

$$(20-b) \quad C_2 = (1 - t_w) \cdot F(I_1, L_1, K_1).$$

²²We assume that the marginal productivity of capital is greater than zero. If no favorably productive outlets existed for capital within the firm, the collective would be well advised to secure a high current wage rate and save through the state banks.

²³The analysis is easily extended to cover the multi-period case where the planning horizon T is finite but greater than two. See: B. G. Furubotn, "Towards A Dynamic Model of the Yugoslav Firm," Foreign Affairs Research Documentation Center, U. S. Department of State, 1969.

In the highly simplified model under discussion, the collective's decision on the Internal Fund allocation I_1 determines the particular levels of consumption C_1, C_2 the workers can achieve over the planning interval.

From a mathematical standpoint, it is evident that equations (19-b) and (20-b) constitute a system which can be solved simultaneously to eliminate the variable I_1 . The result is a relation in C_1, C_2 and a set of tax and technological parameters. Writing this in implicit form, we have:

$$(21) \quad G(C_1, C_2; t_w, t_1, L_1^0, K_1^0) = 0.$$

Equation (21) is interpreted as a *consumption possibility frontier*; it shows the various combinations of first and second period consumption levels (C_1, C_2) that are feasible given the firm's initial input mix, technology, tax rates, etc.

Following (21), the consumption possibilities for a Yugoslav collective can be shown as curve AGZ in diagram 2. In the institutional setting envisioned, C_1 can be equal to zero or greater than zero, but no larger than $(1 - t_w)P_1^0$. The "liquidation" assumption makes it impossible for C_2 to be less than $(1 - t_w)P_1^{0*}$; on the other hand, C_2 cannot be greater than A, or the point that is reached when all of the after-tax profits of the first period $(1 - t_1)P_1^0$ are invested in non-owned assets. If a policy of wage maximization is accepted (and investment in owned assets is ruled out), the collective will operate at point Z and enjoy the consumption level $(1 - t_w)P_1^0$ in each of the two periods. However, if the collective decides to plough profits back into the firm, lesser consumption than $(1 - t_w)P_1^0$ will be possible in the first

²⁴In other words, we assume that the marginal productivity of capital is never less than zero. When the marginal product of capital is equal to zero for the firm, positive investment (I_1) will not increase profits in the second period and $C_2 = (1 - t_w)P_1$. Alternatively, the collective can elect to save nothing in period one so that, again, profits will remain at P_1 in the second period. Of course, given the institutional setting, it is impossible for the collective to borrow against future business proceeds in order to increase consumption in period one. Thus, C_2 cannot be reduced below $(1 - t_w)P_1$ because of outstanding debts.

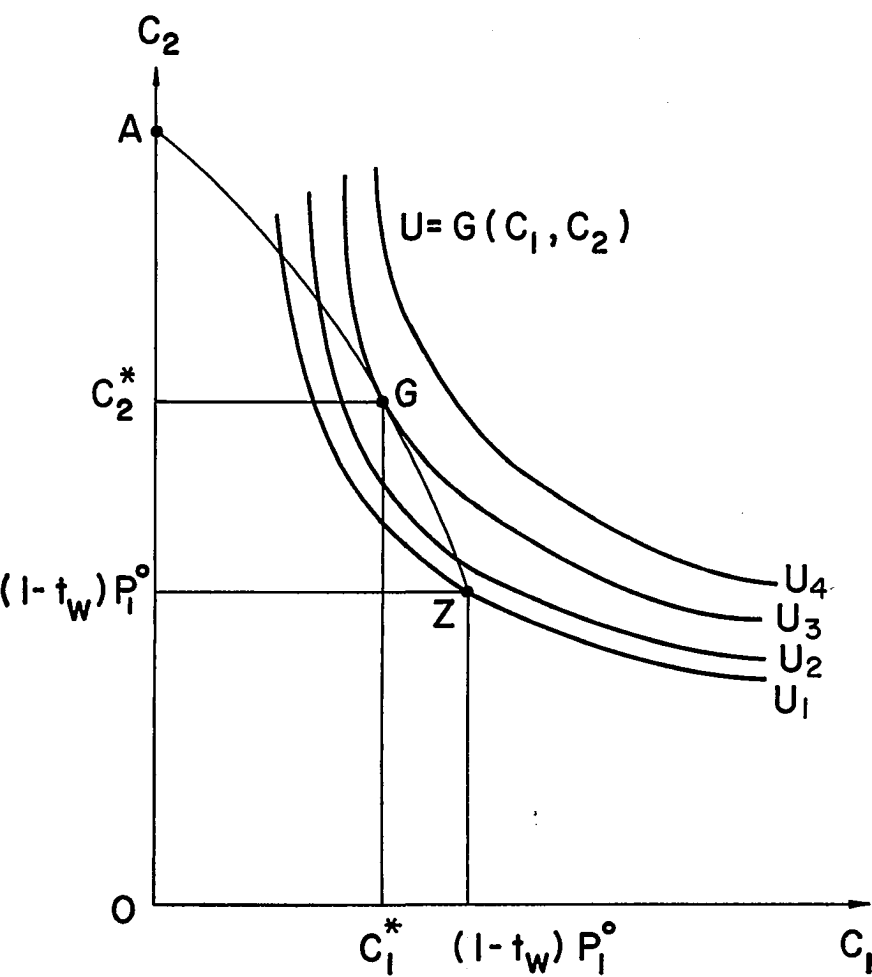


DIAGRAM 2

second, and greater consumption in the second—as suggested by the tradeoff path ZGA.

So far, we have talked about the range of consumption opportunities open to the workers. But in order to isolate one equilibrium point from among the infinity of feasible points on ZGA, we must define the *time preferences* of the collective. Under certain assumptions, the workers' attitudes toward different consumption time streams can be reflected by a preference function of the general form:

$$22) U = G(C_1, C_2).$$

Equation (22) presupposes that, for a given distribution of income, different consumption streams can be ranked; thus, a system of time indifference curves is derivable in the normal way. Each indifference curve shown in diagram 2 represents various combinations of C_1, C_2 that the collective finds equally attractive. The curves are convex to the origin and, in general, poses orthodox properties since there is no reason to believe Yugoslav workers have unique motivations.

Now, assuming that the situation is one where the workers desire to invest in non-owned assets,²⁵ we see the equilibrium position must be at point G—i.e., the point of tangency between a time indifference curve (U_3) and the consumption possibility frontier. At G, the collective reaches the highest level of welfare consistent with the existing constraints,²⁶ and the optimal consumption

²⁵With preference and technological data different from those depicted in diagram 2, the ideal solution for the collective might be at some point other than G where no investment in non-owned assets is contemplated. For example, if i^* is effectively greater than r , non-owned assets must be rejected; any saving accomplished takes place as the result of individual decisions to save at the state banks.

²⁶The collective's objective must be to maximize the utility function (22) subject to non-negativity restrictions ($C_i \geq 0, i=1,2$), and certain other constraints based on the opportunity locus (21) and the inequality conditions specified for consumption in each time period. This optimization problem is of the type encountered in nonlinear programming and can be approached by way of the Kuhn-Tucker conditions. See: E. G. Furubotn, "Towards A Dynamic Model of the Yugoslav Firm," *op. cit.*

stream is: C_1^*, C_2^* . In other words, by sacrificing a certain amount of consumption ($1-t_w$) $P_1^* - C_1^*$ in the first period, the collective is able to secure a much more desirable consumption stream—compare point Z on U_1 with point G on U_3 .

Finally, given the equilibrium solution (C_1^*, C_2^*), it becomes possible to retrace our steps and determine the ideal allocation of profits to the Internal Fund for period one (I_1) by substituting C_1^* in (19-b) or C_2^* in (20-b). With knowledge of I_1 , the firm's tax in period one emerges from equation (18). Indeed, all the variables of the system are now determinate— $C_1, I_1, W_1, T_1; C_2, I_2, W_2, T_2$, etc.

The model considered above is rudimentary and discussion has been conducted in highly general terms. Nevertheless, the construct does seem to provide sufficient insight into the Yugoslav system for us to see the broad influences exercised by the present profits tax structure. With t_w greater than t_i , there is clearly tax incentive for the Workers' Council to limit the size of the Wage Fund and, thus, to limit the tendency to invest in *owned* assets (i.e., state savings accounts). *Ceteris paribus*, the existence of differential tax rates ($t_w > t_i$) pushes the collective in the direction of greater acquisition of *non-owned* assets and greater total saving than would otherwise occur. The general result for the firm is that use of relatively capital intensive methods of production is stimulated and growth accelerated.

It is also interesting to note that the Yugoslav government appears to have some understanding of the incentive effects just described. For, if the government were primarily concerned with raising a given amount of tax revenue and felt essentially neutral relative to the distribution of profits between current wages and investment, it could employ the proportional profits tax. The adoption of the discriminatory tax ($t_w > t_i$) constitutes *prima-facie* evidence that the authorities are interested in inducing enterprises to increase the share of profits earmarked for the Internal Fund. Whether the present rate structure is

optimal to achieve the ends desired is an open question. Nevertheless, the model presented in this paper suggests that the general problem can be studied within a well defined analytical framework. In more sophisticated form and with plausible values specified for the various institutional, psychological and technical parameters, the investment model sketched with the aid of diagram 2 might contribute to a more sensitive adjustment of government policy to existing economic conditions.

VI. CONCLUSIONS

The analysis of the present paper leads to a number of important conclusions. We find:

(1) Any change in the property rights structure affects the voluntary allocation of income between current consumption and savings. Given the community's time preference, we observe that the weaker the position of individual property rights the greater is the relative share of income desired for present consumption.

(2) It follows from the effect of property rights structures on the voluntary allocation of resources between present and future consumption that the more centralized a socialist economy the greater must be the need for administrative interference with the community's time

preference to obtain a "target" rate of saving.

(3) There is evidence to suggest that the Yugoslav government is attempting to use the discriminatory profits tax as a means for influencing the savings behavior of Yugoslav workers; the objective seems to be to make savings behavior come closer to the pattern it would take if individuals were allowed to own capital goods. Moreover, this new strategy is followed without any direct controls designed to change the workers' basic attitudes toward present and future consumption.

(4) If we accept the preceding interpretation of Yugoslav intentions, the implication is that socialist states can employ traditional tools of economic policy, such as tax adjustments, for the purpose of achieving rational allocation of resources. In practice as well as in theory, it may be possible for socialist planners to approximate the solution reached in a regime of free markets and private property while retaining public ownership of the means of production.

(5) There is reason to believe, then, that a theory of economic systems should be developed around the concept of property rights structures. The unifying theme provided by property rights makes possible deeper and fuller understanding of the economic process in countries operating under widely different political and social schemes.