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INVESTMENT IN LABOUR MANAGED FIRMS:

THEORETICAL PROBLEMS AND EMPIRICAL EVIDENCE FROM YUGOSLAVIA

by

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INTRODUCTION

The economic theory of the labour-managed firm (LMF) has its origins in an article by Benjamin Ward (1958) on the Illyrian firm, and has further been developed by Jaroslav Vanek (1970), James Meade (1972) and a number of other scholars.[1] Although originally Ward's model had been inspired by the Yugoslav system of self-management,[2] the concept of the LMF has in the meantime been extended to include producer cooperatives in Western economies.

Thus today, in the growing theoretical literature on labour-management, the LMF refers to both the self-managed socialist firm in Yugoslavia, and the workers' cooperative in the West. The models of both types of firms are considered to have the following principal features in common (Nuti, 1988a):

1)Self-management: All workers participate in the decision-making process, usually on the basis of the principle one man, one vote, directly or through representative organs, on all major policy issues.

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1. For a survey of the literature and an extensive bibliography, see Bartlett and Uvalic, (1986).
2. The reference to Illyria both suggests Yugoslavia and distances the analysis from it.

2)Egalitarian system of profit distribution: All workers participate in the distribution of profits on equal terms.

3)Collective property of capital: It is usually considered that a LMF is in collective/social property, as there are restrictions on the appropriability of net assets, both in Yugoslavia and in Western cooperatives.

Given these specific features, the LMF has been distinguished for its objective function (Ward, 1958, Vanek, 1970). In contrast with the capitalist firm which maximizes total profits, the LMF is assumed to maximize income per worker. Of course, decision makers in both types of firms in reality are subject to a number of other considerations, such as size, growth, status, security, political influence etc., but there is agreement among scholars that capitalist profits and LMF income per worker are the primary single concern.

Among the various problems of the LMF that have been emphasized in the literature, two have by far received most attention: 1)its "perverse" response to changes in product price, technology, and capital rental, and the related restrictive employment policies in the short run; and 2)the tendency of the LMF, in the long run, to underinvest with respect to a capitalist firm operating in similar conditions.

What is apparent from the vast economic literature on the LMF, however, is that a large part consists of highly abstract models that give only the barest indication of the institutional

arrangements assumed. Hence much of the theory is unapplicaole to concrete institutional settings. However, depending on the particular institutional environment considered, the LMF may show different patterns of behaviour. Labour management is only one aspect of the institutional setting, in spite of its "specific dimensions" that distinguish it from other economic forms - labour hiring capital and not vice versa. Other specific features inherent to the system under consideration might also be important.

The main objective of this study is to verify whether the LMF can be expected to have a distinct behaviour. Related to this issue, we will need to evaluate the importance of other features - besides labour-management - in determinining a LMF's behaviour. We will focus on the LMF's investment decision, and present empirical evidence from Yugoslavia. If the hypothesis on the importance of the institutional environment is confirmed, this would have an important implication for the methodological approach prevalently used in studying the LMF: that even in a theoretical context, the concrete institutional arrangements and general environment in which LMFs operate, cannot be neglected.

In spite of the generalized approach which dominates the theory of the LMF, based upon common features of the LMF outlined above, there are indeed important institutional differences between the Yugoslav firm and the Western cooperative:

1)**Property regime**: In Yugoslavia, after the official aboli-
tion of state property in 1953, all capital assets became social
property, granting enterprises not property rights, but only the
right to use capital assets. The Western cooperative, on the
contrary, is usually based on a mixture of private property
(shares) of workers employed, and collective property (specific
funds).

2)**Capital withdrawals**: Precisely because of the difference
in property regimes, restrictions concerning capital withdrawals
are different in the two types of LMFs. In Yugoslavia, firms are
obliged to maintain the value of their fixed capital, and hence
must continuously refinance past investment. In Western coopera-
tives, interest on workers' shares is usually limited; shares
are frequently redeemed at their nominal value; and in some
countries allocation to specific funds is obligatory, which are
not distributable to workers in case of closure.

3)**Environment**: The Yugoslav LMF is part of a socialist
system, which might imply the presence of systemic features
characterizing other socialist economies. The workers' coopera-
tive, on the contrary, operates in a capitalist economy and
consequently may face different types of problems than the
Yugoslav firm.

These differences may have far-reaching theoretical im-
plications for the investment decision of the LMF, which is one

of the issues we will try and clarify in the course of our research.

The structure of the study is as follows. Following these introductory remarks, the first chapter examines some of the theoretical issues relevant for the investment decision of a LMF. After a brief survey of the principal theories on investment in a LMF, the reviewed theories are critically evaluated, by considering first, specific assumptions of the two theories, and then, the main features common to both theories. Finally, restrictions on capital withdrawals applied in practice, both in workers' cooperatives in Western Europe, and in Yugoslavia, are discussed.

In the second chapter, Yugoslavia has been chosen for verifying theoretical predictions as it is the only existing economy in which LMFs are prevalent. Empirical evidence is presented, for the post-1966 period, on the savings and investment performance of the Yugoslav economy, on the savings performance of Yugoslav enterprises, and on the methods of financing investment.

In the third chapter, an explanation is proposed on why Yugoslav evidence diverges from theoretical predictions. The Furubotn and Pejovich's theory is reexamined and confronted with Yugoslav data, in order to determine how adequate it is for explaining investment decisions of the Yugoslav LMF. An alternative approach is then proposed, based on Kornai's (1980) theory

of the socialist enterprise, and evidence from Yugoslavia sup-
porting the theory is provided. Finally, the two theories are
tested econometrically.

Chapter four discusses investment incentives in the
Yugoslav economy, introduced by the 1970s economic reform. The
theoretical bases of the new system are first exposed, and the
practical implementation of existing mechanisms is discussed.
Proposals for reforming the system of investment incentives are
then reviewed, and Yugoslav workers' views on the issue are
presented.

Chapter five examines some open problems of investment
allocation and mobilization in Yugoslavia, and proposes the
principal necessary conditions for improving the system.

Finally, concluding remarks are made, and the principal
findings of the research are exposed.

Chapter 1.THEORETICAL CONSIDERATIONS ON THE INVESTMENT BEHAVIOUR
OF A LMF

The purpose of this chapter is to examine some of the
theoretical issues relevant for the investment decision of a
LMF. After a brief survey of the principal theories on invest-
ment in a LMF, the reviewed theories are critically evaluated,
by examining both specific assumptions, and common features of
the two theories. Finally, in order to clarify some of the main
theoretical arguments, restrictions concerning capital
withdrawals imposed in practice on the LMF are discussed.

1.1.The principal theories

Existing theoretical literature on the investment behaviour
of a LMF is primarily based on the theories developed by
Jaroslav Vanek (1970, 1971) and Eirik Furubotn and Svetozar
Pejovich (1969-1980). Since both theories reach the same conclu-
sion - that workers in a LMF with collective ownership of
capital will be reluctant to self-finance investment - some
authors consider the two theories jointly as the "Vanek-
Furubotn-Pejovich effect" (Bonin, 1985). Others, however, have
considered these theories as two distinct schools of thought:
the Cornell School (Vanek), and the Texas School (Furubotn and
Pejovich) (Stephen, 1984), since there are several differences
between the two approaches.

First, Vanek's (1970) theory treats investment problems of the LMF in general, while his specific analysis (1971) is addressed to workers' cooperatives in the West, whereas Furubotn and Pejovich's theory is primarily based on institutional arrangements present in Yugoslavia. Second, the cause of underinvestment is somewhat different: although both theories assume collective property of capital will have adverse effects on investment, the underinvestment effect according to Vanek derives from the mode of financing investment, whereas according to Furubotn and Pejovich, primarily from the absence of private property rights. Consequently, whereas Furubotn and Pejovich find no remedy for the investment bias, Vanek considers that the disincentive to invest can be removed, in spite of collective property, through complete external financing of investment.

The basic premises of Vanek's theory on the investment behaviour of a LMF are already found in his General Theory (1970).[3] When taking an investment decision, the LMF considers, unlike the capitalist firm, the return per unit of employment. In order to ensure a higher income per worker, the LMF will tend to invest more in capital-intensive projects. The decision on an investment project will essentially depend on the effect of new

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3. Vanek discusses the investment problem in relation to the national investment function, and in a formal theory on investment (see J. Vanek, 1970, Chapters 8 and 14).

investment on employment. A project will be undertaken only if it involves an increase of employment proportionally greater than the associated increase in the present value of expected total earnings. This may lead to distortions in project selection, as projects having a positive present value may be rejected if they lower income per worker, while negative present value projects may be accepted if they raise income per worker (Vanek, 1970; Nuti, 1988a).

The investment mechanism of the labour-managed economy can, nevertheless, produce a tendency towards Pareto optimality as much as an equally idealized capitalist system, but on the condition that LMFs are externally financed. Self-financed investment will be avoided, because collective ownership of assets implies that saving by investing in the firm requires a far higher current rate of return to be opted for, as compared with saving in a bank. Practices of self-financing are inefficient for the labour-managed economy, and hence should be made unnecessary by providing external funds.[4]

However, it is only a year after the appearance of the **General Theory** that Vanek discusses the drawbacks of self-financed investment in a formal way, in an article which will be summarized below. Vanek (1971) examines a LMF maximizing income

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4. Vanek (1970), pp. 168-172, 296-306.

per worker, a function of the capital-labour (hereafter K/L) ratio. All members have some time preference R, while the title of an investment remains in the hands of the collective. If the firm self-finances its investment, and constant returns to scale (hereafter CRS) are assumed, four dynamic forces operate on the equilibrium of a LMF: 1)the first self-extinction force, or the desire of the LMF to reduce membership in order to increase income per worker, until the point where the firm is reduced to one member; 2)the second self-extinction force, or the desire to consume capital, that sets in after the first force has brought about a disequilibrium in the K/L ratio; 3)the underinvestment force, which arises because the collective nature of investment impels workers to recover the principal of an investment in the course of their expected employment (which is not the case if they "invest" in savings accounts); and 4)the never-employ force, because an increase in labour reduces the K/L ratio and therefore income per worker.

When deciding to invest, a worker compares the present value (V) of yearly returns (A) from investment in the firm, in i=1...T years preceeding a worker's expected retirement,

$$V = A \sum_{i=1}^{T} (1+R)^{-i} \gtreqqless 1$$

with the present value (W) of yearly returns from investment that ensures the recovery of the principal, in i=1...T years,

$$W = A \sum_{i=1}^{T} (1+R)^{-i} + (1+R)^{-T} \geq 1$$

In comparing the two investment alternatives, the equilibrium marginal product of capital Ax in the first case will be above the subjective time preference R by a positive magnitude D, the differencial distinguishing the two investment criteria. Hence, in order to compensate for the loss of the principal, returns from investment in the firm will have to be higher than R, such that Ax=R+D. Consequently, underinvestment in the firm's capital will prevail.

In the case of increasing-decreasing returns to scale (hereafter IDRS), a self-financed LMF will operate in the increasing returns to scale region which implies inefficiency (the analogue of the first two self-extinction forces), the only difference being that the firm will never reduce membership to one worker because of the nonrealization of economies of scale. The underinvestment force remains unchanged.

In contrast, if investment is externally financed at a cost equal to the time preference R, all four forces disappear: in the CRS case, an equilibrium will be obtained at a point where the marginal product of capital equals the rate of time preference R; in the IDRS case, the LMF would always operate in the region of maximum physical efficiency (CRS), where for a prescribed K/L ratio average and marginal products of labour are

equalized and along which the average product of labour is at its maximum.

The above arguments are presented as being crucial in explaining why cooperatives have fared poorly in the capitalist environment. By contrast to a self-financed cooperative, an externally financed firm would show a pattern of behaviour identical to an "ideal" capitalist firm.

Furubotn and Pejovich's theory is similar, but it considers only the underinvestment force, assumes a somewhat different maximand,[5] and in most articles, looks at a different context: a LMF under the Yugoslav institutional setting. Despite the differences in the formal treatment of the problem (see Table 1), the essence of their hypothesis is the same. When workers do not have full ownership rights over the firm's assets (hence the term "non-owned assets"), as in the LMF under consideration, they cannot recover the principal of their investment at the end of their time horizon, whereas in individual savings accounts (or "owned assets"), both the principal and interest will be reclaimed. The basic implication of such collective property rights is a bias in favour of "owned" and against "non-owned" assets.

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5. Usually, the assumed maximand is wealth per worker, and hence the dynamic case of income per worker.

Table 1. THE EVOLUTION OF THE FURUBOTN-PEJOVICH HYPOTHESIS ON THE INVESTMENT BEHAVIOUR OF A LABOUR-MANAGED FIRM

Abbreviations:
I=investment	pf=profit	C=consumption
n.o.a.=non-owned assets	K=capital	max.=maximization
o.a.=owned assets	L=labour	CMR=capital maintenance requirement
T=time horizon	U=utility	w=wages
S=principal invested		
r=return on n.o.a.		
i=return on o.a...		
(interest rate)		
LR=bank lending rate		

Article	Field	Maximand	Other assumptions	Investment criteria	Conclusions
1. Pejovich (1969)	Decentral. socialist state	Wealth/worker	−Only the right to use assets (usu-fructus law) −CMR	Shortened T in case of I in n.o.a. because of the change in property. r has to be larger than i to elicit savings.	Voluntary allocation of resources between present and future C in a centralized socialist state tends to favour current C relative to a decentralized socialist state, and in the latter tends to favour current C relative to a private-property society. I projects with long gestation periods dis-criminated against, have to be financed by banks of central treasury. Limited role of monetary and fiscal policies.
2. Furubotn Pejovich (1970a)	Socialist firm	Two cases: 1) wage/worker (one-period) 2) director's U=f(i,w), and wealth/worker (dynamic)	−usufructus law −CMR no external financing	1) first maximand: I in n.o.a.=0. 2) second maximand: I in n.o.a. positive as long as r is greater than i. Indifferent: r=i.	While the wage max. hypothesis is inconsistent with positive I, wealth max. can lead to I in n.o.a. even without government pressure, as long as r greater than the opportunity cost of K, i. If the director is the central figure, I in n.o.a. even more likely; does not conflict with the motives of the whole community.
3. Furubotn Pejovich (1970b)	Yugoslav firm	Relevant goal: wealth/worker	usufructus law −CMR −an interest tax on the book value of K −no external financing	I in n.o.a. displaces savings schedule up-wards, because of the behavioural effects of the change in property rights.	N.o.a. can bring effectively higher r than the official i and thus there is no desire to allocate all pf to wages. However, the greater the attenuation or private property rights, the lower is the level of voluntary savings. Economic theories should be developed around the concept of property rights.
4. Furubotn Pejovich (1971)	Yugoslav firm	Wealth/worker or community's U index: U=f(C1....Ct) C=pf−I	−usufructus law −CMR −identical U −no external financing	Indifferent if: $S(i+1)=[(1+r)^t-1]$ $\frac{t}{r}$ I in n.o.a. yields rs, diminishes as I increases, while I in short o.a. s+is if T short.	Narrow self-interest can dictate I in n.o.a. but no logical mechanism exists which requires such I; for it to be likely, initial K has to be small, production elasticity of K large, T long. Existing property rights favour C more and more as individual property rights are weak-ened. As time passes, cessation of self-finance occurs, because later I must promise very high r.
5. Furubotn Pejovich (1973)	Yugoslav firm, LM economy	Utility (wealth)	−Usufructus law −CMR −1) no external finance −2) external sources available	1) Indifferent if: $S=\sum_{t=1}^{T}(rS)t/(1+i)^t$ Unless T is very long i must exceed r. 2) No I in n.o.a.	I. in n.o.a. possible, but unlikely. If credit is available, self-finance decreases, leading to a general retardation of voluntary savings in the economy, inflation, inefficiency, etc. The pure LM system is an essentially unstable construction.
6. Furubotn (1974)	LMF through a model of the Yugoslav firm	Multiperiod preferences U=F(C1...Ct)	−Usufructus law −cannot select to disinvest −long-term credit r*:critical yield on I in n.o.a. r:productivity of I in o.a.	Indifference formula same as in 5. r*=S, but typical case: r* larger than r, unless T very long. When r smaller than r*, I in n.o.a.=0.	Bank credit enables the LMF to enjoy higher future C without sacrificing present income. "Credit first" rule, self-finance avoided. I in n.o.a. possible, but improbable if work-ers have freedom of choice. IR low and T short. When LR lower than r*, credit will substitute savings completely, causing a retardation of voluntary savings in the economy.

Table 1. (cont.)

Article	Field	Maximand	Other assumptions	Investment criteria	Conclusions
7. Furubotn (1976)	LMF	Welfare of the original major-ity: $U=f(C1...Ct, X1...Xt)$ where X: economic and social environ-ment, a function of employment, that has an upper limit	-Usufructus law -cannot liquidate capital stock -r: critical -r: reduced r: return on I, n.o.a. that accounts for change in property (product of I in n.o.a.)	$r+Tt$ $dr/dIt < I$ r must be greater than T for T in n.o.a. to be made.	Pareto efficiency will prevail only under very special conditions, but highly improbable, because equilibrium is unknown (no free capital market). Even if it is known, efficiency requires r=I, while LMF is motivated only if r>I. Diver-gence between needs of society and those of the firm, possible for socially desirable I to be neglected even if r larger than I. The LMF is not an inherently efficient organization.
8. Pejovich (1976)	LMF, LM economy	Wealth	-Usufructus law -CMR -Firm's demand for liquidity related to K stock. -1)no credit available -2)bank credit available	1)rs if I in n.o.a. s:Is if I in n.o.a. Only if r larger than I, is I in n.o.a. likely. 2)loans available, r falls and I in n.o.a. not likely. As long as LR below r, prefer debt finance	Falling the special condition that r is larger than r and the possibility of credit, the LMF will choose C as alternative. Demand for long term loans will be accompanied by rising demand for liquid assets, which in a socialist firm have to be held in non interest bearing forms; cost of holding liquid assets higher than in capitalist firm. Produces a liquidity crisis inflation. etc.
9. Furubotn (1978)	LMF, LM economy	Benefits over I	-r: critical r -Yugoslav insti-tutional structure -K leased	Since K leased, no interest to preserve equipment. Repayment burden shifted to future, preference for quickest-yielding projects.	Labour-managed system cannot achieve Pareto optimality. Incentives distorted by institut-nal arrangements. LM: an artificial construc-tion. Rental contracts do not banish the inefficiency problem. Incentives for the creation of new firms lower than in a capital-ist firm.
10. Furubotn (1980a)	Socialist LMF	The earning's residual (total minus K mainten-ance, and loan repayment)	-Usufructus law -CMR -Long-term credit available -r:minimum r for loan to be justi-fied	r=S+I ds/dI r larger than LR as long as the loan period is finite. K must cover: K maintenance, repayment of loan, surplus for higher wages.	LMF will borrow and invest in lesser volume than is justified from a social standpoint. LM system cannot achieve Pareto optimality because of incentives distorted by specific institutional arrangements. Collective welfare criteria different from social welfare criteria.
11. Furubotn (1980b)	LMF	Expected U	-Yugoslav insti-tutions -bank credit available	Typical case: LR will almost certainly be less than r, unless T very long.	LMF will prefer bank credit, no savings. Incent-ives are such as to disuade workers from I in n.o.a. Alternatives promising higher rewards than I not available. More difficult to mobilize voluntary savings. The explanation is found in the property rights structure.
12. Furubotn (1980c)	LMF in a capital-ist setting	Present value of the worker's claims	Possibility of trading job rights. Difficulties emerge in disposing of claims because: 1) democracy increases risk 2) high cost of the search pro-cess.	Compare present value of I in conventional stock and in LMF. LMF claims under valued in the absen-ce of an organized market.	Allocative efficiency cannot be brought about by introducing tradeable claims. I in n.o.a. remain retarded. Inefficient resource allocation since claims difficult to sell. LMF less attract-ive because purchaser of a claim must join the firm. Tradeable claims not consistent with broad-er needs of LM since they decrease democracy. Possibility of degenerating into a conventional firm. If solution exists, must rest on external sources of finance.

The following formula gives the condition for the two investment alternatives to be equally attractive, for a sum invested in t periods (Furubotn, 1971, p. 190):

$$S(1+i)^t = S[(1+r)^t -1] \quad \text{where}$$

S is the principal invested

i is the interest from investing in savings accounts

t is the time horizon

r is the return from investing in the firm's capital stock.

In the case of a one-year time horizon, an investment in "owned assets" brings back S+iS, whereas an investment in "non-owned assets" brings back only rS, and hence r has to be large enough as to compensate for the loss of the principal S. With the prolonging of the time horizon, the difference between the required returns from "owned" and "non-owned" assets diminishes, but disappears only for an infinite time horizon.[6]

The problem is first presented in Pejovich (1969), and its implications discussed in a number of later articles. Although the authors' principal hypothesis is that the greater the attenuation of private property rights, the lower will be the

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6. Nevertheless, the difference between the required rates of return becomes negligable for a fairly long time horizon; e.g. assuming the principle invested is 1, the rate of return from investment in non-owned assets, equivalent to a 5% rate of interest on owned assets, for a 1 year time horizon will be 1.05%, whereas for a 20 year time horizon it will only be 0.03 (see Sacks, 1983, p. 79).

level of voluntary savings in a LMF, their earlier articles leave more room for optimism. As opposed to wage maximization per worker (one-period case), inconsistent with positive investment in the firm, wealth maximization (dynamic case) can ensure positive investment and wages below the maximum attainable level.[7]

In all later articles, the authors' conclusions are rather more pesimistic. There will be no scope for self-financed investment in a LMF, and especially if bank credit is available, in which case only external funds will be used, and the more so the shorter is the time horizon, the higher is the rate of interest on savings, the lower is the cost of credit, and the lower is the marginal productivity of capital. This will cause a general retardation of voluntary savings, followed by inflation and inefficiency, and an economy composed of LMFs will not attain Pareto optimality.[8]

Contrary to Vanek's proposal, rental contracts based on the leasing of capital do not banish the inefficiency problem of the LMF, because collective property rights, the main cause of the

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7. See Furubotn and Pejovich (1970a) and (1970b), and Furubotn (1971).
. 8. See Furubotn and Pejovich (1973), and Furubotn (1974). The preference of a LMF for bank-financed investment is also discussed in Pejovich (1976), Furubotn (1980a), and Furubotn (1980b).

problem, distort incentives for investment (Furubotn, 1978). Workers will have little interest to protect and preserve leased capital. In addition, efforts will be made to shift the repayment burden to future generations of workers, leading the LMF to choose projects which pay off relatively quickly, and hence a bias in project selection will be present.

However, neither does a simple change in property rights ensure optimal investment behaviour of a LMF (Furubotn, 1980c). If a LMF in a capitalist environment is considered, and tradeable claims held by individual workers are assumed, underinvestment will still prevail. Difficulties will emerge in selling workers' claims, and there will be a high probability that the LMF will degenerate into a conventional capitalist firm. Hence, allocative efficiency will not be brought about merely by giving each worker the option of selling his claim, since labour-management is not an inherently efficient economic organization.

In concluding, we have limited the analysis to the above two theories, as they are the ones that have laid down the bases of the principal hypotheses on the investment behaviour of the LMF. Although different authors have in the meantime made important contributions to the field, as will be seen below, all later theoretical developments are an extention/critique of the discussed theories.

1.2.A critical evaluation of existing theories: differences and similarities

Since the two theories bear both similarities and differences, we will examine first, specific assumptions of the two theories separately; and next, main features which are common to both theories.

1.2.1.Specific assumptions

1.2.1.1.Vanek's theory

We will examine the validity of Vanek's hypotheses on 1)degeneration, 2)underinvestment, and 3)external financing, by questioning both the acceptability, and the internal consistency of the model's principal assumptions.

1)The degeneration hypothesis

First it is necessary to question income per worker maximization, since it is precisely this maximand that leads to the disappearance of the firm under CRS and to its small size under IDRS. The maximand is not consistent with Vanek's own assumption on membership reductions, which are supposed to take place only via natural wastage since the community prohibits the expelling of members. The assumed maximand can be considered correct only if the adjustment of membership is viewed as a short-run phenomenon, whereas Vanek's assumption on the prohibition of expelling workers assumes just the contrary - downward adjustments only in the long run.

If the LMF does have some preference for changes in member-
ship, several models have shown that the objective of a LMF will
not simply be the maximization of income per worker. Thus
Ireland and Law (1982) propose a utility function which includes
membership as well as income in the form U=u(Y,L); this maximand
does not require the maximization of income per worker, since
the LMF may be willing to trade off lower incomes per worker for
higher employment.[9] Steinherr and Thisse (1979) and Zelic
(1975) preserve the maximand of income per worker, but ex-
plicitly include a constraint that membership cannot be reduced
below its initial level.[10] Horvat (1967, 1972), inspired by the
practice of profit distribution in Yugoslav firms, proposes the
LMF maximizes total enterprise profits, above the specified
personal income payments which are set in advance, and hence
behaves similarly to a capitalist firm. Since profits are used
for investment, investment is thus also maximized. The main
differences between the LMF and the capitalist firm is that
social property of capital (quite contrary to the Vanek,

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9. Horvat (1972) similarly proposes that a LMF will rather
decrease wages than dismiss fellow workers.
10. Other authors have adopted similar assumptions, including
Meade (1972) and Keren (1985).

Furubotn and Pejovich hypothesis), will reduce risk and uncer-
tainty, and hence a high rate of investment will be achieved
(Horvat, 1972).

Finally, under the assumption of the reluctance to dismiss
workers, degeneration will indeed require a long time: the
youngest members of the LMF would have to retire for the process
to terminate, and a realistic time frame could be a period of 40
years. In such a long-term framework, however, the LMF is even
less likely to maximize its income per worker. Workers will
consider maximizing their incomes over time, where growth objec-
tives requiring positive investment could be essential for
higher consumption in the future,[11] and would therefore not, as
suggested by Vanek, reduce progressively both factors of produc-
tion.

The second assumption that needs to be questioned is that
of no non-labour costs. In the original model developed by Ward
(1958), Vanek (1970) and Meade (1972), the choice of membership
size is the outcome of two competing forces: one which seeks to
reduce membership and hence increase revenue per worker, and the

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11. This is Furubotn and Pejovich's (1970a) initial hypothesis;
Vanek himself recognizes, in (1970), that "it is conceivable
that the LMF would see in its bigness a positive value,
irrespective of what this does to the incomes of its individual
members. But such megalomaniac firms ... are not our concern"
(p. 304).

other which seeks to increase membership thereby reducing non-labour costs per worker. Vanek explicitly assumes no non-labour costs are present, because the community owns collectively the firm's assets and does not pay for them. But this is not a very realistic assumption: the LMF is bound to have certain non-labour costs, even if assets are not paid for, not only concerning capital (e.g. maintenance) but also other costs necessarily present in any type of enterprise (rent, heating, insurance, etc.). Minimizing such non-labour costs by spreading them over a larger number of workers would represent an incentive against membership reductions.

Another assumption of Vanek's model, although implicit, is the perfect homogeneity of the labour force. If specialization is introduced, it would represent a further obstacle in membership reductions since certain types of workers, indispensable for production, would have to be replaced on retirement. Similarly, the assumed perfect responsiveness in adjustments of capital may not always be possible; a machine that cannot be replaced by one operating with fewer workers may block membership reductions.

Several inconsistencies related specifically to the second self-extinction force can also be pointed out. First, as rightly pointed out by Stephen, the maximand of income per worker does not require the reduction of capital, at least not in the CRS case, given that income per worker is a function of the K/L

ratio, while the second force involves a reduction in that ratio (Stephen, 1984, p. 81). This again brings into question the credibility of the assumed maximand. Contrary to Vanek's analysis of the degeneration process, where the opportunity cost of capital is assumed to be equal to zero, a more realistic objective function would be one maximizing income net of opportunity cost of capital per worker, or $Y=(pX-rK)/L$. This is because capital does have an opportunity cost, even if no financial payment is made for its use: it is the return to be earned from liquidating the asset and investing its proceeds (Stephen, 1984, p. 80-84).

Another possible inconsistency related to the second force is that its operation requires such an institutional arrangement which explicitly allows the consumption of capital. However, this is not quite in conformity with Vanek's later analysis of the underinvestment force, where workers are assumed not to be able to consume assets set up by an investment. If this was not so, the selling of an asset and distributing its proceeds could provide the recovery of the principal.

Finally, contrary to Vanek's conclusion, the degeneration process will not necesssarily take place in case of IDRS. As argued by Stephen (1984, 1984, p. 78, 81), in the IDRS case, the second self-extinction force need not benefit the collective, and this will depend on the particular production function assumed. Where the technology is not of a CRS type, the theory

only provides an explanation of the small size of cooperatives, not their short life-span, but a small size does not necessarily imply a short life (Stephen, 1984, p. 78). Furthermore, a LMF under IDRS may obtain a technically efficient level of production, if we consider capital does have an opportunity cost equal to R (Stephen, 1984, p. 84), or if we consider that the two conditions necessary for the maximization of income per worker, $F_L = X/L$ and $F_R = 0$, imply that CRS do hold (Bartlett, 1984).

In summarizing, the process described by Vanek, under IDRS does not, and under CRS needs not necessarily, involve degeneration, once more realistic assumptions are introduced. And since CRS is a very special, rather than general case usually encountered in practice, the degeneration process itself could occur only under specific conditions.

2)The underinvestment hypothesis

In connection with the third force of underinvestment, three assumptions have been examined: the collective nature of investment; the infinite durability of assets; and the cost of capital.

Before proceeding with Vanek's theory, it is important to clarify that the collective nature of investment in a LMF can have different implications, depending on the type of restrictions regarding capital withdrawals. The different rules limiting capital appropriability by individual workers of a LMF

have in the literature often been considered jointly, under the generic term of "limited recovery of capital".[12] Here we will make a distinction between the "limited recovery of capital" (hereafter LRC), which we will use in the sense of a general principle which in theory distinguishes a LMF from a capitalist firm; and specific restrictions regarding capital withdrawals imposed on LMFs in practice, such as, in Yugoslavia, the "capital maintenance requirement" (hereafter CMR), and those present in workers' cooperatives (hereafter restrictions in workers' cooperatives - RWC). We will briefly define the three sets of restrictions.

a)LRC: the limited recovery of capital principle derives from the specific nature of a worker in a LMF, with respect to a capitalist entrepreneur, and hence from the difference between labour and capital. A worker of a LMF cannot sell his job and the future income stream it can generate, but may only be able to get his share of income by continuing to work in the cooperative. This is not the case with the capitalist entrepreneur, who can capitalize his part of the firm's capital by selling his share on the market, and hence immediately realize the present value of income it represents.

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12. Synonims for this term used in the literature are limited appropriability of capital, limited recouperability of capital, etc.

Since workers in a LMF may not be able to fully benefit from undertaken investment unless they stay in the firm for a sufficiently long period of time, the LRC principle is expected to lead the LMF to adopt a "truncated" time horizon.[13] In a capitalist firm, the owner-entrepreneur can capitalize his part of the firm's earnings, current and future, by selling his claim on income flows, and hence his investment is to a smaller or greater extent "perfectly" liquid (depending on the organization of capital markets). This effectively means that he has a long enough planning horizon to benefit from all future revenues expected of an investment, i.e. his planning horizon is "theoretically" infinite. In a LMF, on the contrary, perfect liquidity of an investment is absent, and hence the planning horizon of a LMF, as a rule, is not as long. Consequently, a distinct feature of the LMF with respect to the capitalist firm is that when undertaking investment, its time horizon may become an important criterion. When deciding to invest, an individual worker will consider the time he expects to remain in the firm, since he may benefit from such investment only for as long as he stays with the same firm, which is not the case if he invests in savings accounts.

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13. The time horizon of the LMF is therefore defined as the period of time the average worker expects to remain employed in the same firm.

b)CMR: the capital maintenance requirement is a specific rule present in Yugoslavia, which requires enterprises to maintain the value of the firm's physical capital stock.[14] Since the value of capital cannot be decreased, workers cannot decide to disinvest and consume capital in order to increase incomes of current workers, but must continuously refinance past investment.

c)RWC: restrictions imposed on workers' cooperatives differ substantially from country to country, but the most frequent restrictions, as already mentioned, include limited interest on workers' shares, redemption of shares at their nominal value, and obligatory collective funds which are not distributable to workers in case of closure.

Since all three sets of rules imply a limitation of traditionally conceived capitalist property rights, these rules have often been confounded in the literature. [15] However, the concrete implications of the LRC principle, which in theory distinguishes the LMF from the capitalist firm, will depend on specific regulations governing capital withdrawals in LMFs. In other words, although both the Yugoslav firm and the Western

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14. The precise nature of the rule will be discussed in 1.3.2.
15. For some clarifications, see Zafiris (1982); and Rock and Defourny (1984).

cooperative are characterized by the LRC, whether the disincen-
tive effects for the investment decision deriving from the LRC
can be overcome (or in some way compensated for), will depend on
further considerations directly linked to the nature of concrete
restrictions on capital withdrawals.

We support the view that the disincentive to invest from
retained earnings can only be established unambiguously if the
LMF is assumed to be obliged to maintain its capital stock
indefinately (Zafiris, 1982, p. 57).[16] More precisely, a strong
CMR as defined by Bonin (maintenance of the real value of assets
over time), does generate a disincentive to invest, since
workers cannot recover the principal of an investment even if
they remain with the same firm for the full duration of an
asset,[17] and hence even if they adopt fairly long time horizons.
Depreciation allowances will have to be devoted to the refinanc-
ing of past investment, whereas any new investment, financed

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16. What is usually assumed in the literature by investment from
retained earnings in the enterprise is investment in physical
capital of the enterprise (which we will refer to as investment
in capital stock), and not financial investment. The conclusions
we draw are therefore based on such a definition of investment,
but do not necessarily hold if one expands the analysis to
include investment in financial assets.
17. Bartlett (1986) regards the CMR is not a disincentive, but a
savings rate constraint, i.e. a way of preventing the LMF to
consume its capital. In our view, it is both: whereas the
savings rate constraint is the principle reason for imposing a
CMR on the Yugoslav LMF, the CMR at the same time is expected to
provoke a disincentive to invest.

from firm's profits, will increase capital stock which sub-
sequently cannot be reduced. Hence, in both cases, the principal
of an investment can never be recovered, because the value of
fixed capital cannot be reduced. Therefore, a LMF with a strong
CMR will exhibit the underinvestment effect, applying a higher
rate of return from real assets than the capitalist firm, the
rate being inversely related to workers' time horizon (Bonin,
1985). The only exception is if infinite time horizons are
assumed, since in this case the investment criterion of a LMF
will not differ from that of a capitalist firm, and the required
rate of return from investment in capital stock will be equal to
the return from investment in savings accounts.

If, on the contrary, a LMF is not obliged to maintain the
value of its capital stock, it can decide to disinvest, sell
capital stock and hence recover the principal of an investment.
While from the point of view of the individual worker, this
solution does not yet eliminate the LRC problem if he decides to
leave, the problem could be overcome through alternative reward
schemes (see below). To what extent will a cooperative be able
to reward workers for their investment decisions, will depend on
how restrictive internal rules on profit distribution are in a
given cooperative. In addition, the LMF's investment decision in
this case will essentially depend on the relationship between
its time horizon, and the repayment period of an investment.

Only if the LMF's time horizon is shorter than the repay-
ment period of an investment, will the expected tenure of
workers represent an essential, and specific investment
criterion of tne LMF. In such a case, an investment in real
assets to be opted for, would have to earn gross profits having
the same total present value as investment in bank deposits, not
over the lifetime of the plant as in a capitalist firm, but over
the expected tenure of workers.

The difference in criteria will lead to a different ranking
of projects: projects with high returns over the LMF's time
horizon may be accepted because of shorter payback periods, even
though those with higher rates of return are rejected.
Therefore, a LMF may place liquidity concerns above the produc-
tivity of capital, discriminating against projects stretching
beyond the workers' horizon (Bonin, 1985, Zafiris, 1982).

This distortion implies suboptimality in the sense that
the ranking of projects in a LMF will differ from that in a
capitalist firm. However, the distortion is not equivalent to
underinvestment: it influences the type of projects chosen, but
might not necessarily decrease the overall level of investment
of a LMF; and the distortion is conditional on relatively short
time horizons, which need not be the case.

If on the contrary, the time horizon of a LMF is longer
than the repayment period of an investment, the investment
behaviour of a LMF may not differ substantially from the one of

a capitalist firm, since in this case the relevant criterion of the LMF will no longer be the time horizon, but the repayment period of an investment (Zafiris, 1982).[18]

A fairly long time horizon could be present in a LMF for a series of reasons (high commitment, limited labour mobility, specific age structure of the labour force, etc. - see 1.2.2.2.). However, even if it is not, and the LRC principle indeed induces workers to initially adopt fairly short time horizons, different reward schemes could ensure the overcoming of its disincentive effects.

In order to eliminate uncertaintly deriving from the LRC principle, i.e. the risk of not fully recovering past investment in case of leaving, and hence lead workers to adopt fairly long time horizons, a system of compensation for past investment would need to be introduced. There are different ways this could be achieved.

Ideally, the cause of the problem of LRC could be removed by introducing marketable workers' shares. However, there are difficulties connected with the practical implementation of this

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18. D. Ellerman (1986) similarly argues that earnings reinvested in social property would not penalize workers if they all remained with the firm long enough to completely depreciate the purchased assets (pp. 62-63).

solution (possible in theory, but not applied in practice, except sometimes within a cooperative).[19]

Alternative, more feasible arrangements could include remuneration schemes based on individually specified rewards for capital invested in the firm, corresponding to the net increase in the value of assets obtained through new investment, which could take the form of workers' bonds or shares.[20] Or, dividends could be credited to a worker's account, on which interest would be paid, and the sum returned if he leaves the cooperative (similar to the scheme applied in Mondragon).

An elaborated version of such remuneration schemes is offered by Meade. His initial proposal (1972) on the "inegalitarian cooperative", based on the maximization of returns per workers' shares,[21] does eliminate some of the draw-

19. Unless, as proposed by Nuti (1988a), job tradeability is introduced only to ensure a zero price of labour; if the firm is obliged to hire more people as long as its jobs are demanded at a positive price, job rights would be tradeable only to have an automatic check on the enterprise employment policy, but should never be so valuable as to generate active trade. On the issue of tradeable workers' shares, see also Sertel (1982), and Schlicht and Von Weizsacker (1977).

20. In Yugoslavia, this was introduced in the form of "past labour" rewards in the early 1970s, but the scheme has not worked successfully for a variety of reasons (see Chapter 4).

21. Each worker on joining the LMF is given a share L in the total surplus (S) of the firm, and shares allotted to individual workers differ, among other things, on the time a worker has joined the firm. The objective of the LMF will be to maximize the return per share.

backs of the LMF, but not the preference of a LMF for external financing of investment.[22] However, in developing the model further, Meade offers a solution which effectively resolves the problem of underinvestment of a LMF. In Meade's (1986) labour-capital discriminating partnership, workers and capital providers instead of income, would be given a number of shares. Two types of shares would be issued: capital shares, freely tradable on the market, and labour shares (pro-rata so as to exhaust all of the enterprise's revenue), which would be tied to an individual worker and surrendered upon departure. The investment bias would be avoided by issuing either debentures (1982, p. 218), or free capital shares corresponding to self-financed investment, pro-rata to all labour and capital shareholders (Meade, 1986; Nuti, 1988a).

The major drawback of Meade's proposals is the inegalitarian principle of distribution: those workers who join the LMF early, bearing the initial risks, will earn more than those who come in later.[23] Hence, the underinvestment problem is resolved, but at the cost of income inequality. Whether this is an acceptable principle, is a matter of debate, but a possible argument in favour of such a scheme is that workers

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22. See Meade (1972), and Nuti (1988a).
23. Meade (1972) himself recognizes this drawback. See also Nuti (1988a).

joining earlier should indeed be rewarded for the bearing of initial risk.

Finally, since in a LMF not obliged to respect a CMR, no specific rules regarding the use of depreciation are likely to be imposed (in spite of obligatory legal depreciation), the possibility could be introduced to compensate workers from depreciation allowances. The depreciation fund would thus serve as a "guarantee" to the original investors (workers of the firm at the time of undertaking an investment). In case of leaving, a worker would have the right to cash in his share of an investment.

An objection to such an arrangement could be that it may lead to the consumption of capital stock, and this solution would indeed be no remedy for the underinvestment problem if all workers decided to leave. However, the mere possibility of leaving does not imply such behaviour.[24] If the scheme is introduced only to provide a way of assuring a worker that he can withdraw his part of a past investment in case of leaving, it may serve in providing the necessary incentive to invest in capital stock.

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24. As noted by Zafiris, capital assets do tend to be maintained, although optional and not compulsory, even in systems that have the possibility of liquidating their investment (Zafiris, 1982, p. 70).

In the above alternative arrangements, the characteristic problem of the LMF - the LRC - would be overcome by adequate compensation, and a worker could recover both the principal and the returns of an investment. To what extent these alternative arrangements are feasible in practice, will depend on how restrictive internal rules are in a given LMF.[25]

Returning now to Vanek's theory, some authors have argued that Vanek's underinvestment force derives from the CMR (Stephen, 1984, p. 79). Indeed, one of Vanek's assumptions is the infinite durability of assets, which could implicitly be considered as referring to the CMR since the rule makes the life of the asset infinite in the financial sense. Nevertheless, Vanek's collective nature of investment did not refer to the CMR but rather to the more general principle of LRC,[26] since Vanek's theory is addressed primarily to the Western cooperative, and is based on the assumption that capital can be consumed.[27] Hence

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25. As will be shown in 1.3.1, internal rules in Western cooperatives are not always, and not in all countries, as restrictive as is usually assumed.
26. A similar view is shared by Zafiris (1982), although based on calculations which are not fully convincing (pp. 65-66).
27. Otherwise, the degeneration process (the second force of consuming capital) could not take place.

Vanek considers a LMF on which a strict CMR is not imposed,[28] in which case, as argued above, the disincentive to invest need not necessarily be present.

It is in the light of the above analysis that Vanek's assumption on the infinite durability of assets can be seen to be highly misleading, not only because it implies the exclusion of depreciation,[29] but because such an assumption, by definition, provokes the disincentive to invest: assuming infinite durability of assets and finite time horizons of workers obviously implies that the principal can never be recovered within the workers' time horizon.

Finally, Vanek's analysis provokes confusion since it assumes two different opportunity costs of capital, one prior to an investment equal to R+D, and another one for an asset already commited to the firm, equal to zero. Yet for CRS to hold, under the assumption of self-financing and the maximand of income per

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28. Indeed, in a conversation with J. Vanek in Florence in July 1985, he confirmed my belief that he did not intend the inclusion of the CMR.

29. Vanek's exclusion of depreciation according to Stephen (1984, p. 79) "assumes away the basic problem"; while according to Zafiris (1982, pp. 56-59) is "seriously misleading", because Vanek compares the annual returns required by the alternative investments, but these are not comparable because they are different in nature: investment in bank deposits, in addition to interest, returns the original capital, while in real assets only yields an annual return, and therefore such a return should exceed the rate of interest as to allow for depreciation.

worker, the optimal capital stock requires that the marginal
product of capital is equal to zero, and not R+D, and hence
would be larger, not smaller than in the externally financed
case, where the marginal product of capital equals R (Bartlett,
1984).

3)External financing of investment

In connection with the preferability of external finance,
it can be shown that the mode of financing may not be as crucial
as Vanek suggests; that the main reasons for the poor perfor-
mance of cooperatives might not be solely the ones proposed by
Vanek; and that additional difficulties may arise in the case of
external finance.

Concerning the mode of financing, Vanek's differential D in
the case of internal financing is not sufficiently justified,
since here the opportunity cost of capital may in fact be equal
to R (and not R+D), under the following alternative arrange-
ments: if the repayment period of an investment is shorter than
the LMF's time horizon, as proposed earlier; if investment is
undertaken from financial assets already commited to the firm,
where funds are transferred from one use to another and no
change in property takes place;[30] or if individually held

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30. Stephen (1984), pp. 80-94. A similar argument is proposed by
Zelic (1975), and Connock (1982).

tradeable shares were introduced. [31]

Similarly, external financing might not be provided at a cost reflecting the time preference R, as idealy envisaged by Vanek. Imperfections arising from transaction costs and different lending and borrowing rates could lead to situations where external financing will not be preferred: if the weight of the repayment cannot be transferred into the future beyond the time horizon of the collective's majority, or if the repayment periods are shorter than the life of the asset. [32]

Aoki (1984) has suggested that the choice of the method of financing by the LMF will depend essentially on whether an investment project is labour-saving or not. If an investment requires the employment of new workers and is financed internally, the entry of new workers is financed at the sacrifice of existing members, whereas future fruits from the investment will be shared equally by all workers (including newcomers). In this case external debt will be preferred, since future interest payments will be born equally by new and existing members. If however, an investment requires the introduction of labour-saving technology, there is less oportunity to mitigate the

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31. The issue of tradeable workers' shares has been much debated in the literature; see Sertel (1982), Schlicht and Von Weizsacker (1977), Nuti (1988a).
32. See Gui (1984), p. 175, and Chillemi (1981), pp. 161-162.

burdens of cost-bearing by putting off the actual payment of the capital cost. Since there will be a smaller number of new entrants in respect to the number of outgoing workers, workers who have prospects of longer tenure will be better off by sharing the capital cost currently with the relatively larger number of existing workers, and hence will prefer financing investment from retained earnings (pp. 87-88).

In addition, the existence of external finance does not remove the obligation of the LMF to pay back the principal eventually. Both internal and external finance imply a sacrifice of current income, the only difference being that in the first case it will have to be paid for at once, while in the second gradually; the shorter is the payback period of a loan, the more external financing approaches internal financing of investment.[33]

Passing to the second issue, the main reason behind under-investment of traditional cooperatives may not be the one proposed by Vanek - the high implicit cost of capital from internal sources - but limited internal funds, since the reliance on internal funds where the supply of funds is not

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33. Bonin (1985) similarly argues that the investment decision will not be very different under external financing, since social capital, as the root of the problem, is not eliminated by external financing (p. 18).

infinitely elastic clearly hampers the growth of the firm's capital stock (Stephen, 1984, p. 84-86).

Finally, in relation to Vanek's external financing solution, two additional problems have been widely discussed. The first is the problem of high dependence of LMFs on financial institutions, leading to banks' involvement in the internal policy of the firm which is against the principle of self-management, and hence the confrontation between the owner of capital and its user.[34] The second problem is the "moral hazard" problem, arising from risk connected with debt financing of a LMF. LMFs may be lacking effort to operate successfully if in risky situations substantial part of the losses can be got rid off by bankruptcy, and hence lending to a firm of yet unknown future profitability may involve a higher degree of risk.[35]

1.2.1.2.Furubotn and Pejovich's theory

We will for the moment discuss two principle weaknesses of Furubotn and Pejovich's theory: 1)its methodology; and 2)the role of bank credit.

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34. See Schlicht and Von Weizsacker (1977), Jensen and Meckling (1979), Dumas and Serra (1973), Horvat (1982), Ellerman (1986), Bonin (1985).
35. See Schlicht and Von Weizsacker (1977), Gui (1982-83), Keren (1985).

1)Methodology

Furubotn and Pejovich have not properly analysed either the "pure" LMF, nor the Yugoslav firm. If the authors' intention had been to analyse the LMF in its "pure" form, it is misleading to have based their entire analysis on the Yugoslav firm - a socialist LMF, obliged to respect the CMR [36]- and on this basis propose general hypotheses for the LMF's behaviour. [37] The CMR is not present in the legal framework of cooperatives in Western countries, and therefore investment behaviour under such an assumption cannot be generalized.

If, on the contrary, Furubotn and Pejovich wanted to examine the specific case of a Yugoslav LMF, it is misleading not to have taken into account other features, along with social property and the CMR, peculiar to the Yugoslav context. Whereas specific features of the Yugoslav economy will be treated in greater detail subsequently, here we will mention primarily those which are most relevant for theoretical considerations.

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36. In most articles the CMR is explicitly assumed, although the authors fail to stress, with the exception of Furubotn (1980a), the importance of the CMR as a disincentive.

37. Thus in Furubotn, Pejovich (1973), the labour-managed system with a specific property rights structure and the CMR is assumed (p. 278), but later the authors conclude that "the pure labour-managed system is an essentially unstable construction" (p. 283); or in Furubotn (1974), the Yugoslav LMF is analysed, but conclusions are generalized: "...there is an inherent flaw in the structure of the pure LMF" (p. 284).

For example, since inflation has been the characteristic feature of the Yugoslav economy, it has been argued that its presence has probably caused a systematic bias in favour of non-owned assets.[38] Although the authors propose inflation will be present in a labour-managed economy, they do not consider that inflation could render the CMR partially ineffective, when replacement costs exceed historical cost (Bonin, 1985; Zafiris, 1982). Or, that a partial relief from the CMR could be present due to regulations regarding loan finance in Yugoslavia, which permit the repayment of a loan from depreciation allowances,[39] or if debt repayment exceeds depreciation. Furubotn and Pejovich have also neglected actual banking policies in Yugoslavia, artificially low interest rates on loans, which have had their impact on the high level of bank-financed investment, and hence they are ascribing inefficiencies due to an imperfect capital market to Yugoslav property rights.[40] Finally, by concentrating

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38. Sacks (1983), pp. 81-83. Sacks also argues that there is room for argument over the appropriate method of calculation when comparing returns from owned and non-owned assets, as different discounting procedures can yield lower critical rates of return from investment in non-owned assets (Sacks, 1983, p. 77-81).
39. See Stephen (1978); Connock (1982).
40. See Stephen (1984), p. 89. Estrin (1983) also notes that the model "is not really concerned with the effects of labour-management at all, but rather the consequences of particular legal constraint on private Yugoslav choices" (p. 6).

their argument on one issue - that of property rights - Furubotn and Pejovich disregard other systemic features of socialist economies (e.g. the tendency to overinvest), which may be important for analysing the investment decision of the Yugoslav LMF.

Hence, Furubotn and Pejovich's theory is based on assumptions which do not adequately reflect either the Western cooperative, nor the Yugoslav LMF. The CMR does not usually apply to a LMF in a capitalist environment, whereas in the case of the Yugoslav LMF, its effectiveness needs to be evaluated by taking into account other features of the Yugoslav economy, that have played a part in maintaining a high level of investment in Yugoslavia, in spite of the absence of private property rights.

2)Bank credit

Furubotn-Pejovich's claim that the availability of external sources of finance will drive self-financed investment to zero has been extensively critisized, as the hypothesis is conditional upon specific conditions.

Only if the CMR was not obligatory for investment financed externally, would there be an absolute preference for external sources of finance.[41] Otherwise, whether bank finance will be the cheaper source, will depend on the length of the payback

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41. Quite inconsistently, in Furubotn (1974) and (1976) the author did not apply the CMR to assets purchased by the use of borrowed funds; see Bonin (1985).

period of loans, the time horizon, the interest rate, and the technological properties of a given investment.

Stephen (1980, 1984) has convincingly argued that when the loan repayment period is shorter or equal to the workers' time horizon, any investment must be seen as a combination of credit and self-finance. When borrowing and lending rates are the same, the required return for a project financed by a loan which is repaid within the planning horizon is the same as that for an internally financed project, and the availability of credit does not affect the level of investment. If these rates differ, it is highly likely that the sum borrowed will be less than the total investment and that there will be some self-financing.

Bonin (1985) confirms Stephen's conclusions and asserts that Furubotn's argument is valid only if no payment of principal is ever made. He notes that Furubotn and Pejovich's implicit assumption that maturity dates for loans are matched not with tenure, but rather with the expected life of the as-sets, is a heroic assumption, since the CMR makes the life of an asset infinite, implying that the loan maturity date will also be infinite. For a LMF to rely only on external financing, either financial institutions will have to offer especially advantageous conditions (long maturity and low rates), or the

representative worker's tenure would have to be quite short, or both.[42]

Finally, as already stressed in reference to Vanek's theory, external sources of finance will not be preferred in case a project involves the introduction of labour-saving technology, since workers will prefer to share the capital cost currently with the relatively larger number of workers, and thus finance the project from retained earnings (Aoki, 1984).

Therefore, contrary to Furubotn and Pejovich's assertion, the LMF may rely more, under certain conditions, on internal financing of investment.

1.2.2. Common features

Three issues that are central in both theories will now be reconsidered, related to property rights, the planning horizon, and workers' interests, since it is precisely the nature of the assumptions on these three items that crucially determines the conclusion on underinvestment.

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42. Similar objections are made by Zafiris (1982) who argues that the advantage of bank credit cannot be a decisive one under the CMR; if loans are ultimately repayable, bank finance also becomes self-finance in the long run. Ireland and Law (1982, p. 49) note that the proposal is based on the unrealistic assumptions that banks will allow the principal to be repaid at the same rate as the rate of depreciation, and that bank finance is unlimited.

1.2.2.1.Property rights

Both schools of thought assume a strong causal relationship between legal ownership and the investment decision of a LMF. While Furubotn and Pejovich explicitly emphasize that underinvestment is caused by the attenuation of private property rights, Vanek is less explicit on this point, but nevertheless also assumes that the absence of private property rights in a LMF implies a major sacrifice for workers undertaking investment.

What are the limitations of such an approach? Our first objection is that these theories, by considering exclusively one, in this case, negative feature of collective ownership, are one-sided, biased, and simplified.[43]

In contrast with Marx's view of social relations as determined by the conditions of production, these theories disregard precisely that the change of ownership from private to collective, may lead to different social relations, having in turn, positive effects on the LMF's behaviour. A collectively-owned LMF may produce an ideologically more acceptable working environment, improved relations among workers, which could

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43. For an excellent critique of specifically "property rights economics" as developed by Furubotn, Pejovich, and others, see Nutzinger (1982) .

represent an important non-material benefit of collective property.

But besides these ideological preferences, there are direct material advantages a worker could have from collective owner-ship. Among these are collective funds that can provide workers with important benefits (apartments, meals, health care, etc.). In addition, the structure of property rights enables a LMF to undertake investment in general human capital, which the capitalist firm would never undertake.[44] Collective ownership of funds can also make the LMF more reliable to external financiers, and ensures a higher level of disposable financial capital, which can be advantageous for the LMF's operations (Zevi, 1984).

Here it may be argued that in an economy where workers know of no other form of property rights, where private business opportunities are limited, as till recently has been the case in Yugoslavia, they will not be in a condition to sufficiently appreciate the advantages of non-private ownership. However, if we look at cooperatives in a capitalist environment, these are often based on collective property forms, yet this institutional

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44. See King (1979) and Horvat (1982).

arrangement is accepted on a voluntary basis. Therefore, collective ownership obviously does have its own advantages, its own raison-d'être. In fact, Zevi (1984) suggests that the extension of private property rights in the case of Italian cooperatives, may have serious negative consequences.

Our second objection to the considered theories is that they have overemphasized the role that the legal regulation of property may have on a LMF's actual behaviour. By an elaborate tax system, a private property economy can approach one labeled socialist, while an economy which has abolished private property rights can still introduce incentives similar to those in a private property economy. [45] There may be ways of reconciling collective property with adequate remuneration of investment decisions. [46]

1.2.2.2.Time horizon

In spite of the emphasized importance of the time horizon as a distinct criterion of the LMF, the collective nature of investment need not necessarily lead to the adoption of short time horizons, as is usually assumed.

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45. A similar argument is proposed by Bajt (1968), (1988). Bajt's proposal and alternative ways of achieving this will be discussed in Chapter 5.
46. A concrete proposal will be given in Chapter 5.

Indeed, Vanek examines the case of a one-year time horizon, and argues that with time horizons longer than one year, the realistic ranges for the returns on investment in capital assets Ax will be between twice and four times the time preference rate R (we recall that Ax=R+D). This does not hold, however, if a sufficiently long time horizon is considered. [47]

Furubotn and Pejovich, on the contrary, do adopt a dynamic analytical framework, yet the LMF's time horizon is regarded as being "typically short" because of the negative implications of collective property rights. [48] It is only in two articles that additional arguments are given: preferences of workers who plan to quit or retire; and risk increasing with time, since new voting patterns or revised payoff policies, may be introduced. [49]

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47. E.g., in a LMF consisting of a majority of young workers, who expect to retire after 30 years, assuming that R=6%, Ax=7,2%, the differential D is only 1,2%, and therefore Ax will not be much higher than R (as calculated by J. Defourny, 1983, p. 209).

48. In Furubotn, Pejovich (1973) the authors state: "in what may be regarded the typical case, a majority of workers in the firm will not be commited to a 17 or 20 year planning horizon" (p. 281); or in Furubotn (1974), "In what may be considered the typical case, the bank rate of interest (i) is almost certain to be less than the critical rate of return on non-owned assets (r*). That is, unless the collective's planning horizon (T) is quite long" (p. 272). The only exception is Furubotn (1980b): the author does assume a short time horizon, but notes that "it is still conceivable that the expected horizon will be substantial (for example, T=20)" (p. 801).

49. Furubotn (1974), p. 272; Furubotn (1980b), p. 801.

However, these reasons do not seem sufficient for a short time horizon to be present in a LMF. The majority of workers would have to be about to leave in order for the LMF to have a relatively short time horizon.[50] As for the second reason, the author seems to be forgetting that in a LMF, it is the workers themselves who decide on these matters.

The planning horizon of a LMF may, in fact, be as good as infinite, or long enough, at any rate, to eliminate the disincentive to invest (in Yugoslavia arising from the CMR), or the distortion in ranking projects (in workers' cooperatives arising from LRC), if additional factors, neglected by the literature, are taken into consideration: 1)level of commitment; 2)age structure of the work force; and 3)effective investment criteria of a LMF.

1)Commitment of workers in a LMF may be higher than elsewhere, in the first place because of ideological reasons. In a socialist LMF, workers may feel sufficiently like 'guardians' of society's capital to adopt infinite horizons with respect to their investment,[51] in which case even in a LMF with a strict

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50. Of course, it is plausible that older workers (with shorter time horizons) will be the more influential, but this would imply abandoning one of the basic assumptions on the LMF, that each worker has equal voting power.
51. Zafiris (1982), p. 68.

CMR, the disincentive to invest would be removed. Moral incentives may play an equally important role in participatory organizations in the West, since personal and community relations can provide a stronger nonmaterial commitment than elsewhere.

Commitment may also be higher because of factors which reduce the mobility of labour. Schlicht and Von Weizsacker (1977, pp. 61-65) propose that the way in which the commitment problem will be solved in the labour managed market economy is by a sufficient de facto immobility of labour. While capitalism makes the commitment principle compatible with high mobility of workers, but their exclusion from decisions, a labour-managed economy makes it compatible with labour management by reducing mobility.[52]

The principal reason why low mobility of labour might be present in a LMF more than elsewhere, is that past investment, due to the LRC, ties workers to their LMF (Horvat, 1982;

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52. Furubotn himself proposes that under labour management, high labour mobility is ruled out, but criticizes Schlicht and Von Weizsacker's approach, arguing that even if there is absolute commitment, the majority group controlling the firm will still undertake poor investment projects, since as it ages, the firm's effective planning horizon becomes shorter (Furubotn, 1979, p. 216-229). However, he neglects the realistic possibility that with time, the majority group will not consist of the original workers, but will be renewed by younger workers, thus prolonging the LMF's time horizon.

Nutzinger, 1975). It could also be present because of solidarity issues (reluctance to fire workers). A worker in a LMF, when deciding to invest, is probably going to be concerned more about how such a decision is going to affect the firm's growth and therefore, his own future earnings, than with the possibility of changing jobs. Transferred to the level of the whole collective, it is highly improbable that the majority of workers, at the moment of an investment decision, will think of seeking another employment at some near future.

Whereas an immobile labour force will cause other inefficiencies and problems, its presence implies that penalty for poor investment choice will have to be born by workers. Consequently, it will be in their interest to make the best possible investments, since poor decision will mean lower incomes in the future (Milenkovich, 1971, p. 224).

2)The second issue of importance for the LMF's time horizon is the age structure of the work force, which is usually neglected, or assumed to be such as to determine short time horizons.[53]

If we accept the usual assumption that in a LMF, the system of decision-making is such as to provide each worker with one

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53. Among the few exceptions are Furubotn (1979), Bonin (1985), and Conte (1980).

vote, it is the median aged worker who will cast the decisive vote on investment.[54] If the hiring policies of a LMF are such as to replace older members (at retirement) on a consistent basis with younger members, the median age of workers will remain approximately constant, and collective property rights is not a sufficient reason for the median aged worker to adopt a short time horizon. If there are no unvoluntary dismissals, as seems plausible, and the above mentioned hiring policy is applied, it is not unreasonable to propose a time horizon for the median worker to be around 20 years, which should be long enough, on average, to allow the benefits from an investment to be born by workers.

3)Finally, let us reconsider the investment criteria of the LMF. Although we have shown that the time horizon, if exceeding the repayment period of an investment, loses much of its relevance as a specific investment criterion of the LMF, let us for a moment consider a short time horizon, of e.g. 5 years. Such a horizon would allow sufficient time for workers to recover their shares of an investment (under appropriate reward

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54. Here we are grateful to M. Conte (1980) who is one of the very few authors that has considered this problem. His article, in spite of the mathematical errors it contains, which Conte himself aknowledges, has to a large extent inspired our reflections on the matter.

schemes) only if the firm selects projects with a pay-off period not longer than 5 years.

In this context it is useful to consider the capitalist firm, which is increasingly using discounted cash flow techniques in conjunction with other methods. Among these, the pay-off period, as a method which provides a way of handling uncertainty and risk,[55] is reported to be used extensively by capitalist firms.[56] For a project to be undertaken, its pay-off period should not exceed the standard period which is customary in a given sector, ranging from under 2 to 5 years.[57]

Therefore, it is very probable that a contemporary capitalist firm, operating under conditions of high uncertainty and rapidly developing technology, will not be in a position to maximize the present value of a given investment project, but will be constrained to primarily consider the period over which the investment is repaid through gross profits as the decisive criterion for guiding investment.

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55. See Hirshleifer (1970), p. 59, Nuti (1987) pp. 2-3, Hodder (1986), p. 17.
56. On early evidence on the use of this investment criterion, see Nuti (1987). Recent evidence is reported in Schall et al. (1978), who found that in a sample of 189 large U.S. firms, 74% used the pay-off period as an investment criterion.
57. Nuti, (1987).

A LMF operating under the same conditions of rapid tech-
nological progress, in order to survive, will have to behave
similarly to its capitalist counterpart, and therefore opt for
fastest-yielding investment projects. Yet the proposed pay-off
period of no more than 5 years is highly unlikely to be longer
than the time horizon of an average worker in a LMF. In this
case, the ranking of projects by a LMF would not differ substan-
tially from that of a capitalist firm, even in the case that the
LMF has a finite (and rather short) time horizon as compared
with the capitalist firm having an infinite one.

It is also worth noting that a key problem for the
capitalist firm is that it has to frequently bargain with labour
unions. Since investment weakens the firm's bargaining position,
a biasmay be created towards more liquid forms of investment or
towards easily sellable capital, or simply towards investment.
This may be a bigger problem for the capitalist firm than the
time horizon problem is for the LMF (see Ireland, 1984).

1.2.2.3.Workers' interests

An assumption explicit in both Vanek's and Furubotn-
Pejovich's theory, is that workers in a LMF behave according to
their own self-interest. Such an approach, based on strict
individualism, considers a LMF is reducable to a group of uncon-
nected individuals, each pursuing his own self-interest and
disregarding those of the firm or of his fellow workers. This is
not surprising for Furubotn and Pejovich, but does seem strange

for an author like Vanek, who in various works stresses the "special dimensions" of labour-management.[58]

However, individual self-interest, the favourite neoclassical assumption, may not be the most adequate criterion for explaining the behaviour of a LMF, since it implies the neglection of collective value judgements, group behaviour, and the complexity of labour participation. If labour-management is to represent a different type of social organization based on elements such as democracy, participation, and solidarity, workers in a LMF will be more concerned about the effects of their decisions on others than elsewhere, precisely because of their active role in the decision-making process. The performance of a LMF cannot, therefore, be judged and evaluated by simply aggregating individual preferences, since decisions in such an organizational setting are no longer individual, but collective.

While when investing a part of his income in a savings account, the worker acts according to his self-interest since the decision concerns only him as an individual, this may not be the case when he is considering investing in the firm, as

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58. To quote Stephen (1984), to Vanek "the study of labour-management goes beyond the 'crossword puzzles' of the neoclassical paradigm into the realm of 'relevance and application'" (pp. 5-6).

such a decision is of a collective nature. It is through a process of discussion of all workers, at the general assembly or elsewhere, that a decision about investment in a LMF is usually made, and here it is the collective as a group who decides, who is responsible, and who bears the consequences of such a decision. Therefore the two types of investment are of a different nature.

In support of the above approach we will briefly present Sen's arguments, which are interesting in view of their possible application to a LMF. Sen (1967) shows that if we assume complete independence of individuals' expectations of other people's action, the pursuit of self-interest by each produces an overall result that is Pareto-inferior. Individuals can do better off by collusion, but the collusive solution would not come about, except through compulsory enforcement. This is what Sen calls the "isolation paradox", as an extension of the two-person non-zero-sum game known as the "prisoners' dilemma". He applies it to the savings problem and shows that an individual in isolation will be better off not saving himself, although each would have preferred that others save. In contrast, if expectations about other people's behaviour are assumed, an individual expecting, and having assurance, that others will all vote for investment, will vote for investment himself, and enforcement becomes unnecessary. This is what Sen calls the "assurance problem": if each individual has complete faith that

others are going to opt for investment, it is in his own interest to act in the same way.

Sen concludes tnat individual self-interest influences collective decisions in a different way than it does unilateral decisions. Self-interest pursued by an individual in isolation produces a conflict between individual and collective preferences, and cooperation would need to be enforced in order to obtain a collectively-optimal outcome, whereas if individuals' actions are interdependent, such an optimal solution can be arrived at voluntarily.[59]

While the first of the above problems, the "isolation paradox", corresponds to Vanek's and Furubotn and Pejovich's notion of a LMF, tne second problem of "assurance" could be resolved in an actual LMF. For this to be feasible two conditions would need to be fulfilled: 1)perfect information on other people's opinion; and 2)a solid ground for assurance tnat others will also vote for a given decision.

These conditions could be fulfilled in a LMF, precisely because of the specific mechanism of the decision-making process. The first condition is fulfilled because discussion by all workers, and an exchange of opinion, ensures the flow of

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59. It is important to note that the central point of the argument is not altruism. For a similar analysis, see Marglin (1963).

information on other people's preferences. The second condition is fulfilled because after the phase of discussion, where each worker agrees to the adoption of a specific policy, he is un-likely to change his initial opinion, and analogously, there should be no fear that others will do so and vote differently.[60]

Such a group-behavioural approach is therefore more likely to produce a collectively-optimal outcome, and is also more likely to lead to positive investment than the approach based on individuals' isolated self-interest. If each worker realizes investment can be beneficial for the collective as a whole, including himself, provided he agrees to it, and workers jointly decide that it is in the interest of the firm to make an invest-ment, they may be willing to vote for positive investment as optimal.

Nevertheless, the above approach may also involve serious difficulties in its practical implementation. Its feasibility depends essentially on how "ideally" self-management functions, whether it is actually able to eliminate the conflict between individual and collective interests. The approach is based on the assumption that a harmonious process of convergence of

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60. If this, however, was to happen, under conditions of public voting it would probably send the decision back to the initial stage and workers against would eventually be persuaded.

workers' opinions will actually take place, and hence that a conflict-resolving decision-making process is a realistic framework, which is indeed a strong assumption. In addition, Sen's argument may be used against the entire idea of self-management at the enterprise level, in favour of nation-wide cooperation.

1.3. Restrictions on capital withdrawals: some further clarifications

It has already been argued that the CMR and RWC have different implications for the investment decision of the LMF, but the analysis has so far been primarily concentrated on the issue of the time horizon. Another important aspect of the problem of underinvestment concerns concrete restrictions in LMFs, i.e. how restrictive rules on capital withdrawals are in practice and what they actually imply. In the case of a cooperative, even if it adopts a time horizon longer than the life of an asset, and consequently uses the same criterion as the capitalist firm, what will be the effects of the LRC principle, and hence how much of an investment a worker will be able to recover individually, will depend on internal regulations concerning capital withdrawals. Similarly, under the CMR, how strong will the disincentive to invest be, will depend on the effectiveness of the rule in practice.

1.3.1.Rules in Western cooperatives

Restrictions posed on capital withdrawals in workers' cooperatives in Western Europe differ substantially not only from country to country, but also within countries, as specific rules are sometimes determined only by the statutory acts of the single cooperative. The different regulations governing cooperative practice in Western Europe are presented in Table 2.

The first point to be made is that in practice, there are almost no cases of 100% collective ownership of assets in the sense of Vanek's theory.[61] The more frequent practice is a property form based on a mixture of private and collective ownership. Individual workers contribute a certain amount of capital when joining a cooperative, usually in the form of a share, which remains in private property and in most cases, under certain restrictions, is redeemable. What constitutes collective property of the cooperative is usually the part of capital which is allocated to various funds, which in case of closure, in some countries, cannot be distributed among workers.

The proportion of private capital respect to collective funds is very different across countries. In contrast with Spain (Mondragon) where 85% of original capital is put on members'

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61. The only exception are some Danish cooperatives, which however, are owned, financed and controlled entirely by trade unions.

Table 2 REGULATIONS IN COOPERATIVES IN WESTERN EUROPE

	Limitations			Profit distribution		Distribution of capital in case of liquidation	Advantages	
	Capital provided by members							
	Worker's capital stake	Interest on shares	Recovery of shares on leaving	General rules	Reserves (RF) and other funds		Fiscal benefits	Financial support
BELGIUM	No legal minimum or maximum	Not limited	Nominal value	No rules except for legal reserves	Same as in other types of firms	No rules	If member of association: -reduced corporation tax -Interest on workers' invest non taxable first 1500 FR interest on capital invested exempt from income tax	Soficatra, a special fund for coops
DENMARK	Rules as in other firms*	Usually limited to 2% above the DNB rate	n.a.	As in other firms		No rules	No benefits respect to other types of firms	Workers National Bank: gives loans 1% lower¹
FRANCE	One share or more per memb. One member cannot hold more than 1/4 of total share capital	Limited to 2 points above the NBF rate	Nomin. value but only if this doesn't decrease capital to less than 1/4	RF: 15%. until it has reached the level of capital. At least 26%. workers' bonuses(or put in Participation Fund). Dividend on capital:not exceed 25%. and must be lower than amount for bonuses		Surplus in RF after shares& debt are paid goes to charitable purposes	-No business licence fee -workers payments deductable from taxed profit -Particip.fund. if blocked for 5 years. not taxed. -Investment RF (can be set up if partic. fund exists) is tax-free	Guarantee fund set up by FEL provides coops revolving loan SCUP; state support.Coops favoured in publ.contracts
GERMANY	At least one share per member. Level set in internal rules	Interest on original shares not limited;but + part of reserve fund on workers' investment only when profits allow		Free to decide	Level of RF specified in internal rules	Once all obligations are met. assets can be distributed to members	Same fiscal treatment. but for few exceptions (construction coops excempt from tax)	No special provisions
ITALY	One share or more per member. Min.& max. loans.Until stake set: '83 to .5%. 5000 lira& after .83 30 million to 2.5% above interest on postal bonds.	Interest limited on shares and	Nominal value	RF: at least 20%. Profits distributed to workers must not exceed by more than 20% the average market wage; otherwise the coop is no longer legitimate for tax excempt.		Surplus,after shares&debt are repaid goes to charitable purposes	Interest on workers loans taxable at 10% (and not 20%) If adhering to coop. law, benefits from total/partial tax relief (corporate tax, local revenue tax, tax on distrib. profits)	State fund for the promotion of coops. through the Banca Nazionale di Lavoro
IRELAND	Maximum per worker set to 3000 Pounds	Not limited (set by coop)	Not refunded	No rules	RF: usually a part of profits	No difference respect to other firms (in proportion to shares)	Tax on dividends not paid Dividends and premia tax deductable	Grants under a scheme for promoting small industry

*In Denmark, however, in the largest part of workers' cooperatives, ownership and control rests entirely with trade unions, and hence are not really comparable with cooperatives in other countries.

Table 2. (cont.)

	Limitations provided by members			Profit distribution		Distribution of capital in case of liquidation	Advantages	
	Worker's capital stake	Interest on shares	Recovery of shares on leaving	General rules	Reserves (RF) and other funds		Fiscal benefits	Financial support
NETHERLANDS	No legal provision	Sometimes workers have no shares; if they do: modest	n.a.	No rules		Must be set in internal rules	Profits distributed to workers exempt from tax (taxed only as income). Members' loans not taxed if interest not received	A recently created fund for promotion of ABC coops
SPAIN (Mondragon)	High init. capital of 1% of the which 15% goes to RF, rest to workers personal accounts	Limited to 1% of the Bank of Spain, or the max. of 11%	Revalued members' capital is redeemed on retiring; if leaves earlier, receive 80%	Compuls. RF: min. 20%. Compuls. Social fund: 10%. Optional RF may be set up. Remaining profit: individ. accounts, according to & 1% due on shares (this part is usually reinvested)		Optional RF & 50% of compuls. RF can be distr. to workers. Shares repaid Rest: for charity purp.	Corporate tax is 18% (and not 33%). Social fund is tax-deductible. Exempt from tax: transactions among coops and profits distributed to workers A rebate of 95% on the taxation licence	Caja Laboral Popular provides investment capital & various services
UK ICOM	One 1 Pd share per member			Members may share in profits, but a certain % must go into RF (left to the coop to decide)		Residual must go to charity purposes		Indus. Common Owner. Finance (govern. funds) loans at lower int. rate Sometimes get 1.000 Pd.
CPF/Coop. Union	No limits other than legal max. (5000 Pd in 1981)	Not limited	Usually reimborsed (nominal value)	Apart from legal requirement for individual holdings assets held in collective form. Can issue bonus shares to workers.		Can be distr. to workers in from proportion to shares	Workers' bonuses deducted from corp. tax (taxed as pers. income); interest on investment in coop tax-free	start-up grant sometimes finances up to 50% of invest.

Source: Commission of the European Communities (1984), European Communities (1985), Bartlett and Uvalic (1986).

individual capital accounts, and only 15% goes into the compul-
sory reserve fund, in Danish trade union cooperatives, the
entire capital is collectively owned, in British ICOM coopera-
tives (cooperatives belonging to the "Industrial Common
Ownership Movement") the percentage of collective funds is
generally quite high because individual capital stakes are
limited, and, e.g., in British CPF (Cooperative Production
Federation) cooperatives only 4% of capital was in individual
ownership in 1968 (Estrin, 1985). Differences are found even
within different sectors; for example, Estrin, Jones and Svejnar
(1984) found that private property of workers in French coopera-
tives represented 30% of capital in the building sector, but
almost 60% in the electric energy sector.

This implies that, in general, capital in "collective
property" to which Vanek's theory refers to (and from which the
underinvestment problem arises), represents only a part of total
capital of a cooperative (smaller or larger, is a matter of
empirical verification).

As to concrete restrictions which may be unstimulative for
the individual worker investing in a cooperative, they can be
classified into two large groups. The first group are restric-
tions concerning shares, or initial capital contributions by
members. Whereas in most countries there are no limitations on
the maximum amount that can be contributed, there are exceptions

to the rule.[62] Second, interest on members' shares is usually limited, as this is one of the principles of the International Cooperative Alliance. The regulation present in almost all countries is that subscribed capital cannot be remunerated at an interest rate higher than a fixed predetermined level, but exceptions to this rule are also found (in Ireland, Germany, Belgium, and some cooperatives in the U.K.). The same principle of limited interest is also applied, in some countries, on members' loans (Italy, Netherlands). Third, if a worker decides to leave the cooperative, shares/initial capital contributions are usually reemborsed, but not always (in Ireland), sometimes only at their nominal value (Belgium, France, Italy), or only partially (in Spain 80% if leaving before retirement). Finally, shares cannot be sold to outsiders, and are not tradeable except sometimes among members.

Therefore, a worker as an individual, in most countries, cannot realize capital gains from investing personal wealth in the cooperative. In case of leaving, he may incur losses, and hence may be constrained by his time horizon, which however may

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62. In British ICOM cooperatives the individual capital stake is limited to one share of 1 Pound per member; or limits put on total capital of a single memoer, as in Italy, until recently set to a maximum of 4 million Lira but now raised to 30 million Lira; in Ireland set to 3000 Pounds, and in British CPF cooperatives to the legal maximum of 5000 Pounds.

become longer precisely because of limited redemption. [63]

However, enrichment is certainly not the main reason why a worker joins a cooperative, and in any case, as long as he remains in the cooperative, he could, in principle, be rewarded for investment undertaken collectively from retained earnings. [64]

The second group of restrictions regards profit distribution, and the related issue of distribution of residual assets in case a cooperative is liquidated. With the exception of France, Italy, Spain and British ICOM cooperatives, where precise rules do exist on which percentage of profits needs to be dedicated to funds, in other West European countries the allocation of profits is not determined by law (in Belgium, Denmark, Germany, Ireland, the Netherlands).

However, the percentage of profits to be allocated to certain funds, even when obligatory, is not very high. The compulsory allocation to the reserve fund (indivisable reserves) ranges from 15% of profits in Spain and France, [65] to 20% in Italy. In Spain, an additional 10% must go into the Social Fund.

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63. This will depend on whether the worker considers the ex ante or ex post effects.

64. Some of the theoretical possibilities have already been discussed earlier; schemes effectively applied in practice will be discussed below.

65. In France, however, it ceases to be obligatory once it has reached the level of the cooperative's capital.

In France, 25% of profits must be distributed to workers (or reinvested for them through the Workers' Participation Fund). In Italy, profits distributed to workers must not exceed by more than 20% the average salary bill on the market, otherwise the cooperative is no longer liable to ask for tax benefits.

In the above countries, if a cooperative is liquidated, the residual remaining in collective funds cannot be distributed among workers, but has to be desolved or dedicated to charity purposes. Whereas the strictest rules are present in Italy and France (the residual, once shares are redeemed and debts paid, entirely goes to charity purposes), the rules in Spain allow, in addition to the full recovery of capital held on individual members' accounts, the distribution of 50% of the compulsory reserve fund, the entire distribution of optional reserves, and only what remains goes into charity purposes.

This implies that a worker in an Italian, French, Spanish and ICOM cooperative may not be able to capitalize his share of the firm's capital if the cooperative is liquidated. However, as long as the cooperative continues operating, and the worker remains in the cooperative for a sufficiently long time, he could benefit from undertaken investment through reward schemes which allow for an adequate recognition of individual contributions to capital accumulation. Since the property regime in cooperatives is already based on a part of capital being privately owned by workers, issuing additional capital shares to

workers in correspondence to the net increase in capital is a perfectly feasible solution. [66] That interest on such shares would have to, in many countries, be limited, should not provoke serious disincentive effects, as these limits are such as to allow an interest which is at least equivalent (if not higher) than the bank interest rate.

There is indeed evidence that in some of these countries schemes rewarding investment undertaken from retained earnings are successfully applied in practice. In French cooperatives, when new assets are purchased members are sometimes issued with new shares corresponding to the value of new assets, effectively guaranteeing the return of the principal.[67] Or, in Mondragon cooperatives even up to 70% of profits is allocated to individual member's accounts, which are revalued annually and fully redeemed at retirement.

In all other countries, in case of closure of a cooperative, residual assets can be distributed to workers, usually in proportion to shares, and hence the disincentive to invest is not likely to be present.

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66. In this sense, there are no systemic constraints, as in Yugoslavia, that workers cannot be owners of a part of capital of the enterprise.
67. See Thornley (1981) and Oakeshott (1978), as cited by Estrin and Jones (1987).

The discussed limitations posed on cooperatives also need to be weighted against advantages they may have, primarily in terms of fiscal benefits and financial support. It is precisely cooperatives in those countries in which the strictest rules are applied, that also enjoy major benefits (Italy, France, Spain). The general rule seems to be that freedom in setting internal rules is paid by an unpreferential treatment respect to other types of enterprises.[68] The stricter the rules are, the more the cooperative sector seems supported by external institutions.

Finally, the three countries in which the strictest rules are applied - Italy, France, and Spain - are also the ones that have experienced the most rapid growth of workers' cooperatives in the past 20 years, and that today account for the largest number of workers' cooperatives in Western Europe.[69]

Nevertheless, it should be empnasized that a major problem of the cooperative sector, both historically and today, has been the problem of finance. The lack of capital has led to the difusion of cooperatives almost exclusively in labour-intensive sectors (trade, construction, transport, light manufacturing, services) (see Nuti, 1988a). However, how much this tendency has

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68. A possible exception is Belgium, where cooperatives are free to determine most of their internal rules, yet at the same time are offered some preferential treatment respect to other types of firms.
69. See Estrin, (1985).

been due to a hostile environment and the related unprivileged access to bank finance, or to restrictions imposed on cooperatives and hence reluctance to finance investment from retained earnings, remains an open question.

As to empirical evidence, early evidence on British footwear cooperatives seemed to offer support to Vanek's theory on underinvestment (Jones and Bakus, 1977).[70] However, more recent evidence suggests just the contrary. The system applied in Mondragon cooperatives has secured a high level of reinvestment of profits, and a substantial part of investment is internally-financed.[71] Similarly, latest evidence from France suggests that the basic determinants of investment in workers' cooperatives are similar to those in conventional firms, and that in general, no tendency to underinvest is present (Estrin and Jones, 1987).

The foregoing analysis of restrictions on capital withdrawals applied by workers' cooperatives in different countries shows that these rules include a wide variety of arrangements. Some of these regulations are not always, and not in all countries, as restrictive as is usually assumed in the

70. However, these results are not fully convincing and hence have not been universally accepted as a confirmation of the theory (see Stephen, 1984, p. 147).

71. See Commission of the European Communities (1984), Vol. II, p. S16, and Thomas and Logan (1982).

theoretical literature. In many cases, these regulations need not produce an unstimulative effect on investment.

Even in countries where the strictest rules are applied, these restrictions essentially concern 1)original capital of members (limited interest, redemption of shares at nominal value); and 2)subsequent increments of capital (obligatory collective funds, and the prohibition to distribute the residual in case of closure). Therefore, these limitations are likely to affect the worker primarily in two cases: if the worker leaves the cooperative, and if the cooperative is liquidated. As long as a worker remains in the cooperative, and the cooperative continues operating, if an adequate system of rewarding workers' investment decisions is introduced, these restrictions need not produce a disincentive to invest.

Nevertheless, what Vanek's theory is really concerned about is not the first limitation (individual members' stakes are anyway, usually not very high, except in Mondragon), but primarily the second referring to collective funds. Hence the restrictions existing in workers' cooperatives essentially come down to the obligation to allocate a part of profits to collective funds, which subsequently cannot be distributed to workers in case of closure. However, as long as the cooperative continues operating, the collective reserve fund which is usually held in financial form, can serve the cooperative for different purposes (e.g. in Italy, for covering losses).

1.3.2.Yugoslav regulations

There is some confusion in the literature connected with the CMR. For some authors, this requirement is directly linked to Yugoslav practice; for others, which do not make a distinction between the CMR and the LRC, it is the reflection of collective ownership of assets which implicitly contains such an obligation, and as such the rule is more widely applicable. In addition, the real meaning of the CMR in Yugoslavia has been questioned: whether it refers to the physical maintenance of existing equipment or the maintenance of the value of capital, to the book or the real value of assets, to gross or net assets, to capital provided by the state or also future increments of capital, etc.[72]

The CMR is a specific regulation, fully present only in Yugoslavia.[73] Its implications will be analysed by briefly reviewing Yugoslav laws on depreciation and revaluation, and by discussing some of the problems related to the implementation of the CMR in practice.

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72. See for example, Zafiris, (1982); Stephen (1984); Bonin (1985).
73. French cooperatives are required to maintain the value of assets to 25% of the highest value they have reached (see Estrin and Jones, 1987), but this minimum requirement on capital is not equivalent to the CMR. Or, Mondragon cooperatives effectively revalue all their capital assets, but in case of closure, can distribute a large part of capital among members, and hence are not obliged to maintain indefinitely the value of capital.

1.3.2.1.The legal framework

The 1974 Constitution and the 1976 Associated Labour Act state that "workers are obliged to ... continuously renew, increase and improve social assets".[74] Detailed instructions concerning the CMR are contained in various laws on depreciation and revaluation of assets, which have been changed continuously in the past 20 years.[75]

In the whole post-1967 period, the system of "free depreciation" was applied, implying first, that depreciation allowances, according to prescribed minimum rates, remain in the enterprise for the purpose of maintaining the value of the firm's fixed assets (instead of being put on special accounts, as in the pre-1967 system); and second, that enterprises may allocate to depreciation more than the prescribed minimum rate.

Until 1975, the basis for calculating depreciation was the book value of assets. A revaluation of all fixed capital was,

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74. Art. 15 of the 1974 Constitution, and Art. 13 of the Associated Labour Act (ALA). For further details, see Chapter VI of the ALA, which specifically refers to the management of social resources (Art. 227 onwards).

75. Since the first Law on depreciation was adopted in 1966, effective from January 1, 1967, there has been a special law on depreciation rates (1966), other four laws on depreciation (1974, 1976, 1984, and 1986), and 16 ammendments to the mentioned laws. The first law on the revaluation of fixed assets was adopted in 1975, followed by a new law in 1984, and its replacement, in 1986, by new provisions on revalorization included in the 1986 Law on total revenue.

however, effectuated in 1953, 1957, 1962, 1966, and 1971, by bringing up the value of capital to its market value. In 1972, regulations were adopted envisaging revaluation if the market price of fixed assets had exceeded their book value by over 5%. However, it is only from 1975 onwards, when the first law on the revaluation of fixed assets was adopted,[76] that enterprises are obliged to permanently revalue their assets if a difference emerges between the book value and the market value of fixed assets greater than 10%. Capital is revalued at the end of each current year, and as such serves as the basis for calculating next year's depreciation. Assets acquired using foreign loans are revalued in such a way as to adjust their book value to the corresponding change in the foreign exchange rate.

From Jan 1, 1985, revaluation is obligatory also for working capital (raw materials, work in progress, finished products). From 1987, a new system of revaluation has been introduced,[77] based on special coefficients which are determined on the basis of the index of industrial producers' prices. An important innovation is that revaluation must also be applied

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76. Zakon o revalorizaciji... (1975).
77. The new system is included in the new Law on total revenue (Zakon o ukupnom prihodu, 1986), effective as of January 1, 1987.

to depreciation allowances (i.e. resources allocated to depreciation, not yet used for replacement).

As to depreciation, the 1966 laws on depreciation[78] have effectively served as the basis of all future laws. Resources to which depreciation rules apply are fixed assets and resources for collective consumption in use. The obligation to calculate depreciation lasts as long as these assets are not fully depreciated. If assets are put out of use before they are fully depreciated, either the undepreciated amount is compensated from the business fund, to be refunded in the next 6 years from income, or such assets are offered on sale through a public auction. If no buyer is found, assets can be written off by debiting the business fund, but without the corresponding compensation from income; if a price lower than the value of such assets is obtained, the difference need not be compensated from the business fund. Finally, depreciation allowances are to be used primarily for the replacement of existing and the acquisition of new fixed assets, but may temporarily also be used for other purposes (e.g. as working capital).

Subsequent laws on depreciation and amendments to these laws have enlarged the list of resources to be depreciated (to

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78. Zakon o amortizaciji osnovnih sredstava radnih organizacija, (1966), and Zakon o stopama amortizacije osnovnih sredstava radnih organizacija, (1966).

include expenditure on innovation, and founder's investment),
but have also enlarged the list of fixed assets that can be
written off without being depreciated.[79] In the mid '70s, en-
terprises have also been given more freedom in using
depreciation allowances (for the repayment of investment
credits, as funds for obtaining bank credits for new investment,
and in joint investment with other enterprises). From 1982,
preferencial treatment was introduced for enterprises in process
of liquidation or rehabilitation and those which do not use
fixed assets at full capacity.[80]

According to the newest 1986 Law on depreciation,[81]
resources that need to be depreciated include fixed assets
(buildings, equipment, cattle), material rights which are part
of capital assets (provided for by investing into buildings or
equipment), material rights to technology (patents, etc.),
innovation resources, investment for enhancing agricultural
production, founders' investment, forests, slow growing plants
and fast growing trees (Art. 1). An exception is land (including

79. See the 1976 Law on depreciation.
80. In the first case, the possibility of transferring 50% of
depreciation obligations to the next year, whereas in the second
case, the reduction up to 50% of depreciation rates (see
Amendments adopted at the end of 1982).
81. Zakon o amortizaciji drustvenih sredstava, (1986).

long growing plants), edifices and equipment that serves na-
tional defence and state security, cultural monuments, fast
growing trees and cattle in the process of being promoted. The
depreciation rate is set on the basis of the purchase,[82] or the
revalued value of such resources, to be calculated until the
value is not fully repaid (depreciated). An enterprise can lease
assets out of use to other enterprises or to individuals which
set up private businesses, or, as in previous laws, offer such
assets on sale. Depreciation allowances can be used for a
variety of different purposes, including the repayment of in-
vestment credits and for working capital. [83]

Besides these standard provisions which are similar to
those in previous laws, the 1986 Law also introduces several new
elements. Depreciation obligations can no longer be postponed or
calculated at a lower rate if assets are not used at full
capacity.[84] Mandatory depreciation no longer enters income,[85]

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82. This refers only to newly-bought assets, purchased in a
current year, to which from Jan. 1 of the next year standard
provisions apply (revalued assets become the basis for
depreciation).
83. The only restriction is that they cannot be used for
purchasing collective consumption resources or for repaying
credits intended for collective consumption (see Art. 44).
84. See Art. 14. The only exception are resources damaged due to
"vis majeure", and assets in their first year of use (see Art.
11).
85. Income (dohodak) in Yugoslavia is defined as gross revenue
minus material costs.

but material costs of an enterprise. Enterprises which are in the process of rehabilitation and regular liquidation, which were not privileged by the 1984 Law, are now again excempt from depreciation obligations. Finally, stricter regulations are set for assets out of use: if the price obtained by selling an asset is lower than the non-written off value of the asset, the difference must be compensated. [86]

Depreciation rates have been applied in the whole post-1967 period on a uniform basis in the whole country,[87] as set in the Nomenclature, a part of the federal law on depreciation in which all assets are classified into more than 100 different groups. The characteristic feature of depreciation rates is that they have remained almost unchanged in the past 20 years. The average rate of depreciation has been around 5% in most years following 1971 (with the exception of 1974, when it was 8,58% due to a different method of accounting),[88] although the rates for different groups of assets vary substantially, ranging from a

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86. See Art. 41, 49, 57, 62, 64.
87. The only exception are republican laws on the depreciation of appartments, buildings, forests and roads.
88. See Zarkovic and Vujicic (1987), p. 144.

minimum of 1%, to a maximum of 50%.[89] In the 1986 Law on depreciation, these rates have been increased for most groups of assets, in some cases even by more than 100%.

1.3.2.2. Problems in implementing the CMR

The systems of depreciation and revaluation of fixed assets in Yugoslavia has been extensively critisized on different grounds. The first is the **inadequate revaluation of assets**. Revaluation has not adequately been reflecting inflation, nor the change in the foreign exchange rate, due to the absence of revalorization until 1975, and thereafter, due to the untimely and inappropriate revaluation of fixed assets.[90] In addition, until 1987, revaluation was not applied on yet unused depreciation allowances, which according to some calculations has decreased the real value of depreciation funds annually by more than one half.[91]

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89. E.g., in the Nomenclature of the 1985 Law on depreciation, a 1% rate is applied to earth sluices for water supply and canalization, branch lines for railway tracks, and sports facilities made of concrete (springing boards, skating tracks), whereas a 50% rate is applied to certain types of cattle, and to furniture for the transport of radio and television equipment.
90. As already emphasized, this is because fixed assets are annually revalued for inflation in previous year, and revalued capital serves as a basis for depreciation only in the next year.
91. Zarkovic and Vujicic (1987), p. 29.

Such an inadequate system of revaluation has resulted in depreciation being lower than necessary for maintaining the real value of assets. To quote a government report, "A comparison between the increase in nominal values of depreciation in 1984 respect to 1983, and in 1985 respect to 1984, and the level of prices and income, leads to the conclusion that in certain productive sectors the real level of depreciation has actually decreased, annually by about 20-30%, or by the amount for which depreciation has lagged behind the increase in prices, or the devaluation of the dinar".[92]

It has also been calculated that in the 1971-1980 period, the nominal value of fixed assets increased 14.1 times, whereas depreciation only 10.7 times. The average depreciation rate actually declined from 6.5% in 1970, to 4.2% in 1980. Although from 1981 onwards these rates have been increased, the average rate has remained low and thus has resulted in a rather low average depreciation period of fixed assets: 23.6 years in 1980, and 21.7 years in 1981. [93] The possibility of postponing depreciation has meant that in practice, an enterprise could effectively, in a given year, calculate 50% of its current year

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92. Federal Executive Council, June 1986, as quoted in Zarkovic and Vujicic (1987), p. 139.
93. See Drakul (ed.), (1984).

depreciation, and only a part of last year's postponed deprecia-
tion.[94] According to Zarkovic and Vujicic (1987, p. 28), the
prevailing estimates of the total Yugoslav "debt" owed to fixed
assets (due to untimely depreciation), in the 1970-85 period
amounts to 20 billion dollars.

Since depreciation enters material costs, its calculation
lower than necessary for maintaining the real value of assets
has meant that costs were understated, and thus products were
sold at a lower price, while income could for the same amount
artificially be overstated. This has had an important negative
impact: higher income serves as the basis for paying higher
personal incomes, and thus the system encouraged the outflow of
a substantial part of income from fixed assets into consump-
tion.[95]

Such tendencies have also been favoured by existing ac-
counting procedures. When net assets are revalued, the
counterpart in the liabilities side is entered by increasing the
value of the business fund (i.e. enterprise's own sources).
However, whereas the business fund is increased according to
revalued capital, depreciation enters costs in a given year in
its non-revalued amount. Such an automatic increase in the value

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94. Zarkovic and Vujicic (1987), p. 119.
95. See Zarkovic and Vujicic, (1987), pp. 28-29, 39, 318.

of the busines fund can serve as the basis for distributing a part of income, and hence not necessarily in proportion to obtained business results. In addition, it seems that inflation is, quite inappropriately, sometimes entered twice in an enterprise's balance sheets: not only through the revaluation of assets, but also through changes in interest rates and in foreign exchange. [96] The existing systems of accounting, depreciation, and revaluation have therefore been critisized as being an active generator of inflation, and have been blamed for the present liquidity crisis of the Yugoslav economy.[97]

The existing accounting system has also been unstimulative for allocating funds to mandatory depreciation, at least until 1986, since this part of depreciation was not included in costs, but in taxed income.

These tendencies have favoured a high reliance on bank loans. An enterprise can effectively use depreciation allowances as working capital, and compensate the amount, when needed in the future, through new bank credits, and thus it can realize a "gain" by saving on interest that would have been paid on a bank

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96. See Bajt (1985), and Rankovic (1985). However, it is not quite clear why inflation is entered twice; to clarify the issue further, accounting laws would need to be examined in greater detail.
97. See also Rankov (1986).

loan. It is claimed that this "gain" is not entered into the

business fund, but goes directly into consumption. [98]

Finally, existing legislation is very complicated to apply.

Indeed, in order to facilitate the implementation of existing

laws by enterprises, several handbooks on their application have

recently been made available. [99]

In concluding, it is worth stressing that Yugoslav

depreciation laws and problems encountered in implementing them

are very similar to those in other socialist countries. [100] The

Yugoslav economy in this respect (as in many others, as will be

shown later) seems to resemble much more other socialist

economies that the system of workers' cooperatives in Western

Europe.

Therefore, in the whole post-1965 period in Yugoslavia, the

CMR has been effective only partially. Even after 1975, in spite

of the intention to introduce a strict CMR, the system has not

adequately been reflecting inflation, and the maintenance of the

real value of assets was never fully implemented. The CMR has

not fully fulfilled the principle objective of its introduction,

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98. Zarkovic and Vujicic (1987), pp. 101, 107, 131.
99. Some of these handbooks include Milosevic and Zivkovic
(1984); Pancic (1985), Zarkovic and Vujicic (1987).
100. For a discussion of depreciation problems in the Soviet
Union, for example, see Lavigne (1962), (1967), and (1968).

as existing accounting procedures have enabled the eating up of capital stock, and hence disinvestment. Under existing arrangements, Yugoslav enterprises may indeed be stimulated to finance new investment from bank loans, while eating up their capital assets.

The main theoretical implication of the analysis is that a partial relief from the CMR, as suggested by several authors in the theoretical literature, is indeed present in Yugoslavia. Hence the investment bias is likely not to exhibit its full effect not even in Yugoslavia. Nevertheless, disregarding other considerations, it is still likely to be present (albeit partially) more than in workers' cooperatives, because the CMR is a stricter regulation than RWC.

The above analysis permits a further clarification of the differences between the CMR and the RWC. Since both the CMR and RWC put limits on the amount of capital that can be distributed to workers, it could be argued that obligatory collective funds implicitly involve the same type of disincentive as the CMR. However, the obligation to allocate a part of profits to collective funds is present only in some countries, and even when the allocation to collective funds is obligatory, it does not represent a large percentage of profits.

Therefore, the nature of the CMR and RWC is different. As long as a LMF continues operating, the CMR prohibits the consumption of all physical capital, while RWC, by imposing a

minimum requirement on collective funds or limited interest on workers' shares, only prohibit the distribution of a relatively small part of financial capital. Hence the disincentive effects are likely to be weaker than in the case of a LMF obliged to respect a CMR. Whereas in Yugoslavia, there are limits on the amount that can be distributed to workers on account of both capital stock (because of the CMR), and profits (as will be seen in Chapter 2), in Western cooperatives these limits on distribution primarily concern profits.

Under a CMR, workers must continuously refinance all investment, past and present, i.e. allocate sufficient amounts to depreciation and reinvest it subsequently in order to maintain the value of their fixed capital. Under RWC, on the contrary, there is nothing in cooperative laws which prohibits disinvestment, and hence the recovery, for the cooperative, of the principal of an investment. While this does not yet eliminate the problem of LRC for the individual worker, issuing additional capital shares to workers equivalent to reinvested income per worker, could eliminate its disincentive effects.

Finally, because of the difference in property regimes, in case an enterprise is closed, in Yugoslavia no part of capital can be appropriated by workers, as the enterprise is not the legal owner of its capital. In workers' cooperatives, on the contrary, only a part of capital (collective funds) cannot be

distributed to workers, but needs to be dedicated to charity purposes (and this, only in some countries).

Therefore, as suggested earlier, the restrictions on capital appropriation present in Yugoslavia are indeed more restrictive than those in Western cooperatives.

1.4.Concluding remarks

The foregoing analysis on the theoretical problems of the LMF's investment decision leads to the following principal conclusions. Respect to a capitalist firm, when undertaking investment from retained earnings a LMF does face a distinct problem, deriving from limited transferability rights over real property and income streams it can generate, and hence absence of perfect liquidity of an investment. Unlike the capitalist entrepreneur whose investment is "perfectly" liquid, a worker in a LMF cannot sell his job and the future income streams associated with it, and thus capitalize his part of the firm's earnings, but can only benefit from an investment over the period of employment in the same firm. This specific feature of the LMF is expected to lead to a truncated time horizon, a problem non-existent in the capitalist firm, and this in turn is expected to cause underinvestment of the LMF respect to its capitalist counterpart.

However, the conclusion on underinvestment cannot be generalized. How serious will the problem of limited transferability rights be, and what will its implications be for the

investment decision of a LMF, will depend on two groups of additional considerations, which are closely interrelated:

(1)nature and practical application of restrictions on capital withdrawals, distinguishing between the CMR and RWC, or the rules in Yugoslavia and in workers' cooperatives; and (2)effective length of the time horizon, as a LMF will not necessarily operate with a short (truncated) time horizon.

In spite of the fact that both the CMR and RWC represent a limitation of traditionally conceived property rights, our analysis has suggested that the CMR is a more restrictive obligation than those present in workers' cooperatives. The CMR requires continuous refinancing of all investment in capital stock, past and present, and hence prohibits disinvestment (which would, in principle, provide for the recovery of an investment).

The disincentive to invest would unambiguously be present only under the CMR, fully effective under the strong CMR, or partially under the regulation to maintain the book value of assets. Under a CMR, workers will not be able to recover resources invested in fixed capital, even if they remain with the firm for the full duration of an asset, and hence irrespective of the length of their time horizon. The only exception is if infinite time horizons are adopted.

However, a strict CMR is an extreme case not encountered in practice, in spite of intentions to introduce it in Yugoslavia

after 1975. Hence the investment bias is likely not to exhibit its full effect not even in Yugoslavia, but is still likely to be present more than in workers' cooperatives, because the CMR is a more restrictive regulation that those existing in workers' cooperatives in Western Europe.

In the absence of the CMR, the LRC principle need not necessarily lead to the adoption of a truncated time horizon, the use of the time horizon as the dominant criterion in investment selection, and to underinvestment. RWC do impose a minimum requirement on collective reserves which are not distributable to workers in case of closure (however, only in some countries), but do not seem to prevent cooperatives from adopting remuneration schemes which could compensate workers for the lack of perfect liquidity of an investment.

In a LMF not obliged to respect a CMR, whether the time horizon will present itself as the dominant criterion of the LMF, will depend on the effective length of the time horizon adopted, in relation to the repayment period of an investment:

a)If the time horizon is shorter than the repayment period of an investment, a LMF will probably exhibit a preference for short-lived projects, but this distortion is not equivalent to underinvestment, and need not lead to distinct behaviour if we consider that in practice today, a capitalist firm may often have the same preference for quickest-yielding projects.

b)If the time horizon exceeds the repayment period of an investment, workers could, in principle, fully benefit from income flows of an investment, and underinvestment need not prevail. A long time horizon is plausible for a number of reasons, mainly neglected by the literature: advantages a worker could have from collective property; high level of commitment; reduced labour mobility; constant renewal of the labour force; longer-term interests; and group-behavioural approach.

However, even if the LRC leads workers to initially adopt relatively short time horizons, workers could be compensated, through various remuneration schemes rewarding investment, for the imperfect liquidity of an investment. Such schemes are likely to decrease workers' uncertainty with respect to tenure with the firm, and hence lengthen workers' time horizon.

As to the concrete mode of financing investment, neither is internal financing always excluded by the LMF (as suggested by Furubotn and Pejovich), nor is external financing (proposed by Vanek) necessarily the more convenient way of financing invest-ment. Whether external finance will have absolute preference over self-finance, will depend on the terms of a loan (repayment period, interest rate), workers's time horizon, and the tech-nological properties of an investment project.

Therefore, whereas in theory, the LRC principle is expected to lead to a truncated time horizon, and this in turn to under-investment, in practice there is a variety of different possible

outcomes and the disincentive effect is not inevitable. A summary of the different possibilities concerning a LMF's investment decision is presented in Table 3. The Table indeed shows that the time horizon may, but need not always be the decisive criterion of the LMF's investment decision. Contrary to the surveyed theories which draw their conclusions by exclusively focussing on the workers' time horizon as the dominant criterion of a LMF's investment decision, two other horizons are equally important: in case of self-financed investment, the payback period of an investment; in case of external finance, the repayment period of a loan. However, even when the time horizon is applied as the dominant criterion in a LMF undertaking investment, it need not, under certain conditions, lead to underinvestment. Therefore, our principle conclusion is that underinvestment in a LMF with collective ownership need not prevail, but needs to be evaluated by taking into account the concrete institutional setting in which a LMF operates.

Table 3. THE IMPACT OF APPROPRIABILITY RESTRICTIONS ON LMF INVESTMENT BEHAVIOUR

Restrictions	Time horizon (T)	Investment criterion	Underinvestment
1.LRC + CMR			
1.1.Maintain real value of assets	Finite	Horizon	Fully present
1.2.Maintain book value of assets	Finite	Horizon	Present only partially
1.3.Maintain real or book value of assets	Infinite	Standard*	Not present
2.LRC without a CMR			
2.1.T relatively short, due to LRC	a.T<Invest. pay-back period (PP)	Horizon	Distortion in ranking projects, which is not equivalent to underinvestment, and could be avoided by schemes meant to lenghten LMF horizon
	b.T<Loan maturity (LM)	Horizon	Not necessarily present if lending rate is high
2.2.T relatively long, due to 1)age structure, commitment,etc. or 2)reward schemes meant to prolong T	a.T>PP	Standard	Not necessarily present, if workers are adequately rewarded
(e.g.shares)	b.T>LM	Standard	Not present, especially if lending terms are unfavourable
	c.T>PP, but techn. properties of a project are considered:		
		If labour-intensive	Present
		If labour-saving	Indefinite

*Criteria usually used in capitalist firms based on discounted cash flow techniques (net present value, internal rate of return).

Chapter 2.TESTING THEORETICAL HYPOTHESES ON EMPIRICAL EVIDENCE FROM YUGOSLAVIA - A FIRST ASSESSMENT

The conventional theories of the investment behaviour of a LMF suggest two sets of hypotheses. The first concerns the incentives to invest from retained earnings. In a LMF where capital is collectively/socially owned, low levels of savings and investment in the firm's capital assets are predicted (Vanek, 1971, Furubotn, 1974). This is expected to lead to a "retardation of voluntary saving in the economy as a whole" (Furubotn, 1974, p. 274). The second hypothesis, closely related to the first, concerns the financing of investment. The availability of external sources of finance, according to one variant, will drive savings of a LMF and voluntary self-financed investment to zero (Furubotn 1974, Stephen 1984). According to the other variant, external sources of finance can remove the mentioned underinvestment effect (Vanek, 1971).

The principal theoretical predictions on investment of the LMF will be contrasted with empirical evidence from Yugoslavia, but the analysis will primarily concern Furubotn and Pejovich's hypotheses, as their theory, contrary to Vanek's, does aspire to explain the behaviour of the Yugoslav LMF.

We will for the moment assume that Yugoslavia is appropriate for testing theoretical predictions on investment of the LMF. Indeed, Yugoslavia may seem most adequate for this purpose for several reasons. First, since it is the only existing economy where LMFs are prevalent, it has most frequently been used in empirical research for testing theoretical

hypotheses on the LMF.[101] Second, the largest part of the Yugoslav economy is characterised by non-private property rigths (i.e. the social sector, which produces around 85% of Gross Material Product - GMP).[102] Finally, our previous analysis has led to the conclusion that the underinvestment effect, disregarding other considerations, is more likely to be present in Yugoslavia than elsewhere, because of stricter regulations concerning capital withdrawals (the presence of the CMR).

The period under examination is the whole post-1965 period. It is with the reforms of the mid 1960s, which marked the passage to "market socialism" in Yugoslavia, that major changes were introduced into the field of investment, parallel with the strengthening of self-management. The system of mobilysing and allocating investment resources was transformed from a centrally-directed mechanism financed predominantly through government funds, to a system that relies on enterprises' self-financing, and the banking mechanism as its principle financial intermediary. Central investment funds were abolished, and decisions about finance and investment were decentralized to

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101. For various empirical tests of theoretical hypotheses on the LMF on Yugoslav data, see Bartlett and Uvalic (1986).
102. Gross material product, or social product in Yugoslav terminology, is the value added in market prices of productive sectors in both the social and the private sector of the economy. It does not include non-productive sectors, such as housing, health, education, administration, defence.

enterprises and self-managed banks.[103] At the same time, fiscal
burdens on firms were reduced, which left a larger share of
income generated at the disposal of firms, and enterprise
autonomy was increased regarding the distribution of enterprise
income between capital accumulation and personal incomes.

It has been argued that only the 1965-72 period can be
considered "truly self-managed", and hence appropriate for
testing hypotheses from self-management theory. The new rules on
income distribution introduced in 1971 have indeed limited
enterprise autonomy, by obliging enterprises to respect general
principles on income distribution set in social compacts, which
directly or indirectly impose a minimum savings requirement.[104]
Nevertheless, even after 1971, enterprises have retained some
discretion in their savings decisions.

However, irrespective of formal regulations governing
enterprise autonomy,[105] the principal reason why the analysis
has been extended beyond 1972, is that the general characteris-
tics of the specific field we are examining - investment policy

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103. The only federal investment fund existing today is the Fund
for the development of less-developed republics and regions,
which however, comprises a small percentage of total investment
effort (around 0.4% of gross investment in 1983).
104. Social compacts are agreements between state
representatives, enterprises, and other organisations on prices,
income distribution, employment policy, etc. Social Compacts on
Income are concluded at the republican level. A detailed
description of the new regulations on income distribution
introduced in 1971 and subsequente modifications are given in
Appendix A(a).
105. While formal autonomy over income distribution is an
important issue, it will be shown later that it is not crucial.

- have remained much the same throughout the whole post-1965 period.[106]

2.1. Investment and savings performance of the Yugoslav economy

The first hypothesis that will be tested is whether low savings and investment will be present in an economy in which capital is predominantly socially-owned.

On the aggregate level, the Yugoslav economy has achieved high investment and savings rates since the reforms introduced in 1965. In the years immediately following the reform, some moderation of these rates was registered. In comparison with the 1961-65 period, in 1966-70 the share of gross investment in GMP, as measured in current prices, declined from 43% to 38% (see Table A1, Appendix A(b)).[107] When inventories are excluded, however, this decline is less pronounced: from 32.2% of GMP in 1961-65, investment in fixed assets declined to 30.6% in 1966-70. At the same time, a decline in the domestic savings/GMP ratio was registered, from an average of 41.5% in 1961-65, to 35.8% in 1966-70 (see Table A2).

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106. For the moment, this is only a hypothesis, which will be elaborated further in Chapter 3.
107. Gross investment in Yugoslav statistics includes investment by the social and the private sector of the economy, both in productive and non-productive sectors. However, since the Yugoslav concept of GMP does not include non-productive sectors, the presented investment/GMP ratios are obviously an overestimation. Nevertheless, they are presented as they are the official figures reported in Yugoslav statistics, and as such are the only data available for the entire period being examined.

This decline in the savings and investment rates after 1965 may seem evidence which directly supports theoretical predictions. However, a fact which is often neglected and which substantially alters this conclusion is that one of the main objectives of the reform was to give priority to consumption and redistribute national output in favour of personal incomes. In fact, the 1966-70 Social Plan explicitly stresses as a major objective of the period the rise of personal consumption and living standard of the population.[108] As a result, the decline of the share of savings and investment in the post-reform period was at least partially intentional. Rather than supporting theoretical predictions, it can be considered a sign of successful implementation of planned objectives.

After this initial decline, investment and savings shares in GMP registered a steady increasing trend during the 1970s. The domestic savings/GMP ratio rose to 37.5% in 1971-75, and further to 41.0% in 1976-80. Similarly, the gross investment/GMP ratio rose to around 40%, and further to around 43% of GMP in the two subperiods of the 1970s, of which investment in fixed assets accounted for around 30% and 37% of GMP respectively. By

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108. In the 1966-70 Social Plan, the very first among the principle objectives of economic and social development of the period is "continuous increase of the living standard, particularly personal consumption, and the rise of the share of personal incomes in the distribution of national income" (1966, p. 49). The plan also envisaged a decline in the accumulation/GMP ratio.

the end of the 1970s, Yugoslavia had one of the highest invest-
ment rates in the world.

However, the level of investment reached at the end of the
1970s was well above the domestic savings potential of the
Yugoslav economy. Expansionary policies of the 1970s were in-
creasingly financed through foreign borrowing, leading to a very
rapid rise in external debt.[109] This led to a constant increase
in foreign financing of investment: as a percentage of GMP, it
rose from 1.1% in 1961-65 to 3.4% in 1976-80 (see Table A2).

The trend of increasing reliance on foreign loans to
finance domestic expansion has been reversed only with the
restrictive policies of the 1980s, which have cut domestic
demand, and especially investment in fixed assets drastically.
Although a drop in gross investment in GMP was not registered,
as the ratio remained above 40% throughout the 1980s, a negative
change in the structure of gross investment is evident: a
notable fall in investment in fixed assets in favour of stocks,
so that in 1981-85 fixed investment fell to an unprecedented low
level of only 26.4% of GMP. In addition, for the first time
in the post-war period, investment in fixed assets has con-
stantly registered a negative rate of growth in real terms (on
average over the 1981-85 period of -9.0%).

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109. The Yugoslav net debt increased from 1.9 billion dollars in
1970, to 13.7 billion in 1979, 17.3 billion in 1980, and 20.4
billion in 1987.

Restrictive measures of the 1980s have resulted in the
domestic savings/GMP ratio being higher than the gross
investment/GMP ratio from 1981 onwards, thus leading to a nega-
tive foreign financing/GMP ratio. However, this positive result
and the improvements achieved by 1983 in the external sec-
tor,[110] have been accompanied by a serious deterioration of
domestic economic performance and a severe economic crisis:
stagnation of GMP (even a negative growth rate in 1983); uncon-
trollable inflation, which by 1987 had reached 167% and is
likely not to be lower in 1988; rising unemployment (of around
13% of the labour force in 1987); a substantial reduction of the
living standard (a fall in real wages of over 30% in the 1979-34
period).

When the savings performance of the Yugoslav economy is
viewed in the framework of standardized western concepts, the
ratios of gross savings and of gross investment to GNP are
somewhat lower than the ones based on Yugoslav concepts. This is
primarily because the GNP base includes value added in non-
productive activities, which is omitted from the Yugoslav
concept of GMP. According to OECD estimates of GNP, and data of
the Federal Institute of Statistics (SZS), over the whole 1966-
84 period, the gross national savings/GNP ratio was on average
around 34%, whereas the gross domestic investment/GNP ratio
around 36% (see Table A2). Both of these ratios increased

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110. Primarilly the transformation of the current account
deficit into a surplus, which has remained positive since.

steadily after 1965. According to World Bank estimates of GNP, and data cf the National Bank of Yugoslavia (NBY),[111] the gross investment/GNP ratio declined from 33.7% in 1961-65 to 29.7% in 1966-70 and further to 28.4% in 1971-75, but it rose to 35% in 1976-80. The gross national savings/GNP ratio showed a similar trend of decline from 32.6% in 1961-65 to 28.7% in 1966-70 and further to 27.1% in 1971-75, but thereafter it rose to 32.2% in 1976-80.

Yugoslavia has also performed well when compared with countries at a similar level of development, at least until the 1980s. According to World Bank and OECD estimates, Yugoslavia's gross national savings/GNP ratio in the 1965-80 period, and its gross investment/GDP ratio in the 1960-80 period, have exceeded the ratios in Greece, Spain and Turkey (see Table A3), countries with which Yugoslavia can reasonably be compared. In the 1974-80 period, in years for which data are available, Yugoslavia performed better than all three countries in terms of achieved gross fixed capital formation/GDP ratio (except in 1974 when it was exceeded by Spain by 0.2 percentage points). Even with the introduction of restrictive policies in the 1980s, Yugoslavia's gross fixed capital formation/GDP ratio was in 1984 higher than in the other three countries, and in 1985-86 was only exceeded by that of Turkey (by 1.8 percentage points). Finally, during

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111. Data of the NBY somewhat differ from Yugoslav national accounts provided by the SZS, because the NBY records payments for investment according to flow-of-funds accounts, rather than the value of work done, as in data of the SZS.

the 1969-30 period, the growth rate of gross capital formation
of over 6% reached places Yugoslavia at the top of the range of
these middle-income countries; during the 1980s, although com-
parable data are not available, Yugoslavia has probably been
surpassed by all three countries (in view of negative growth
rates of investment in fixed assets).

Therefore, two different conclusions can be drawn for two
distinct periods. In the whole 1966-30 period, in spite of the
differences in the ratios presented, and variations in the
subperiods examined, the long-term trend points to ratios that
can be considered high by international standards. Contrary to
what is postulated by theoretical predictions, the Yugoslav
economy has successfully maintained its investment and savings
rates. The short-term moderation in these rates immediately
after 1965 did not influence significantly the long-term trend
of relatively high investment and savings rates.

Starting from 1980, a reversal of the trend is present,
because policies of adjustment due to rising foreign indebted-
ness required a drastic reduction of investment spending.
Nevertheless, since the theory is based on the assumption that
LMFs are free to decide on their principal policy issues, while
the reduction of investment was achieved by imposing very strict
administrative measures on enterprises (on the distribution of
income, direct limits on investment spending, etc.), this rever-
sal in the trend of high investment in the 1980s cannot be used

as an argument supporting theoretical predictions.[112] That these

measures were untimely, as they should have been introduced much

earlier in order to avoid some of the problems which led to the

economic crisis in the 1980s, is another question.[113]

2.2.Enterprises savings performance

The second hypothesis to be tested is whether low savings

(and investment) will prevail in socially-owned LMFs. Since the

social sector of the economy has accounted for nearly 70% of

domestic savings, and for over 80% of gross investment over the

1966-84 period (see Table A4), aggregate data presented earlier

are already an indication of the savings and investment perfor-

mance of social sector enterprises in Yugoslavia. Nevertheless,

the savings performance of social sector enterprises will now be

analysed in greater detail.

We will start by presenting four different savings ratios

of Yugoslav enterprises: 1)gross savings/enterprise GMP; 2)gross

savings/enterprise net income; 3)net savings/enterprise GMP; and

4)net savings/enterprise net income.

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112. Rather, this seems to support the hypothesis which will be
advanced later: that the state has retained, in the whole period
after 1965, strong influence on the sphere of investment
decision-making.
113. As shown by Balassa and Tyson (1985), neither Yugoslavia
nor Hungary took macroeconomic adjustment measures in response
to external shocks in 1974-75. Rather, they maintained earlier
rates of consumption growth and exhibited substantial increases
in investment. Although both countries took measures to restrain
aggregate expenditure in 1976, these measures were subsequently
reversed.

1)Following World Bank definitions, the gross savings/GMP
ratio of productive enterprises, i.e. the sum of depreciation
and allocation to funds (business fund, reserve fund, and col-
lective consumption fund) in relation to GMP produced,
registered a substantial decline in the years following the
reform: it fell from 28.9% in 1966 to 21.0% in 1969 (see Table
A5). This tendency was reversed in 1970-75, and enterprise gross
savings rose from an average rate of 24.8% in 1966-70 to 26.1%
in 1971-75. In the second half of the 1970s, after an initial
substantial drop registered in 1976 relative to 1975 (from 26.5%
to 21.8% of GMP), enterprise gross savings tended to increase
continuously, but the average share of gross savings in GMP in
the 1976-80 period was somewhat lower than in the preceding 5-
year period, around 24.4%. With the income controls of the
1980s, enterprise gross savings reached a high, unprecedented
level of 28.1% of GMP in 1981-85.[114]

2)What is of major interest for our analysis, however, is
the distribution of net enterprise income, or the sum of net
personal incomes, depreciation, and allocation to funds, after
taxes and contributions are deducted. Similar to the above
observed trend in the gross savings/GMP ratio, the gross

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114. The gross savings/GMP ratio of enterprises is lower when
adjusted for stock overvaluation. Schrenk's (1979) calculations
available for the years 1966-75, which correct the inventory
overvaluation by taking into account the difference between
year-end and mid-year prices of inventories, yield ratios that
are lower, especially in 1969-75, than the ones just reported.
The ratio does not exceed 20% of enterprise GMP on average in
the period as a whole.

savings/net enterprise income ratio in the years immediately following the reform also declined from 45.3% in 1966 to 36.4% in 1969. Nevertheless, the average rate of gross savings out of net enterprise income showed a tendency of constant increase: it rose from an average of 40.6% in 1966-70 to 42.6% in 1971-75, to 44.3% in 1976-80, and further to 47.8% in 1981-85. This long-term trend of increasing shares of gross savings of enterprises in their net income has largely been due to increasing snares of allocation to funds, as depreciation shares tended to be relatively constant in the whole period.[115]

L. Tyson's (1977) investigation of Yugoslav sectoral data supports the observed trends at the aggregate level. Her empirical test of the savings performance of 16 industrial sectors in Yugoslavia for the period 1965-74 shows that the long-run savings rates (the sum of depreciation and allocation to enterprise funds) out of enterprises' net income (the sum of savings and net personal incomes) were approximately 25% or more in all but 2 of the 11 sectors that yielded statistically significant results, whereas the hypothesis that the long-run savings rate is zero could be rejected in all but 3 sectors. This led Tyson to conclude that "savings rates in many Yugoslav firms are positive and substantial rather than zero as predicted by theory" (1977, p. 407).

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115. With the exception of the minimum and maximum levels - 13.5% in 1966 and 21.3% in 1983 - depreciation accounted, on average, for about 17% to 18% of net enterprise income.

3)It is also of interest to look at enterprise savings net of depreciation, because Yugoslav firms are obliged to depreciate their assets at a legally prescribed minimum rate, and hence depreciation is not a voluntary component of savings in the sense of self-management theory (Stephen, 1984). The average net savings/enterprise GMP ratio (i.e. allocation to enterprise funds as a percentage of enterprise GMP) did not exhibit significant changes over time: it rose from an average of 14.5% in 1966-70 to 14.8% in 1971-75, and then fell to 13.6% in 1976-80, whereas in 1981-85, it amounted to 16.7%.

4)Finally, the net savings/net enterprise income ratio, once again of major interest because of exclusion of taxes, has been oscilating in a similar way, although the 5-year average did rise, moderately but continuously, from 23.7% to 24.3% and further to 26% in the three five-year periods following the reform, reaching 28.3% in 1981-85.

Although the four savings ratios of Yugoslav enterprises which have been discussed are based on four different defini-tions of savings, they nevertheless all exhibit a similar tendency over time (see Graph 1): a fall in the 1966-69 period, constancy or a modest increase in 1969-74, a decline in 1974-76, and a continuous increase in the 1976-84 period.

Graph 1.
SAVINGS RATIOS OF YUGOSLAV ENTERPRISES, 1966-1984
(in %)
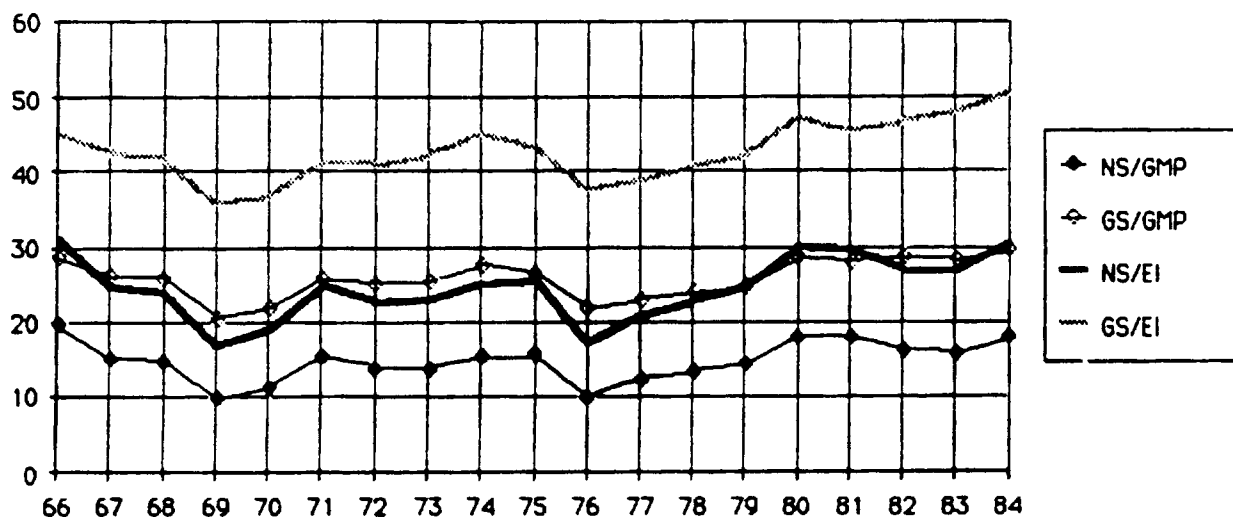
Source: Table A5, Appendix A(b).

However, data utilized to show positive net savings of Yugoslav enterprises may be questioned for their adequacy on several grounds. The first problem that will be discussed is that unambiguous refutation of the theory requires that voluntary savings of LMFs are positive. On the one hand, however, even if we consider the narrower category of savings (net savings, i.e. excluding depreciation which is obligatory), neither is this part of savings entirely voluntary, because first, the formation of enterprise funds is legally subject to a minimum requirement (in line with general principles set in social compacts); and second, at least until 1977 another 10% to 15% of net savings had to be dedicated to various additional

taxes and contributions (see Table A6). On the other hand, a problem emphasized by Stephen (1984) is that bank loans are partly repaid out of resources allocated to the business fund, which implies that positive allocation to the business fund may arise from the need to repay loans contracted in previous periods.

Although it is not possible to make a clear distinction between the voluntary and imposed component of enterprise savings in Yugoslavia, a closer look at the structure of enterprises net savings (or accumulation in Yugoslav terminology) enables a more disaggregated analysis of the use of enterprise savings (see Table A6). Looking at the various items comprising accumulation in Table A6, they have been grouped, for the purpose of our analysis, into four distinct categories of savings: 1)depreciation above the legal minimum (mandatory depreciation); 2)allocation to enterprise funds (business fund, reserve fund and other funds); 3)contractual obligations (interest payments on bank loans, insurance premia); and 4)various taxes and contributions paid out of enterprise net savings.

It is only the first category of savings - mandatory depreciation - which is entirely and undoubtedly a voluntary component of savings. Depreciation above the legal minimum has varied, during the 1967-85 period, from 1% to 14% of accumulation of Yugoslav enterprises. Nevertheless, it was close to, or over 10% in about half of the years following the reform. Although voluntary depreciation may not have been very high in certain years, it has been positive in the entire period under

examination. This is sufficient proof that, contrary to what might be expected from theoretical predictions, Yugoslav firms do save a part of their income voluntarily.

The tendency of allocating a part of net income to depreciation above the legally prescribed minimum is observable not only at the sectoral level. Prasnikar's (1983) data, collected from 147 Yugoslav firms for the period 1975-79, reveal that mandatory depreciation has accounted for 2% to 21% of accumulation (see Table A7).[116] Similar evidence is reported by Miovic, who has estimated that on average Slovenian firms in the industrial sector depreciate at more than twice the minimum rate of depreciation.[117]

Apart from mandatory depreciation, it is not possible to determine the exact proportion of savings that can be considered "voluntary". Nevertheless, mandatory depreciation is probably only a minimum of such voluntary savings, because some of the other categories of enterprise net savings do include savings which are in part voluntary (allocation to funds), or could be considered as being voluntary (contractual obligations).

Thus allocation to enterprise funds is partly imposed on firms (minimum levels), but enterprises are free to allocate

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116. The level of depreciation above the legal minimum was exceptionally high in 1975 (over 20% of total accumulation), as the legal rates in that year were low, which thereafter were substantially increased, leading to a drop of this component from 1976 onwards.
117. Miovic (1975), p. 108, as reported in Tyson (1977), p. 402.

more to these funds than legally required, and this part exceed-
ing the minimum requirements can be considered as part of
voluntary savings. Nevertheless, a problem has been raised
concerning resources allocated to the business fund, the most
important of these funds. The business fund often serves for
loan repayment, and thus it has been suggested that such savings
are not voluntary at the time they take place, for they are
obligations carried over from a previous period (Stephen, 1984,
p. 124).

Data on credit repayments indeed suggest that in order to
be able to repay bank loans, firms are constrained to allocate a
sufficient amount to the business fund. In 14 out of the 19
years following 1965, resources allocated to the business fund
by enterprises have entirely been used for repaying investment
credits, and in most years were not even sufficient so that a
part of resources set aside for depreciation were used (see
Table A8).[118]

On the other hand, the decision to take a loan could also
be considered as anticipated savings, as an intertemporal shift
of voluntary savings from the present to the future, in which
case loan repayments and other contractual obligations can be
considered a voluntary component of savings. If contractual
obligations are viewed as a reflection of a voluntary choice of
firms in the present to finance investment from external

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118. As already mentioned, enterprises have from the mid-1970s
been allowed to repay loans from the depreciation fund.

sources, rather than from retained earnings, voluntary savings of Yugoslav firms can be seen to be substantially higher than the figures reported on depreciation above the legal minimum.

Resources allocated to the business fund may also be a reflection of the obligation of Yugoslav firms to contribute a certain percentage of own savings in order to obtain bank credit. Indeed, in Prasnikar's sample of enterprises, 57% of workers replied that own sources for financing investment were just sufficient to cover the share needed for obtaining bank credits (see Table A10).

As to the last category of net savings - taxes and contributions - these are clearly an unvoluntary component of enterprise savings, but this part of net savings has substantially declined. Although until 1976 around 10% to 15% of accumulation had to be dedicated to various taxes and contributions, thereafter the burden has significantly been reduced and from 1980 onwards it represents only 0.2% of enterprises' net savings.

The above analysis suggests that Yugoslav firms need to allocate sufficient amounts to accumulation in order to be able to repay loans, participate with own sources for obtaining new credits, and meet their obligations concerning various taxes and contributions. Available resources for undertaking investment, according to existing rules on net income distribution, represent only a residual of net income. Only after allocating the necessary amounts for the above mentioned purposes, can remaining resources be used for undertaking investment. These

observations, however, while clearly indicating some of the constraints Yugoslav firms are likely to be facing, do not alter our previous conclusion that voluntary savings of Yugoslav firms have been positive.

A final problem to be addressed is that in theory, enterprise savings for collective consumption purposes should be distinguished from enterprise savings that finance productive investment. As noted by Tyson (1977), workers who might be reluctant to save to finance a risky business investment, might be eager to save to finance the construction of an apartment complex for their own use. However, savings allocated to the collective consumption fund (in Tables A6 and A7 included under "other funds"), which is effectively used for investment for collective consumption purposes, has represented a low proportion of total accumulation (the total sum allocated to "other funds" ranged from 0.4% to 1.2% according to sectoral data, or from 1% to 5% according to Prasnikar's enterprise data, of accumulation). Hence this problem is not as serious as suggested by Tyson.

It is also worth noting that Yugoslav policy-makers have continuously been critisizing productive enterprises for low savings rates, as only about half of gross national savings is generated by productive enterprises of the social sector. Nevertheless, the share of productive enterprises in both gross domestic savings and in social sector savings registered a

continuous increase in the post-1965 reform period.[119] As to the share of social sector productive enterprises in total gross investment, it remained fairly constant at the level of around 70% during the 1966-80 period,[120] or above 85% of gross investment undertaken by the social sector (see Table A9).

Evidence based on disaggregad data is provided by Estrin (1983). Estrin found that Yugoslav firms tended to invest relatively more after 1965, since the post-1965 period is characterized by an acceleration in the rate of growth of capital stock. He observed similar changes in the pattern of growth of each of the 19 individual industrial sectors. After 1965, capital accumulation actually accelerated in absolute terms in 11 of these sectors, while the rate of growth of the capital stock accelerated relative to output in every sector and absolutely in a few (Estrin, 1983, pp. 154-158).

Questionnaire data from Prasnikar's sample offers additional evidence (see Table A10). Although 50% of workers gave personal incomes priority over accumulation in income distribution, 37% considered the two categories equally important, whereas 7% had a preference for accumulation, and the large majority (over 70%) considered the level of accumulation was too

119. Productive enterprise share in gross domestic savings rose from 48.6% in 1961-65, to 51.2% in 1966-70 and 53.6% in 1971-75, and further to 54.1% in 1976-80, whereas their share in social sector savings increased from 69.7% to 79.3% to 79.4% in the three 5-year periods following the reform.
120. The share of social sector productive enterprises in gross investment declined from an average of 72.4% in 1966-70 to 69.6% in 1971-75, but rose to 71.5% in 1976-80.

low. Concerning investment, over 62% of workers thought there was need for investment (medium to quite high), and 47% of workers were actually ready to renounce personal incomes in favour of investment (partly or completely).

In conclusion, Yugoslav enterprises' savings have been positive and not exceptionally low in the whole 1966-85 period, and have accounted for a rising portion of gross domestic savings. Although some of the evidence on positive savings of Yugoslav firms could be rejected on the basis of the argument that they do not reflect a voluntary component of savings, a more detailed analysis of the distribution of net savings, on the basis of not only sectoral but also enterprise data, does confirm that Yugoslav firms have, at least until 1980, been saving a part of their net income voluntarily.

2.3.Financing of investment

The second issue of importance for verifying predictions on the LMF's investment behaviour concerns the financing of investment. Will the availability of external sources of finance drive self-financed investment of a LMF to zero (Furubotn, 1974)? If a part of investment is self-financed, is this done on a voluntary basis (Stephen, 1984)?

1)The proposed tendency of a LMF to finance its investment from external sources, rather than from retained earnings, will first be evaluated by examining the self-financing ratio of Yugoslav enterprises, or the portion of enterprise investment which is financed from enterprise savings.

One of the standard methods of calculating the self-financing ratio of Yugoslav firms is based on data of the NBY on productive enterprises' gross savings, financial savings, and gross investment. Their self-financing ratio is then calculated as the ratio of their gross savings to their gross investment.[121] According to this method, productive enterprises' self-financing ratio increased substantially in the decade following the reform, from an average of 62.3% in 1961-65, to 68.4% in 1966-70, and to 74% in 1971-75. Thereafter, in 1976-80, it declined to 70.8%, and in 1981-84 it reached a high average of 79% (see Table A11).

However, since the above calculations are based on figures on total investment (i.e. including inventories), these ratios are somewhat overestimated.[122] Indeed, Schrenk et al. (1979, p. 153) report a lower self-financing rate of economic organisations in the social sector, calculated on the basis of adjusted gross savings and adjusted gross investment, of 66.8% in 1966-70 and 63.8% in 1971-75.

A further limitation of the above method of calculating the self-financing ratio of Yugoslav enterprises is that it overestimates the part of enterprise gross savings that are really disposable for undertaking investment. The method relies on

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121. Data using this method is reported by different authors, including Dimitrijevic and Macesich (1983); Lydall (1984), p. 115; Stephen (1984), p. 119.
122. As already mentioned, this is because stocks are inflated in Yugoslav statistics because they are calculated according to end-year prices.

figures on the formation of gross savings, but only a small part of these gross savings is effectively used for investment purposes. In fact, we have seen that 30% to 60% of resources allocated to the business fund and depreciation, which are the principle components of enterprise gross savings, are being used for repayment of investment credits. Therefore, enterprise savings remaining available for undertaking investment, after loans have been repaid, are substantially lower than the figures reported, and consequently, also their self-financing ratio.

2)For this reason it is necessary to consider a more reliable method: **investment in fixed assets by source of finance**, as provided by the SZS (see Table Al2). [123] The share of enterprises in total sources for financing fixed investment increased substantially immediately after 1965, which was precisely one of the intensions of the reform. [124] It remained relatively constant at the level of around or over 50% until the 1980s, when restrictive policies and greater emphasis on enterprise self-financing increased enterprises' share, by 1985, to 66% (see Graph 2).

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123. Data using this method is reported by the OECD in its Economic Surveys on Yugoslavia; Schrenk et al. (1979, p. 336-7); Horvat (1976, p. 222).
124. Enterprises self-financing ratio was only 28% in 1965. The substantial increase in self-financing after 1965 was in part the direct consequence of the reduction of fiscal burden on firms after 1965.

Graph 2.
INVESTMENT IN FIXED ASSETS IN YUGOSLAVIA. BY SOURCE OF FINANCE
1967-1984
(as % of total)

Legend:
- Grants
- Credits
- Firms
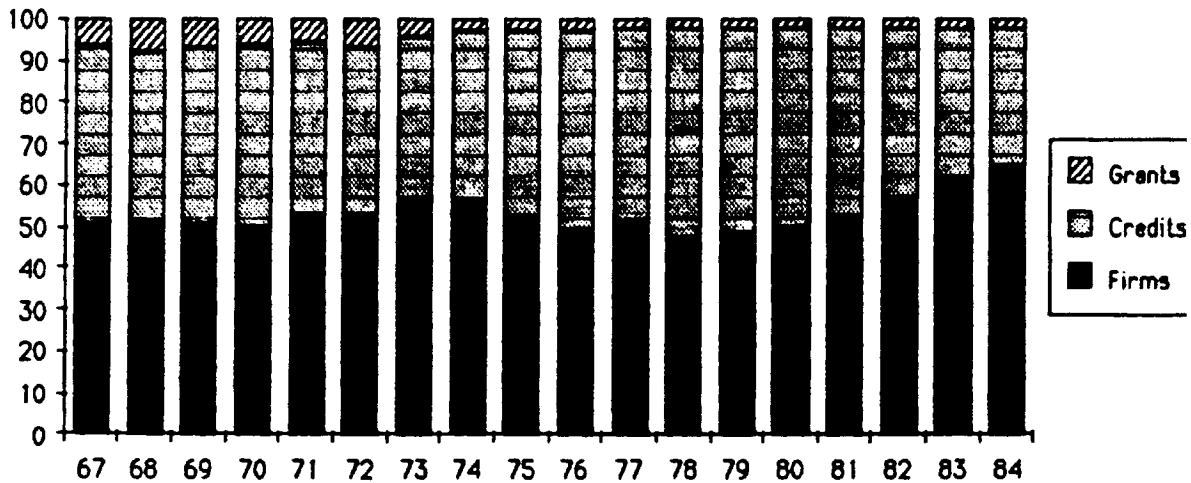
Source: Table A12, Appendix A.

It is also of interest to analyse available enterprise data on the proportion of self-financed investment. In the period 1975-79, for the sample of firms investigated by Prasnikar, enterprises' own sources in the financing of investment oscilated from a minimum of 31.18% in 1977, to a maximum of 42.70% in 1979 (see Table A13). These figures are, therefore, lower than the ratios presented earlier. However, if in Prasnikar's table, credits from domestic suppliers are considered as sources provided by other enterprises belonging to the productive sector of the economy, as they represent direct credits from other productive enterprises and therefore are a form of internal financing (as opposed to financing through bank credit),

Prasnikar's self-financing ratios are higher, and approach the self-financing ratio of over 40% in the late 1970s presented earlier.

Prasnikar's questionnaire data offers additional evidence on a self-financing ratio of around 50%. More than half of interviewed workers expressed the view that the portion of enterprise savings respect to bank loans for financing investment, were about equal. In addition, although 65% of workers did express a preference for borrowed funds, 35% actually preferred own sources for financing investment (see Table A10).

Finally, it has been argued that the observed positive level of self-financed investment is not a refutation of the theory since no distinction has been made between self-financed net and self-financed gross investment (Stephen, 1984). Stephen suggests that self-financed investment in Yugoslav firms has been roughly equal to their depreciation allowances, and hence, that self-financed net investment, or the part of investment being self-financed by enterprises on a voluntary basis, has been close to zero. He tests the hypothesis empirically by using sectoral data from the 19 industries in the Yugoslav mining and manufacturing sector in the years 1969, 1970, and 1971, and concludes that the hypothesis cannot reasonably be rejected.[125]

Evidence on the use of gross savings of Yugoslav enterprises indirectly supports Stephen's hypothesis. Around 33%

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125. Stephen (1984), pp. 125-126.

to 59% of resources allocated to the business fund and deprecia-
tion, which are the principal internal sources of enterprises
for financing gross investment, have actually been used for
repaying investment credits in the post-1965 period (see Table
A8). In 14 out of 19 years following the reform, resources
allocated to the business fund were not sufficient for repaying
loans, but a part of resources allocated to depreciation had to
be used. Therefore, enterprises' own resources available for net
investment, remaining after loans have been repaid and
obligatory depreciation covered, may not have been very high. In
other words, net investment, i.e. investment other than replace-
ment of worn-out capacity, probably had to, in most years, be
financed externally.

On the other hand, a different picture emerges if we con-
front productive enterprises' depreciation allowances, with
total payments for investment in fixed assets financed by en-
terprises (see Table A14). The difference should represent the
part of investment which is self-financed by Yugoslav firms, yet
is not directly imposed on firms as in the case of legal
depreciation.[126] This part of self-financed investment exceeding
depreciation has been 26.9%, 31.6%, and 32% of gross investment
in the three years considered. Therefore, enterprise own sources

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126. This part of self-financed investment need not represent
actual net investment, because depreciation may not correspond
to actual replacement of productive capacity, but this component
of enterprise self-financed investment exceeding depreciation is
fully in line with what Stephen considers "net investment".

for financing investment, other than the ones used for deprecia-
tion which is imposed on firms, have been well above zero.

In addition, if we look at figures on investment in new
capacity and enlargement, as opposed to capital maintenance (see
Table A15),[127] investment in new capacity and enlargement has
accounted, in the three years considered by Stephen, for over
80% of total investment in fixed assets. Recalling that in 1969-
71, around 51% of fixed investment was financed by enterprises,
it would seem that at least a part of these resources provided
by enterprises had to be used for investment in new capacity and
enlargement, and not exclusively for capital maintenance. In
other words, the reported levels of investment in new capacity
and enlargement seem rather high to offer support to Stephen's
hypothesis.

Therefore, our evidence differs from that presented by
Stephen, and leaves room to believe that a part of investment in
Yugoslavia is self-financed on a voluntary basis (although it is
not possible to determine the exact proportion).

A similar conclusion can be drawn by examining calculations
provided by Schrenk et al. (1979, p. 153), where figures on
depreciation and net investment of productive enterprises in

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127. According to the definition provided by the SZS,
maintenance refers to the replacement of capital, whereas
enlargement includes enlargement, reconstruction and
modernisation, referring to changes in assortment, technology,
and technique of production, rearrangement of equipment and
purchase of new fixed assets within existing working units.

Yugoslavia are reported.[128] The shares of net investment in total gross investment have been 69.9% and 68.1% respectively in the two 5-year periods following the 1965 reform, and considering that the self-financing ratios for these subperiods as provided by Schrenk et al., were 66.8% and 63.8% respectively, we can get approximative figures for net investment financed by enterprise sources of 46.7% in 1966-70 and 43.4% in 1971-75.

In conclusion, it seems that theoretical hypotheses on the financing of investment of a LMF are also not fully supported by empirical evidence from Yugoslavia. Furubotn and Pejovich's prediction that the availability of external sources of finance will drive savings and self-financed investment of LMFs to zero, runs counter to the observed relatively high level of self-financing of Yugoslav firms in the entire period under examination (even if not all of it is done on an entirely voluntary basis). Stephen's hypothesis, that self-financed net investment of Yugoslav LMFs has been close to zero, runs counter to our calculations, which suggest that self-financed net investment (and hence voluntary self-finance) of Yugoslav firms has been positive.

Nevertheless, there are several problems which render it difficult to definitely assess the validity of these hypotheses.

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128. Depreciation of productive sectors was 49.6 billion dinars 'in 1966-70, as compared with net investment in both fixed assets and inventories, of 115.3 billion dinars. In 1971-75, depreciation amounted to 156.7 billion dinars, as compared with net investment in fixed assets and inventories of 334.9 billion dinars.

The first and most serious problem is that it is not possible to determine which part of investment is actually self-financed on a **fully voluntary** basis in Yugoslavia. This is because external (state) influence on the investment sphere, in the period preceeding the 1980s, included a minimum savings requirement imposed through social compacts, legal depreciation, and the obligation of firms to contribute a certain percentage of own savings in order to obtain bank credits; while in the 1980s, in addition to the above, direct administrative measures which have severely interfered with enterprise autonomy.

The second problem is that Furubotn and Pejovich's hypothesis applies to an extreme hypothethical case: that bank credit will **exclusively** be used if available. In practice, however, Yugoslav firms have relied on both own and external sources for financing investment. Among other things, because of the mentioned requirement to participate with own sources when applying for credit, and because external sources of finance have obviously, not been available in unlimited amounts. Hence it is not possible to determine whether bank credits would be used **exclusively** if provided in sufficient amounts, nor the consequences of such full reliance on external finance.

The third problem relates to specific features of Yugoslav banking policies, and primarily very low interest rates on loans. It may be that such policies, rather than the structure of property rights, have significantly stimulated bank financing of investment (and investment itself). The reliance on external

sources of finance cannot, therefore, unambiguously be inter-
preted as evidence supporting theoretical predictions on the
lack of incentives to self-finance investment from retained
earnings in socially-owned firms.

The fourth problem is that banks in Yugoslavia are specific
institutions, "service" agencies of enterprises operating under
their direct control.[129] Banks' funds are provided by the found-
ing enterprises, and all bank profits are distributed among
enterprises-members. This implies that it is difficult to make a
net distinction, under existing Yugoslav arrangements, between
"internal" and "external" sources of finance.

Finally, why should self-financing necessarily be good, and
external financing bad, or vice versa? Can a ratios of around
50% be considered high or low? Which is the margin of self-
financing that can be considered "acceptable"? Is the
traditional theory of the cost of capital, which holds that an
increase in the debt-equity ratio is not beneficial for the
firm, applicable to Yugoslav conditions? It is worth noting that
the self-financing ratio of firms in different capitalist

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129. The concept of banks as "service" agencies of enterprises
'has been abandoned only recently. The new law on banking adopted
in 1985 envisages their transformation into profit-making
institutions, whereas the latest proposal envisages the setting
up of banks as shareholding institutions (see **Ekonomska Politika**
no. 1908, Oct. 24, 1988).

economies varies considerably across countries,[130] and hence there are no universally acceptable prescriptions on the "ideal" debt-equity ratio.

2.4. Concluding remarks

Throughout the foregoing analysis of the savings and investment performance of Yugoslav firms, different problems have been emphasized. These included insufficient statistical information and lack of disaggregated data; official regulations which limit enterprise autonomy, which does not permit us to determine the part of voluntary savings and self-finance; alternative methods of calculation, different concepts and hence different interpretations of observed trends. These problems render it difficult to definitely refute the theory.

However, neither does the evidence presented fully support the theory. On the contrary, our analysis has led us to conclude that predictions from conventional theory on the investment behaviour of a LMF are not, in general, supported by empirical evidence from Yugoslavia. In Chapter 3, an attempt is made to determine why this is so.

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130. E.g., British firms tend to rely heavily on retained earnings for financing investment (often approaching 100%), whereas Italian firms had a self-financing ratio of only 19% in 1975, and 21% in 1983; see OECD, Economic Surveys – Italy, 1975, p. 14.

Chapter 3. DIVERGENCE OF LMF INVESTMENT THEORY AND YUGOSLAV EMPIRICAL EVIDENCE - AN INTERPRETATION

An interpretation of why theoretical hypotheses cn the investment behaviour of a LMF are not supported by empirical evidence from Yugoslavia will now be proposed. Furubotn and Pejovich's theory is first reconsidered, in order to determine to what extent its assumptions are appropriate for explaining Yugoslav reality. An alternative approach will then be used based primarily on J. Kornai's theory of the socialist firm, and evidence from Yugoslavia supporting the theory is presented. Finally, the two theories are tested, using regression analysis, on Yugoslav data.

3.1. Applicability of Furubotn and Pejovich's theory to Yugoslavia

Some observers are surprised by the fact that Yugoslav empirical evidence does not support theoretical hypotheses on self-financing of a LMF.[131] However, this is not at all surprising, considering specific characteristics of the Yugoslav economic system. On the one hand, our previous analysis has led us to conclude that due to existing regulations in

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131. Tyson (1977). Nevertheless, in later articles, Tyson does stress the similarity between the Yugoslav and Hungarian experience in investment allocation (1983), and in macroeconomic adjustments to external shocks (Balassa and Tyson, 1985), and hence approaches our view.

Yugoslavia,[132] a part of savings used for investment purposes is not an entirely voluntary component of enterprise savings, and hence it is normal to expect positive self-finance of Yugoslav firms. On the other hand, other specific features of the Yugoslav economic system which will be discussed below, have strongly stimulated investment in capital stock in Yugoslavia.

In view of these institutional characteristics, it will be argued (and shown) that the principal determinants of the investment decision proposed by Furubotn and Pejovich, are variables which do not quite adequately reflect Yugoslav reality. According to the theory, investment in savings deposits, and in firm's capital stock, is expected to primarily depend on the interest rate, the lending rate, the marginal productivity of capital, and the time horizon of the representative worker.[133]

Table B1 in Appendix B(a) contains data on the above variables in Yugoslavia during the 1966-85 period. Since inflation has characterised the Yugoslav economy in the period under examination, interest rates on savings deposits and on bank loans have been deflated, the first by the cost of living index, and the second by the industrial producers' prices index, in order to obtain figures on returns on savings deposits and the

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132. Primarily the requirement to contribute a portion of own resources in order to obtain bank credits; obligatory depreciation; and the minimum savings requirement set by social compacts.
133. Furubotn and Pejovich (1973), p. 281.

cost of borrowed funds in real terms.[134] As to capital returns, three sets of figures are presented: 1)the pre-tax profit rate,[135] as it is the category which is most likely to approximate marginal productivity of capital; 2)the post-tax profit rate,[136] as it has the advantage of excluding taxes and contributions, as well as different other obligations (including interest payments as a separate item);[137] and realized returns on 100 dinars of utilized assets, as the official indicator provided by the SDK. Finally, the time horizon variable is approximated through figures on labour turnover in the Yugoslav economy.

Several observations follow from data in Table B1 concerning interest rates, profits, and labour turnover. There was practically no position interest rate policy in Yugoslavia at least until 1982, as rates were fixed for a long number of

134. Using a different deflator may not seem justified, but for the moment it has been used only in order to show the effective losses and gains of the two sectors. In the econometric tests which follow, one single price deflator has been used.
135. Pre-tax profit rate = [(Gross revenue - material costs - net personal incomes - depreciation)/historical value of capital] x 100, referred to in Table B1 as Profit rate I.
136. The post-tax profit rate = [(depreciation + allocation to funds)/historical value of capital)] x 100, referred to in Table B1 as Profit rate II.
137. Nevertheless, since we have seen that loans are often also repaid from the business fund, it is not clear whether all interest payments are effectively included in the deducted item of "interest payments".

years.[138] The presence of inflation has meant that real returns from investment in savings deposits have been negative almost throughout the whole period (except in 1967, 1968 and 1984). Inflation has also significantly reduced the real cost of borrowed funds, which has also more often been negative than positive (except in 1967-69, 1972, 1976-78, and 1983-84), implying that enterprises have often been paying a negative price on borrowed capital (see Graph 1).

Graph 1
Real interest rates in Yugoslavia
1966-1984
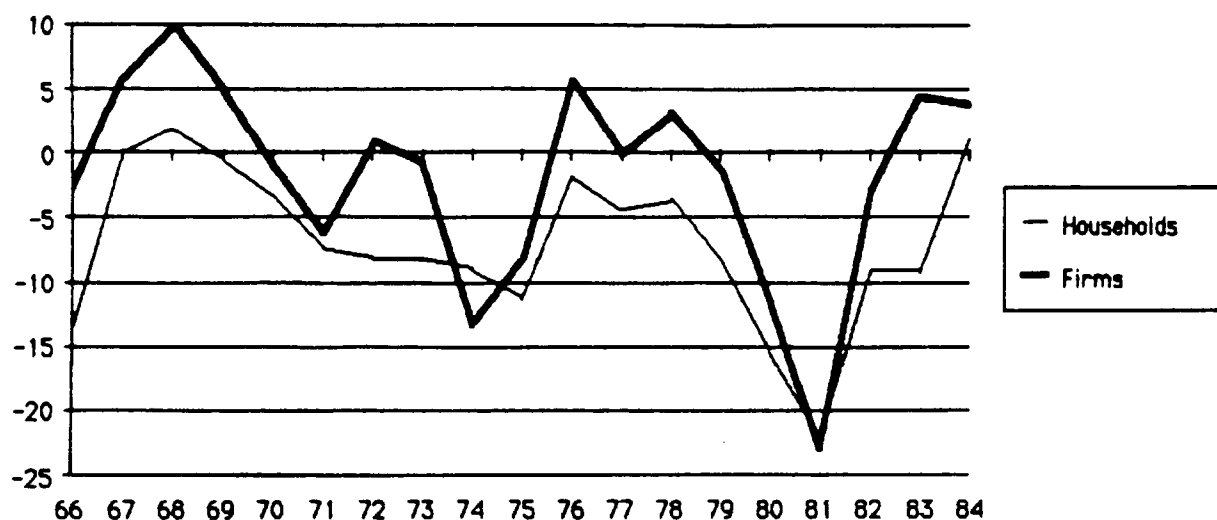
Source: Table B1, Appendix B(a).

An important implication of such an interest rate policy is that a specific form of redistribution, from the households to

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138. The inadequacy of the interest rate policy conducted in the past is presently one of the most widely discussed issues in Yugoslavia; see, e.g., Ekonomski Institut Pravne Fakultete (1985).

the enterprise sector, has been taking place in Yugoslavia (see
Graph 2).

Graph 2
Distributional effects of interest rates in Yugoslavia

Households' gains from savings deposits
1966-1984

Firms' gains from bank loans
1966-1984
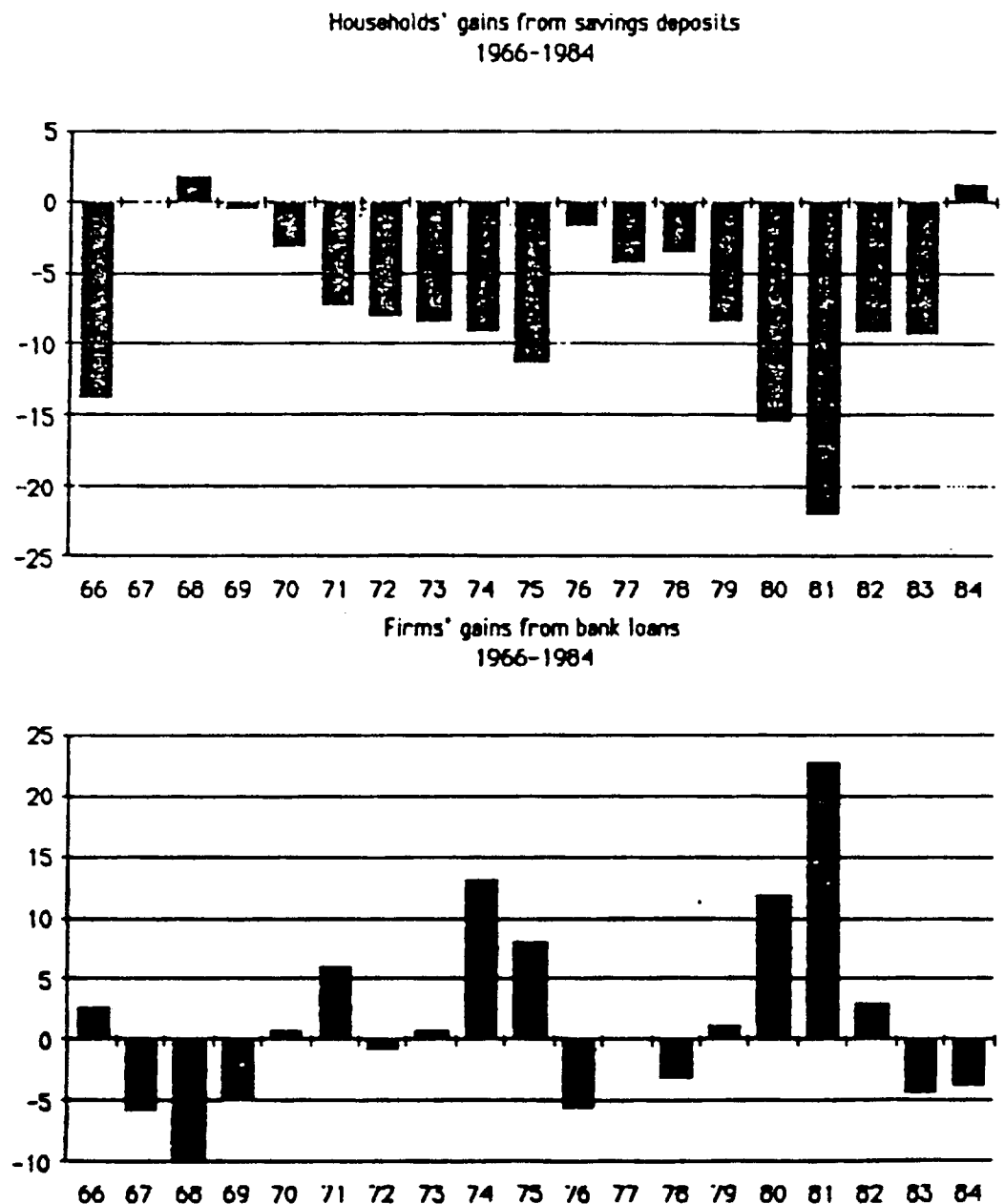
Source: Table B1, Appendix B(a).

Whereas negative interest rates on savings deposits repre-
sent a loss for households, negative interest rates on loans, on

the contrary, represent a gain for enterprises. To capture the
distributional effects of interest rates on the two sectors, in
Graph 2 the two real interest rates are presented in terms of
gains (losses) of the two sectors. The Graph clearly
demonstrates that in most of the years following 1965, due to
inflation, enterprises have been "subsidized", through the
banking mechanism, by savings of households. Although in 1984, a
positive real interest rate has been achieved, for a brief
period, on both the lending and the borrowing rate, in 1985 both
interest rates again turned negative.

It is very probable that this was indeed an intentional
policy. Interest rates on savings deposits have until very
recently always been kept low because of ideological reasons,
since rental income has been considered appropriation not ac-
cording to work performed, but on the basis of "exploitation".
The above data shows that it was indeed the enterprise sector
that was "exploiting" the households sector, and not vice versa.

The foregoing analysis of interest rates suggests a
privileged position of the productive sector vis-à-
vis households in Yugoslavia, which is important to stress as it
may be one of the factors which have favoured investment in non-
owned assets in Yugoslavia, respect to investment in owned
assets.

The essential point for the investment decision, however,
is the gap between the borrowing rate and the rate of return,
whether in monetary or real terms. Analysing capital returns, if
we consider the pre-tax profit rate, or average returns on

capital as calculated by the SDK, these have indeed been higher than the nominal interest rate on bank loans during the entire 1966-82 period. It is only in 1983-85, due to the substantial increase in nominal interest rates, that the relationship has been reversed. However, even if the post-tax profit rate is considered, which is the lowest among the three sets of figures presented in Table B1, this profit rate was higher than the nominal interest rate on loans in the larger part of the period under examination (except in 1976, 1978-79, and 1982-85).[139]

Additional evidence based on more precise data are available, although in real terms and for a shorter period of time (1965-75). According to prevailing estimates, the real rate of return on enterprise investment in Yugoslavia has been somewhere from 9% to 12% during the 10-year period following the 1965 reform.[140] When compared with the real rate of interest paid on bank loans in the same period, which has more often been negative than positive, the gap between the borrowing rate and the rate of return in real terms is likely to have often favoured investment in non-owned assets.

Finally, labour turnover in Yugoslavia has been low. After an initial increasing trend due to the opening of Yugoslav borders and the outflow of workers to Western Europe in the late

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139. However, since our profit rates, as already mentioned, are not calculated in an entirely satisfactory way, the presented calculations and comparisons remain approximative.
140. Miovic (1975), Vanek and Jovicic (1975), as reported by Tyson (1977).

1960s, labour turnover stabilized at a level of around 1% and has been relatively constant thereafter. Low mobility of labour in Yugoslavia has been supported by existing legislation which ensures a high level of job security. However, it has also been conditioned by specific historical, cultural and national factors that have set regional barriers to labour mobility.[141]

Data based on managers' and workers' answers in Prasnikar's sample of 147 Yugoslav firms suggests that labour force mobility in Yugoslavia is indeed low (Prasnikar, 1983). In 96% of cases, managers did not consider firing workers because of bad business results, and 58% of managers regarded workers' fluctuation occurs rarely. Around 65% of workers didn't think of searching employment in another firm; around 40% of workers had been employed in the same firm for 6-15 years, and another 29% over 15 years; and the level of workers' commitment seems quite high (80% of workers considered their firm a relatively good firm) (see Table B2).

Immobile labour implies the extension of the time horizon, and hence it is very probable that the average Yugoslav worker actually adopts a fairly long time horizon. With the prolonging of the time horizon, the difference between investment in owned and non-owned assets diminishes substantially: e.g., for a 20

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141. Since the principal similarities between Yugoslavia and other socialist countries will be analysed later, it is to be noted that in this respect (low mobility of labour) the Yugoslav experience contrasts with that of several other socialist countries.

year time horizon, an 8% return from non-owned assets is re-
quired to make the worker as well off as with a 5% return from
owned assets. Since the Yugoslav worker in most years could not
have even received a positive real interest on savings deposits,
and investment opportunities yielding above 8% in real terms, as
reported earlier, do seem to have existed, investment from
retained earnings in Yugoslavia could have been not only an
acceptable, but even the more profitable alternative respect to
investment in owned assets.[142]

The foregoing analysis suggests that the assumptions on
which Furubotn and Pejovich's theory is based on are not quite
appropriate for explaining the investment behaviour of the
Yugoslav-type LMF. The authors put all emphasis on one institu-
tional characteristic of the Yugoslav economic system – limited
property rights – but disregard all other features, among which
quite a few seem to have favoured investment in non-owned assets
respect to own assets (low mobility of labour, severe capital
market distortions, etc.). This can lead us to conclude that
Furubotn and Pejovich's theory does not seem fully applicable to
Yugoslavia.

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142. Other factors of minor importance have favoured investment
in non-owned assets relative to owned assets in Yugoslavia:
fiscal policies that tax personal incomes on a progressive
basis, relatively more than firms' profits, and limited
possibilities (until recently) of private investment.

3.2. An alternative approach: Kornai's soft-budget constraint

Workers in Yugoslav firms have been investing in capital stock, in spite of the nonrecoverability of the principal of an investment. How does one explain such behaviour? Some of the elements that may have favoured investment in capital assets in Yugoslavia have already been discussed. We will now turn to systemic features of socialist economies, since besides being a self-managed and a market economy, Yugoslavia is also (and perhaps foremost) a socialist economy. Our principal hypothesis is that in the field of investment, it is the socialist features of the economy that dominate. As a result, the investment process in Yugoslavia resembles much more that in other socialist countries than any market-based process in capitalist economies. In ranking what the investment process in Yugoslavia is, and has been during most of the period following the 1965 reform, we would first, characterise it as socialist (regulated); second, self-managed; and last, a market process.

Let us begin with the main features that apparently distinguish Yugoslavia from most of the other countries of the socialist world, that have emerged primarily from the development of self-management over the last 35 years. Following the 1965 economic reform, the investment process has been extensively decentralised, as individual firms and banks were to become the principal agents of investment decisions. The autonomy of firms in profit disposal has increased significantly through the reduction of fiscal burdens, and firms are in principle free to choose their own investment projects, as well

as the proportion of profits to be allocated to investment. The sources for financing investment are no longer provided by the central federal fund, but by banks and enterprises' savings. Finally, the banking mechanism has sustained significant changes, as a diversified structure of decentralised all-purpose banks, which are founded by enterprises, has replaced the system of sectoral banks at the federal level existing prior to 1965.

However, in spite of these changes, the essence of the investment process has remained much the same. In order to show that in the field of investment, the Yugoslav enterprise has retained many features of the traditional socialist enterprise, parts of Kornai's (1980) theory on enterprise behaviour in a socialist economy will be used. Leaving apart the question whether Kornai's theory is generally acceptable,[143] in the absence of an alternative, more appropriate, theoretical framework some parts of his theory and concepts he uses can help in understanding Yugoslav practice in the field of investment decision-making. It is also worth noting that although Kornai

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143. It is not our intention to offer an extensive evaluation of Kornai's theory, as this would require a separate research, much beyond the scope and interest of our present analysis. Some parts of Kornai's theory which could be questioned, particularly in reference to Yugoslavia, include the notion of shortage; his perception of price policy of socialist enterprises, as the Yugoslav experience is quite different; his hypothesis on interest rate policy as not being an effective regulator of total investment demand in a socialist country, as the recent change in Yugoslav policies seems to point to the contrary; or his emphasis on redistribution of profits, which is probably less present in Yugoslavia than in other socialist countries.

initially (1980) develops his theory for CMEA countries (primarily for Hungary), he extends the theory to other countries (1986) suggesting that the theory is also applicable to Yugoslavia.

The Yugoslav economy has been characterised by exactly the same basic systemic features as those in other socialist economies: by expansion drive, or the strive for high growth rates (Kornai, 1980; Bauer, 1985). According to Kornai (1980), in a socialist economy it is expansion drive that explains investment hunger.[144] Expansion drive, present at all levels, is a form of behaviour preconditioned by social relations, which however became rooted so deeply in the thinking and acting routine of leaders in the socialist economy that it has become a "natural instinct". Consequently, no firm is found that should not want to invest and investment hunger is permanent. [145]

This "natural instinct", in our view, is still very much present in the Yugoslav economy (although the term is perhaps not quite appopriate, as it is only a disguised term for strong state influence). Yugoslavs have for generations been educated in the spirit of the sacredness of growth objectives. Such an attitude, while initially imposed on firms through precise norms to be fulfilled, today is a part of the socialist morale, and

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144. Kornai also discusses other causes of investment hunger, which we do not accept as fully applicable to Yugoslavia, including the awareness of shortage (1980, p. 334).
145. Kornai (1980), pp. 191-4, 317-21.

hence continues to be transmitted to firms, although often in an informal and indirect way.

Expansion drive has remained a characteristic feature of the Yugoslav economy until the 1980s, while the recent drastic reduction in investment spending only supports another of Kornai's hypothesis: that the upward swing of investment growth will last as long as the process does not hit one of the "tolerance limits". According to Kornai, one of these limits is the balance of payments situation, and if drastic intervention is necessary, the most obvious field will be investment.[146]

What has enabled such an overinvestment drive in Yugoslavia, as in other socialist countries, is the absence of a "hard" budget constraint. While all the necessary conditions for the presence of the "soft" budget constraint listed by Kornai are more or less present in the Yugoslav firm, what is of major importance is the consequence of such a "soft" budget constraint, which is fully applicable to Yugoslavia: no risk bearing by the individual firm, its protection from bankruptcy, and hence, due to the absence of financial failure, no voluntary constraint on investment hunger.[147] Although deficits arising from inefficient investment are no longer covered directly by

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146. Kornai (1980), pp. 211-214.
147. As noted by Nuti when discussing the reasons for the accumulation bias of the Soviet-type economy, "both at the macro and the micro level the same urge to accumulate typical of the capitalist system is present, but without the checks and constraints of the capitalist system (such as stock market valuation, takeover bids, bankruptcy discipline, and so on)" (in D. Lane, 1985, p. 115). See also Tyson (1983).

the federal budget, but indirectly, through the banking mechanism (loans at favourable terms, rescheduling of debt), by reserve funds of other enterprises or reserves of the commune, by a lowering or abolishment of fiscal burdens, they are still, in most cases, covered by (or shared with) other agents, and not primarily by the individual firm.[148] The Yugoslav enterprise does bear risk, but more frequently for investment decisions of other enteprises, than its own.

From an ambitious investment project, under present circumstances, a Yugoslav enterprise has nothing to lose. On the contrary, it expects substantial gains, not only material: praise from local authorities if such projects open new work places, or increase the living standard of the local community. If resources are not sufficient to terminate the project, additional resources will be required, the larger the project, the more important it may seem to bank officials, and the larger the firm, the more likely it is to get additional finance (because of the influence of enterprises-founders on banks). If the project is a failure, however, losses are socialized.

Furthermore, although the "allocator" of resources in Yugoslavia (to use Kornai's expression) is no longer the state, but banks, capital continues to be rationed, predominantly according to non-market criteria (see below). The level of political influence in no longer the one of federal ministries,

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148. On the socialization of losses in Yugoslavia, see Knight (1984); OECD Economic Survey - Yugoslavia, 1987/88.

but that of local communes. The channels of state influence are no longer necessarily direct, through plan norms to be fulfilled, but indirect, through policy guidelines or as informal as simple advice, usually via commune representatives in the boards of banks, or their influence on terms set in social compacts.[149]

Therefore, the behaviour and motivation of firms has not changed much regarding investment, in spite of all undertaken reforms. Workers of the Yugoslav LMF are today more interested in increasing profits, and are in principle free to determine their investment levels,[150] but this fact does not determine in itself their behaviour. To use Kornai's words, "the main question - ... - is not the actual form of incentive, but the rules for the survival and growth of the firm, and, linked to these phenomena, the relation between firm and state" (1980, p. 319). In fact, it is precisely the enterprise-state relationship that has remained almost intact in Yugoslavia, in spite of the development of self-management. The investment process has remained "soft", as extensive decentralisation has not yet meant the transfer of responsibility and risk-bearing for undertaken investment to the individual enterprise.[151] The enterprise

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149. As already mentioned, social compacts, introduced by the 1974 economic reform, are agreements concluded by state representatives and enterprises on prices, income distribution, employment policy, etc.
150. Indeed, every investment project to be undertaken needs to be approved by each individual worker.
151. Similar conclusions are drawn by Tyson (1983).

continues, in most cases, to be protected from financial failure, while the price being paid for such protection is limited freedom and persistent government intervention.

Tyson's analysis has led to similar conclusions: although the economic reforms in Yugoslavia have continuously been modifying decision-making authority of other agents, they have not affected the effective discretion of enterprises (1983, p. 301), while Burkitt (1983) found that every administrative instrument used in the period before 1965 in the field of investment policy, was also occasionally used in the post-reform period.

There are different channels of state influence and regulation in Yugoslavia (not to use the word planning, as planning in the traditional sense of the word has lost much of its meaning). Some of the existing mechanisms of economic regulation are specific to self-management (e.g. social compacts as agreements reached through a bargaining process between different agents). Others resemble state intervention practices in capitalist countries (economic policy of the federal government, such as e.g. monetary policy). Still others are similar to those in other socialist countries, such as various planning instruments (e.g. 5-year plans which define priority objectives and priority sectors of the period, or annual economic resolutions which set the annual targets). These elements of regulation are the main instruments for the transmission of social objectives and interests to the individual enterprise.

However, in addition to the above instruments of macro-economic regulation, which are in one form or another necessary, and hence present in most existing economies, the Yugoslav government has retained tne right to intervene, in case of necessity, with ad hoc administrative measures in practically all daily policy issues of the enterprise. In recent years, under the pressure of the severe economic crisis, frequent government intervention of this type has included direct limits on increases in personal incomes and price freezes, as well as various indirect measures (e.g. ceilings on bank credits for investment purposes). It is primarily this type of administrative state intervention in an enterprise's daily economic policy that is today being critisized in Yugoslavia, and that the present reform is trying to eliminate.[152]

3.3.Kornai's theory: evidence from Yugoslavia

We will consider some of Kornai's principal hypotheses on the investment behaviour of the socialist enterprise, primarily the ones that do seem relevant also for the Yugoslav economy.[153]

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152. Whereas the first group of instruments of regulation are of a more "permanent" type, as they are known in advance and hence an enterprise has the possibility of planning its activity in accordance with them, the second type of ad hoc intervention is administratively imposed from one day to another and hence quite unpredictable, not leaving much room for autonomous decisions to the individual enterprise.
153. Although we use Kornai' work to illustrate the principal characteristics of the investment process in Yugoslavia, the hypotheses that will be discussed have also been stressed by different other authors, including Tyson (1983), World Bank (1983), Knight (1984), Nuti (1985), OECD Economic Survey - Yugoslavia, 1987/88.

These hypotheses are summarized below, and evidence from Yugoslavia supporting them is presented.

1)"Soft" budget constraint. Demand for investment is not limited by fear of loss or failure. Repayment of money received for investment purposes can never cause much worry. A possible financial loss is compensated by different means. The budget constraint of expenditures earmarked for an investment action is soft (Kornai, 1979, p. 531).

Evidence from Yugoslavia offers support that the budget constraint of the Yugoslav firm is indeed "soft". Two types of data are presented: on the number of liquidated firms, and on the socialization of losses (see Table B3 and B4, in Appendix B(a)). Table B3 shows that 262 enterprises were liquidated in 1976-78, 442 in 1979-80, 345 in 1981-82 and 283 in 1983-84.[154] This is indeed considerable in comparison with the practice in other socialist countries, but the number of liquidated enterprises is still small relative to total organization changes, and to the number of enterprises ceasing to exist (see Graph 3).

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154. However, it is possible that these figures do not really refer to enterprises that have gone bankrupt. The OECD (Economic Survey - Yugoslavia, 1987/88, p. 37) suggests a much smaller number of bankrupt enterprises for the 1983-84 period (around 10 and 22 in the two years respectively), than the SZS figures on liquidated firms reported here. Since both sources are based on official Yugoslav statistics, either OECD data contain an error (since the number of bankrupt firms is given only in graphic form and hence there may be a printing mistake in the scale presented), or the difference arises from a different definition of "bankruptcy" respect to "liquidation" (although the two terms suggest the same thing).

In the 1976-84 period, liquidated enterprises represented be-
tween 1.9% and 5.7% of total organizational changes. Of major
interest, however, is that liquidated enterprises represented
only 9.6%, 22.2%, 20.7% and 14% in the four two-year periods
respectively, of all enterprises that have ceased to exist. A
more frequent way of closing down an enterprise is to merge or
affiliate it to another enterprise (50% to 60%).

<div align="center">

Graph 3
Liquidated enterprises in Yugoslavia
1976-1984

</div>
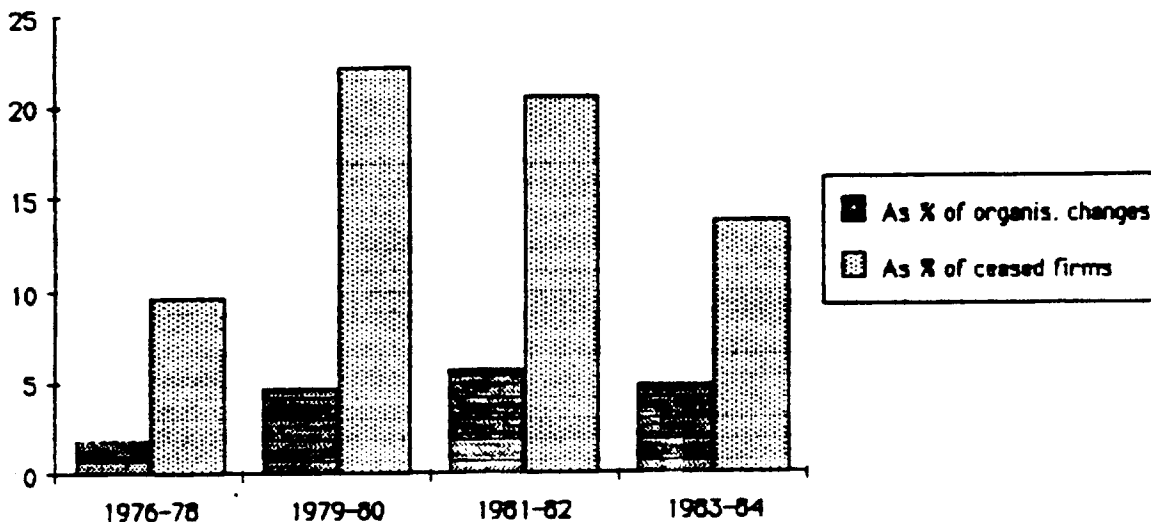
Source: Table B3, Appendix B(a).

The ratio of liquidated firms to total exit of firms sug-
gests that the budget constraint seems to have somewhat
"hardened" in 1979-82 with respect to the previous period, but
thereafter, in 1983-84 it was again "softened", in spite of the
fact that it is precisely in 1983 that the legislation on

bankruptcy had been changed in order to impose more severe conditions on firms operating with losses.[155]

Nevertheless, the very recent developments suggest that such permissive policies are finally being abandoned. With the new law on rehabilitation and liquidation adopted in December 1986, which applies stricter criteria for defining losses, introduces major controls, and substantially shortens the period of rehabilitation of loss-making enterprises, it seems that the budget contraint of Yugoslav firms has been significantly "hardened". Compared to previous years, when bankruptcies affected only a small number of workers (2000 on average, between 1982 and 1986), in 1987, as a consequence of the doubling of the number of bankrupt firms in 1987 respect to 1986, some 16 000 workers were laid off (OECD Economic Surveys - Yugoslavia, 1987/88, p. 38).

As to the socialisation of losses, Table B4 shows that 80% to 95% of enterprise losses in the 1980-87 period has been covered through different means, using resources of other enterprises, socio-political communities, and banks. The largest part of losses is being covered through rehabilitation credit, but a substantial amount through non-reimbursable funds, as well as the writing off of claims (see Graph 4). These data, like the previous, also suggest that instead of "hardening", the budget

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155. The Law on rehabilitation and liquidation of organisations of associated labour of July 1980, has been ammended twice in 1983.

constraint seems to have become even "softer" during the 1980s: rehabilitation credits, through which over 80% of total losses were covered in 1980, declined to 50% by 1987, whereas non-reimbursable funds increased from 15% in 1980 to 31% in 1987.

Graph 4
Coverage of losses in Yugoslavia
1980-1987
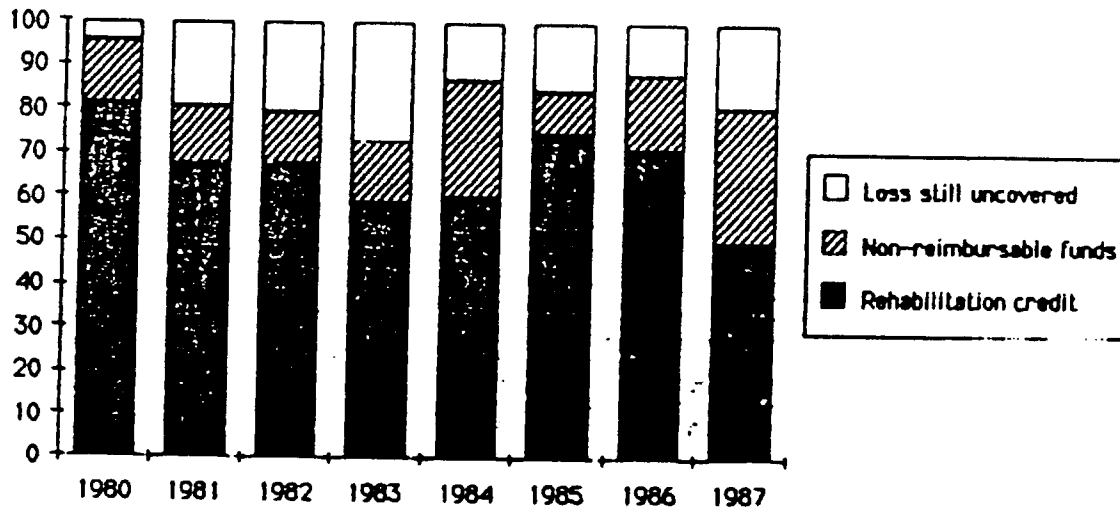
Source: Table B4, Appendix B(a).

2)Cost overruns and overdues. In a socialist economy claimants underestimate expected costs, since chances of acceptance (when applying for funds) are greater if costs are relatively small. Approval must be obtained for starting the investment; once started, it will also end in some way and at some time (Kornai, 1980, p. 326).[156]

Table B5 provides data on time overdues and cost overuns in a sample of 125 investment projects in industry and agriculture,

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156. On the underestimation of cost of investment projects in Yugoslavia, see also Tyson (1983).

all on the territory of Serbia, undertaken in the 1979-82 period through the Associated Belgrade Bank (Celenkovic et al, 1984). The average delay in project completion, compared with planned time, was around 50%. Out of the 122 completed projects,[157] 82% surpassed the planned time of completion, only 14% were terminated as planned and 4.1% were completed before time. The analysis of cost overruns shows that 37.5% of investment projects had surpassed the estimated planned cost, by around 50% of the planned value. As to the financing of cost overruns, enterprises investors participated with a relatively small amount (22% of total), whereas the bulk was financed through bank credit (over 50%).

Another empirical study, also undertaken by the Associated Belgrade Bank (Ostojic et al, 1985) provides similar data,[158] analysing in addition the sectoral distribution of delays and cost overruns of investment projects. The study shows that projects undertaken in sectors which were considered priority sectors in the 1980-85 period, had higher time overdues and cost overruns respect to projects in non-priority sectors. Out of total loans for financing cost overruns, the by far largest part was assigned to projects in priority sectors (70% to 90% in

157. Out of 125 investment projects, 3 were still not completed at the time the study was finished, and hence they have been excluded.
158. The sample is quite representative, since it includes all projects undertaken through the Associated Belgrade Bank, which represented 23% to 25% of all investment projects undertaken in 1982-84 on the whole territory of Yugoslavia.

1979-83). This suggests a high level of protection of priority

sectors, and credit rationing in their favour.

3)Proliferation of interfirm credits. Another indirect

symptom of the softness of the system of short-term financing of

the socialist firm, is the proliferation of interfirm credits.

In times of restrictive monetary policy, firms help themselves

by mutually tolerating indebtedness towards each other, through

the expansion of interfirm credit (Kornai, 1980, p. 915-916).

Graph 5
Securities in Yugoslavia, bought by banks
(in blns. of din.)
1977-1984
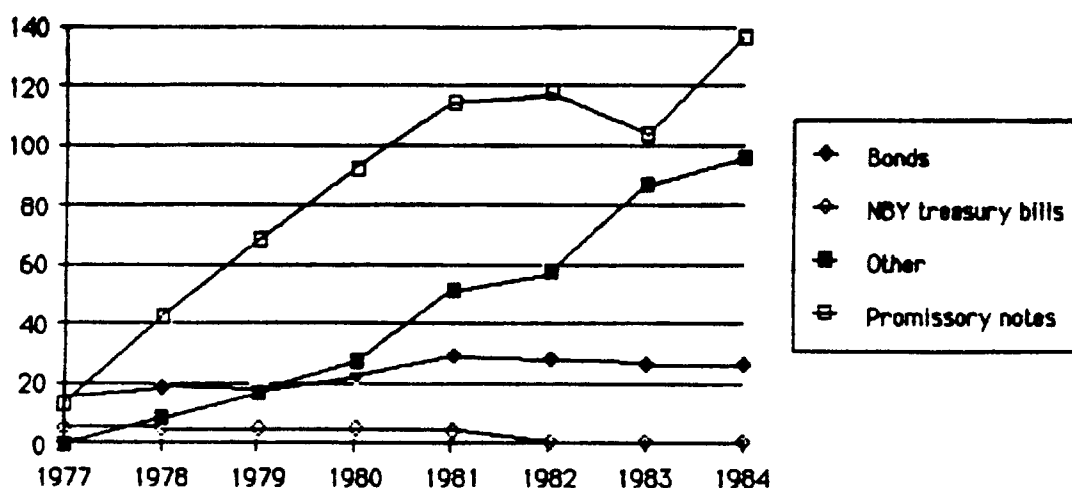
Source: Table B6, Appendix B(a).

Table B6 and Graph 5. indeed show the dramatic increase in

the issuing of promissory notes from 1977 onwards. In the 1977-

84 period, promissory notes accounted for by far the largest

part of all securities, whereas the main issuers of all

securities were, indeed, enterprises.[159]

4)Non-market allocation of investment resources. Investment

resources in a socialist economy are rationed, mainly according

to nonprice criteria (Kornai, 1980, p. 420).

A good example for illustrating the small use of market

criteria in Yugoslavia, and the inference of political struc-

tures (and considerations) into the microeconomic sphere, is the

practice in investment project appraisal.

Prior to 1965, investors had to prepare investment projects

according to unified instructions provided by the social invest-

ment funds, whereas project appraisal was done by specialized

agencies. After 1965, these functions were transferred to banks

as one of the principal agents of investment policy, and banks

were "free" to choose their own criteria for project selection.

This resulted in very heterogeneous banking practices in

project selection, but economic criteria based on profitability

of projects were seldom applied.[160] The system of priority

investments introduced after 1976 envisaged the setting aside of

investment resources for priority sector development through

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159. L. Tyson (1977a) provides similar data on interfirm
credits, but in reference to earlier periods.
160. As noted by Tyson, "it is rare that any project is
abandoned, because there are no accepted criteria to distinguish
good from bad projects... the criteria used varied from project
to project, region to region, and time to time" (Tyson, 1983,
pp. 293, 301-2).

social compacts, whereas the main instrument for its implementa-
tion were selective credits of the NBY for priority sectors. The
selective credit mechanism, which gave priority access to fund-
ing (privileged discount rate) to priority sectors, meant that
priority sector projects were not exposed to realistic pricing
of capital, and were not subject to the same appraisals methods
as projects in nonpriority sectors.[161]

Hence, instead of highest yielding projects, the system
encouraged investment primarily in priority sectors, irrespec-
tive of effective returns. Economic profitability of a project
was usually subordinated to more general economic objectives.
This is indeed confirmed by some of the existing methodologies
on project appraisal. [162]

All of these methodologies have the same general features.
They contain an excessive number of criteria that should simul-
taneously be respected, and hence it is not surprising that they
were rarely used in practice. Besides including "micro" criteria
on the market-financial efficiency of a project, based on stan-
dard criteria of project selection (net present value, internal
rate of return, etc.), these methodologies also include a number
of other "macro" criteria on the socio-economic efficiency of a

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161. See World Bank (1983), p. 286-287.
162. See methodologies of the Association of Yugoslav Banks
(Udruzenje banaka Jugoslavije, 1981), of the Associated Belgrade
Bank (Lajsic, 1984), of the Republican Institute for Social
Planning of Serbia (Republicki zavod za drustveno
planiranje..., 1984), and of the Association of Belgrade Banks
(Udruzenje bankarskih organizacija Beograd, 1985).

project, such as its effect on exports, foreign exchange, domestic sources of energy, raw materials and equipment, employment, sources of financing, contribution to regional development, pollution, even the contribution of an investment project to "the association of labour and resources". Social cost-benefit considerations clearly dominate over profitability criteria. For example, the methodology of the Association of Belgrade Banks (Udruzenje bankarskih organizacija Beograd, 1985) contains a total of 21 criteria that should be respected, of which only the first three refer to the economic profitability of an investment.

Since no adequate institutional mechanism existed to encourage efficiency in investment selection (no uniform methodology at the national level, mandatory evaluation of investment projects), a social compact was concluded in December 1985 between representatives of the federal and republican Executive Councils.[163] The compact envisages the elaboration of a uniform methodology on project appraisal, which will be institutionalized as obligatory through a self-management agreement on its application, to be signed by all Yugoslav banks. However, the compact also envisages that approval for projects should be obtained from the Federal Institute for Social Planning, which ought to give its opinion on whether the

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project is consistent with the economic policy established by the social plan.

The unique methodology, completed by the middle of 1986, has been widely critisized for its excessive length (over 600 pages) in spite of the fact that it fails to cover some important aspects, its inconsistency (e.g. between the methodological part and the operative part), the duplication of prescriptions, etc. A revised version was ready by the middle of 1987 (Bendekovic et al. 1987). This methodology does not differ much from the above described methodologies: it similarly includes both market (financial) criteria (internal rate of return, net present value, etc.), and a number of "socio-economic" criteria which evaluate a project's contribution to broader objectives of socio-economic development (savings, balance of payments, employment, foreign markets competitiveness, underutilization of resources, technology, etc.), among which even a criterion on a project's effect "on the economic and military-strategic independence of the country". Besides the individual discount rate, a social discount rate, which takes into account the social preferences of the community, should also be applied.

The above analysis clearly illustrates how government authorities use extra-market processes to direct investment activities of enterprises.[164] Even in a decentralized economy

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164. On this issue, see also Bergson (1967).

such as Yugoslavia, socialism directly imposes the supremacy of social, over individual interests.

3.4. Confronting the two theories: an econometric analysis

Furubotn and Pejovich's theory will now be confronted with Kornai's theory in order to evaluate, using econometric methods, which of the two alternative theories offers a better explanation of the investment process in Yugoslavia. The two theories are first considered separately, by evaluating the role of the two alternative groups of variables proposed by each of the two theories as being crucial for explaining savings deposits, investment and self-financed investment. The two theories are then evaluated jointly, by applying the complete parameter encompassing procedure (unrestricted-restricted model).

3.4.1. Testing Furubotn and Pejovich's theory

The most explicit statement made by Furubotn and Pejovich on what determines the level of savings, investment and self-financed investment in a Yugoslav-type LMF is found in their (1973) article (p. 281):[165]

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165. The problem of how to quantify Furubotn and Pejovich's theory in a most appropriate way has raised many question, and has suggested a number of alternative approaches to the one that has finally been chosen. One way of proceeding could have been to construct a fairly complex model which includes a large number of explanatory variables, but not only were we limited by degrees of freedom, but this procedure was more subject to our own subjective evaluation which of the variables are the most important. The other way was to construct a simpler model, which however fully reflects the point of view of the authors, and try to improve it at a later stage. We have opted for the second method.

"We find that (1)the shorter the collective's planning horizon, (2)the higher the rate So (interest paid on savings deposits - M. U.), (3)the lower the rate i (cost of bank credit - M. U.), and (4)the lower the marginal productivity of capital in the firm, the less attractive are non-owned assets in comparison with owned assets and the less likely is self-finance activity."

The theory therefore proposes that savings deposits, investment, and self-financed investment are determined by the planning horizon, interest rate on savings deposits, cost of bank credit, and capital returns, the first three variables being the dependent, and the last four being the explanatory variables.

In testing the theory on empirical evidence from Yugoslavia, aggregate data has been used for the above seven variables, represented as H (planning horizon), IR (interest rate on savings deposits), LR (interest rate on bank credit), PF (capital returns), SD (savings deposits), INV (investment), and SFI (self-financed investment) (see Appendix B(b)). All variables have been deflated, and hence are in real terms. The period being examined is 1966-84. Investment and self-financed investment data, however, refer to the 1967-84 period, since changes in the methodology of reporting statistics did not permit the inclusion of 1966.

The following procedure was applied. First, in order to get a first insight into the relationship between these seven variables, correlation coefficients have been calculated, and their

significance tested. Second, a series of single regression equations have been estimated. Finally, two simultaneous equation models have been estimated.

3.4.1.1.Correlation

The correlation matrix between the seven variables reflecting Furubotn and Pejovich's theory, for the 1967-84 period, is presented in Table 1.

Table 1. CORRELATION MATRIX - FURUBOTN AND PEJOVICH'S THEORY

	SD	INV	SFI	IR	LR	H	PF
SD	1.000						
INV	0.949	1.000					
SFI	0.929	0.951	1.000				
IR	-0.337	-0.452	-0.461	1.000			
LR	-0.334	-0.459	-0.403	0.959	1.000		
H	0.663	0.625	0.783	-0.425	-0.308	1.000	
PF	-0.178	-0.306	-0.359	-0.096	-0.147	-0.174	1.000

All correlation coefficients higher than 0.5 have been put in bold, in order to render the table more readable. The corresponding t values, which measure the significance of correlation coefficients, reveal that all of the above coefficients are statistically significant.[166]

Quite surprisingly, there is higher correlation among variables considered dependent by the theory (SD, INV, SFI), than between each of these and the explanatory variables. The only variable that is highly correlated with SD, INV, and SFI is

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166. Using the formula $t = \dfrac{r}{\sqrt{(1-r^2)/df}}$ where r is the correlation coefficient, and df is the degree of freedom, the t test is applied to correlation coefficients (see Mayes and Mayes, 1976, pp. 84-86). All reported coefficients proved significant at 5% level, since obtained t-values were higher than the critical t value (for 18 observations, two explanatory variables and hence 16 degrees of freedom, t>2.120).

the time horizon variable (H).[167] The correlation coefficients
between SD, INV, SFI and the other 3 variables, are generally
low. As to the relationship among explanatory variables, only
two seem highly correlated: the two interest rates.

3.4.1.2.The general model

Three single equations have first been estimated using OLS:

(1)**Savings deposits equation:**

$$SD= b_1 IR - b_2 LR + b_3 H + b_4 PF + b_5 + u \qquad (1.1)$$

$$b_1 > 0, \quad b_2 < 0, \quad b_3 < 0, \quad b_4 < 0 \;^{168}$$

IR : interest rate on savings deposits
LR : lending rate on credits to firms
H : a proxy for the time horizon
PF : profit rate
u : error term (see Appendix B(b))

(2)**The investment equation:**

$$INV= b_1 IR + b_2 LR + b_3 H + b_4 PF + b_5 + u \qquad (1.2.)$$

$$b_1 < 0, \quad b_2 \lessgtr 0, \quad b_3 > 0, \quad b_4 > 0 \;^{169}$$

INV: investment in fixed assets (social sector). All other
variables are same as in (1.1).

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167. In the case of savings, however, the sign of the
coefficient is contrary to what is postulated by the theory.
168. The IR is expected to positively influence SD, whereas the
remaining three variables influence savings indirectly, through
the investment decision. Thus the lower is the LR, the shorter
is H, and the lower are PF, the less likely is SFI, and hence
the more likely are SD.
169. The lower is the IR on SD, the less likely are SD and the
more likely is INV. The higher is the H and PF, the higher is
SFI likely to be, and hence also INV. As to LR, although the
sign according to Furubotn and Pejovich's statement ought to be
positive (b2>0), its influence on INV is indeterminate as it
will depend on the proportion between internal and external
finance.

(3)The self-financed investment equation:

$$SFI = b_1 IR + b_2 LR + b_3 H + b_4 PF + b_5 + u \qquad (1.3.)$$

$$b_1 < 0, \quad b_2 > 0, \quad b_3 > 0, \quad b_4 > 0 \quad {}^{170}$$

SFI : self-financed investment in fixed assets (social sector).
All other variables are same as in (1.1) and (1.2).

Results:

OLS   Period: 1966-84   (1.1.)

	Dep. variable: SD		R2: 0.620	R2C: 0.511	
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	IR	1.644	1.100	1.49	33.0
B2	LR	-1.694	1.034	1.64	35.9
B3	H	23.616	5.136	4.60	27.3
B4	PF	-0.284	0.432	0.66	3.7
B5	Constant	-2288.496	505.614	4.53	0.0
St.error: 7.245	MAPE: 16.90		DW: 0.953	RHO(1): 0.52	

OLS   Period: 1967-84   (1.2.)

	Dep. variable: INV		R2: 0.601	R2C: 0.478	
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	IR	4.008	2.840	1.41	31.6
B2	LR	-4.824	2.569	1.88	40.2
B3	H	50.015	17.609	2.84	19.1
B4	PF	-1.726	1.080	1.60	9.2
B5	Constant	-4806.978	1737.728	2.77	0.0
St.error: 17.559	MAPE: 15.43		DW: 1.045	RHO(1): 0.46	

OLS   Period: 1967-84   (1.3.)

	Dep. variable: SFI		R2: 0.724	R2C: 0.639	
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	IR	0.826	1.236	0.67	19.8
B2	LR	-1.194	1.118	1.07	30.2
B3	H	30.831	7.661	4.02	35.8
B4	PF	-0.882	0.470	1.88	14.2
B5	Constant	-2978.098	756.053	3.94	0.0
St.error: 7.639	MAPE: 14.63		DW: 0.937	RHO(1): 0.51	

Note: Details on reported statistics are given in Appendix B(b).

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170. The lower is the IR on SD, the less likely are SD and hence the more likely is SFI. The higher is the LR, H, and PF, the more likely is SFI.

The results are similar for all three equations. The relatively low R2C suggests that the fit is not very good. The Durbin-Watson statistics and the high RHO(1) indicate there may be a problem of positive autocorrelation of residuals. Since the DW in all three equations lies in the inconclusive region, the Durbin Watson Exact Test (DWE) was applied, which confirmed positive autocorrelation in all three equations (the HO on no autocorrelation is rejected, since the probability that it is correct is 0.03%, 0.06% and 0.01% in the three equations respectively, i.e. below 5%).

Autocorrelation of residuals suggests misspecification of the equations, and in its presence inefficient regression estimates and misleading t-statistics are produced. In order to discover which type of specification bias is present,[171] a series of tests have been performed: for normality of residuals, presence of outliers, heteroscedasticity, linearity of variables, correctness of the functional form and of the model specification (NORMAL, OUTLIE, HETERO, HARVEY, RBOW, DIFF, IMT).[172] The results (reported in Appendix B(b)) reveal that the

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171. Misspecification can imply: 1)omission of relevant variables or inclusion of irrelevant ones; 2)incorrect functional form; 3)use of a linear model where a nonlinear model is needed; 4)incorrect specification of the error term, etc.
172. Details on of each of these tests are reported in Appendix B(b).

three regressions passed all of the above tests. Therefore, it seems that misspecification derives primarily from the omission of relevant variables and/or inclusion of irrelevant ones.

3.4.1.3.Improving the model

In trying to improve the model, several attempts were undertaken. First, in order to correct for autocorrelation, the Cochrane-Orcutt (CO) method has been applied (instead of OLS) in estimating equations 1.1., 1.2., and 1.3., both by including and excluding the first observation. This, however, did not yield satisfactory results, since serial correlation remained a problem (except in one case, where it was at the margin, autocorrelation was confimed by the DWE).[173]

Second, since the two interest rates, IR and LR are highly correlated (correlation coefficient of 0.959), a remedial measure was applied to remove the problem of collinearity, by a different parametrisation of the interest rates. IR was retained, while LR has been replaced by a new variable DIR representing the absolute difference between IR and LR, i.e. DIR=IR-LR. However, neither did this procedure provide better results. In all three equations, the results were very similar

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173. The DWE on the regressions estimated by CO gave the following probability values: for equation 1.1., 0.15% and 4.25%; for equation 1.2., 0.25% and 0.97%; and for equation 1.3, 0.78% and 5.02% respectively, when including and excluding the first observation.

as before (identical R2, R2C, DW). The t statistics remained unchanged for all variables (DIR had same t statistics as the previous variable LR), except for IR: in the first two equations, it was actually lower than before (quite contrary to expectations), while in the third it was somewhat higher (1.05).

Finally, although Furubotn and Pejovich (1973) very explicitly list IR, LR, H, and PF as the crucial determinants of SD, INV, and SFI, additional explanatory variables have been added to the original three equations, as the tests performed suggested that misspecification is likely to derive from the omission of relevant variables.

In the first place, besides considering the cost of credit, captured by the variable LR, it may be equally important to consider the level of credit availability. Therefore, bank loans for fixed assets extended to enterprises (BL) has been added to the original three equations.

(1) Savings equation: (1.1) + b_5BL $\qquad b_5 > 0$ (1.4.)

(2) Investment equation: (1.2.) + b_5BL $\qquad b_5 \lessgtr 0$ (1.5.)

(3) Self-financed investment: (1.3) - b_5BL $\qquad b_5 < 0$ (1.6.)[174]

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174. The availability of bank loans is expected to decrease SFI, and hence increase SD. As to the effect on INV, as in the case of equation 1.2., the effect remains indeterminate, as this depends on the proportion between internal and external funds.

Results:

OLS   Period: 1966-84   (1.4.)

Dep. variable: SD   R2: 0.715   R2C: 0.605

	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	IR	2.361	1.048	2.25	36.1
B2	LR	-2.294	0.974	2.36	37.0
B3	H	17.758	5.414	3.28	15.7
B4	PF	-0.026	0.408	0.06	0.3
B5	BL	0.149	0.072	2.08	11.0
B6	Constant	-1735.291	527.089	3.29	0.0

St.error: 6.516 MAPE: 16.25   DW: 0.995   RHO(1): 0.49

DW Exact: Prob. 0.0%

OLS   Period: 1967-84   (1.5.)

Dep. variable: INV   R2: 0.741   R2C: 0.633

	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	IR	6.603	2.593	2.55	35.9
B2	LR	-6.855	2.299	2.98	39.4
B3	H	40.151	15.277	2.63	10.6
B4	PF	-0.841	0.971	0.87	3.1
B5	BL	0.426	0.168	2.54	11.0
B6	Constant	-3906.357	1500.518	2.60	0.0

St.error: 14.733 MAPE: 12.41   DW: 1.316   RHO(1): 0.32

DW Exact: Prob. 0.38%

OLS   Period: 1967-84   (1.6.)

Dep. variable: SFI   R2: 0.878 R2C: 0.828

	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	IR	2.254	0.929	2.43	30.9
B2	LR	-2.311	0.823	2.81	33.4
B3	H	25.406	5.472	4.64	16.9
B4	PF	-0.396	0.348	1.14	3.7
B5	BL	0.234	0.060	3.90	15.2
B6	Constant	-2482.750	537.503	4.62	0.0

St.error: 5.278 MAPE: 9.09   DW: 1.275   RHO(1): 0.35

DW Exact: Prob. 0.27%

In all three equations, although adding the variable BL

improves the fit of the equations, [175] it did not eliminate the

problem of autocorrelation, confirmed to be present in all three

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175. This was to be expected; adding a variable usually
increases R2, never decreases it.

equations by the DWE (Prob. of 0%, 0.38%, and 0.27% in 1.4, 1.5.
and 1.6. respectively). Consequently the t statistics, although
high for most of the variables, are not precise, and do not
permit any definite conclusions.[176]

Next, although all variables have been deflated, this might
not have been sufficient to remove the influence of time on our
dependent variables, and hence a trend variable has been added
to the original three equations:

(1)<u>Savings equation</u>: (1.1) + $b_5 T$ $b_5 > 0$ (1.7.)

(2)<u>Investment equation</u>: (1.2.) + $b_5 T$ $b_5 > 0$ (1.8.)

(3)<u>Self-financed investment</u>: (1.3) + $b_5 T$ $b_5 > 0$ (1.9.)[177]

Results:

OLS Period: 1966-84					(1.7.)
Dep. variable: SD			R2: 0.742	R2C: 0.643	
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	IR	2.680	1.030	2.60	37.1
B2	LR	-2.436	0.934	2.61	35.6
B3	H	-0.394	10.645	0.04	0.3
B4	PF	0.354	0.451	0.79	3.2
B5	T	1.881	0.759	2.48	23.8
B6	Constant	-76.464	992.450	0.08	0.0
St.error: 6.197 MAPE: 13.21		DW: 1.048	RHO(1): 0.47		
DW Exact: Prob. 0.03%					

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176. This procedure was also applied to an alternative set of
equations, where LR is replaced by DIR, which yielded similar
, results.
177. All three dependent variables are likely to increase with
time.

OLS Period: 1967-84 (1.8.)

	Indep. variables	Est. Coeff.	St. dev.	t	BC%
	Dep. variable: INV		R2: 0.722	R2C: 0.606	
B1	IR	6.277	2.661	2.36	36.2
B2	LR	-6.462	2.345	2.76	39.4
B3	H	-5.593	28.770	0.19	1.6
B4	PF	-0.298	1.128	0.26	1.2
B5	T	4.273	1.872	2.28	21.6
B6	Constant	323.415	2707.834	0.12	0.0

St.error: 15.260 MAPE: 13.60 DW: 1.293 RHO(1): 0.33
DW Exact: Prob. 0.33%

OLS Period: 1967-84 (1.9.)

	Indep. variables	Est. Coeff.	St. dev.	t	BC%
	Dep. variable: SFI		R2: 0.876	R2C: 0.825	
B1	IR	2.159	0.928	2.33	32.0
B2	LR	-2.156	0.818	2.63	33.7
B3	H	-1.828	10.037	0.18	1.3
B4	PF	-0.044	0.394	0.11	0.4
B5	T	2.509	0.653	3.84	32.6
B6	Constant	35.052	944.699	0.04	0.0

St.error: 5.324 MAPE: 9.24 DW: 1.176 RHO(1): 0.39
DW Exact: Prob. 0.10%

Since these equations did not provide much better results, and primarily, did not eliminate autocorrelation, a final attempt to improve Furubotn and Pejovich's model using single regressions, was to include a variable reflecting institutional change. Since the change in economic policies in Yugoslavia from 1980 onwards has been taken into account in the alternative set of regressions, which test Kornai's theory, the same dummy variable DA, which is 0 until 1979 and 1 thereafter, has also been added to the original three equations reflecting Furubotn and Pejovich's theory:

(1) Savings equation: (1.1) + b_5DA $b_5 < 0$ (1.10.)

(2) Investment equation: (1.2.) + b_5DA $b_5 < 0$ (1.11.)

(3) <u>Self-financed investment</u>: (1.3) + b_5DA b_5<0   (1.12.)[178]

<u>Results:</u>

OLS	Period: 1966-84				(1.10.)

Dep. variable: SD   R2: 0.642   R2C: 0.511

	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	IR	1.014	1.273	0.80	22.1
B2	LR	-1.223	1.140	1.07	28.1
B3	H	26.374	5.852	4.51	33.2
B4	PF	-0.498	0.484	1.03	7.1
B5	DA	-5.922	6.002	0.99	9.5
B6	Constant	-2555.106	573.724	4.45	0.0

St.error: 7.252   MAPE: 17.05   DW: 0.953   RHO(1): 0.52

DW Exact: Prob. 0.00%

OLS	Period: 1967-84				(1.11.)

Dep. variable: INV   R2: 0.607   R2C: 0.444

	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	IR	3.223	3.415	0.94	26.6
B2	LR	-4.248	2.947	1.44	37.1
B3	H	52.372	18.924	2.77	21.0
B4	PF	-1.987	1.258	1.58	11.1
B5	DA	-6.781	15.146	0.45	4.2
B6	Constant	-5033.029	1863.485	2.70	0.0

St.error: 18.125   MAPE: 15.41   DW: 1.052   RHO(1): 0.46

DW Exact: Prob. 0.04%

OLS	Period: 1967-84				(1.12.)

Dep. variable: SFI   R2: 0.724   R2C: 0.610

	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	IR	0.932	1.497	0.62	21.2
B2	LR	-1.271	1.292	0.98	30.6
B3	H	30.514	8.296	3.68	33.7
B4	PF	-0.044	0.394	0.11	0.4
B5	T	2.509	0.653	3.84	32.6
B6	Constant	35.052	944.699	0.04	0.0

St.error: 5.324   MAPE: 9.24   DW: 1.176   RHO(1): 0.39

DW Exact: Prob. 0.10%

    Therefore, similar conclusions can be drawn for both groups

of regressions (1.7, 1.8, 1.9, and 1.10, 1.11, 1.12). Although

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178. Restrictive policies introduced in the 1980s are expected
.to negatively influence both SD (because of limits on personal
incomes), and INV and SFI (because of different measures aimed
at cutting investment demand).

in some cases the R2C is higher, and hence suggests a better

fit than in the original equations, the problem of autocorrela-

tion, confirmed by the DWE test, has not been eliminated, thus

producing misleading t statistics, and inefficient coefficient

estimates. Hence, as before, little can be concluded about the

significance of each of these variables in determining savings

deposits, investment and self-financed investment in Yugoslavia.

Our attempts to improve the original model did not provide

better results, more supportive of the theory, but have in

addition provided evidence that the model is very sensitive to

minor changes. [179]

3.4.1.4.A simultaneous equation model

The theory examines the choice of workers whether to dis-

tribute retained earnings in the form of personal incomes and

put these savings on a bank account, or invest retained earnings

in capital stock of the firm. In other words, the theory postu-

lates that savings deposits and self-financed investment are

mutually dependent, moving in the opposite direction.

Therefore a simultaneous equation model may reflect the

theory in a more adequate way. Although the positive sign of the

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179. E.g., in the first group of regressions (1.7, 1.8, 1.9),
the variable H seemed one of the least significant, whereas in
the second group (1.10, 1.11, 1.12) it seemed highly significant
(although this is approximative because of the presence of
autocorrelation).

correlation coefficient between SD and SFI suggested just the contrary (a positive linear relationship), a set of simultaneous equation models have been estimated using TSLS. The first is based on the original three equations (1.1, 1.2, 1.3):

$$SD = a_1 SFI + a_2 IR + a_3 + u_1 \qquad (1.13a.)$$

$$a_1 < 0, \quad a_2 > 0$$

$$SFI = b_1 SD + b_2 LR + b_3 H + b_4 PF + b_5 + u_2 \qquad (1.13b.)$$

$$b_1 < 0, \quad b_2 > 0, \quad b_3 > 0, \quad b_4 > 0$$

In each of the equations, only those variables which are expected to directly influence the dependent variable have been included. Thus in 1.13a, savings deposits are directly influenced by the interest rate and by self-financed investment, whereas all other explanatory variables influence it indirectly, through self-financed investment, and therefore are excluded from 1.13a, but included in 1.13b.

Results:

TSLS Period: 1967-84					(1.13a)
Dep. variable: SD			R2: 0.872		
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
A1	SFI	0.651	0.102	6.39	93.7
A2	IR	0.092	0.181	0.51	6.3
A3	Constant	5.149	3.584	1.44	0.0
St.error: 3.821	MAPE: 10.47		DW: 0.469	RHO(1): 0.73	

ARSIM: value of test-statistics 1.056

TSLS Period: 1967-84					(1.13b)
Dep. variable: SFI			R2: 0.913		
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	SD	0.486	0.417	1.17	30.0
B2	LR	-0.355	0.206	1.72	14.6
B3	H	18.977	9.003	2.11	35.7
B4	PF	-0.752	0.286	2.63	19.7
B5	Constant	-1828.526	875.430	2.09	0.0
St.error: 4.393	MAPE: 8.56		DW: 1.054	RHO(1): 0.16	

ARSIM: value of test-statistics 1.053

Although the model confirms a better fit than the one obtained in single regression (a higher R2), the ARSIM test statistics in both regressions suggest that the H0 on the presence of autocorrelation cannot be rejected.[180] This model, therefore, did not provide much better results than the single equations.

In the alternative simultaneous equation model, the variable on bank loans for fixed assets (BL) has been added to the second, SFI equation:

$$SD = a_1 SFI + a_2 IR + a_3 + u_1 \qquad\qquad (1.14a.)$$

$$a_1 < 0, \quad a_2 > 0$$

$$SFI = b_1 SD + b_2 LR + b_3 H + b_4 PF + b_5 BL + b_6 + u_2 \qquad (1.14b.)$$

$$b_1 < 0, \quad b_2 > 0, \quad b_3 > 0, \quad b_4 > 0, \quad b_5 > 0$$

Results:

TSLS Period: 1967-84					(1.14a)
Dep. variable: SD			R2: 0.873		
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
A1	SFI	0.661	0.089	7.46	93.2
A2	IR	0.101	0.173	0.58	6.8
A3	Constant	4.841	3.180	1.52	0.0
St.error: 3.789	MAPE: 10.45		DW: 0.464	RHO(1): 0.74	

ARSIM: value of test-statistics 1.082

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180. The value of the ARSIM test statistics of 1.056 in 1.13a. is at the margin for accepting autocorrelation (the lower bound DW statistics for 18 observations and 2 explanatory variables at 5% level of significance is 1.05), whereas 1.053 in 1.13b. lies in the inconclusive region (for 18 observations and 4 explanatory variables, at 5% level of significance, the lower bound DW is 0.82 and the upper bound 1.87).

TSLS Period: 1967-84					(1.14b)
Dep. variable: SFI			R2: 0.991		
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	SD	0.842	0.094	8.95	49.0
B2	LR	-0.216	0.062	3.48	8.4
B3	H	8.006	2.036	3.93	14.3
B4	PF	-0.453	0.095	4.78	11.2
B5	BL	0.098	0.017	5.63	17.1
B6	Constant	-777.531	199.059	3.91	0.0
St.error: 1.443	MAPE: 2.87		DW: 2.340	RHO(1):-0.23	

ARSIM: value of test-statistics 2.333

The savings equation again suggests there may be autocor-relation,[181] but the self-financed investment equation provides good overall results: a higher R2 than in 1.13b., no autocor-relation of residuals,[182] and high significance of all variables (at 1%).

However, looking at the signs of the estimated coeffi-cients, four out of five are contrary to what is postulated by Furubotn and Pejovich's theory (for variables SD, LR, PF, and BL). Self-financed investment seems highly influenced by savings deposits, but positively; the lower is the lending rate and the lower are profits, quite contradictorily, the higher will be self-finance; and the availability of bank loans for fixed assets, instead of decreasing self-financing, seems to increase

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181. The value of the ARSIM test-statistics of 1.082 lies in the inconclusive region (for 18 observations and 2 explanatory variables at 5% level of significance, the lower and upper bounds of DW statistics are 1.05 and 1.53 respectively).
182. The value of the ARSIM test-statistics of 2.333 is higher than 2.06, the upper bound DW statistics for 18 observations and 5 explanatory variables, at 5% level of significance.

it. Therefore, the equation only offers support that H influences self-financed investment, whereas the wrong signs of the coefficients for the remaining variables obviously indicate that the model does not fulfill one of the most important conditions for accepting it: congruence with theory. [183]

3.4.2.Testing Kornai's theory

Kornai's (1980) theory will now be tested, in order to determine whether in the field of investment, Yugoslavia is indeed primarily a socialist economy. The following hypotheses, all referring to investment, have been quantified: [184]

1)Expansion drive has been approximated by the priority of investment growth respect to consumption growth, represented by the variable ED (for all variables, see Appendix B(b)). Expansion drive is present whenever there is a positive difference between the growth rate of investment in fixed assets and the growth rate of GMP, i.e. at the expense of consumption.

2)Irresistability of growth. One must grow. Productive forces of the socialist economy grow incessantly. [185] The desire

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183. We could have proceeded by including, instead of BL, alternative variables used before (T, DA), but the principal result presented here concerning the signs of the coefficients, is unlikely to have changed.
184. The determinants of savings will be specified later, independently of Kornai's theory.
185. Kornai (1980), pp. 191-194, 202.

to increase productive forces is represented by the variable FXA<1>, fixed assets of the social sector of the economy, lagged by one year (increasing capital stock respect to previous year).[186]

3)No failure of investment projects. What is important is to get approval for the starting of an investment. A true investment failure (in the financial sense) never occurs.[187] This hypothesis is approximated by a variable on the stock of investment in unfinished projects, WIP (work in progress). The stock of unfinished projects, in the absence of failure of unprofitable projects, is expected to put pressure on investment. The higher is WIP, the higher is effective investment likely to be.

4)Investment planning. Official expectations regarding investment behaviour, as one of the factors which explains investment tension,[188] has been represented by a variable on planned investment growth PINV.

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186. It could be argued that this is equally true for any economy, as replacement of capital in capitalist economies follows this rule. Nevertheless, because of the greater emphasis, in socialist economies, on material growth in general, the hypothesis could be considered as applying more to socialist than to capitalist economies.
187. Kornai (1980), pp. 194-198, 523.
188. Kornai (1980), p. 210.

5)<u>Growth priority</u>. Investment tension is strengthened if central economic policy itself forces the fastest possible rate of economic growth.[189] The influence of planned GMP growth is represented by the variable PGMP.

6)<u>Tolerance limit</u>. The upward swing of investment growth will last as long as the process does not hit one of the "tolerance limits".[190] In Yugoslavia, the tolerance limit (worsening of balance of payments position) was hit at the end of 1979, which brought about a radical change in official policies from 1980 onwards: restrictive policy of all forms of consumption, especially of investment, in order to reduce the balance of payments deficit. Restrictive policies are represented by a dummy variable DA which is 0 until 1979 and 1 thereafter.

The above hypotheses have been tested using a similar procedure as before. First, correlation coefficients between variables have been calculated, and their significance tested. Second, a series of single regression equations have been estimated. Since SD and SFI are not considered mutually dependent, there was no need to estimate a simultaneous equation model.

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189. Kornai (1980), pp. 208-209.
190. Kornai (1980), pp. 211-214.

However, we have used Kornai's theory only for the invest-
ment equations, since his analysis of savings in a socialist
economy is very general. Kornai speaks of motives for household
savings in a socialist economy (1980, p. 455-459), but doesn't
specify which economic aggregates are likely to influence them.
He is only explicit in stating that the interest rate is not
among these. However, in order to be able to offer an alterna-
tive to Furubotn and Pejovich's SD equation in the joint test
which is to follow, we had to make our own assumptions on the
variables determining savings.

3.4.2.1.Correlation

Two separate correlation matrixes are presented, one for
variables reflecting Kornai's theory influencing investment and
self-financed investment (Table 2), and another for those in-
fluencing savings (Table 3).

Table 2. CORRELATION MATRIX - KORNAI'S THEORY (1967-84)

	INV	SFI	FXA<1>	ED	WIP	PINV	PGMP	DA
INV	1.000							
SFI	0.951	1.000						
FXA<1>	0.699	0.876	1.000					
ED	0.601	0.333	-0.145	1.000				
WIP	0.974	0.874	0.556	0.720	1.000			
PINV	0.968	0.924	0.694	0.554	0.951	1.000		
PGMP	0.800	0.936	0.981	0.005	0.677	0.804	1.000	
DA	0.340	0.537	0.878	-0.431	0.206	0.419	0.762	1.000

All correlation coefficients higher than 0.5 have been put
in bold. The t-test on the significance of the correlation
coefficients showed that all are significant at the 5% level,

except for one (between ED and PGMP, t=0.16, i.e. lower than 2.12, for 16 df at 5%).

The correlation coefficients between the dependent variables and the explanatory variables are generally high, except between INV and DA, and between SFI and ED. As to the relationship between the explanatory variables, it is clear that multicollinearity may pose a serious problem, since some of these variables are highly collinear (especially FXA<1> with DA and PGMP; WIP with PINV; PINV with PGMP).

The correlation matrix between SD and the variables assumed to determine them are provided in Table 3.

Table 3.CORRELATION MATRIX - SAVINGS THEORY (1966-84)

	SD	INC	GMP	DA
SD	1.000			
INC	0.858	1.000		
GMP	0.818	0.660	1.000	
DA	0.253	0.193	0.734	1.000

The correlation matrix between SD and the variables assumed to influence SD suggest that whereas SD is highly correlated with GMP and INC, it is not correlated with DA (but has nevertheless been included in our regressions, because the low correlation coefficient does not yet mean that in conjuntion with other variables, DA will not prove significant).

3.4.2.2.The general model

Three single equations have first been estimated, using OLS. As before, aggregate data of the Yugoslav economy in the

period 1966-84 for the savings equation, and in the period 1967-84 for the investment and self-financed investment equations have been used.

(1)Savings deposits

As already mentioned, the SD equation should not be considered as representing Kornai's theory,[191] but is based on our own assumptions. Savings deposits have been considered a function of disposable income, GMP, and government economic policy (limits on personal incomes imposed in the 1980s).

$$SD = b_1 INC + b_2 GMP + b_3 DA + b_4 + u \qquad (2.1.)$$

$$b_1 > 0, \quad b_2 > 0, \quad b_3 < 0 \ \ ^{192}$$

INC: Household disposable income
GMP: Gross material product
DA : Dummy, reflecting restrictive policies of the government from 1980 onwards.

(2)Investment

$$INV = b_1 ED + b_2 FIA<1> + b_3 WIP + b_4 PINV + b_5 PGMP + b_6 DA + b_7 + u \quad (2.2.)$$

$$b_1 > 0, \quad b_2 > 0, \quad b_3 > 0, \quad b_4 > 0, \quad b_5 > 0, \quad b_6 < 0 \ \ ^{193}$$

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191. Although partly it does reflect some of Kornai's views (e.g. GMP could be taken as approximating Kornai's assertion that in a socialist economy, with rising livings standards, the consumption of expensive consumer durables becomes more important, requiring prior savings, but this equally holds for any type of economy).
192. SD are expected to increase with the increase of disposable income and the rise in GMP, whereas restrictive policies are likely to have a negative impact.
193. Expansion drive, increase of fixed assets, stock of unfinished projects, planned investment and GMP growth, are all expected to have a positive influence on INV. The introduction of restrictive policies is expected to negatively influence INV.

All explanatory variables reflect Kornai's hypotheses: ED (hyp. 1 on expansion drive); FXA<1> (hyp. 2 on growth of productive forces); WIP (hyp. 3 on no investment failure); PINV (hyp. 4 on investment planning); PGMP (hyp. 5 on growth priority); and DA (hyp. 6 on tolerance limit).

(3) Self-financed investment

Since Kornai suggests that expansion drive, the principle determinant of investment in a socialist firm, is present at all levels (1980, p. 193), investment financed by firms, representing a part of total investment, should depend on similar factors determining investment. Hence the same variables as in the INV equation have been included.[194]

$$SFI = b_1 ED + b_2 FXA<1> + b_3 WIP + b_4 PINV + b_5 PGMP + b_6 DA + b_7 + u \quad (2.3.)$$
$$b_1 > 0, \quad b_2 > 0, \quad b_3 > 0, \quad b_4 > 0, \quad b_5 > 0, \quad b_6 < 0$$

All variables are the same as in (2.2).

Results:

OLS Period: 1966-84					(2.1.)
Dep. variable: SD		R2: 0.957		R2C: 0.949	
Indep. variables	Est. Coeff.	St. dev.		t	BC%
B1 INC	0.025	0.008		3.01	13.5
B2 GMP	0.142	0.016		8.63	55.9
B3 DA	-13.476	2.192		6.15	30.9
B4 Constant	-15.062	3.132		4.81	0.0
St.error: 2.349	MAPE: 6.90	DW: 1.983	RHO(1): -0.05		
Tests: NORMAL, OUTLIE, HETERO, DIFF, F (see Appendix B(b), 2.3.)					

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194. It may seem simplified to assume that INV and SFI are roughly proportional, but as seen in Chapter 2, the portion of fixed assets financed by enterprises sources in Yugoslavia has been relatively constant over time. Under such an assumption, it may have been sufficient to specify only one regression (whether for INV or SFI), but both were needed for our later analysis.

All statistics for this regression are quite satisfactory: the fit is good, DW and RHO reveal no serial correlation (confirmed by the DW Exact: Prob. of 23.09%). The t-statistics reveals that all three variables are highly significant (at 1%).[195] Hence the regression supports our theoretical postulations: savings deposits are positively influenced by the rise in disposable income and the rise in GMP, whereas restrictive policies have had a strong negative impact on savings. The model passed all of the performed tests.

OLS Period: 1967:84					(2.2.)
Dep. variable: INV		R2: 0.999		R2C: 0.999	
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	ED	0.343	0.028	12.37	34.1
B2	FXA<1>	0.028	0.009	3.19	17.9
B3	WIP	0.058	0.019	3.07	11.3
B4	PINV	-0.005	0.049	0.10	0.4
B5	PGMP	0.162	0.034	4.77	32.5
B6	DA	-2.830	1.117	2.53	3.7
B7	Constant	-2.365	2.559	0.92	0.0

St.error: 0.836 MAPE: 0.86 DW: 2.540 RHO(1): -0.34

Tests: NORMAL, OUTLIE, HETERO, RBOW, DIFF, F (see Appendix B(b)).

This regression offers substantial support to Kornai's hypotheses. Not only is the fit very good, but there is no autocorrelation (DWH: Prob. of 25.19%).[196] Hence the t-statistics are precise, revealing that five out of six

195. For 16 degrees of freedom (19 observations and 3 explanatory variables excluding the constant), at 1% level of significance t>2.291.
196. Since one of the regressors is a lagged variable, the DWH test was used for testing autocorrelation.

explanatory variables are highly significant (four at 1%, and one at 5% level of significance).[197] However, the PINV variable is not significant. Whether it actually does not affect INV, will be evaluated in the next section. The model passed all of the performed tests.

OLS Period: 1967-84					(2.3.)
Dep. variable: SFI			R2: 0.996	R2C: 0.994	
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	ED	0.063	0.033	1.90	11.3
B2	FXA<1>	0.040	0.011	3.74	45.3
B3	WIP	0.030	0.023	1.32	10.5
B4	PINV	0.054	0.059	0.92	7.1
B5	PGMP	0.036	0.040	0.90	13.2
B6	DA	-5.359	1.325	4.04	12.6
B7	Constant	-5.848	3.037	1.93	0.0
St.error: 0.993 MAPE: 2.01 DW: 2.850 RHO(1): -0.57					

Tests: NORMAL, OUTLIE, HETERO, RBWO, DIFF, IMT, F (see Appendix B(b)).

This regression again suggests a good fit, and absence of autocorrelation of residuals (DWH: Prob. 7.09%). The t statistics reveal that FXA<1> and DA are highly significant at 1%, while ED is significant at 10% level of significance.[198] However, the remaining three variables, WIP, PINV and PGMP have

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197. For 13 degrees of freedom (18 observations and 6 variables), at 1% level of significance t>3.055, at 5% t>2.179. Hence ED, FXA<1>, WIP and PGMP are significant at 1%, whereas DA at 5% level of significance.
198. For 18 observations and 6 explanatory variables, and hence 12 degrees of freedom, at 1% level of significance t>3.055, and at 10% t>1.782.

not proved significant. Whether this is due to high multicol-
linearity will be checked in section 3.4.2.4. The model passed
all of tne tests applied.

3.4.2.3. Improving the model

(1) Investment

The investment equation has been reestimated by dropping
PINV, the variable which previously was not significant.

Results: (2.4.)

OLS   Period: 1967-84

Dep. variable: INV			R2: 0.999	R2C:).999		
	Indep. variables	Est. Coeff.	St. dev.	t	BC%	
B1	ED	0.342	0.025	13.53	34.3	
B2	FXA<1>	0.029	0.007	4.10	18.4	
B3	WIP	0.058	0.017	3.43	11.3	
B4	PGMP	0.159	0.025	6.46	32.3	
B5	DA	-2.894	0.888	3.26	3.8	
B6	Constant	-2.247	2.193	1.02	0.0	

St.error: 0.801 MAPE: 0.86   DW: 2.531   RHO(1): -0.33

Tests: NORMAL, OUTLIE, HETERO, RBOW, DIFF, F (see Appendix B(b)).

The results reveal that the R2 and R2C remain unchanged,
and hence dropping PINV is probably justified. All variables are
now highly significant (at 1%, for 13 df, t>3.012). The DWH
confirms no autocorrelation of residuals (Prob. of 26.02%). The
model passed all of the applied tests.

(2) Self-financed investment

In choosing which variables to include in the model, we
were guided not only by the t statistics in equation 2.3. but
also by the level of correlation between variables. Thus in
addition to the highly significant variables in equation 2.3.
(FXA<1>, DA), in choosing between two collinear variables, ED

and WIP, ED was included because it proved more significant in
2.3. In choosing between the other two highly collinear vari-
ables, PINV and PGMP, PINV was included because it proved more
significant in 2.3.[199]

Results: (2.5.)
OLS   Period: 1967-84

Dep. variable: SFI			R2: 0.995	R2C: 0.994	
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B1	ED	0.083	0.022	3.74	14.2
B2	FXA<1>	0.052	0.003	15.66	56.5
B3	PINV	0.124	0.037	3.30	15.5
B4	DA	-6.168	1.250	4.94	13.8
B5	Constant	-1.314	1.319	1.00	0.0

St.error: 1.021   MAPE: 2.11   DW: 2.442   RHO(1): -0.33

Tests: NORMAL,   OUTLIE,   HETERO,   F,   DIFF   (see   Appendix
B(b)).

The results reveal that although the R2 is a bit lower than
in 2.3. (0.995 respect to 0.996), the R2C remains the same, and
hence dropping WIP and PGMP is probably justified. All variables
are now highly significant (at 1%, for 14 df, t>2.977). The DWH
confirms no autocorrelation of residuals (Prob. of 34.89%). The
model passed all of the tests applied.

3.4.2.4. Kornai's theory: a final evaluation

Finally, we wanted to check whether the low t values for
single variables which have been dropped in the second stage,
really are a sign of no (low) influence of these variables on

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199. If we had taken into account only t statistics in equation
2.3., this would have led us to include ED and WIP, rather than
ED and PINV or PGMP. Precisely because ED and WIP are highly
correlated, this in fact, did not give satisfactory results.

the dependent variable, or whether this is due to multicollinearity.

In the original INV equation (2.2.), the insignificant variable was PINV. The F test was applied to the estimated coefficient (H0: B4=0), which seemed to indicate that PINV is not significant (Prob. 91.97 that the H0 is correct). However, regressing PINV on INV, a very high R2 is obtained (R2=0.937) which suggests that 94% of variations in INV can actually be explained by this single variable PINV.[200] Therefore, recalling that PINV was highly correlated with WIP and PGMP (correlation coefficients were 0.951 and 0.804 respectively), the low t statistics for PINV in the general model (2.2.) is likely due to multicollinearity, and not to the small impact of PINV on INV.

In the original SFI equation (2.3.), the insignificant variables were WIP, PINV, and PGMP. The F test was applied to each of the estimated coefficients (H0: B3=0; H0: B4=0; H0: B5=0, for WIP, PINV, and PGMP respectively), which seemed to confirm that these variables are not significant (the probability that H0 is correct was 21.44%, 37.89% and 38.82% respectively). However, regressing each of these variables

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200. This was to be expected, since the correlation coefficient between these two variables was 0.968 (see Table 2).

separately on SFI, high coefficients of determination are ob-
tained (SFI= b1WIP + b2, R2=0.765; SFI=b1PINV + b2, R2=0.854;
SFI=b1PGMP + b2, R2=0.876),[201] which again suggests that each of
these variables has substantial influence on SFI.

Recalling that these three variables were highly correlated
(correlation coefficient between WIP and PINV was 0.951, and
between PGMP and PINV 0.904), it can again be concluded that the
low t statistics for these three variables in the original model
is probably again due to multicollinearity, and not to the small
influence of WIP, PINV, and PGMP on self-financed investment.

3.4.3.Joint testing of the two theories

An alternative way of confronting the two theories is to
use the complete parameter encompassing procedure: combine both
sets of variables in a single regression equation (the
"unrestricted" model), and then apply the F-test to test the
significance of each of the two subsets of regression coeffi-
cients. If the null hypothesis being tested is accepted, the
correct model will be the restricted model (restricted by the
zero coefficients). This should reveal which of the two subsets
(theories) helps to explain more the variation in the dependent
variable.

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201. Again, this was already suggested by high correlation
coefficients between these variables in Table 2.

Two alternative null hypotheses have been tested, in order to see whether the joint effect of the first/second subset of regression coefficients on the dependent variable is equal to zero:[202]

1)First theory: H0(1): B11=B12=...=B1n=0

2)Second theory: H0(2): B21=B22=...=B2n=0

This procedure was applied to three regressions in which the explanatory variables are a combination of the two theories. They have been estimated without the constant in order to test the "net" influence of the first against the second group of variables.

(1)Savings deposits					(3.1.)
OLS Period: 1966-84					
Dep. variable: SD			R2: 0.998	R2C:	0.998
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B11	IR	0.638	0.335	1.90	15.8
B12	LR	-0.314	0.319	0.98	8.2
B13	H	-0.141	0.045	3.16	0.2
B14	PP	0.070	0.122	0.58	1.1
B21	INC	0.036	0.009	4.13	15.8
B22	GMP	0.129	0.015	8.43	41.0
B23	DA	-9.738	2.067	4.71	17.8

St.error: 1.846   MAPE: 4.93   DW: 2.036   RHO(1): -0.03

Results of the F-test:
Probability that H0(1) (B11=B12=B13=B14=0) is correct: 0.03%
Probability that H0(2) (B21=B22=B23=0) is correct: 0.00%

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202. The F-test gives the probability value that the H0(1)/H0(2) is correct; whenever this probability is higher than 5%, the H0 is correct and hence can be accepted. In other words, the joint effect of this group of variables has no influence on the dependent variable.

Therefore, we reject both HO(1) and HO(2): both groups of variables seem to influence SD. Nevertheless, the lower probability of HO(2) (rejecting it at 100%) suggests that the second group influences more the dependent variable than the first group of variables. Moreover, since there is no autocorrelation[203], additional conclusions can be drawn from t statistics and the Beta Coefficients. The overall significance of the second group of variables is clearly higher than that of the first group, and 74.6% of variation in SD can be explained by changes in the variables proposed by the alternative theory.

(2)Investment

OLS Period: 1967-84					(3.2.)
Dep. variable: INV			R2: 1.000	R2C: 1.000	
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B11	IR	0.131	0.249	0.52	2.2
B12	LR	-0.092	0.223	0.41	1.7
B13	H	-0.016	0.058	0.27	0.0
B14	PF	0.099	0.143	0.69	1.1
B21	ED	0.377	0.080	4.73	37.0
B22	FXA<1>	0.029	0.029	1.00	18.2
B23	WIP	0.043	0.042	1.03	8.3
B24	PGMP	0.158	0.075	2.10	31.5

St.error: 1.129   MAPE: 1.06   DW: 2.097   RHO(1): -0.09

Results of the F-test:
Probability that HO(1) (B11=B12=B13=B14=0) is correct: 83.99%
Probability that HO(2) (B21=B22=B23=B24=0) is correct: 0.00%

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203. DW standard statistics are not directly applicable to regressions without an intercept. Therefore the DWE was applied, which gave a probability of 17.91% that HO on no autocorrelation is correct.

As a representation of the second theory, the same number of explanatory variables have been included as for the first theory (the ones which previously proved most significant).

Since the HO(1) is accepted and the HO(2) is rejected, the results are rather more straightforward than in the SD equation, offering direct support to the second theory. Since there is no autocorrelation of residuals (DWH: Prob. of 83.63%), additional support can be derived from t statistics and the Beta Coefficients. The variables reflecting Kornai's theory are as a group clearly more significant than Furubotn and Pejovich's variables, explaining around 94.0% of variation in INV.

(3)<u>Self-financed investment</u>

Again, as a representation of the second theory, the same number of explanatory variables have been included as for the first theory (the most significant ones).

OLS Period: 1967-84					(3.3.)
Dep. variable: SFI		R2: 1.000	R2C: 1.000		
	Indep. variables	Est. Coeff.	St. dev.	t	BC%
B11	IR	0.061	0.226	0.27	1.7
B12	LR	-0.094	0.209	0.45	2.7
B13	H	-0.033	0.026	1.24	0.0
B14	PF	0.089	0.085	1.06	1.6
B21	ED	0.104	0.030	3.50	16.5
B22	FXA<1>	0.056	0.005	12.38	56.3
B23	PINV	0.080	0.053	1.52	9.3
B24	DA	-5.683	1.451	3.92	11.8
St.error: 1.065	MAPE: 2.10	DW: 2.786	RHO(1): -0.50		
Results of the F-test:					

Probability that HO(1) (B11=B12=B13=B14=0) is correct: 59.86%
Probability that HO(2) (B21=B22=B23=B24=0) is correct: 0.00%

Since HO(1) is accepted, and HO(2) is rejected, the second theory is again directly supported. Since there is no autocorrelation of residuals,[204] additional support can be derived from t statistics and the Beta Coefficients. The variables reflecting Kornai's theory are as a group clearly more significant than Furubotn and Pejovich's variables, explaining around 93.9% of variation in SFI.

In concluding, several limitations of the above analysis should be pointed out. The first is the small number of observations. However, quarterly data on some of the variables do not exist, whereas extending the period prior to 1966 would not have been justified.

The second limitation is the use of aggregate data to test Furubotn and Pejovich's theory, which however primarily refers to enterprise behaviour. Nevertheless, it should be noted that the theory does propose that underinvestment at the firm level will have similar implications for the economy as a whole.

The third limitation is the approximation of several variables, especially of the time horizon (H), profit rate (PF) (ideally, data on the marginal productivity of capital should

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204. The DWH gave the probability of 9.55%, rejecting autocorrelation. However, because of the high value of RHO(1), in order to be sure that there is no autocorrelation, an additional test was applied (AR), which confirmed that there is no autocorrelation.

have been used), and most of Kornai's variables, as they are a simplification of the actual hypotheses (especially expansion drive).

Last but not least, the SFI variable has been represented using data on the proportion of investment in fixed assets financed by enterprise sources, which are not, however, an entirely voluntary component of enterprise savings. An alternative set of figures could have been used (e.g. mandatory depreciation, which is completely voluntary). However, not only is mandatory depreciation an underestimation of actual voluntary self-finance in Yugoslavia, but such an alternative model would not have provided us with the answers we were seeking. It might have offered an explanation of what determines depreciation in Yugoslavia, but not overall investment, or self-financed investment. What we were primarily interested in, was to evaluate the role of the two groups of alternative variables of the two theories in determining investment in Yugoslavia, irrespective of whether a smaller or larger part of it is imposed on firms through external regulations.

This may again imply that Furubotn and Pejovich's theory, which assumes voluntary investment decisions, cannot be refuted. Nevertheless, our analysis does show that the variables considered crucial by the theory have had a limited role to play in

determining investment decisions in Yugoslavia, and hence confirms our previous conclusion that the theory is not fully applicable to the Yugoslav economy.

3.5. Concluding remarks

While Furubotn and Pejovich's theory is based on assumptions which correspond to an idealised capitalist environment (a perfect capital market, perfect labour mobility, project appraisal according to criteria typically used by a capitalist firm), in Yugoslavia severe capital market distortions have prevailed, labour force mobility has been limited, and investment criteria have not been the ones typically used in market economies. This initial analysis already suggested that variables considered crucial by Furubotn and Pejovich's theory have had a limited role in determining investment decisions in Yugoslavia.

Therefore we have sought an alternative theoretical framework in Kornai's theory, in order to propose that some of Kornai's hypotheses may be more applicable to Yugoslavia in comparison with Furubotn and Pejovich's theory. We have argued that in spite of substantial institutional changes in Yugoslavia, the essence of the investment process has remained much the same, and that in the field of investment the Yugoslav enterprise has retained many features of the traditional socialist firm. Data from Yugoslavia indeed suggest the presence of the soft-budget constraint, substantial cost overruns and

overdues of investment projects, proliferation of interfirm credits in times of restrictive monetary policy, and the use of non-market criteria in the allocation of investment resources, thus supporting some of Kornai's hypotheses.

In the econometric testing of the two theories, all regressions based on Furubotn and Pejovich's theory suggested either misspecification (autocorrelation), or noncongruence with the theory. The presence of autocorrelation in turn implies imprecise t-statistics on the significance of each of the variables, and inefficient estimates of the Beta coefficients. Therefore, at best, the initial analysis suggested that no definite conclusions could be made about the confirmation of the theory on Yugoslav data. In testing the alternative theory, on the contrary, good overall results were obtained.

In the joint testing of the two theories, additional evidence is provided which seems to indicate that Kornai's theory is in fact more supported by empirical evidence from Yugoslavia than Furubotn and Pejovich's theory.

The main implication of the analysis is that the investment behaviour of Yugoslav firms, in spite of decentralisation, self-management and increasing use of the market after 1965, is being determined primarily by the socialist features of the economy, rather than market signals.

Chapter 4. INVESTMENT INCENTIVES IN THE YUGOSLAV ECONOMY

In the pre-1965 period, when the system of mobilysing and allocating investment resources was centrally directed through state investment funds, there was no need for investment incentives at the enterprise level. Following the 1965 reform, however, decentralization and the desire to introduce a market-oriented system required the creation of new mechanisms which would provide built-in incentives for the enterprise to invest and allocate capital efficiently.

As our present analysis will show, however, in spite of intentions, reflected in the introduction of a number of innovative financial instruments, these new schemes did not fully respond to this requirement. The theoretical framework of the new financial mechanisms introduced by the 1970s economic reform, based on Edvard Kardelj's ideas, is first presented, in order to pass to the discussion of existing mechanisms for incentivating investment in Yugoslavia. Recent proposals for reform are then reviewed, and workers' views on investment incentives are presented.

4.1.Theory: Kardelj's views on past labour

Among the various problems that emerged after the 1965 economic reform, were also the ones of growing concentration of economic power in banks, and the related problem of "autonomous" financial capital. These problems were evaluated by Yugoslav authorities as being directly in conflict with self-management,

because they implied rental income for privileged classes, and the deprivation of workers of a part of income produced. Consequently, the 1970s economic reform was supposed to: first, enable enterprises to appropriate a larger part of income; and second, decrease the role of banks, by introducing new forms of mobilizing savings that would not necessarily require their intermediation.

A lively debate at the end of the 1960s resulted in the victory of economic reasoning over ideology. Investing capital and entrepreneurship were finally recognized as functions that ought to be rewarded. It was Edvard Kardelj who laid down the theoretical bases of the new system. The new system envisages workers' remuneration based on the contribution of not only their "live" (current) labour, but also "past" (embodied) labour. "Past labour" is a synonym for capital,[205] but Kardelj preferred using the term "past labour" instead of "social capital", "accumulation", or "means of enlarged reproduction", in order to emphasize that such a remuneration scheme would not be linked to capital, but to labour.[206] Since workers directly contribute to the increase of capital through their investment decisions, they ought to be rewarded by receiving a part of

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205. More precisely, past labour refers to investment in capital stock undertaken by workers in the past.
206. See Kardelj (1978), pp. 52-53.

income on this basis. The scheme was thus intended as an incentive for stimulating workers' willingness to invest, both in their own, and in another enterprise.

Kardelj's proposal at first provoked severe opposition. The most dogmatic ideologists identified the very notion of "past labour" with the concept of private shareholding, a capitalist category totally in conflict with marxism, socialism, and self-management.[207] Their main argument was that since, in line with the Marxist theory of value, it is only live labour that produces new value, live labour should be the exclusive basis for rewarding workers. A remuneration scheme that includes the contribution of past labour (capital), would imply earning income on the basis of investing capital and not on the basis of work performed, and hence remuneration on the basis of property.

Kardelj strongly criticized such views, regarding them a misinterpretation of Marx. Although live labour is the only creator of value, a part of surplus value created by live labour (profit on capital, bank profit and rent), in spite of not producing new value, does represent value, and has a specific use value, as more efficient management of social capital creates more favourable conditions for the rise of live labour's

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207. For a detailed survey of the discussions on past labour in the late 1960s, see Buric (1983), pp. 80-108.

productivity (1978, pp. 55-56). Rewarding past labour cannot be interpreted as a scheme independent of workers' live labour, but on the contrary, because "it is clear that you need to open the tap of a cask in order to enable to flow of wine" (1971, p. 139). The essential point is to prevent that workers fill the cask of social property with their work, while someone else opens the tap. Hence, "It is not a question of whether past labour produces value or not, but a question of who disposes of income" (1971, p. 141).

Kardelj recalled that Marx did not identify state ownership with social ownership, but considered social property should also enable a form of individual property. "Social property is...common property of all working men, and therefore also personal property of each individual worker in the scope and form in which it ensures him the right to work with social means" (1978, p. 24). Workers collectively dispose of means of production, but individually enjoy the fruits of their labour. However, social property is not a monopolistic right of any individual subject (the state, the working collective, the individual worker), but property of everybody and nobody, i.e. common and personal. This is the only way that social property would really "belong" to all members of society (1972, p. 318; 1978, pp. 11, 23). Nevertheless, social property must not be

interpreted as a no-property category, since "as long as appropriation exists, property will continue to exist" (1972, p. 293).

The post-1965 alienation of past labour related to "group-ownership" tendencies had according to Kardelj represented a form of managerial capitalism. Awarding workers' past labour would be the only way of really implementing self-management (1971, p. 137). Workers should receive an award for good management of social capital, but should also bear the consequences deriving from its bad management (1978, p. 141).

Kardelj therefore regarded the system he was proposing a way of avoiding the negative effects of both state ownership and "group" ownership, but was also very explicit in emphasizing that the scheme would be fundamentally different from private shareholding. Indeed, he firmly rejected proposals on citizens' shares in socially-owned enterprises.[208] Private shares imply a permanent right to exploit someone else's labour, while the proposed system would be based on the right of a worker deriving from his own work, thus definitely eliminating the old relationship between the worker as hired labour, and the owner or

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208. Among the proposals for introducing shares in Yugoslavia advanced in the late 1960s, is the proposal by S. Kavcic, who beleived it would be an adequate way for mobilizing citizens' savings; and the proposal of a Working Group of the Federal Assembly (see Korac, 1986, pp. 186-187).

manager of capital (1978, p. 53). Personal income of workers would not be linked to the amount or cost of invested capital, because this would cause the division of social capital into shares, but would depend on obtained results, returns of an investment, in order to make the worker aware that his material position depends on his choice to accumulate. Workers would not receive this part of income as proprietors, but as managers of social capital, and thus would be stimulated to manage capital rationally (1978, pp. 68, 133-5).

However, while Kardelj is critical of shareholding, he at the same time proposes that possible forms of rewarding past labour could be shares and bonds (although he remains vague by suggesting this is "a secondary problem" for which "concrete solutions must be found"; 1971, p. 140); he also stresses the need for a market for such securities. Since Kardelj's ideas concerning the issuing of workers' bonds had "provoked a real affair" (to use Kardelj's own words), Kardelj insisted that what the worker would receive on the basis of such a receipt would be a minimum of an incentive character. Hence, "it is absurd to identify a worker that consumes these means in the form of personal income with a capitalist that appropriates them on the basis of a share due to private capital" (1978, p. 70).

The main merit of Kardelj's writings on past labour is his emphasis that being rewarded for investment decisions is not only compatible with socialism, but is one of the necessary

requirements for capital to be used rationally. Nevertheless, Kardelj's writings are not always sufficiently consistent. One of the central points that provokes confusion is the relationship between "social" and "individual", whether referring to property, income, past labour, or other categories he uses.

Thus Kardelj contemporaneously speaks of property "of the whole society"; of social property as a form of personal property; and occasionally, in spite of all his criticism of "group-ownership", seems to consider the enterprise the main subject of property rights.[209] Similarly, Kardelj emphasizes the social character of income. Income is in social property, belonging to all workers and to each of them individually, since it is the result of labour of the whole society, the result of social productivity (1978, pp. 36-44). The same type of ambiguity is also present in reference to past labour. Kardelj does not make a clear distinction between "social past labour" and "individual past labour", as his definitions are often

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209. E.g.: "We have transferred social capital to basic organisations of associated labour (BOALs)" (1978, p. 67); or "Self-managed associated labour today disposes of the entire social capital, but this social capital is distributed, i.e. decentralized to BOALs" (1978, p. 57).

unprecise, ambiguous, even contradictory.[210]

Kardelj fails to distinguish between initial capital endow-
ment given to enterprises by the state when social property was
introduced, that could be considered "social property", the
result of "social past labour", and thus ensuring a part of
income that is "social", and successive increments of capital
arising from "individual past labour", for which workers ought
to be rewarded depending on realized income of the individual
enterprise. In this sense, Kardelj is not explicit enough in
emphasizing the individual basis of the scheme: because if the
scheme is to be applicable in a functional way, the subject of
property cannot be the whole society, income realized that
serves as the basis for determining workers' past labour must be
income of the individual enterprise, and past labour rewards
ought to be linked to the individual worker's contribution.

Kardelj is also ambiguous concerning the relationship
between the proposed scheme and socialist objectives. A way of
avoiding tendencies towards private property relations would be

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210. E.g.: "Past labour in the wider sense represents that part
of value that workers have produced with their current labour,
which the society in various ways allocates for accumulation"
(1978, p. 52); "Pooling of income is not investment in another
organisation, but investment in common social labour" (1978, pp.
39-44); "From the results of total social labour a worker ought
to have a material benefit on the basis of his own past labour"
(1978, p. 49).

to implement simultaneously not only the principle of distribution according to work (both current and past), but also the principle of workers' solidarity (1978, p. 141).

Finally, in order to incorporate his scheme into a planning mechanism of coordination, Kardelj proposes that rewarding workers' past labour "would every year be stabilised by the social plan" (1978, p. 65), and that "a worker does not have the right to, through his personal income, appropriate a part of social capital ... since self-management agreements and social compacts should regulate distribution relations" (1978, p. 141).

In conclusion, it seems that Kardelj encountered some difficulties in incorporating the envisaged individually-based system of workers' remuneration of past labour, into a more general framework that takes into account social interests, socialist objectives, and a planning mechanism of coordination.

4.2. Practical solutions

The economic reform implemented during the 1970s resulted in the adoption of several new schemes meant to stimulate investment, both within and outside the enterprise, and the financing of investment through a variety of new instruments.

4.2.1. Incentives within the firm

In all of the major documents adopted during the 1970s,[211] workers' past labour is explicitly recognised as a criterion that determines the level of personal incomes. However, legal provisions on past labour are very general.[212] They clearly state only that past labour should be rewarded, but there is no indication as to how an individual's contribution to capital increase should be measured, and according to which criteria. Details concerning past labour rewards ought to be specified in self-management acts of the enterprise, which are firm-specific.[213] And without precisely defined methods on rewarding past labour, it is not surprising that in every-day practice the scheme has been implemented in a rather simplistic way.

The common feature is that past labour rewards are usually determined in proportion to seniority. For each year of employment, usually starting with the second year, a worker is given an additional percentage (around 0.5%) of his personal income.[214] However, such a reward is usually linked to the total

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211. The 1971 Amendments, the 1974 Constitution and the 1976 Associated Labour Act.
212. See Constitution, 1974, Art. 20, and ALA, Art. 126 and 129.
213. The only restriction is that these acts may not be contrary to social compacts concluded by the enterprise (Art. 128, ALA).
214. A worker employed, e.g., for 10 years, would receive an additional 4.5% of his personal income on account of past labour.

number of years a worker has been employed in the social sector, and hence the scheme does not guarantee a worker's stimulus for efficient management of capital (and investment) of the en- terprise where he is employed.

Besides the described mechanism, in some enterprises an idemnity in cash is given to workers that are about to retire. However, given that the amount is small,[215] and is in no way related to investment, or successfull entrepreneurship, neither can this form of rewarding workers represent an adequate compen- sation for their investment decisions.

Several Yugoslav economists have criticized the way the scheme is being implemented in practice, claiming that it repre- sents a misinterpretation of the original idea advanced by Kardelj. In fact, Kardelj himself complained that the scheme did not have a positive impact on workers' motivation to invest, since bonuses on seniority are considered more as an instrument of social policy, than as an economic right of a worker linked to his investment decisions (1971a, p. 248).

Since the implementation of the past labour scheme did not result, as expected, in its further elaboration in practice, the

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215. It usually does not represent more than a worker's monthly, or two months personal income.

need was felt to regulate the issue further. After long discussions and 7 versions of a law on past labour,[216] in 1982 the "Law on Enlarged Reproduction and Past Labour" (LERPL) was finally adopted. However, in spite of 24 articles devoted specifically to past labour, the Law does not clarify some of the crucial issues.

The procedure for determining the amount of income to be devoted to past labour rewards is rather complicated (see Art. 60-69). This part of income is determined on the basis of not only 8 obligatory indicators for evaluating obtained business results, as prescribed in Art. 141 of the ALA, but also of other three criteria. The indicators are not only numerous, but are not mutually consistent: already the ones contained in the ALA have been demonstrated to be conflictual (see Babic, 1982). What is surprising is that the part of income initially set apart for past labour rewards, need not necessarily be used in the enterprise that has realized it, and need not be used exclusively to rewarding past labour.

Furthermore, the Law does not ensure that an individual worker will be rewarded according to the quantity and quality of past labour he has personally contributed (see Art. 70-83),

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216. On the different versions and discussions on the new law on past labour, see Buric (1983), pp. 121-125.

since the incentive is more of a collective, than of an individual nature.[217] The only significant innovation of the Law respect to the ALA is the possibility of realizing the right to past labour after a worker's termination of employment, probably in order to legalize what is effectively being done in practice.

A new system of rewarding past labour is presently being elaborated. An attempt has been made to define the part of income to be devoted to past labour rewards more accurately, by linking it to obtained "rentability" of an enterprise, "rentability" being defined as a ratio between accumulation (net savings) and average utilised business assets (capital).[218] However, the rentability rate, instead of being calculated as a ratio between accumulation and total business assets of an enterprise, ought to have taken into account only returns from own capital (Dumezic, 1986). In addition, an efficient system of rewarding past labour ought to consider not only the profitability of invested resources, but the absolute increase in the value of net assets of an enterprise.

In the new system it has finally been recognized that the seniority criteria is not satisfactory, but past labour rewards

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217. Two out of three elements that determine a worker's contribution are based on his contribution together with other workers.
218. See draft of the "Law on Revenue and Income", in Dumezic, (1986).

are simply the positive difference between gross personal in-
comes and personal incomes for current labour, to be distributed
in every enterprise that allocates a part of net income to
accumulation.[219] This seems to imply that past labour rewards
ought to be distributed in all enterprises (as a minimum to be
allocated to accumulation is a legal requirement). Therefore,
even if an enterprise allocates a minimum to accumulation, and
incurs losses from investing these resources, it will reward its
workers, instead of penalizing them. In addition, the system
seems to shift emphasis from rewards for past investment, to
rewards for current accumulation; but why should workers be
rewarded for something they are not entirely free to decide
upon?

4.2.2. Incentives for investing outside the firm

The 1970s economic reform introduced several instruments
that were meant to increase the mobilization of savings exter-
nally, including different types of securities, while the
organisation of an effective market for securitites was recom-
mended in all of the latest 5-year social plans from 1970
onwards. The present analysis will be limited to long-term

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219. See draft of the "Social Compact on Income", in Bogetic,
(1987).

financial instruments an enterprise can use for financing in-
vestment.[220]

1)Pooling of labour and resources. At the enterprise level,
one of the possible forms of the so-called "pooling of labour
and resources" is for one enterprise to invest in another. What
is effectively being pooled is the investing enterprise's finan-
cial resources with labour and resources of the enterprise
invested in. Once the pooling of labour and resources is estab-
lished through the signing of a self-management agreement, the
participants are supposed to jointly share income and risk, and
influence the business and development policy of the firm (ALA,
Art. 64-65).

However, legal provisions do not seem very stimulative for
the investing enterprise.[221] First, although the investing
enterprise is supposed to receive both a refund of invested
capital and a compensation, the enterprise invested in is given

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220. Thus short-term instruments (e.g. promissory notes used in
direct inter-enterprise credits), treasury bills of the National
Bank of Yugoslavia, or certificates of deposit (issued by banks
upon request), all introduced by the 1971 "Law on Securities",
have not been considered.
221. Our observations have been inspired and are in part based
on an excellent critique of these issues by S. Babic (1983).

priority in income distribution.[222] Second, the possibility of a

permanent share in the income of the enterprise invested in is

clearly excluded.[223] Third, contrary to the envisaged "joint

bearing of risk", it is the investing enterprise that bears all

the risk: once the time-limit of the contract has expired, it

has no further rights in recovering invested capital, while the

enterprise invested in is ensured, in advance, even a part of

income for accumulation. Finally, it is even envisaged that the

investing enterprise may renounce its right to the restitution

of pooled resources.[224]

Therefore it is not surprising that this form of pooling

resources has not had a significant role in stimulating direct

investment in other firms. Out of total long-term investment of

firms, in 1984 only 13.2% had been invested in other en-

terprises.[225] In 1981, long-term bank credits to enterprises

were eleven times higher than long-term pooled resources among

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222. "Shares in joint income on account of past labour shall be realized from the part of such income left after the allocation of resources for personal incomes ..." (ALA, 1976, Art. 82; see also Art. 84).
223. "The right to the share in joint income shall expire upon the refund of the value of pooled resources and compensation, or upon the expiration of the time-limit determined by the selfmanagement agreement, irrespective of the amount in which the value of pooled resources has been refunded ..." (ALA, 1976, Art. 85; see also Art. 83).
224. ALA, Art 82 and Art. 85.
225. SZS, (1986), p. 43.

enterprises; the ratio between short-term obligations of en-
terprises on the basis of pooled resources, bonds, bank credits,
and direct credits, was 1:1.5:10:20.[226]

The 1982 LERPL merely elaborates the legal provisions
already contained in the ALA. It confirms the temporary charac-
ter of a contract concluded by the two enterprises, and provides
an additional element to protect the enterprise invested in. The
only exception to the rule that the partnership ends when the
time-limit of the agreement has expired, is "in cases that the
time-limit has been overpassed by the fault of the enterprise
invested in" (Art. 39). Therefore, if the enterprise invested in
encounters difficulties in realizing a joint project, it can
prolong the duration of the contract, and hence effectively
postpone its obligations towards the investing enterprise
(instead of being in some way penalized).

2)Pooling resources in a bank. Another form of pooling
resources is the type that occurs when a bank is formed. Banks
have during the 1970s been transformed into "service agencies"
of enterprises, operating under direct control of their founding
members. A bank can be founded by enterprises and self-managed
communities of interest (prior to 1977, also by sociopolitical
communities), which sign a self-management agreement on the

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226. See Mramor (1984), pp. 82, 86.

bank's foundation (ALA, Art. 16). The founders of a bank may contribute an initial amount of capital, but this is from 1977 no longer obligatory. Founding members guarantee all obligations of a bank with their own resources, and thus jointly carry the liability for the bank's operations. All decisions are made not by workers of a bank, but by the bank's members, which all have equal say at the general assembly, irrespective of invested capital.[227] After operating costs have been covered and resources set aside for the bank's work community, all new income is distributed among founding members, both depositors and borrowers, as it is considered that both borrowing and lending contribute to the bank's income. The distribution of income is carried out proportionately to the "contribution" made by these organisations, to be determined in a self-management agreement (ALA, Art. 89).

However, the existing concept of banks as "service agencies" is presently being changed. The federal government has recently advanced a rather bold proposal that banks should be transformed into "independent shareholding institutions". Shareholders who contribute initial funds would have full

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227. Prior to the 1977 Law on Banking, the number of votes of each founder was supposed to be linked to the amount of capital contributed, but in practice, each founder nevertheless usually had only one vote (see Mramor, 1984).

property rights, including the right to management, which would be directly linked to the amount of invested capital. In addition to enterprises and self-managed communities of interest, as in the previous system, shareholders would also include sociopolitical communities, citizens, foreign investors and banks (although these categories would not be allowed to establish new banks). [228]

For the different forms of pooling of resources, the 1971 "Law on Securities" envisages the use of certificates of pooled resources, which entitle the bearer to participate in both profits and management. These certificates have a minimum redemption period of 10 years, can be issued by an enterprise, a bank, or an insurance company, and are transferable to other enterprises, banks, and sociopolitical communities. Certificates issued by an enterprise can be subscribed only by another enterprise or a foreign firm; those by a bank, by enterprises, communities of interest, and sociopolitical communities; and by an insurance company, in addition to the above categories, also by banks. [229]

3)Bonds. Fixed-interest rate bonds of sociopolitical communities and of enterprises have legally been introduced into

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228. See Ekonomska Politika no. 1908, Oct. 24, 1988, pp. 22-23.
229. 1971 "Law on Securities", Art. 16-23, 46, 52-55.

the Yugoslav economy already during the 1960s, but those issued by enterprises were few and only on an experimental basis. [230] The 1971 Law introduced the possibility for enterprises, sociopolitical communities, and communities of interest to issue not only bonds at a fixed interest rate (which can be higher than the limited legal interest rate on bank credits), but also profit-related bonds, which bring an interest depending on business results of the enterprise issuer. The redemption period of all bonds must not be shorter than 2 years.

The 1971 Law has also relaxed conditions under which issues can be made. An enterprise has to have a minimum amount of capital in its business and reserve fund, [231] and the total nominal value of bonds issued must not exceed the value of the enterprise's business and reserve fund. However, if an enterprise does not fulfill these conditions, it can still issue bonds if another enterprise, bank, or sociopolitical community is willing to guarantee.

Contrary to certificates on pooled resources, which can be subscribed by a limited number of institutions, bonds can be bought by practically all types of organizations and in addition, also by households.

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230. The first enterprise to issue bonds in Yugoslavia was "Crvena zastava" in 1969.
231. In 1971 set to 20 million dinars.

In practice, sociopolitical communities have issued bonds far more often than enterprises.[232] Earlier presented data (Table 36, Appendix B) suggest that enterprises give preference to short-term instruments, primarily promissory notes, which have accounted for by far the largest part of all securities of the enterprise sector in 1977-84 (see Graph 1). [233]

Graph 1
Securities in Yugoslavia, bought by banks
(as % of total)
1977-1984
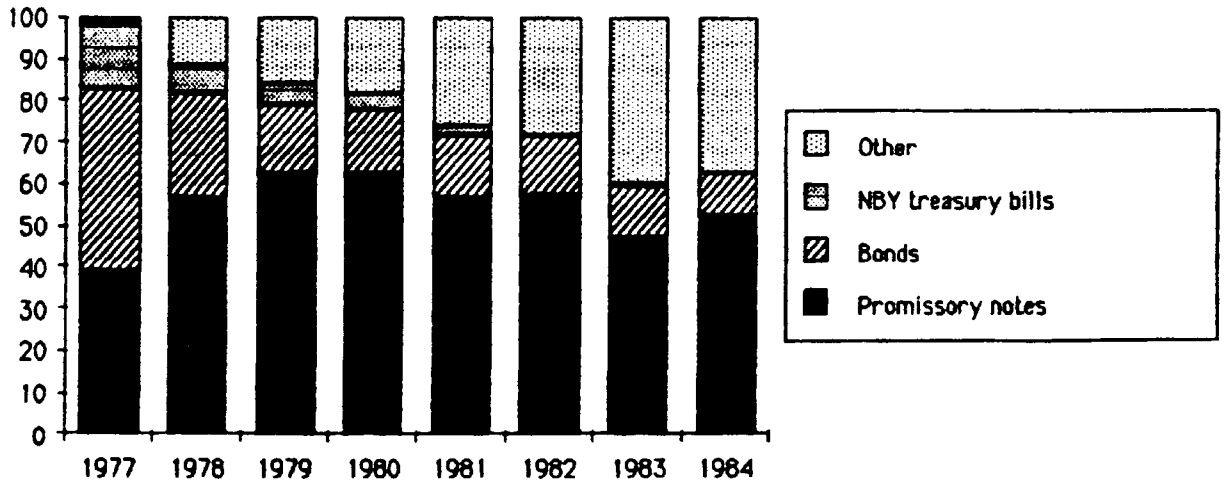
Source: Table B6, Appendix B(a).

232. Prout, (1985), p. 95.
233. Comparing the value of all securities issued by productive OALs, with the value of promissory notes, leads to the conclusion that promissory notes accounted for 60% to 90% of securities issued by enterprises (see Table B6).

As can be see from Graph 1, the ratio of bonds to other types of securities has been steadily declining from 1977 onwards. Nevertheless, some recent examples of successful issuing of bonds by enterprises include "Elektroprivreda", who has issued bonds at a fixed interest rate a bit higher than the bank interest rate, and "Crvena zastava", who has issued bonds for its newest "Florida" car at an interest rate lower than the bank interest rate, but ensuring to subscribers priority in delivery.

4)COALs. Existing laws envisage different ways of mobilizing private savings of individuals in intermediate forms of enterprises, based on a mixture of private capital and the self-management system. The first of these forms is a "contractual organisation of associated labour" (COAL), in which an individual pools his labour and privately-owned resources with labour of other workers on a self-management basis. The individual receives a compensation for invested resources, participates in profits, and has the right to run, as manager, the business of a COAL. Private capital in a COAL can be contributed by more than one individual.

Although the ALA envisages the participation of different organisations with their socially-owned assets in the establishement of a COAL (Art. 306), in practice existing COALs have

more often been composed of solely private capital.[234] Two features distinguish a COAL from small firms of the private sector. First, in a COAL there is no limit on the number of workers that can be employed, and hence, COALs are often much larger enterprises than those of the private sector. Second, COALs must respect certain rules which apply to normal social-sector enterprises, which may be unstimulative. Thus workers' personal incomes are given priority in income distribution (the part paid to the manager on account of ownership, other than his personal income, is a residual); and the capital maintenance requirement must be respected (Art. 311-312). Furthermore, the manager's rights on account of ownership are not clearly defined, as they are determined by the contract on the establishment of the COAL (Art. 312). Finally, a COAL has been envisaged as a transitional form of enterprise to be gradually transformed into a standard socially-owned firm: workers have the right to buy the owner out over time, by paying the historical cost of capital invested.[235]

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234. Commentators have observed that this is in effect a private enterprise acting under certain legal restraints. Workers sign a contract with the owner, who in turn agrees to conform to self-management rules (Singleton and Carter, 1982, pp. 199, 203).

235. "If the value of the resources which the manager has pooled ... has been paid out ... the manager's right to a share in income on account of his ownership right shall be terminated" (ALA, 1976, Art. 315).

Evidence on COALs reveals that from 23 in 1976, their number has risen to 59 in 1978, to 156 in 1982, and to 225 in 1984 (SZS 1986, p. 32), the latest figure representing about 0.01% of the total number of organisations in Yugoslavia (all forms included).

5)<u>Individual private savings</u>. The second instrument for mobilizing private savings envisages that firms may collect financial resources from citizens (ALA, Art. 91). A citizen that invests his savings in a socially-owned enterprise has the right to recover invested capital, and to receive a compensation in the form of interest or other benefits. If these resources are used for creating new work places, a labour relationship with the citizen may be established.

The 1982 LERPL specifies what is intended by "other benefits" (employment; housing and training; using services of the enterprise), and clearly states what such a benefit may not include: that an individual enjoys the benefit for an unlimited amount of time; that he participates in management; and that he participates in income distribution, other than receiving inter-

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est (Art. 46).[236]

A special law regulating private investment by citizens has been adopted in 1986. [237] The law contains both stimulative and unstimulative elements. It envisages that instead of employing the investor, a member of his family may be employed, but also specifies that the investor has the right to start recovering invested capital only after a period of three years, thus limiting the liquidity of such an investment.

4.3. Recent proposals for reform

At the center of the present debate on the economic reform in course is the question of property. The concept of social property, that has for years been accepted in a rather acritical way as one of the fundamental features of the Yugoslav economy,[238] is for the first time being openly criticized. Related to the issue of property, there is a revival of interest

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236. Hence, even if the benefit takes the form of employing the citizen, such an individual is automatically put in a position of a "second-order" worker: not only must his employment be of a fixed duration, but he will be excluded from participating in management and income. This could not have been the intention of the Law.
237. "Zakon o pribavljanju sredstava od gradjana za prosirivanje materijalne osnove organizacija udruzenog rada", Sluzbeni List SFRJ no. 24, 1986, as reported by Labus (1987), pp. 139-40.
238. Nevertheless, endless discussions about the real meaning of social property have been going on for years, as disagreement among Yugoslav scholars exists on practically all issues. On these earlier discussions, see B. Horvat (1970), pp. 49-52.

in traditional financial instruments, and a lively debate on shareholding is presently going on. What has emerged from these discussions is a generally favourable attitude towards the diversification of property rights.

4.3.1.Workers' "shareholding"

Several economists have recently been advocating the introduction of a form of workers' shareholding, i.e. "shareholding of past labour" in line with Kardelj's scheme on past labour. Some of these views will be discussed.

Thus S. Babic (1983) considers there is no reason why shareholding by producers should explicitly be prohibited, since the law does not prohibit shareholding by citizens (investing in savings accounts). In order to increase an entrepreneur's motivation to invest, both in his own and another enterprise, and increase the mobility of capital, Babic advances two principle proposals. The first is to introduce a "parametric" price (a scarcity-reflecting price, or charge) for the use of social capital, thus ensuring the social character of property. The second proposal is to allow "shareholding entrepreneurship", i.e. the possibility for the collective entrepreneur to recover the principal of an investment, and receive a dividend for invested capital. If this type of shareholding was introduced, resources obtained through the capital charge would not be transferred to an external institution, but could be left at the

disposal of the enterprise. The entrepreneur would be permanently excluded from consuming this part of income, but would become indifferent whether he will invest it in his, or another enterprise, as long as he can recover the principal of an investment.

While Babic's proposal would probably increase capital mobility, it would not eliminate the essence of the underinvestment problem. Babic implicitly proposes that resources obtained through a capital charge would have to be used for investment. If this is imposed on the firm, the decision to invest hardly reflects a voluntary choice of the collective. Babic's solution would ensure higher levels of investment, but through administrative norms and not by influencing an entrepreneur's "motivation to invest".

Furthermore, Babic does not consider the disincentive effects of the capital maintenance requirement. If the Yugoslav firm continues to be obliged to maintain the value of its capital, Babic's "shareholding entrepreneurship" per se could never ensure the full recovery of the principal of an investment. Although a partial relief from the capital maintenance requirement is present in practice, the obligation still applies to a part of capital, and hence there would be no possibility, under Babic's scheme, to recover the principal of an investment in capital which effectively is being maintained.

M. Milovancvic (1986) develops a theoretical model of rewarding workers' past labour.[239] Among the assumptions required for obtaining an equilibrium solution, is the existence of a capital market, and of a compensation for using social capital. The model shows that under free capital market conditions, optimal remuneration of past labour is possible; and that an economy without a capital market is inferior respect to an economy having such a market, since it will have lower consumption per employed in all time periods.

Milovanovic also offers a concrete proposal on how to introduce workers' shares in a socialist economy (1986, pp. 116-7). He proposes that the state issues initial shares in proportion to the value of social capital, and distributes them to the population. What would then follow is the trading of shares on an organised market. Workers would in general own shares of their own firm, but could also buy shares of other firms. Such ownership would not give the worker any right in management, which remains a self-management right of those employed, but would only guarantee a dividend depending on the firm's business results. When retiring, a shareholder would not

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239. As a theoretical framework under conditions of certainty, Milovanovic uses the Austrian theory of capital (in a simple Fisher-Hayek form), and under conditions of uncertainty, Hirshleifer's theory of probabilistic decision-making.

abandon his share; only after a worker's death do his rigths cease. Shares would not be transferable to heirs, but would go into a state fund from which each 18-year old citizen would be given a minimal amount of shares. In this way social resources would in a real sense become "social", while workers would become permanently interested in investing.[240]

Milovanovic's proposal is appealing, but fails to clarify several issues. How are shares valued on the market, and would they reflect the net worth of an enterprise? What would be the incentive for outside shareholders to buy no-voting shares? How would a possible divergence of interests between workers and outside snareholders be resolved? According to which principles are initial shares distributed to the population? Would new shares, corresponding to the increment in social capital, be equally accessible to all; or would workers employed in the enterprise issuing new shares be given priority, in order to ensure that the majority of shareholders remain workers employed? Otherwise, the underinvestment problem would not be resolved: workers could vote for consumption rather than invest-ment, while the outside shareholder, having no vote, would be powerless to press for more investment.

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240. Milovanovic's proposal bears some similarities with the proposal on "entrepreneurial socialism" of a Hungarian economist T. Liska, first advanced in the mid-sixties (see Barsony, 1982).

Another economist in favour of shareholding is T. Nikolic, who argues (1986) that workers' shareholding has net advantages over credit relations that have enabled the present high indebtedness of the economy. Workers as co-owners of social capital would be interested in its increase, because dividends on the basis of past labour would directly be linked to realized profits, and because their personal property (value of snares) would depend on the efficiency of its use. The introduction of workers' shareholding would not only prevent inefficient investment by political bureaucracy, out would resolve the "enigma" regarding the unprecise definition of social property, as eacn individual subject would need to bear risk and responsibility. Social capital would increase depending directly on the creation of domestic accumulation, and hence further indebtedness would be prevented.[241] Workers' shareholding would not represent the negation of social property, since it is directly based on Marx. When describing cooperative factories, Marx spoke of a worker having two functions: as the proprietor of his own means of production, he is a capitalist and receives profit, and as a worker, he is hired labour and receives a wage.

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241. This is doubtful, however; several economies with share capital have not avoided the problem of high external debt, e.g. Brasil, Mexico, etc.

Nikolic does not discuss, however, the problem of how to reconcile social property with the concretization of property rights and workers' share capital. In fact, he finds a compromise by using a highly ambiguous term: "workers' shareholding social property".

A concrete solution to this problem is offered by Labus (1987), who proposes a clear distinction between macro and micro interests and competences regarding property, to be divided between working collectives and state organs. In order to prevent "group-ownership" tendencies, a price for the use of capital should be introduced.

On the other extreme, several economists have attacked such proposals, mainly on ideological grounds, regarding workers' shareholding a step backwards, leading to reprivatisation and recapitalisation of socialism. M. Korac (1986, p. 188) has gone as far as to calculate what the introduction of workers' shareholding could cause in terms of capital losses: social capital, instead of increasing 6 times in the next 40 years, would only increase 1.8 times. Nevertheless, Korac's calculations are based on the simplified assumption that workers would distribute the larger part (two thirds) of accumulation in the form of dividends, that would thereafter go into their personal

consumption, thus considerably decreasing the average accumula-
tion rate of the economy. However, he offers no arguments why
this assumption should hold.[242]

Similarly, Stambuk (1988) is against workers' shares,
acritically opting for a **status quo** solution: according to the
author, the only way to motivate workers to produce efficiently
"is by enforcing a property form through which individual and
class interests of direct producers are expressed in a most
efficient way, and this can only be social property" (p. 19).

Finally, Bajt (1988, pp. 6-7) has recently expressed doubts
about the positive effects of workers' shareholding in en-
terprises where they are employed. He considers that workers
would need to be given the possibility of selling their shares
(otherwise motivation would be absent), which could seriously
undermine the whole social sector and transform the Yugoslav
system into a capitalist economy. The principal problem of the
Yugoslav economy according to Bajt is not the lack of savings,
but of entrepreneurship.

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242. If workers are co-owners of capital, this would not be
their long-term interest. Even if a large part of profits is
distributed in the form of dividends, mechanisms meant to
mobilize workers' savings for productive purposes could prevent
the lowering of the accumulation rate.

4.3.2.Shareholding by external capital providers

The second group of proposals concerns incentives of an enterprise to invest outside the firm. Many of these proposals seek solutions for introducing, in some way or another, schemes similiar to shareholding, but without affecting the socialist features of the economy, e.g. by introducing shareholding on a limited scale, either in specific sectors, or in a mixed-property sector.

Recent discussions on the issue of a "mixed economy" suggest that tne diversification of property forms in Yugoslavia could have important positive effects. B. Kovac proposed the division of the economy into three sectors: social, private, and mixed. The social sector could be given 5-6 years, a transition period during which conditions for the survival of firms would be tightened, and enterprises not surviving would be liquidated, while the establishment of a mixed sector with diversified property forms, where shareholding would be allowed, would stimulate competition (Round Table Discussion-RTD, 1986).

Other economists are sceptical about the possibility of introducing shareholding even on a limited scale, because of ideological reasons (Mencinger), negative consequences shareholding may have, by increasing competition, on socially-owned enterprises (Inic), absence of citizens' confidence in the state without which a shareholding system cannot function properly (Jerovsek), incompatibility between a stock market and

the present system in which the government "freezes" and "unfreezes" the entire economy every three months (Labus), and eventual loss of control of the government, which can easily order 200 enterprise managers what to do, but not two million shareholders (Labus) (RTD, 1986). Bajt (1988, 1988a) puts emphasis on the high inefficiency of the Yugoslav economy, expressing doubts about shareholding being able to function under existing conditions: illiquidity problems of Yugoslav enterprises in the past years have shown that they are often not even able to pay interest on bank loans, and hence would even less be capable of paying (higher) dividends.

However, the central argument that seems to worry Yugoslav economists is that snareholding may be in conflict with self-management. Labus (in RTD, 1986) argues that no one would be willing to invest in a share of a firm unless he can retain some form of control in management. If this control is not ensured, shareholding capital would remain at a minimum level, but such control would be in conflict with self-management. Instead of shareholding, Labus considers that bonds, which do not imply the participation in management, have a better chance of success-

fully being implemented. [243]

Others, however, consider that the conflict between shareholding and self-management could be resolved. Bozovic suggests the parallel participation in management, of both workers and capital providers (in Lakicevic, 1987a). Nikolic and Raic (in Nikolic, 1986) propose the establishment of an assembly of shareholders in workers' councils of enterprises, which would have certain rights concerning the election of managerial bodies and the economic policy of the firm.[244]

Finally, these issues have widely been discussed also at the official level. Although the 1982 Stabilization Programme, the main document of the present reform, does not specifically treat the issue of property, problems related to property have lately been discussed officially by the Party, the government, and other political bodies.[245] At a February 1987 meeting of the

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243. Labus strongly advocates a system similar to the one existing in Mondragon cooperatives, where individual workers' accounts are not really shares, since a worker cannot sell the claim on his individual account before retiring.

244. We support the view that there are ways of reconciling shareholding with self-management. The real obstacle to shareholding in Yugoslavia is ideology, and not self-management (see Uvalic, 1988).

245. Discussions organized by the Central Committee of the League of Communists of both Macedonia (Skoplje, 1985) and Serbia (Belgrade, 1986), by the Presidency of the League of Communists of Yugoslavia (Kumrovec, 1986), and by the Chamber of Commerce (Belgrade, 1986) (see Korac, 1986, p. 187).

top Party organ (CCLCY), it has been proposed that individuals (even foreigners) should be permitted to privately own means of production (i.e., other than those in the small-scale private sector), while at a March meeting it has been suggested that "the economic and social situation requires that, in the framework of our socio-economic system, besides social, other forms of property are developed" (Lakicevic, 1987). This resulted in a document on property prepared for the Presidency of the CCLCY, which considers how to incentivate private investment on a wider scale, especially of Yugoslavs employed abroad, and how to encourage existing mixed property forms. In another document prepared for the government it has been proposed to ensure more rights to an enterprise investing in another (Lakicevic, 1987a).

The issue of workers shares in socially-owned enterprises has also in the meantime reached the official level, as a proposal of the Serbian Commission for the reform.[246] It is reported that the proposal will in fact form part of the new government measures, to be enacted by January 1, 1989.[247]

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246. As reported by Crnobrnja, head of the Serbian Commission, in Ekonomska politika no. 1885, May 16, 1988.
247. See Wall Street Journal, 3-4 June, 1988, based on statements in Yugoslav press.

Some of the articles concerning property in the 1974 Constitution will also be changed, as proposed in the draft of the Amendment no. 9 to the Constitution which is presently under discussion. For the moment, however, the document does not provide for any fundamental change. The problem deriving from the unprecise definition of social property is recognised, but no concrete solution is offered, as social property in its existing form is to continue to be the dominant form of property. Nevertheless, recent critiques of the document may result in yet other modifications.

In the new Law on Enterprises, which has in the meantime been completed (but not yet approved),[248] and which should, together with other two laws, replace the **Associated Labour Act**, four principal forms of property are envisaged: social, mixed, private, and foreign. In the case of non-social property forms, contributors of capital would actively participate, along with workers employed, in management, in proportion to invested capital, and the trade union would be given a more important role.[249]

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248. The Law has been submitted in the middle of October 1988 by the Federal Executive Council to the Federal Assembly for discussion and approval.
249. See "Politika", Oct. 26, 1988, p. 11.

The prevailing position at the official level is that as long as the socially-owned enterprise continues to represent the dominant form of enterprise, shareholding on a limited scale need not threaten the socialist features of the economy. Nevertheless, there is still a lot of resistence towards changes in this direction.[250] The history of economic reforms in socialist countries teaches us, indeed, that there is a long way from proposals to elaboration and implementation.

4.4. Workers' views

Finally, it is of interest to see how workers feel about the notion of past labour. A sociological study based on a questionnaire posed questions to some 3500 workers from Croatia and Slovenia on four specific issues: criteria for rewarding past labour, its concrete forms, the character of such a right, and its time dimension (Zupanov, 1977).

Table Cl. (see Appendix C) reveals that less precise criteria for rewarding past labour, such as personal income and total years of employment, were given priority. In order to explain such an attitude, additional questions were posed on the

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250. E.g., the draft of the law on enterprises with foreign capital, meant to attract capital of Yugoslav workers employed abroad, had in the first instance been refused, on the basis of the argument that Yugoslav emigrants, having the exclusive right to invest in such enterprises, would be privileged respect to workers employed in Yugoslavia. However, the law has in the meantime been approved (late 1988).

most precise criteria referring to individual investment by workers. A relative majority regarded this criteria was not in conformity with the law, which may be the reason for not having considered it.

Concerning forms of realizing the right to past labour, 16 different forms were grouped into three subcategories depending on the role past labour rewards should have: entrepreneurial (compensating postponed consumption); self-managed (managing social capital in general); and security-oriented (securing workers' socio-economic welfare). Table C2 (see Appendix C) reveals that the most favoured forms of rewarding past labour were those linked to: seniority in a specific firm (E), the firm's productivity (J), housing problems (O), and job protection (P).

The third group of questions concerned the character of the right to past labour rewards: whether it is a worker's subjective right, or a moral right based on solidarity; and whether it is a property right. Responding to the first question, the majority considered it a subjective right of each individual. Concerning the second question, workers thought past labour rights should not be linked to membership in an enterprise. However, a worker being fired for economic reasons should continue to enjoy such a right, but if he is dismissed because of his own fault, the right to past labour should cease. Only around 15% of workers thought that the right to past labour

should be transferable, although the majority regarded it should be inheritable by family members (around 60% in both republics).

Finally, workers were asked what should be the minimum length of employment required for acquiring the right to past labour. In Croatia 51.5%, and in Slovenia 45% of workers thought 5 years was sufficient. Workers were also asked whether the right to past labour ought to be recognised retrospectively; 50% of Croat, and 39% of Slovene workers expressed themselves in favour.

The results of the presented survey reveal that there might be social constraints to the introduction of workers' shareholding in Yugoslavia. On the one hand, it seems that the Yugoslav worker is risk-averse and is not willing to fully accept the role of an entrepreneur, but prefers the present "implicit" contract with the state which assures benefits irrespective of personal contribution. This is confirmed by workers preferring less precise criteria of rewarding past labour, their negative attitude towards investing personal savings, by answers on forms of past labour rewards, as three out of the four most preferred forms of rewarding past labour belong to the "security" oriented group ¯(and not the entrepreneurial one), and by their attitude towards the right to past labour, which ought to be non-transferable, not linked to membership, but inheritable.

On the other hand, workers in Yugoslavia may be happy the , way things are: the solutions effectively adopted in practice do

not diverge much from the desires of this group of workers, given that the most preferred criteria, personal incomes and total seniority, are precisely those effectively applied in practice, while out of the four most preferred forms of rewarding past labour, three can be said to be present in practice (personal income depending on collective productivity, job protection, and social help for housing problems).

4.5.Concluding remarks

The new system of inducing workers to invest from retained earnings, based on rewards for past labour, has done little to increase a worker's motivation to invest. Had Kardelj's scheme been implemented in a way as to link more directly past labour rewards to capital returns, or ideally, to the absolute increase in the value of net assets of an enterprise, the scheme might have improved investment incentives, as it would have contained some elements of shareholding. Workers would be rewarded for investing retained earnings in capital stock, and hence a worker, just like a shareholder, would be able to count on a personal return on a part of equity of the enterprise, while the firm would be able to obtain, similarly to what is obtained by the issuing of shares, additional capital.

In this sense, a better application of Kardelj's scheme could have improved incentives to invest, but it still would not have eliminated the disincentive to invest arising from the

capital maintenance requirement (disregarding other considerations which have pushed in the other direction). In spite of the partial ineffectiveness of the requirement in practice in Yugoslavia, the requirement is still likely to provoke some disincentive effects, albeit partial.

In addition, an important limitation would remain concerning the possibility of converting shares into liquid assets. The collective would not be able to cash in past labour rights, as workers are not permitted to liquidate the enterprise voluntarily and distribute the proceeds, and neither would the individual worker be able to cash in these rights, as he cannot transfer them to other individuals. Therefore, past labour rewards could at best have taken the form of non-transferable, non-marketable dividends.

The second group of mechanisms, meant to incentivate investment outside the enterprise, also bear some similaritites with shareholding. Had the scheme of investing in other enterprises allowed a permanent sharing of income by the two enterprises, and had the joint bearing of risk been ensured, the instrument could have represented a form of shareholding of one socially-owned enterprise in another. The pooling of financial resources in a bank resembles shareholding insofar as it ensures founding members participation in profits, management, and the joint bearing of risk, but differs fundamentally from shareholding because it gives such a right to all members and hence

irrespective of invested capital. The individual investing his capital in a COAL can be compared to a shareholder, as he does receive a part of profits on account of property, but such participation is also only temporary. Finally, the scheme for mobilizing private savings by socially-owned enterprises, as envisaged by the ALA effectively puts the citizen in the position of a shareholder (although the 1982 LERPL took care of excluding such a possibility).

As to financial instruments, the certificate of pooled resources is the one that comes closest to shares, but in spite of being a long-term security, this certificate is also redeemable (as all other types of securities in Yugoslavia), and it cannot be subscribed by households.

Therefore, the nature of the schemes introduced into the Yugoslav economy during the 1970s clearly indicates that forms similar to shareholding are needed, also in a socialist economy.

At the same time, however, the discussion of these mechanisms indicates that in spite of intentions, the new schemes introduced by the 1970s economic reform were not quite successful in introducing built-in investment incentives, necessary for the development of a market-oriented system in which enterprises would make autonomous investment decisions primarily according to market criteria.

The foregoing analysis serves to clarify further our principal hypothesis, proposed in Chapter 2 and explained in

Chapter 3, cn the continuous presence, in the whole post-1965 period, of government intervention in the microeconomic sphere of investment decisions. Precisely because the discussed mechanisms have not functioned in a way to successfully substitute the role of state intervention of the previous periods, there remains a need for state involvement in investment decision-making in Yugoslavia.

A final question to be adressed is why the new financial mechanisms have not functioned as expected in incentivating efficient investment decisions in Yugoslavia. Is it because none of these instruments provide a permanent basis for income on account of ownership, in line with Furubotn and Pejovich's theory, or is it rather, because of other reasons? An answer to this question will be provided in the next, and last chapter of this study.

Chapter 5. MOBILIZATION AND ALLOCATION OF INVESTMENT RESOURCES
IN YUGOSLAVIA - SOME OPEN QUESTIONS

The major problem with the investment process in Yugoslavia
in the post-1965 period has not been one of maintaining high
levels of investment, but rather of mobilizing and allocating
capital efficiently.[251] Some of the principal problems of in-
vestment incentives, which have not yet been resolved by any of
the undertaken reforms in Yugoslavia, will now be discussed.
These problems are directly linked to the efficiency of invest-
ment decisions, but are of a wider scope, since they concern the
entire system of self-managed market socialism. Finding ap-
propriate solutions to these problems are among the necessary
conditions for improving the system of mobilization and alloca-
tion of investment resources. Possible solutions for improving
the system will then be proposed, and concluding remarks drawn.

5.1. Unresolved problems of investment incentives

Rewarding past labour has not improved much an enterprise's
motivation to invest, nor has the diversification of financial
instruments proved sufficient to increase the inter-enterprise

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251. It is beyond the scope of this study to analyse in greater
detail capital allocation inefficiencies in Yugoslavia, as this
has been done elsewhere (Tyson, 1980; Schrenk et al., 1979;
World Bank, 1983; etc.). The general conclusion of these studies
is that after 1965 the allocation of capital has been suboptimal
from several points of view.

and inter-regional mobility of capital, and substitute bank credits by more direct forms of investment financing. Some of the reasons why the new schemes, discussed in the previous chapter, have not functioned as envisaged, include the absence of a secondary market of securities, an inadequate banking system, and inappopriate legislation. However, while these specific issues are important, the principal reason for the failure of the new instruments introduced into the Yugoslav economy in the 1970s, is of a more general character, and concerns the unchanged nature of the enterprise-state relationship, and the related persistence of the soft budget constraint.

5.1.1. Secondary securities market

In order for securities to play the role they usually play in a capitalist economy, what is necessary is a developed market of securities, including a secondary market for securities. However, a secondary market for securities was never set up in Yugoslavia. The absence of such a market, which would have ensured immediate liquidity of resources placed in securities, is probably one of the principal reasons why securities in Yugoslavia, with the exception of promissory notes, have not been used to a greater extent.

Related to the issue of a secondary market of securities, is the problem of evaluation of net assets of enterprises. Although all of the discussed schemes introduced in the 1970s

bear some similarities with shareholding, they have not suc-
ceeded in playing one of the essential roles equity shares play,
or ought to play in the capitalist economy, of providing a
pricing mechanism by which enterprises value themselves.

Motives for not setting up a secondary market of securities
in Yugoslavia are of a wider nature. The rejection of a market
for securities is directly linked to the cautious and limited
use of the market in general in Yugoslavia. The role of the
market in the Yugoslav economy has always been more important
for final demand, than for factors of production. The normal
functioning of both a capital market, and a labour market, has
never been fully accepted, mainly for ideological reasons (see
Schrenk et al. 1979). The belief present in the early 1960s,
that a capital market is inconsistent with the principles of
socialism,[252] is widely diffused even today in Yugoslavia.
Rather, a "specific" capital market, adapted to the needs of a
self-managed, socialist economy (and hence a highly regulated
capital market) is to be developed.

Cirovic[253] gives an illustrative explanation of the offi-

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252. These discussions are reported in detail in Milenkovich
(1971).
253. It is worth noting that professor M. Cirovic is one of the
major Yugoslav experts on monetary issues, and his views on
inflation have had a significant influence on government
policies in recent years.

cial attitude towards capital markets, in reference to securities: "The introduction of a securities market is not a purely technical issue, since ... it enables speculative operations on the market, ... financial losses for some and financial gains for others, leading to financial redistribution of income. This is directly in conflict with the self-managed economic system, which is trying to develop a system of distribution based on labour contributions. A complete market of securities would require the introduction of a flexible interest rate, formed exclusively on the basis of demand and supply of financial assets ... In such a system, associated labour would not be able to consciously regulate the level of the interest rate, but the market interest rate, formed 'behind the back of commodity producers', would be the main parameter. Hence the interest rate would dominate (rule over) enterprises... This is the principal reason why the Yugoslav economic system has not accepted the introduction of a securities market... ".[254]

Therefore, it is clear that the new financial instruments introduced in the 1970s, under conditions of a highly imperfect capital market, and the related impossibility of introducing an effective secondary market for securitites, could not have given the desired effects. Allowing economic agents to issue

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254. Cirovic (1976), p. 85.

securities, but without giving them the possibility of cashing them by trading them on the market, was only a half-way solution which could not have proved satisfactory. [255]

As to possible solutions, it is worth noting that e.g., in Hungary, a bond market has been operating since 1983, with both primary issues and secondary trading, whereas in China, several stock exchanges have been opened in 1986 (see Nuti, 1988b). These examples seem to indicate that capital markets (and stock markets) can be reconciled with socialism, and hence there is no reason why in Yugoslavia, secondary trading should continue to be regarded as being in conflict with socialist principles.

5.1.2.Banking system

The setting up of a secondary market of securities requires an adequate banking system which can successfully organise, and undertake operations on such a market. In Yugoslavia, however, all of the undertaken banking reforms, which have led to substantial decentralization of the banking aparatus, and the transferring of a part of investment decisions and investment financing to banks, have not been sufficient to assign the banking system the role it should have played as a financial intermediary.

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255. On these issues, see Grlickov (1987).

This is because commercial banks in Yugoslavia, at least until the very recent proposals, were never conceived as independent, profit-making institutions.[256] In theory, they were to be merely "service" agencies of enterprises founders operating under their direct control, and in line with such a concept, banks' capital funds have been limited by law.

A secondary market of securities could have developed if banks were prepared to buy as well as sell securities, but banks could only issue securities under very special circumstances with the permission of the Federal Executive Council.[257] The second part of Table B6 in Appendix B(a) indeed suggests that the value of securities issued by banks has remained modest, except for bonds. However, what is included in bonds, which have accounted for by far the largest part of all securities issued by banks, are obligatory funds for the development of less developed regions, which banks issue on behalf of enterprises.[258]

On the other hand, while in theory banks were to be controlled by enterprises founders, they have never really been

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256. A possible exception is the period immediately following the 1965 economic reform.

.257. See Prout (1985), p. 94.

258.I am grateful to M. Gaspari from the National Bank of Slovenia for having pointed out this to me.

freed from the influence of political structures. Although some

of the undertaken measures seemed to move in this direction,

such as the exclusion of sociopolitical communities, from 1977

onwards, from the list of organisations permitted to found, and

hence directly invest in banks, different political authorities

have still been deciding on a number of other important issues

concerning a bank's functioning. [259]

Since the Yugoslav bank has no capital of its own, and

cannot freely decide on the use of its funds since it is under

the pressure of both enterprises founders, and political struc-

ture, it cannot have an important role in placing capital in

most profitable ventures. In the absence of an independent

banking system, it is not surprising that capital market imper-

fections have prevailed in Yugoslavia (serious underpricing of

capital, administrative methods of capital allocation, etc.). [260]

The consequence of the limited autonomy of the Yugoslav

bank is that it does not bear risk and responsibility for its

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259. Thus it is political organs at the republican level who
issue the certificate that the necessary conditions are
fulfilled for the founding of a bank; communal representatives
participate actively in social compacts which dertermine the
role of banks in the financing of priority sectors; political
structures are also initiators of inter-bank social compacts
(e.g., on interest rate policy); see Mramor (1984).
260. As noted by Tyson (1983), "the fatal shortcoming of the
banking system reform was the failure to impose a price-
rationing standard on the allocation of investment funds" (p.
299).

decisions. Indeed, the same type of socialization of losses present in enterprises is also present in banks, but to an even higher extent. The banking law envisages that banks should evidence all non-cashed liabilities in the course of 60 days, and should "regulate" them by refinancing, by writing them off, or by booking them as "dubious", which effectively enables banks not to evidence losses.[261] It is only recently, in 1987, that the first commercial bank has been closed in Yugoslavia, in connection with the financial scandal of false promissory notes of the enterprise "Agrokomerc".

The recent proposal of the federal government of transforming banks into shareholding profit-making institutions, seems to be the first step in the right direction. In addition, the legalization of political influence, by again allowing sociopolitical communities to found banks, and invest capital funds in them, is probably a better solution than the existing system which formally excludes state organs from banks' decisions, but de facto ensures high influence of political structures.

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261. As reported by Grlickov (1987a).

5.1.3.Legislation

The legislation on all financial instruments existing in Yugoslavia does not seem sufficiently motivating for the potential investor. What is needed are regulations which would be more stimulative for the provider of capital. In the first place, the potential investor must be assured fuller control over invested capital, even if this may require decreasing existing "self-management rights" of workers in decision-making. Parallel participation in management, by both workers and capital providers, could be a possible solution.

From the legal point of view, since existing arrangements are all characterized by temporary participation in profits of the individual/institution contributing capital, a solution could be sought in explicitly allowing a continuous renewal of contracts with external providers of capital, thus allowing a "hidden" form of shareholding. Such schemes could be interpreted as a temporary (renewable) right to income from using socially-owned resources, and not a "permanent right to income from ownership", and hence would be fully acceptable from an ideological point of view, but could significantly increase the incentives to invest in another enterprise.

5.1.4.Enterprise-state relationship

The setting up of a complete market for securitites, parallel with a more independent banking system, and more stimulative legislation for investors, would probably not be sufficient to

have an efficient system of investment mobilization and alloca-

tion in Yugoslavia, without resolving the crucial issue: enable

the individual enterprise to operate as an autonomous economic

agent.[262] This in turn requires a clearer specification of

property relations, and related to this issue, a further hard-

ening of the budget constraint.

After the official abolition of state property, as already

mentioned, all capital assets became social property, granting

enterprises only the right to use socially-owned resources.

Whereas this principal regulation concerning property has

remained intact in the course of the next decades,[263] the im-

plications of the rule in practice for the individual enterprise

have been different.

The system applied in the 1965-71 period was a solution

that enabled the retaining of "social" property (although unof-

ficially still state property), while at the same time avoiding

some of the problems of "group-ownership" tendencies.

Enterprises were charged a tax for the use of social capital,

whereas resources collected through the tax on social capital

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262. This does not exclude, as already mentioned, the
possibility of having substantial government intervention,
through various macroeconomic policy measures, but simply
implies the exclusion of permanent government sector-specific
interference in the microeconomic sphere.
263. The 1976 ALA clearly states that "no one may acquire the
right of ownership over social resources" (Art. 12).

were allocated, through the banking mechanism, to enterprises seeking investment loans.

However, in the early 1970s, the conclusion was reached that this solution was not entirely in conformity with self-management, since a tax on social capital implied the imposing on the enterprise of a minimum level of savings from retained earnings for investment purposes. In order to further increase the autonomy of enterprises in investment decision-making, in 1971 the tax on social capital was abolished. Investment resources were to be left to the enterprise, which would use them freely for investment purposes, mainly according to tendencies prevailing on the market. The individual enterprise was thus expected to become an autonomous collective entrepreneur.

But in practice, the decentralization of investment decisions, together with the elimination of charges for socially owned resources, led to a series of problems. The abolishing of the tax on social capital meant that enterprises acquired full rights to the income streams generated by social capital. This in turn meant the sanctioning of nonlabour factor incomes, the introduction of implicit factor incomes, and hence the generation of income inequality due to different capital

endownments.[264] These tendencies have been interpreted by many scholars as implying an effective redistribution of property rights, i.e. the expansion of enterprise property rights vis-à-vis the state. Bajt (1968) has in fact argued that economic ownership, reflected in the system of distribution (the right to entrepreneurial incomes), needs not correspond to the legal title of property, and consequently, that Yugoslav enterprises behave, and the law has to enable them to behave, as if they were the effective owners of capital.[265]

However, it should be stressed that the interpretation of social property as a form of group property of the enterprise, is indeed a **very specific** form of "ownership". By acquiring rights to the income stream generated by socially-owned capital, enterprises have not been assigned other functions that ownership usually encompasses, including the right of disposal and the bearing of risk. These are the fundamental differences between the right to use and the right to own. What was not sufficiently recognized in Yugoslavia, and is only recently

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264. As commented by Milenkovich (1971, p. 265), "The Yugoslav principle of distribution becomes to each according to the factors of production suplied by the human agent or to which the human agent has access, as valued on the (imperfect) market"; see further pp. 252-272.
265. However, it should be stressed that Bajt has in the meantime modified his view. In (1988) he argues that the real owners of social capital, even in the economic sense in Yugoslavia, are political structures.

gaining ground, is that along with positive rewards for entrepreneurship, negative rewards (penalties) for poor (investment) decisions are also necessary, and hence an appropriate incentives system of both profits and losses.

Under the existing system of "social" property, capital is officially owned by "the whole society", but the real owner of capital is the state. Although until the 1980s, the enterprise seemed the effective owner of income streams from socially-owned resources, the state (society) was responsible for the coverage of losses, the setting up and liquidation of enterprises, and for a number of other issues which determine "the rules of the game". The very recent Yugoslav experience confirms that the real owner of capital in Yugoslavia is the state, as the Yugoslav enterprise has lost practically all control over its income, including entrepreneurial income. As stressed by Bajt (1988), the Yugoslav LMF is no more than a form of workers' participation in state management of the economy (p. 35). Such property relations have therefore had concrete negative implications on the responsibility of the single enterprise, including the bearing of all consequences for investment decisions.

5.2.Possible solutions

Although today, the traditional socialist doctrines on private property is being reinterpreted in most socialist countries,[266] private property has always been identified with capitalism, and hence its extention in socialist countries needs to remain on a limited scale. This is equally true for Yugoslavia. A permanent right to an income from ownership poses unsurmountable ideological barriers even in a reformed, highly decentralized, socialist economy. Therefore it is necessary to seek solutions within the existing institutional framework of "social" property.

One solution would be to return to the system existing until 1971, by reintroducing a charge for the use of social capital.[267] However, since social property would effectively (unofficially) remain in state property, the responsibility for its use would at least indirectly remain in the hands of the state. This would probably again require the imposing of the capital maintenance requirement (in order to prevent workers from consuming capital), and hence from a purely theoretical

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266. The most obvious examples are financial innovations in the USSR, Hungary, and China.
267. The prevalent position among Yugoslav economists is that enterprises should pay society the market-clearing interest rate for the use of social property.

point of view, the disincentive to invest from retained earnings would not be eliminated.

The other solution is to decentralize ownership of social property, but without individualising it. Social property could officially be recognized as collective property. Concrete (collective) holders of property rights would be specified, which could be enterprises and all other forms of organizations existing in Yugoslavia, including the state. The part of capital stock inherited by an enterprise from the state, at foundation or at the time of transition to social property, would remain in social (state) ownership, for which the state would be given an appropriate number of shares. In spite of the fact that capital initially contributed by the state has lost much of its value or has become obsolete, it has still served in providing the gross income out of which some of today's capital has come in existence, and this should therefore be recognized.

All subsequent increments of capital that the enterprise has financed through its own savings from retained earnings, could be left at its disposal. An enterprise's capital would thus consist of two principle parts: initial capital in social (state) property, and capital effectively owned by the enterprise, in collective property.

Such a concretization of social property would not only respond more to the requirements of self-management, but it would specify that it is the individual organisation (whether

economic, non-economic, or state) that ought to bear full responsibility for the use of its part of social capital, and hence would imply the imposing of a hard budget constraint.

Since the issuing of shares to the state would prevent the consuming of capital to which workers have not contributed, in such a system there would be no need to impose the obligation to maintain the value of capital assets, and hence the cause of the underinvestment problem would be eliminated. At the same time, in order to induce workers to undertake investment from retained earnings, workers could be issued profit-related bonds equivalent to reinvested income per head, as a recognition of their "past labour", and hence be rewarded accordingly for their investment decisions. An appropriate incentives system could take the place of individual workers' shares based on private property, as risk-sharing does not necessarily require owner-ship.[268]

In addition, in order to increase the mobility of capital, organisations who have free financial resources at their disposal could invest them in other enterprises, for which they

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268. Some regard workers' shares are fully compatible with social property and socialism, under the condition that an egalitarian system is provided that permits everyone access to capital; see Milovanovic (1986); and Liska, in Barsony (1982). For an alternative solution of introducing risk-bearing in a socialist economy but not private property rights, see Nuti (1987a).

would receive shares ensuring participation in management, which would be tradeable on the secondary market.

In case an enterprise is closed, initial capital contributed by the state/society would be returned to the state, whereas all remaining capital, after debts are repaid, other enterprises' shares and workers' bonds redeemed, could be distributed to workers.

Or, following Nuti's (1987a, 1988a, 1988b) recent proposals, a competitive periodic valuation of enterprise assets could be introduced through a process of bidding, where an enterprise's capital would either be revalued, or overbid out of its hands by other enterprises. Such periodic valuation would ensure the potential mobility of resources towards their most productive uses. In such a system, state's initial capital would be continuously revalued; enterprises could benefit from a higher market valuation of their own assets if they are forced to surrender them; and individual workers would benefit from any reinvestment or revaluation of their past labour through the acquisition of bonds. If a worker left the enterprise, he could cash in his bonds corresponding to that part of enterprise capital financed by his efforts, or revalued during the period of employment in the enterprise since he joined, and hence would leave nothing behind (Nuti, 1988a).

5.3. Concluding remarks

When institutions that ensure the direct interest in efficient factor use that ownership provides do not exist, they can be simulated. Property is becoming less important even in capitalist countries, as the recent tendency towards reprivatization has shown that efficiency is not necessarily a question of ownership, but of incentives.

It is probably possible to find solutions that could lead to efficient investment decision, also in socialism, without the introduction of private ownership of capital. Decentralization of investment decisions does not necessarily require the reprivatisation of capital, but it does require risk-bearing.

It is not a question of returning to capitalism, but of using its financial instruments by adapting them to socialism, through the definition of alternative mechanisms of incentives that could play the role they play in capitalist economies. And as noted by A. Bajt: "The most efficient way of simulating capitalist relations of property, entreprenuership, and management (in Yugoslavia), is by liquidating all decision-making on entreprenuership outside associated labour, i.e. by transferring entrepreneurial functions to working collectives" (1986, p. 45).

In concluding, it would be unfair to ascribe all inefficiencies in investment decision-making in Yugoslavia to socialism. Self-management, or rather, the institutional forms of self-management implemented in Yugoslavia, have had their

role in hampering efficient investment decisions. The development of self-management has meant extensive (and probably excessive) decentralisation, which has resulted in extreme regionalisation and fragmentation, the pursuing of local interests, the building of "political" factories and superfluous duplication of plants, and the suboptimal utilization of resources.[269] However, respect to the other problems that have been discussed, which concern the most fundamental issues of a market-oriented socialist economy, these problems are of minor importance.

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269. These problems have also greatly been enhanced by the fact that Yugoslavia is a multinational country.

CONCLUSIONS

Each chapter of our study has tried to answer a specific question related to investment of LMFs. These questions, and the answers provided by our research, are summarized below.

Ch. 1: Does the LMF exhibit a distinct investment behaviour, and will this result in underinvestment?

Respect to a capitalist firm, a LMF does face a distinct problem, which we have called the LRC principle, which derives from limited transferability rights: a worker of a LMF cannot sell his job and the future income stream it can generate, and hence can benefit fully from undertaken investment only if he stays in the firm for a sufficiently long period of time. The LRC principle is therefore expected to lead the LMF to adopt a "truncated" time horizon, and this in turn is likely to provoke the underinvestment effect.

Nevertheless, the conclusion on underinvestment cannot be generalized, as it needs to be evaluated by taking into account the concrete institutional setting in which a LMF operates. The concrete implications of the LRC principle for the LMF's investment decision will depend on specific regulations governing capital withdrawals in LMFs, distinguishing between those present in Yugoslavia (CMR), and those existing in workers' cooperatives (RWC).

The disincentive to invest would fully be present only in the extreme case, usually not encountered in practice, of a LMF obliged to respect a strong CMR (but even in this case may be removed if infinite time horizons are assumed). If a partial

relief from the CMR is present, as has been the case in Yugoslavia, the investment bias is likely to be weaker, but is still likely to exhibit itself more than in workers' cooperatives (disregarding other considerations which have pushed in the other direction), because the CMR is a more restrictive regulation than those existing elsewhere.

In the absence of a CMR, the LRC principle need not lead to the adoption of a truncated time horizon, the use of the time horizon as the dominant criterion in investment selection, and hence to underinvestment. RWC do impose concrete restrictions on cooperatives (but not in all countries), but do not seem to prevent cooperatives from adopting remuneration schemes which could compensate workers for the imperfect liquidity of an investment. That these restrictions need not produce a disincentive to invest if an adequate system of rewarding workers' investment decisions is introduced, seems indeed confirmed by the experience in some Western countries, in spite of the fact that it is precisely these countries in which the strictest rules are applied.

A LMF on which a CMR is not imposed may exhibit a preference for short-lived projects, but only if its' time horizon is shorter than the repayment period of an investment. This distortion, however, is not equivalent to underinvestment, and can be removed if sufficiently long time horizons are assumed, or if we consider that in practice today, a capitalist firm may often have the same preference for quickest-yielding projects. If, on the contrary, the LMF's time horizon exceeds

the repayment period of an investment, workers could, through appropriate schemes, fully benefit from income flows of an investment, and underinvestment need not prevail.

Ch. 2: **Does Yugoslav empirical evidence on savings and investment support the theoretical hypothesis on underinvestment?**

Empirical evidence from Yugoslavia revealed that relatively high investment and savings rates have been maintained in most of the period under examination. The short-term moderation in these rates at the aggregate level immediately after 1965, and the drastic reduction in investment spending in the 1980s, suggested that the state has retained substantial control over the investment process in Yugoslavia.

In addition, Yugoslav enterprises' savings have been positive and not exceptionally low in the whole 1966-85 period, and have accounted for a rising portion of gross domestic savings. Similarly, the theoretical hypotheses on the financing of investment of a LMF are also not fully supported, as Yugoslav firms have been financing a large portion of their fixed investment from internal sources.

However, since the theory is based on the assumption that LMFs are free to decide on their principal policy issues, whereas in Yugoslavia at least a part of savings and investment have not been entirely voluntary, such evidence cannot be taken as definitely refuting the theory. Nevertheless, neither does empirical evidence from Yugoslavia generally support the theory, as our analysis has suggested that a part of enterprise savings,

and hence self-financed investment, is undertaken on a voluntary basis.

Ch. 3: **Why are theoretical predictions not supported by empirical evidence from Yugoslavia?**

Thus theory predicts underinvestment of the LMF respect to its capitalist counterpart, but the Yugoslav LMF has maintained high investment rates. Why is this so? Confronting the theory with Yugoslav practice has revealed that while Furubotn and Pejovich's theory is based on assumptions which correspond to an idealised capitalist environment (a perfect capital market, perfect labour mobility, project appraisal according to criteria typically used by a capitalist firm), in Yugoslavia severe capital market distortions have prevailed, labour force mobility has been limited, and investment criteria have not been the ones typically used in market economies. This initial analysis already suggested that variables considered crucial by Furubotn and Pejovich's theory have had a limited role in determining investment decisions in Yugoslavia. It has also revealed that the principal shortcoming of the theory is of a methodological nature: the authors put all emphasis on limited property rights, but disregard all other features of the Yugoslav system, among which quite a few seem to have favoured investment in non-owned, respect to owned assets.

Hence an alternative approach is used, based on Kornai's theory on the socialist enterprise, in order to propose that some of Kornai's hypotheses may be more applicable to

Yugoslavia. It is suggested that in spite of substantial institutional changes, the essence of the investment process in Yugoslavia has remained much the same, very similar to that in other socialist countries. In the field of investment, the Yugoslav enterprise has retained many features of the traditional socialist firm (expansion drive, absence of a hard-budget constraint, etc.). Some preliminary data suggested that Kornai's theory is indeed supported by Yugoslav empirical evidence.

The econometric testing of the two theories confirmed our previous conclusions, namely that Kornai's theory is in fact more supported by empirical evidence from Yugoslavia than Furubotn and Pejovich's theory.

An explanation for the divergence of Yugoslav empirical evidence from theoretical predictions is therefore found in two principal conclusions: 1)Furubotn and Pejovich's theory is not fully applicable to Yugoslavia; and 2)the investment behaviour of Yugoslav firms, in spite of decentralisation, self-management and increasing use of the market after 1965, is being determined primarily by the socialist features of the economy, rather than market signals, and hence the state has retained substantial control over the investment sphere.

Ch. 4: Why has state involvement in investment decision-making remained present?

Innovative mechanisms and new financial instruments introduced by the 1970s economic reform in Yugoslavia, in spite of intentions, have not meant the introduction of built-in invest-

ment incentives, necessary for the development of a market-oriented system in which enterprises would make autonomous investment decisions primarily according to market criteria. Rewarding past labour does not seem to have increased an enterprise's motivation to invest, nor has the diversification of financial instruments proved sufficient to increase the inter-enterprise and inter-regional mobility of capital, and substitute bank credits by more direct forms of investment financing.

Since the new instruments have not been quite successful in substituting the role of the state, there remains a need for state involvement in investment decision-making in Yugoslavia.

Ch. 5: **Why haven't the new schemes functioned, and how could persistent state influence in the microeconomic sphere be reduced?**

Some of the reasons why the new schemes have not functioned as envisaged include the absence of a secondary market of securities, an inadequate banking system, and inappropriate legislation. However, while a resolution of these problems is among the necessary conditions for the improvement of the system of capital mobilization and allocation in Yugoslavia, it is not sufficient. The most important requirement is to enable the individual enterprise to operate as an autonomous economic agent, and to introduce a further hardening of the budget constraint, which in turn requires a clear specification of responsibilities regarding social property.

However, inefficiencies in capital allocation deriving from an imperfect capital market and other problems that have characterized the Yugoslav economy cannot all be blamed on the absence of private property rights. Collective ownership of assets could be reconciled with appropriate remuneration of entrepreneurship, without necessarily decreasing the level of economic rationality of a LMF. A possible solution is to decentralize ownership of social property, but without individualizing it. Social property could officially be recognized as collective property, while concrete (collective) holders of property rights would include enterprises, other forms of organizations existing in Yugoslavia, and also the state.

In concluding, the major problem with the investment process in Yugoslavia today is that all undertaken reforms, which should have enforced market criteria, have been implemented only half-way. The Yugoslav experience clearly shows how difficult it is for a socialist country to combine partial planning and partial use of the market, and find adequate instruments for guiding enterprises to conform with social objectives, while at the same time allowing their autonomous functioning.

What are the principal findings of the study? Can evidence from Yugoslavia be considered sufficient to refute the conventional theory on the LMF's investment behaviour? The answer is negative, since the theory is not really applicable to Yugoslav conditions. However, some additional observations need to be made.

Yugoslavia has remained a typical socialist country in the field of investment decision-making, in spite of the continuous development of self-management. Hence, regardless of whether the Yugoslav LMF maximizes income per worker, managerial bonuses, or total profits, systemic features of socialist countries have clearly remained present, including the absence of risk bearing and the persistence of a soft-budget constraint, which have had a significant role in encouraging investment. Does this mean that no inherent characteristics are present in labour-management, that it is only a different form of organising the production unit? For the field of investment in a socialist country such as Yugoslavia, this is indeed so. In a market economy, it may equally be true that workers' cooperatives behave similarly to privately-owned firms, in spite of the application of self-management principles.

This suggests a plausible hypothesis: that it is the basic mechanism of allocation of resources, whether market or planned/regulated, that determines a LMF's actual behaviour. This would imply that self-management cannot (yet) be viewed as a new economic system (in spite of its distinct characteristics), but coexists within a socialist/capitalist framework, and is dominated by such a framework.

Therefore, while refuting the theory on the basis of Yugoslav evidence is not really possible, our study also suggests that certain properties attributed to the LMF, including underinvestment, need to be evaluated in a broader methodological framework, by taking into account the principal

characteristics of the institutional setting in which a LMF operates. In this sense, "systemic" features of the LMF, broadly discussed in the theoretical literature on the LMF, are perhaps exagerated.

A P P E N D I C E S

Contents

Appendix A(a) (Chapter 2)
New regulations on income distribution in Yugoslavia

Appendix A(a)

New regulations on income distribution in Yugoslavia

In line with the changes introduced by the 1970s reform, income policies are regulated by Social Compacts on Income, for each republic separately. The republican Social Compacts, although different, are based on similar principles.

The new regulations introduced in 1971 link the maximum permissible amount that can be paid for personal incomes, or the minimal savings requirement, to the skill structure of workers and realized net income. Workers are classified into skill groups, of which the last is the "non-skilled worker" which is used as a numeraire, with each other category being reduced to "non-skilled worker" equivalents, according to determined coefficients. Aggregating across skills gives the "standardized worker" of an enterprise in "non-skilled worker" equivalents.

The Croatian Social Compact sets the maximum level of personal incomes per standardized worker which an enteprise may pay, given that enterprise's income per standardized worker. If an enterprise's net income is larger than this basis, the difference is divided in determined proportions between personal incomes and accumulation. Thus an enterprise's income performance in relation to other enterprises of the republic sets limits on the extent to which its personal income distribution policy can depart from the republican average, whereas the minimum savings requirement is treated as a residual.

The Serbian and Montenegrian agreement, on the contrary, set the minimum savings required of an enterprise, given its income per standardized worker, relative to the average income per standardized worker for the republic (see V. Dubey et al, 1975, p. 351-353).

In 1975 the system was somewhat modified. The basic amount that can be paid out for personal incomes no longer depends on the skill structure of employed workers, but on the personal income fund in the previous period, corrected for the rise in net income of the enterprise (see Mramor, 1983). Currently, discussions are in course on a yet different system to be introduced by the new set of reforms.

Appendix A(b)

Table A1 YUGOSLAVIA: GROSS MATERIAL PRODUCT BY USE (ratios, as % of GMP in current prices) 1961-85

GMP (1) = 100	1961-65	1966-70	1971-75	1976-80	1981	1982	1983	1984	1985
Personal consumption	50.2	54.2	54.7	53.6	51.8	51.6	51.4	50.2	50.2
Public consumption (2)	9.0	9.6	9.1	9.6	9.0	8.9	8.5	8.3	8.6
Gross investment (3)	43.2	38.1	40.6	43.3	44.6	42.0	40.8	42.6	43.6
of which:									
in fixed assets	(32.2)	(30.6)	(30.3)	(36.9)	(31.1)	(29.3)	(25.3)	(23.1)	(23.1)
in inventories	(11.0)	(7.5)	(10.3)	(6.4)	(13.5)	(12.7)	(15.5)	(19.5)	(20.5)
Other(4)	-2.4	-1.9	-4.4	-6.5	-5.4	-2.5	-0.7	-1.1	-2.4

(1)GMP (social product in Yugoslav terminology) is the value added in market prices of productive sectors, in both the social and the private sector; it does not include non-productive sectors, such as housing, health, education, administration, defence.
(2)Public consumption includes "general consumption" and "collective consumption"; it comprises the consumption of goods and productive services by non-productive sectors of the economy.
(3)Gross investment refers to investment in productive and non-productive, private and social sector of the economy.
(4)Balance of imports and exports in goods and services, and statistical discrepancy.

Sources: 1961-80: SZS, SZDP (1982), p. 88; 1981-85: SZS (1986), pp. 233, 237; SZS, SGJ (1986) and (1987).

Table A2 YUGOSLAVIA: AGGREGATE SAVINGS AND INVESTMENT PERFORMANCE (ratios, in %), 1961-84

Yugoslav statistics	1961-65	1966-70	1971-75	1976-80	1981-84	1976	1977	1978	1979	1980	1981	1982	1983	1984
Gross domestic savings/GMP	41.5	35.8	37.5	41.0	42.3	41.6	38.4	40.9	39.5	43.6	41.0	39.1	42.7	46.2
Foreign financing/GMP	1.1	1.2	1.5	3.4	-1.4	-0.5	4.4	1.9	5.6	3.6	-0.2	-0.7	-2.1	-2.5
Gross domestic investment/GMP	42.6	37.0	39.0	44.4	40.9	41.1	42.8	42.8	45.1	46.8	40.8	38.4	40.6	43.7
World Bank														
Gross national savings/GNP	32.6	28.7	27.1	32.2	--	37.4	37.4	32.1	30.5	33.9	--	--	--	--
Foreign financing/GNP	1.1	1.0	1.3	2.8	--	-0.5	3.4	2.3	5.4	3.3	--	--	--	--
Gross domestic investment/GNP	33.7	29.7	28.4	35.0	--	31.9	35.8	34.4	35.9	37.2	--	--	--	--
OECD														
Gross national savings/GNP		31.0	32.8	35.1	38.3	33.2	34.4	36.4	34.7	36.9	38.3	36.8	38.1	40.0
Foreign financing/GNP		1.3	0.9	2.7	0.0	-0.4	3.0	2.2	5.1	3.4	0.8	0.6	-0.4	0.9
Gross domestic investment/GNP		32.3	33.7	37.8	38.3	32.8	37.4	38.6	39.8	40.3	39.1	37.4	37.7	39.1

Note:
GMP: Gross material product, as defined in Table 1.
Gross domestic savings: savings of the social sector and of households.
Gross domestic investment: investment in fixed assets + stocks.
GNP: Gross national product at market prices.
Gross national savings: gross domestic investment + exports - imports + net income from abroad - transfers abroad.
Foreign financing: Gross domestic investment -/+ gross national or domestic savings.

Sources:
1. Yugoslav statistics. GMP: SZS (1986), SGJ, p. 86. Savings and investment: NBV Quarterly Bulletin, various issues. Savings of the social sector include savings of OALs in the productive sector, including self-managed communities of interest; federal government; other socio-political communities; other organisations of the nonproductive sector; and other financial organisations. Savings of households include households and the private sector. Gross investment is calculated as the sum of gross domestic savings and gross financial savings. Foreign financing is calculated as the sum of household financial savings and social sector financial savings; whenever the first category is larger than the second, foreign financing is negative. NBV data record payments for investment according to flow-of-funds accounts, rather than the value of work done, as in Yugoslav national accounts provided by the SZS. Therefore the figures on investment somewhat differ from those in Table C1.

2. World Bank: 1961-75 figures. Schrenk et al., (1979), Table 7.1., p. 137; 1976-80 figures: calculated from data provided by World Bank (1983), table A 2.1., p. 361.
Although the World Bank uses the same source of data (NBV), the ratios are lower than the first set of figures, since 1)the GMP base is broader than the GNP base because it includes an estimate of value added in nonproductive activities; and 2)the GNP estimate entails an adjustment for inventory overvaluation (since in Yugoslav statistics inventories are valued at year-end prices, which inflate the value of investment in inventories and for GMP biases the investment and savings rates upward, an adjustment is made by taking into account the difference between year-end and mid-year prices).

3. OECD estimates: OECD, Economic Survey on Yugoslavia, various issues.
Reasons for different ratios than the ones provided by the World Bank are that 1)the OECD uses a different source of data (SZS, instead of NBV); investment figures refer to realised investment, independent of the dates of payments, while savings refer to the initial distribution of GMP, i.e. exclude savings out of net personal incomes and out of resources allocated to public consumption; 2)OECD GNP estimates are different; 3)OECD does not make adjustments for stocks over valuation.

Table A3. SAVINGS AND INVESTMENT PERFORMANCE IN YUGOSLAVIA AND SELECTED COUNTRIES, 1960-85

	Gross national savings /GNP ratio				Gross Investment /GDP ratio								Gross fixed capital formation (2) growth rate		
	1965-73	1976	1977	1980(1)	1960-80	1974	1976	1977	1978	1980	1984	1986	69-74	75-80	81-85
Greece	18.8	19.5	19.9	25.6	22.6	21.7	21.5	23.0	23.8	23.5	18.5	18.5	0.7	3.8	-1.8
Spain	21.4	19.8	20.2	18.9	21.3	25.0	22.9	20.8	18.4	19.6	17.8	19.7	7.7**	-0.9	1.4
Turkey	19.3	17.7*	17.2	16.6	17.7	20.7	20.5*25.8	20.5	18.0	18.5	23.6		8.3	-0.2	7.6
Yugoslavia	28.4	35.6	35.2	37.0	27.8	24.8	34.3	34.3	35.6	31.0	21.9	21.8***	7.6	5.7	-9.0***

(1) As % of GDP.
(2) Average annual volume growth, at constant prices.
* 1975
** 1970-74
*** 1985
**** Real growth rates of investment in fixed assets.

Sources: 1965-73 figures: Schrenk et al. (1979), Table 6.1.; p. 112. Gross investment/GDP ratio: Bajt (1988), p. 19, based on OECD Historical Statistics 1960-80, Paris, 1982, and World Bank data on Yugoslavia. Growth rates of gross fixed capital formation 1969-74, and all data referring to the post-1974 period: OECD, Economic Survey on Yugoslavia, various issues.

Table A4. GROSS SAVINGS, GROSS INVESTMENT, AND GROSS INVESTMENT IN FIXED ASSETS, BY SECTORS, 1966-84 (ratios in % of total)

	1966-70	1971-75	1976-80	1981-84	1966-84
Gross domestic savings=100					
Social sector	73.5	67.6	68.1	63.4	68.2
Private sector	26.5	32.4	31.9	36.6	31.8
Gross investment=100					
Social sector	82.4	81.6	83.6	85.9	83.4
Private sector	17.6	18.4	16.4	14.1	16.4
Gross investment in fixed assets=100					
Social sector	74.2	77.8	83.7	80.6	79.1
Private sector	25.8	22.2	16.3	19.4	20.9

Note: The first two sets of figures referring to gross national savings and gross investment, are recorded on a payments basis, as provided by the NBY, and therefore are not directly comparable with the third set of figures on gross investment in fixed assets, recorded on a realisation basis as provided by the SZS.

Sources: Gross national savings and gross investment: calculated from data provided by the NBY, Quarterly Bulletin, various issues; gross investment in fixed assets: calculated from SZS, SGJ, various years.

Table A5. DISTRIBUTION OF GMP OF PRODUCTIVE ENTERPRISES (social sector), 1966-85 (in %)

Enterprise GMP=100	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1. Net pers. incomes	34.7	35.6	35.8	36.5	37.1	36.5	36.0	34.6	33.6	34.5	36.1	36.2	34.6	33.6	31.6	33.3	32.4	30.4	28.6	29.4
2. Taxes contribut.	36.8	38.3	38.4	43.0	41.1	37.8	38.9	40.0	38.0	39.0	42.1	40.7	41.5	41.7	39.9	38.7	39.1	41.4	41.9	44.1
3. Depreciation	8.8	10.8	11.0	10.8	10.5	10.2	11.3	11.6	12.3	10.8	11.9	10.7	10.5	10.3	10.5	9.9	12.4	12.5	11.7	10.9
4. Enterprise funds (net savings)	19.7	15.3	14.8	9.7	11.3	15.5	13.8	13.8	15.4	15.7	9.9	12.4	13.4	14.4	18.0	18.1	16.3	15.7	17.8	15.6
Gross savings (3+4)	28.5	26.1	25.8	20.5	21.8	25.7	25.1	25.4	27.7	26.5	21.8	23.1	23.9	24.7	28.5	28.0	28.5	28.2	29.5	26.5
Gross savings (adjusted)*	24.6	25.5	25.1	16.1	15.2	18.8	19.4	17.5	16.3	20.1					(n.a.)					
Net enterprise income=100																				
1. Net pers. incomes	54.9	57.7	58.2	64.0	63.0	58.7	58.9	57.7	54.8	56.6	62.3	61.1	59.1	57.7	52.5	54.4	53.1	51.9	49.2	52.4
2. Depreciation	13.9	17.5	17.8	19.0	17.8	16.4	18.5	19.3	20.0	17.7	20.6	18.1	18.0	17.5	17.5	16.1	20.1	21.3	20.2	19.6
3. Enterprise funds (net savings)	31.2	24.8	24.0	17.0	19.2	24.9	22.6	23.0	25.2	25.7	17.1	20.8	22.9	24.8	30.0	29.5	26.8	26.8	30.6	28.0
Gross savings (2+3)	45.1	42.3	41.8	36.0	37.0	41.3	41.1	42.3	45.2	43.4	37.7	38.9	40.9	42.3	47.5	45.6	46.9	48.1	50.8	47.6

*Corrected for inventory overvaluation, by taking into account the difference between year-end and mid-year prices of inventories, as provided by Schrenk et al. (1979), p. 329.
Source: Calculated from SZS, SGJ, various issues; and Schrenk et al. (1979), Table A9, p. 329.

Table A6. STRUCTURE OF ACCUMULATION (SAVINGS) OF PRODUCTIVE ENTERPRISES IN YUGOSLAVIA, 1966-1985 (ratios, in %)

Accumulation=100	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
1. Depreciation above legal minimum	4.6	8.5	9.7	14.3	12.7	14.3	13.0	12.1	10.5	10.7	6.1	1.8	4.3	3.6	4.9	4.7	2.7	2.8	3.3	1.3
2. Enterprise funds																				
Business fund	48.3	36.9	28.4	31.3	37.7	40.1	34.6	30.9	38.1	31.2	25.7	35.5	33.9	41.9	48.2	49.1	45.0	37.5	35.2	27.5
Reserve fund	11.9	11.7	12.5	10.5	6.4	6.2	5.6	8.8	6.0	6.2	9.1	9.1	10.8	9.1	9.1	9.7	9.4	10.7	9.9	7.2
Other funds	0.7	0.6	0.4	0.8	0.6	0.6	0.7	0.7	0.8	1.2	1.1	0.7	0.6	0.5	0.3	0.7	0.8	0.7	0.8	0.8
3. Contract. obligat. Interest on																				
bank credit	16.5	20.4	23.3	23.2	22.9	21.3	25.1	24.8	23.0	27.9	36.5	35.6	36.8	35.1	30.6	29.6	35.4	42.5	46.3	59.3
Insurance premia	5.9	7.2	7.4	6.7	6.9	7.0	8.3	7.7	6.9	8.3	10.4	9.9	9.2	8.2	6.6	6.0	6.5	5.6	4.3	3.7
4. Taxes/contributions																				
-business fund	10.2	13.0	12.9	11.4	8.9	0.9														
-commune							2.6	3.6	3.4											
-land	0.6	0.8	0.9	0.9	1.0	0.9				1.0	1.1	0.6	0.4	0.3		0.2	0.2	0.2	0.2	0.2
-Skoplje	1.3	0.9	2.3	2.1	2.1	1.3				1.4	0.2									
-water	0.9	1.1	1.1	0.9	0.7	0.6														
-less developed						6.5	7.2	8.3	7.9	9.3	6.8	6.8	35.1							
-contractors						0.1	0.4	0.4	0.7	0.5	0.5									
-common reserves	3.7	2.8	2.2	2.4	0.0	0.1	2.7	2.8	2.7	2.8	2.2									

Source: Balance sheet data of productive enterprises. SDK Bulletin, in: Ekonomski Institut, Zagreb, (1981) and (1986).

Table A7. DISTRIBUTION OF GMP IN A SAMPLE OF 147 YUGOSLAV ENTERPRISES (in %), 1975-79

	1975	1976	1977	1978	1979
Gross value added (GMP)=100					
Fiscal & paraf. contributions and taxes	9.97	9.56	10.36	10.11	10.55
Accumulation and depreciation	33.08	30.74	29.10	31.00	31.02
Gross pers. incomes & collective consump.	56.94	59.50	60.52	58.88	58.02
Statistical discrepancy	0.01	0.20	0.02	0.01	0.09
Gross value added after tax=100					
Accumulation and depreciation	36.7	34.1	32.5	34.5	34.8
Gross pers. incomes & collective consump.	63.3	65.9	67.5	65.5	65.2
Net value added after tax=100					
Accumulation	32.0	25.1	26.0	28.4	28.2
Gross personal incomes	68.0	74.9	74.0	71.6	71.8
Accumulation=100					
Interest payments	27.2	51.3	45.1	48.0	46.5
Depreciation above legal minimum	21.5	5.4	2.6	3.0	2.7
Income of founders	0.2	0.9	2.4	0.9	0.8
Contributions to the economy	0.8	2.3	5.3	7.9	3.6
Business fund	39.5	29.9	32.8	29.9	34.9
Reserve fund	8.2	6.0	9.2	9.5	10.1
Other funds	4.6	4.2	2.6	0.8	1.4

Source: Prasnikar (1983), pp. 124-125.

Table A8. PRODUCTIVE ENTERPRISES' REPAYMENT OF INVESTMENT CREDITS, 1966-84

Blns. of dinars:	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
1.Business fund	7.7	5.8	5.9	8.2	10.9	15.7	15.3	17.5	29.1	25.3	21.4	33.5	43.6	74.9	138.8	212.4	255.9	342.3	609.5
2.Depreciation *	6.3	8.2	9.1	11.9	13.8	19.9	13.4	29.2	41.9	46.1	59.9	67.0	84.4	104.8	143.1	187.4	303.6	430.1	636.3
3.Available for debt repayment	14.0	14.0	15.0	20.1	24.7	35.6	28.7	46.7	71.0	71.4	81.3	100.5	128.0	179.7	281.9	399.8	559.5	772.4	1245.8
4.Debt repayment**	4.6	6.2	7.5	9.4	12.2	16.6	19.4	21.2	25.3	30.3	39.7	58.9	86.1	106.7	145.5	171.4	236.2	349.5	464.4
Ratios, in %																			
Business fund/ Repayment/	60	107	129	115	112	106	127	120	87	120	185	176	198	142	105	81	92	102	76
Repayment/ Avail.funds	33	44	50	47	49	47	50	45	36	42	49	59	67	59	52	43	42	45	37

*Total depreciation, i.e. the legally prescribed minimum and additional depreciation.
**Payments remaining from previous year and payments due in current year.

Source: Productive enterprises balance sheet data (SDK) in Vojnic (1985), p. 463.

Table A9. PRODUCTIVE ENTERPRISES SHARES IN SAVINGS AND INVESTMENT, 1966-84 (in %)

Productive enterprises shares in:	1966-70	1971-75	1976-80	1981	1982	1983	1984
Gross domestic savings	51.2	53.6	54.1	61.8	65.9	59.6	56.2
Social sector savings	89.7	79.3	79.4	87.1	102.1	108.1	89.4
Gross investment	72.4	69.6	71.5	78.7	77.9	81.0	88.3
Social sector gross investment	87.9	85.3	85.5	92.0	90.9	94.3	93.7

Note: For definitions, see Table 2.
Source: NBY, Quarterly Bulletin, various issues.

Table A10. YUGOSLAV WORKERS' PERCEPTION OF ACCUMULATION AND INVESTMENT - QUESTIONNAIRE DATA (in % of workers' answers)

1. Accumulation principle		2. Accumulation level		3. Need for investment		4. Renouncing pers. incomes in favour of investment	
Accum. is a residual, after pers. incomes are paid	49.6	Too low, after pers. incomes and all obligations are met	71.5	Small	27.6	No	23.7
Both planned pers. incomes and planned accum. are realized	37.0	Corresponds to needs	18.5	Medium	22.2	Little	29.7
Planned accum. is realized even at expense of pers. incomes	6.7	Too high respect to investment plans	2.3	High	21.5	Partly	25.3
No accumulation	5.9	Too high respect to income	1.5	Quite high	18.8	Quite	11.8
Other	0.8	Other	6.2	No need	9.9	Much	9.5

5. Accumulation/bank funds proportion		6. Preference for		7. Own sources for financing investment	
Generally equal	53.0	Own sources	35	Higher than share needed for obtaining bank credits	42.5
Rarely equal	28.5	Borrowed sources	65	Just sufficient to cover the share needed for bank credits	57.5
Occasionally equal	18.5				

Note: The answers reported are the result of a questionnaire for workers in a sample of 147 Yugoslav enterprises. Interviewed in 1979, except for questions 6 and 7, which refer to the initial sample of 40 enterprises.

Sources: Questions 1-5: Prasnikar (1983), pp. 52-53, 68-69.
Questions 6-7: Prasnikar (1980), p. 20.

Table A11. PRODUCTIVE ENTERPRISES SELF-FINANCING RATIO (social sector), 1961-84

Productive enterprises (in bins. of dinars):	1961-65	1966-70	1971-75	1976-80	1976	1977	1978	1979	1980	1981	1982	1983	1984
Gross savings	52.0	110.6	334.8	1125.3	117.2	151.3	196.1	259.7	401.0	559.0	754.1	1035.2	1643.9
Financial savings	-31.5	-51.2	-117.5	-465.0	-40.7	-77.8	-81.5	-125.4	-138.6	-149.0	-120.1	-301.9	-600.6
Gross investment	83.5	161.8	452.3	1589.3	157.9	229.1	277.6	385.1	539.6	708.0	874.2	1337.1	2244.5
Self-financing ratio (GS/GI, in %)	62.3	68.4	74.0	70.8	74.2	66.0	70.6	67.4	74.3	78.9	86.3	77.4	73.2
Self-financing ratio (adjusted) (1)	86.8	63.8											

Note: Social sector productive enterprises (OALs) include OALs of the productive sector, internal banks, work communities of banks and other financial organisations and self managed communities of interest for material production, housing and communal development. OALs gross savings represent the difference between proceeds from sales and goods and services, and expenditures, such as operating costs (excluding depreciation), contributions, taxes, personal incomes. OALs financial savings represent the difference between their savings and investment. OALs gross investment is the sum of their gross savings and financial savings.

(1) The ratio of adjusted gross savings to adjusted gross investment of social sector productive enterprises, as calculated by Schrenk et al. (1979), adjusted for inventory overvaluation. However, Schrenk et al. use Yugoslav national accounts data and not the data of the NBY.

Sources: NBY, Quarterly Bulletin, various issues, except for (1): Schrenk et al. (1979), p. 153.

Table A12. INVESTMENT IN FIXED ASSETS, BY SOURCE OF FINANCE (social sector), 1967-85 (bins. of dinars, and ratios, in %)

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Bins of din.																			
Total inv. in fixed assets	21.3	26.2	30.9	39.0	47.7	56.3	63.0	85.8	130.0	167.4	220.7	303.8	377.9	454.6	552.9	673.5	818.4	1211.6	2254.4
Enterprises	10.8	13.4	15.6	19.6	25.3	30.2	35.0	48.3	68.5	83.2	111.5	145.0	185.2	228.6	290.8	385.5	500.3	786.7	1487.1
Credits	9.3	10.7	13.3	16.9	22.4	25.2	19.8	35.0	57.5	79.1	103.9	152.7	185.1	216.9	250.9	273.2	298.8	393.7	713.7
Grants	1.2	2.1	2.0	2.5	2.8	3.7	2.5	4.0	5.1	6.1	5.3	7.6	6.1	9.1	11.2	14.8	19.3	31.2	53.6
Ratios, in %																			
Total=100																			
Enterprise	50.7	51.3	50.6	50.2	53.0	53.5	55.6	56.3	52.7	49.7	50.5	47.7	49.0	50.3	52.6	57.2	61.1	64.9	66.0
Credits	43.5	40.7	42.9	43.4	41.4	39.8	39.9	40.8	44.2	47.3	47.1	50.3	49.0	47.7	45.4	40.6	36.5	32.5	31.6
Grants	5.8	8.0	6.5	6.4	5.6	6.7	4.5	2.9	3.1	3.0	2.4	2.0	2.0	2.0	2.2	2.4	2.4	2.6	2.4

Note: Enterprises refer to both productive and nonproductive sectors, including self-managed communities of interest. Credits are loans from banks, from other enterprises, and from socio political communities. Grants are non-reimbursable funds of socio political communities. All figures refer to payments for investment in fixed assets.

Source: SZS, SGJ, various issues.

Table A13. INVESTMENT IN A SAMPLE OF 147 YUGOSLAV ENTERPRISES, BY SOURCE OF FINANCE, 1975-79 (in %)

	1975	1976	1977	1978	1979
Enterprises' own sources	41.03	36.09	31.18	32.81	42.70
of which: investment in other enterprises (1)	(1.25)	(0.88)	(0.73)	(0.87)	(7.82)
Credits from suppliers (domestic and foreign)	23.45	18.00	25.90	20.10	18.65
Bank credits (short and long term)	35.37	43.74	41.31	45.85	38.50
Other	0.15	2.17	1.61	1.24	0.25
Total sources of finance	100.00	100.00	100.00	100.00	100.00

(1) The so-called "pooling of labour and resources".
Source: Prasnikar, (1983), p. 122.

Table A14. SELF-FINANCED INVESTMENT EXCEEDING LEGAL DEPRECIATION (social sector productive enterprises), 1969 /1

	1969	1970	19/1
1. Self-financed investment in fixed assets of social sector productive enterprises (in billions of current dinars)	15.6	19.6	25.3
of which:			
2. Depreciation	11.4	13.4	17.2
3. Other self-financed investment	4.2	6.2	8.1
Ratio (in %) (3:1) (Self-financed investment exceeding legal depreciation)	26.9	31.6	32.0

Source: SZS, SGJ, various years. Self-financed investment exceeding depreciation: calculated by subtracting depreciation from total self-financed investment.

Table A15. REALISED INVESTMENT IN FIXED ASSETS (social sector), BY TYPE OF INVESTMENT, 1967-85 (% of total)

Total investment in fixed assets=100	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
New capacity	37.3	34.1	33.4	35.2	32.1	34.2	45.0	45.9	51.1	57.5	56.9	59.3	60.0	61.3	62.2	61.2	60.4	54.1	47.7
Enlargement	44.5	49.1	47.9	46.8	50.4	47.4	37.0	36.0	33.2	27.8	28.0	26.3	25.3	24.0	22.9	23.5	22.9	26.9	31.2
Maintenance	18.2	16.8	18.7	18.2	17.3	18.4	18.0	18.1	15.7	14.7	15.1	14.4	14.7	14.9	15.3	16.7	19.0	21.1	

Note: Investment in new capacity refers to both investment on a new location (creation of new enterprises) and on old location (new units in existing enterprises). Enlargement, reconstruction and modernisation refers to changes in assortment, technology, and technique of production; rearrangement of equipment and purchase of new fixed assets within existing working units. Maintenance refers to the replacement of capital. Realised investment of a given year refers to the period when they were constructed or purchased, regardless of the dates of payment.

Source: SZS, SGJ, various years.

Appendix B(a)

Table B1. INVESTMENT IN "OWNED" AND "NON-OWNED" ASSETS; EVIDENCE FROM YUGOSLAVIA, 1966-1985

1. Investment in owned assets	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Interest rates on household savings	6.0	7.0	7.0	7.5	7.5	7.5	7.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	20.0	28.0	55.0	60.0
Inflation *	23	7	5	8	11	16	17	20	21	24	12	15	14	20	30	41	32	41	53	74.0
Real rate of return a)	-13.8	0.0	1.9	-0.5	-3.2	-7.3	-8.1	-8.3	-9.1	-11.3	-1.8	-4.3	-3.5	-8.3	-15.4	-22.0	-9.1	-9.2	1.3	-8.0
2. Investment in non-owned assets																				
External funds																				
Interest rates on bank loans	8.0	8.0	10.0	8.0	8.0	8.0	12.0	12.0	12.0	12.0	12.0	10.0	11.5	11.5	12.0	21.0	38.0	63.0	64.0	
Inflation **	11	2	0	3	9	15	11	13	29	22	6	10	8	13	27	25	32	57	82.0	
Real effective cost of borrowed funds a)	-2.7	5.9	10.0	4.9	-0.9	-6.1	0.9	-0.9	-13.2	-8.2	5.7	0.0	3.2	1.3	-11.8	-22.8	-3.2	4.5	3.8	-9.9
Internal finance																				
Nominal opport.cost of internal finance																				
-tax on business fund	3-4	3-4	3-4	3-4	3-4	3-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-opportunity foregone on time deposits	6.0	7.0	7.0	7.5	7.5	7.5	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	20.0	28.0	55.0	60.0	
Capital returns																				
-Profit rate I b)	24.4	23.5	24.3	30.0	32.6	25.2	30.8	30.9	38.0	25.5	25.1	24.3	25.5	26.0	27.0	25.7	21.9	22.7	23.5	21.9
-Profit rate II c)	12.3	11.5	11.8	11.7	13.5	12.1	14.5	14.5	19.4	12.3	10.5	11.1	11.4	13.3	12.6	11.3	11.2	11.6	9.7	
-Average returns d)	36	34	35	28	28	28	53	53	48	23	24	27	31	31	30	29	27	26	27	n.a.
Labour turnover e)	2.3	1.8	1.7	1.7	1.8	1.7	1.6	1.5	1.0	1.3	1.2	1.3	1.3	1.2	1.2	1.1	1.0	-1.1	1.1	1.1

*Industrial producer prices annual percentage increase.

a)Calculated as [(1+interest rate/1+inflation rate) -1] x 100.

b)[(Gross revenue-material costs-net personal incomes-depreciation)/historical value of capital]x100 (includes all taxes and contributions. Contractual and legal obligations, and expenditure on various services, which are all paid out of current profits). This category is what in Yugoslav terminology is called "visak proizvoda" (surplus value).

c)[(Depreciation + allocation to funds)/historical value of capital]x100.

d)Realised returns on 100 dinars of utilized resources (SDK data).

e)Labour turnover in productive sectors. Fluctuation of workers is calculated by the FIS monthly, on the basis of a sample covering 80% of workers in OALs, working communities and other organisations. Workers' fluctuation is calculated as a ratio between the number of workers left, and the number of workers at the beginning of the month + newly admitted workers during that month.

Sources: Interest rates: NBV Quarterly Bulletin, various issues. Inflation rates: SZS, SGJ, various years. Profit rates: SZS, SGJ, various years, table on distribution of enterprise GMP. Labour turnover: SZS, SGJ 1978, p. 128; SZS, SGJ 1980, p. 134, tables on Fluctuation of workers in productive sectors.

Table 82. FACTORS INFLUENCING THE TIME HORIZON OF YUGOSLAV WORKERS - QUESTIONNAIRE DATA (in % of total answers)

1. Firing workers because of bad business results*		2. Fluctuation of workers*		3. Employment in another firm		4. Years employed in the same firm		5. Level of workers' commitment	
No	96.0	Rarely	58.2	Don't think of it	39.2	Less than 1	4.6	Not a good firm	20.6
Little	2.9	Sometimes	34.3	Don't yet think of it	25.8	1-5 years	26.0	A good firm	37.8
Much	0.7	Usually	7.5	Cannot decide	8.0	6-15 years	40.3	Quite a good firm	27.5
				Has not yet decided	13.8	More than 15	29.1	Very good firm	14.2
				No such intention	13.2				

*Questions posed to managerial workers.

Source: Prasnikar (1983), p. 49, 51, 71, 72, 74, questionnaire data from a sample of 147 Yugoslav enterprises.

Table B3. ORGANISATIONAL CHANGES OF YUGOSLAV ENTERPRISES, 1976-84

	1976-78			1979-80			1981-82			1983-84		
	Number	%	%	Number	%	%	Number	%	%	Number	%	%
TOTAL	13770	100.0		9403	100.0		6048	100.0		5721	100.0	
Leased	2721	19.8	100.0	1993	21.2	100.0	1671	27.6	100.0	2030	35.5	100.0
-by liquidation	262	1.9	9.6	442	4.7	22.2	345	5.7	20.7	283	4.9	13.9
-by will of members	266	1.9	9.8	281	3.0	14.1	264	4.3	15.8	274	4.8	13.5
-by merger	950	6.9	34.9	600	6.4	30.1	530	8.8	31.7	781	13.7	38.5
-by affiliation	687	5.0	25.2	424	4.5	21.3	405	6.7	24.2	603	10.5	29.7
-by division	556	4.1	20.4	246	2.6	12.3	127	2.1	7.6	89	1.6	4.4
Newly-established	8183	59.4		4965	52.8		2877	47.6		1687	29.5	
Status changes	1978	14.4		1230	13.1		919	15.2		929	16.2	
Activity changes	888	6.4		1215	12.9		581	9.6		1075	18.8	

Note: Enterprises refer to organizations of associated labour.
Source: SZS (1986), p. 31, table 2.2 (English version).

Table B4. COVERAGE OF ENTERPRISE LOSSES IN YUGOSLAVIA, 1980-87 (by year of coverage)

	(in billions of current dinars)								(as % of total losses)							
	1980	1981	1982	1983	1984	1985	1986	1987	1980	1981	1982	1983	1984	1985	1986	1987
TOTAL losses (covered & uncovered)	16.4	20.9	28.6	47.7	87.1	99.8	241.8	458.2	100	100	100	100	100	100	100	100
Loss covered from:																
1.Non-reimbursable funds	2.4	2.7	3.3	6.7	22.8	9.6	40.0	141.8	14.6	12.9	11.5	14.0	26.2	9.6	16.5	30.9
-of BOALs	0.4	0.7	1.5	1.5	6.1	3.4	17.0	35.1	2.4	3.4	5.2	3.1	7.0	3.4	7.0	7.7
-common reserve funds	0.2	0.3	0.8	0.3	1.4	0.5	2.4	21.5	1.2	1.4	2.8	0.6	1.6	0.5	1.0	4.7
-socio-polit.communt.*	1.6	1.4	0.7	4.6	14.6	4.5	9.4	38.1	9.8	6.7	2.4	9.6	16.8	4.5	3.9	8.3
-claims written off	0.2	0.3	0.3	0.3	0.7	1.2	11.2	47.1	1.2	1.4	1.0	0.6	0.8	1.2	4.6	10.3
2.Rehabilitation credit	13.3	14.1	19.3	27.9	52.3	73.9	171.3	226.9	81.1	67.5	67.5	58.5	60.0	74.0	70.8	49.5
-of BOALs	1.5	2.3	2.6	5.6	11.0	30.9	58.3	93.7	9.2	11.0	9.1	11.7	12.6	31.0	24.1	20.4
-common reserve funds	6.5	7.1	11.4	12.9	25.1	12.6	12.6	0.0	39.6	34.0	39.9	27.0	28.8	12.6	5.2	0.0
-banks	3.5	3.8	4.2	6.6	12.9	23.7	95.2	113.4	21.3	18.2	14.7	13.8	14.8	23.7	39.4	24.7
-socio-polit. communt.	1.8	0.9	1.1	2.8	3.3	6.7	5.2	19.8	11.0	4.3	3.8	5.9	3.8	6.7	2.2	4.3
Loss still uncovered at end of year	0.7	4.1	6.0	13.1	12.0	16.2	30.5	89.5	4.3	19.6	21.0	27.5	13.8	16.2	12.6	19.5

*Socio-political communities include the federation, socio-political communities at the level of republics and autonomous regions, and socio-political communities at the communal level.

Note: The table reports losses according to year of coverage, referring to losses as shown in the financial reports at the end of the previous year. For 1980-1981, calculated from Knight (1984) also on the basis of SDK data.

Source: SDK data.

Table B5. OVERDUES AND COST OVERRUNS IN A SAMPLE OF 125 INVESTMENT PROJECTS IN YUGOSLAVIA, 1979-82

1. Project overdue

Total time, in months
Planned time: 3590 months
Realized time: 4878 months
Overdue: 1775 months

Length of overdue	number of projects	% of total
Less than 12 months	46	37.7
13-24 months	31	25.4
25-36 months	14	11.5
More than 36 months	9	7.3
Completed in planned time	17	14.0
Completed before time	5	4.1
TOTAL	122	100.0

2. Cost overrun

	Investment projects		Estimated planned cost	Cost overrun	Cost overrun as % of estim. cost
	Number	%	(in billions of dinars)	(in billions of dinars)	
Without cost overrun	29	12.5	2.355	-	-
With cost overrun	96	87.5	16.515	8.280	50.1
TOTAL	125	100.0	18.870	8.280	43.9

3. Financing of cost overrun

	Billions of dinars	% of total
Bank loans	4.276	51.6
Investors' sources	1.830	22.1
Pooled resources	0.811	9.8
Other firms' sources	0.941	11.4
Foreign sources	0.144	1.7
Other	0.278	3.4
TOTAL	8.280	100.0

Note: Based on a sample of 125 investment projects, an empirical study undertaken by the Associated Belgrade Bank.
Source: Celenkovic et al. (1984). pp. 16, 71, 82.

Table B6. SECURITIES IN YUGOSLAVIA, 1973-84 (in billions of dinars, end-year values)

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Securities bought by banks, TOTAL	1.6	2.1	3.4	19.1	35.0	75.2	107.9	147.3	199.9	207.8	222.1	269.3
By type:												
Promissory notes	0.0	0.0	0.0	2.9	13.7	42.8	68.0	92.5	114.5	117.7	103.8	137.1
Bonds	0.9	1.1	2.3	10.9	15.3	18.7	17.7	22.7	29.2	28.1	26.4	26.3
NBY treasury bills	0.7	1.0	1.1	5.1	5.6	5.2	5.1	5.0	4.7	4.6	4.9	9.6
-Other	0.0	0.0	0.0	0.2	0.4	8.5	17.1	27.1	51.5	57.4	87.0	96.3
By sector:												
-Productive OALs	-	-	-	-	17.1	50.8	82.3	113.6	158.7	165.0	181.1	225.0
-Federation	-	-	-	-	9.6	13.1	11.0	16.5	24.0	23.9	23.6	23.4
-Other socio-pol.com.	-	-	-	-	1.3	2.2	3.1	3.4	3.1	2.5	1.6	1.2
-Other sectors	-	-	-	-	7.0	9.1	11.5	13.8	14.1	16.4	15.8	19.9
Securities issued by banks, TOTAL	3.4	4.1	4.7	9.6	15.6	17.2	85.8	110.0	137.6	161.6	161.0	206.3
By type:												
-Bonds	-	-	-	-	9.9	11.7	80.3	104.4	132.4	155.4	155.1	196.2
-NBY treasury bills	-	-	-	-	5.6	5.2	5.1	5.0	4.6	4.6	4.9	9.6
-Other	-	-	-	-	0.1	0.3	0.4	0.6	0.6	1.6	1.0	0.5
By sector:												
-Productive OALs	1.7	1.7	1.8	3.0	6.8	5.5	73.9	98.7	127.4	152.6	153.1	195.2
-Socio-polit.com.	0.6	0.9	1.1	0.9	1.8	3.9	3.9	3.5	3.1	2.5	1.5	0.4
-Other sectors	1.1	1.5	1.8	5.7	7.0	7.8	8.0	7.8	7.1	6.5	6.4	10.8

Note: The table reports securities of all issuers (holders) that undertake their transactions concerning securities through banks. Promissory notes include domestic promissory notes in foreign currency, dinar discounted promissory notes and rediscounted promissory notes. Bonds include short-term bonds of socio-political communities and other issuers, subscribed from reserve funds and giro accounts. Treasury bills are of the NBY, subscribed by basic and associated banks. Other securities include both dinar and foreign currency remaining types of securities, as well as investment in securities. Banks include commercial and associated banks, the National Bank of Yugoslavia, and other financial institutions.

Source: NBY Quarterly Bulletin (Serbocroat edition), Dec. 1983, Aug.-Sept. 1985.

Appendix B(b)
Econometrics appendix

1.DATA

Deflation: Since the Yugoslav economy has been characterised by high inflation, all data in current dinars have been deflated and transformed into constant 1972 dinars (current dinar values/cost of living index, base year 1972). 1972 was chosen as the base year because it is the base year usually used by the Federal Statistical Institute in its Statistical Yearbooks of Yugoslavia (SGJ) when reporting statistics in constant prices.

Variables:

SD: Savings deposits of households (excluding foreign currency), in 1972 dinars, as provided by the SGJ.
(Although households are allowed to have foreign currency accounts, they cannot freely acquire foreign currency, and this justifies the exclusion of foreign currency deposits).

INV: Investment in fixed assets of the social sector, in 1972 dinars.
Calculated from investment in fixed assets of the social sector in current dinars, as provided by SGJ, deflated by the cost of living index (1972=100).

SFI: Investment in fixed assets financed by enterprises of the social sector, in 1972 dinars.
Calculated from SGJ data on investment in fixed assets of the social sector financed by firms in current dinars, deflated by the cost of living index (1972=100).

IR: Real interest rate on savings deposits of households. Calculated from National Bank of Yugoslavia (NBY) data on nominal interest rates on time deposits of households (end-year), and SGJ data on the annual percentage increase of the cost of living index (CLI), according to the formula:

$$IR=\left[\frac{(1+NIR)}{(1+CLI)} - 1\right]*100$$

LR: Real lending rate of bank loans extended to firms. Calculated from NBY data on nominal interest rate on loans to enterprises (end-year maximum), and SGJ data on the annual percentage increase of the cost of living increase (CLI), according to the formula:

$$LR=\left[\frac{(1+NLR)}{(1+CLI)} - 1\right]*100$$

H: A proxy for the time horizon of the average worker, calculated from the indicator on the average monthly fluctuation of workers (labour turnover) (in %):

$$FW = \frac{WL}{WT+WN}$$ where

WL: number of workers left during a month
WT: total number of workers at the begining of month
WN: newly admitted workers during month

The time horizon proxy can be represented as $H=1-FW$. The lower is the fluctuation of workers, the longer the time horizon of the average worker.
(FW could have been used directly, but since H and FW are inversely related, this would have provoked confusion in expected signs).

PF: Profit rate (in %), according to balance sheet data of social sector firms distribution of GMP in current dinars (SGJ), using the formula:

$$PF = \frac{GMP-depreciation-personal\ incomes}{Historical\ value\ of\ capital}$$

DIR: Absolute difference between the real interest rate on savings deposits and the real lending rate for enterprises, i.e.
$$DIR = IR - LR$$

BL: Bank loans for fixed assets extended to enterprises (social sector), in 1972 dinars.
Calculated from SGJ data on bank loans for fixed assets given to enterprises in current dinars, deflated by the cost of living index (1972=100).

T: Trend variable, which takes the values 1-14 in 1966-84.

DA: Dummy variable, which takes the value of 0 until 1979, and 1 thereafter. It reflects the presence of restrictive measures of the government, after one of the tolerance limits is hit.

INC: Total disposable income of households, in 1972 dinars.
Calculated from SGJ values in current dinars, deflated by the cost of living index (1972=100).

GMP: Gross material product, in 1972 dinars, as provided by the SGJ.

ED: Kornai's "expansion drive", represented as the difference between the investment index (INV variable, base year 1966=100) and the GMP (social sector) index (SGMP, base year 1966=100):
$$ED = INV_i - SGMP_i$$

FXA<1>: Fixed assets of the social sector of the economy, in 1972 dinars, as provided by the SGJ, lagged for one year.

WIP: Stock of investment in fixed assets in unfinished projects in 1972 dinars.
Calculated from SGJ data on estimated cost of investment in unfinished projects reported in current dinars, deflated by the cost of living index (1972=100).

PINV: Planned growth of investment in fixed assets, in 1972 dinars.
Calculated from the planned annual rate of growth of investment in fixed assets in % (PGRI), as provided by annual resolutions (one-year plans), and the actual level of real investment in fixed assets in previous year:
$PINV(t)=INV(t-1) + [(PGRI(t) * INV(t-1)]$

PGMP: Planned growth of social sector GMP, in 1972 dinars.
Calculated from the planned annual rate of growth of GMP in % (PGMP), as provided by annual resolutions (one-year plans), and the actual level of real GMP in previous year:
$PGMP(t)=GMP(t-1) + [(PGMP(t) * GMP (t-1)]$

2. STATISTICS
In all our calculations, the IAS-System has been used, an econometric software package for the analysis of time series data, developed by Sonnberger et al. (1986).

2.1. Standard statistics.
The standard way of reporting regressions in the IAS-System is the one used in the text, while the meaning of the statistics reported is the following:

R2 is the Coefficient of Determination, and R2C is the Corrected Coefficient of Determination. For regressions without an intercept, R2 and R2C are computed using a special option (R) which takes into account the non-inclusion of the intercept.

BC are the so-called Beta-Coefficients, which measure the percentage of change in the dependent variable explainable by the change in the explanatory variable.

DW is the Durbin-Watson statistic, testing for the presence of serial autocorrelation of the residuals. Whenever DW lies in the inconclusive region, or whenever the standard DW tables are not applicable, as in the case of regressions without an intercept, a user can use the Durbin Exact Test (DWE) to obtain the exact probability that the Durbin-Watson statistics takes a value less than or equal to the sample outcome. The null hypothesis on no autocorrelation is rejected whenever the probability is less than the assumed %-level of the Durbin-Watson test (usually 5%).

Thus at 5% level of significance, if we are testing for positive autocorrelation, its presence will be confirmed if DWE gives a probability lower than 5%; if we are testing for negative autocorrelation, its presence will be confirmed if DWE gives a probability higher than 95%. In case a lagged variable is included among the explanatory variables, Durbin's h-statistics can be used for testing for autocorrelation by applying the DWH Test.

RHO(1) is the first order autocorrelation coefficient of the regression residuals.

ST. ERROR: Standard error of the regression.

MAPE is the Mean absolute percentage error of the regression, defined as:

$$MAPE = 100 \; (1/T \sum_{\tau=1}^{T} u_t/y_t),$$ where u is the estimated residual of the regression, $u = y - xb$.

2.2.Tests:

1)NORMAL: Jarque-Bera test for normality. H0: residuals are normally distributed.

2)HARVEY: Harvey-Collier test for functional misspecification. H0: equation linear in variable X.

3)RBOW: Utts test for correctness of the functional form. H0: Model is correct.

4)DIFF: Plosser-Schwert-White test for correctness of the model specification. H0: Standard assumptions of OLS regression apply.

5)IMT: White and Hall's test for correctness of the model specification. H0: Standard assumptions of OLS regression apply.

6)HETERO: Pagan-Hall-Trivedi test for specific heteroscedasticity. H0: variance of residuals is constant.

7)F test, testing whether single parameters in a regression are equal to certain values.

All of the above tests give the probability value that the null hypothesis is correct. Whenever this probability is higher than 5%, the null hypothesis can be accepted at 5% level of significance.

8)OUTLIE: <u>Cook-Weisberg test for the presence of outliers</u>. The test gives the maximum t-value of the outlier coefficients, which should be lower than the critical value (reported in tables) in order to conclude that there are no outliers.

9)ARSIM: <u>Harvey-Phillips test for autocorrelation</u>. The test detects first order autoccorelation of the regression disturbances of a single equation in a simultaneous equation system. HO: Residuals of the equation are uncorrelated. The test reports the value of test-statistics, which should then be checked in the DW tables.

10)AR: <u>Breusch-Pagan and Godfrey's test</u>, testing for the presence of higher order autocorrelation of residuals.

2.3.<u>Results of tests performed:</u>

Equation: Test	1.1.	1.2.	1.3.	2.1.	2.2.	2.3.	2.4.	2.5.
NORMAL (prob.)	19.84	20.87	26.79	64.09	76.17	45.51	75.68	64.68
OUTLIE (t-value)	2.49	2.28	2.36	2.45	2.16	2.14	2.19	1.92
HETERO (prob.)	26.04	25.22	54.38	23.72	11.70	75.91	11.32	50.63
HARVEY (prob.)								
Variable 1	31.74	74.62	63.24	–	–	–	–	–
Variable 2	81.45	13.14	12.87	–	–	–	–	–
Variable 3	24.97	32.02	35.75	–	–	–	–	–
Variable 4	18.08	38.40	65.10	–	–	–	–	–
RBOW (prob.)	75.79	87.52	91.08	–	95.75	47.06	91.58	–
DIFF (prob.)	17.29	14.60	24.30	33.91	56.81	41.03	42.55	28.41
IMT (prob.)	–	–	99.99	–	–	52.80	–	–

<u>F TEST Equat.2.2.</u> HO: B4=0 <u>Equat.2.3.</u> HO: B3=0 B4=0 B5=0
<u>Prob. HO correct:</u>   91.97   21.44 37.89 38.82

Appendix C

Table C1. CRITERIA FOR REWARDING PAST LABOUR

C r i t e r i a	% of positive answers Croat.	Slov.	Rank Cr.	Sl.
1.Investment of own capital (workers' savings; personal loans)	18.9	22.8	5	4
2.Rewards for innovation	28.4	21.1	4	5
3.Total personal income	70.5	69.5	1	1
4.Years of employment in firm	40.7	42.5	3	3
5.Total years of employment	61.4	52.2	2	2

Table C2. FORMS OF REWARDING WORKERS' PAST LABOUR

Orientation	F o r m	% of positive answers Croat.	Slov.
Entrepreneur.	A.Worker invests in the firm,receives pers. income and a part of income, depending on profit.	68.2	75.3
	B.Worker puts his savings at firm's disposal, receives interest in advance	51.4	58.6
	F.Worker receives a special reward depending on contribution to past labour while employed in that firm	58.7	55.3
	J.Worker's pers. income depends on productivity in the whole firm	80.3	89.0
Self-managed	K.Worker's pers. income depends on average productivity in the industry (of that republic)	48.3	40.6
	L.Worker's pers. income depends on average productivity in the commune	37.7	29.4
	M.Worker's pers. income depends on average productivity in the republic	40.0	32.0
	N.Worker's pers. income depends on average productivity in Yugoslavia	38.2	23.4
Security	C.All workers receive equal rewards depending on firm's business results	49.8	47.5
	D.Worker receives a special reward depending on total seniority	72.8	68.0
	E.Worker receives a special reward depending on seniority in that firm	72.8	76.5
	G.Worker receives a pension depending on seniority in that firm	51.4	52.6
	H.All workers receive same pension	23.3	18.9
	I.Workers performing similar jobs receive equal pensions	61.5	62.1
	O.Workers helped for housing problems	88.4	88.5
	P.Workers job protection	72.8	81.3

Source: Zupanov et al., (1977).

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