

APPROPRIABILITY OF RETURNS IN THE YUGOSLAV FIRM

Milan Vodopivec

The World Bank

Mass privatization schemes, based on employee ownership, offer a simple and quick solution even for "ungovernable" transitional economies such as Russia, but they are often viewed with skepticism [Lipton and Sachs, 1990]. Many are persuaded that leaving the control of the firm in the hands of workers will fail to improve corporate governance. The objection is theoretically controversial.¹ The failure of Yugoslavia, the Eastern European country with the most significant experience with self-management, is often used to substantiate the claims that a labor-managed economy is not viable [Hinds, 1990; Pejovich, 1990].

The purpose of this paper is to show that the Yugoslav experience does not warrant sweeping conclusions about the effectiveness of labor management. It challenges the central premise of most studies of Yugoslavia's economic system — that "[w]orkers have non-tradable claims on the year-by-year residual cash flows contingent on employment" [Jensen and Meckling, 1979, 482]. Instead, it focuses on the 1970s and 1980s system of wage determination and argues that workers had little say about their earnings and thus only appeared to be residual claimants. Rather, political elites, in blatant violation of nominal worker autonomy, set workers' earnings to level differences among firms. They achieved this through a pervasive and massive redistribution of income, implemented by discretionary taxation and subsidies to enterprises. Indeed, the nonappropriability of returns was the hallmark of the system — and the implications for efficiency were grave.

To substantiate my thesis, I will empirically investigate the effectiveness of the external control of income distribution in the Yugoslav firm, and explore the mechanism of interfirm redistribution that brought about the leveling of income among firms.

AN EMPIRICAL INVESTIGATION OF THE INCOME DISTRIBUTION OF THE YUGOSLAV FIRM

In an effort to regain political control over income distribution in the mid-1970s, Yugoslav authorities introduced special regulations that left little room for worker decision-making. The regulations provided a detailed methodology for determining the "socially warranted" personal earnings fund of the firm — the total amount to be paid as workers' earnings [Ben-Ner and Neuberger, 1990]. The personal earnings fund depended positively on income per worker (income sharing arrangements) and, for a given firm income, negatively on the capital stock (to acknowledge the contribution of capital as a factor of production). While this makes good economic sense, the personal earnings fund was also subject to external control which — by leveling out

income across firms — addressed the political aspect of income distribution. In the mid-1980s, a “correction factor” was superimposed upon economic indicators to determine the personal earnings fund. For example, other things equal, wages in a firm with a business success index 60 percent above average were constrained to be only 25 percent above average, while those in a firm with business success index 40 percent below average were mandated to be only 19 percent below average [Vodopivec, 1989].

Two questions naturally arise: First, given the workers’ wage aspirations, were the controls enforced effectively? Second, when the socially warranted personal earnings fund exceeded the firm’s net revenues less material costs and other obligations, did the workers receive “socially warranted” wages anyway, thus putting the firm into the red? The empirical analysis answers those questions and provides insights into the redistribution that resulted from the attempts to compress wage differences among enterprises.

The mechanism for controlling the Yugoslav firm’s personal earnings allows one to specify the personal earnings equation as follows. *First*, the firm’s personal earnings per worker increase with the firm’s income per worker, but less than proportionally (especially for firms whose income per worker deviates significantly from mean income per worker). To capture such a nonlinear relationship, the linear term of income per worker — the explanatory variable in the equation for personal earnings — is complemented with two additional terms: squared income per worker and the inverse of the square. The squared term, with the expected negative sign, captures the earnings leveling at the upper tail, and the inverted squared term, with the expected positive sign, captures the earnings leveling at the lower tail. *Second*, *ceteris paribus*, that is, ignoring capital as a productive input, personal earnings is negatively related to capital stock (see below for the overall effect of capital stock). *Third*, to allow for industry-specific norms for required capital accumulation rates among industries, industry dummies are included in the equation for personal earnings. *Fourth*, to check for the possible direct effects of interfirm redistribution flows (discussed below) on personal earnings, net subsidies received by the firm are also possible regressors.

Let us now turn to retained earnings (profits). The rules for income distribution called for a positive association between income per worker and the rate of accumulation (retained earnings as a percentage of equity). If the personal earnings’ share of the firm’s income was indeed regressive, one could expect that profitability increased more than proportionally with income — assuming that the taxation of income was linear (an assumption of critical importance). Even with progressive taxation, however, one could expect a positive association of *absolute* retained earnings (profits) with firm income. As in the personal earnings equation, industry dummies are included in the equation to control for the industry-specific norms of retained earnings rates.

An interesting and somewhat surprising implication of this mechanism — if actually binding and effectively imposed — is that one cannot expect personal earnings to “crowd out” retained earnings (profits). That is, one should observe a

TABLE 1
Personal Earnings Functions

Variables	Variant 1	Variant 2
INC/N	0.219 ^a (18.18)	0.217 ^a (18.28)
(INC/N) ²	-0.00067 ^a (-8.73)	-0.00068 ^a (-9.05)
(INC/N) ⁻²	24.188 (1.81)	24.155 (1.81)
CAP/N	-0.0142 ^a (-5.44)	-0.0138 (-5.34)
NSUBS/N	.0085 (1.09)	—
INTERCEPT	12.297 ^a (23.66)	12.307 ^a (23.68)
R ²	0.746	0.745

The dependent variable is net personal earnings per worker. Values in parentheses are *t*-ratios. ^a indicates significance at the 1 percent level.

INC: Firm’s realized income (including depreciation).

N: Number of workers in firm (yearly average of the number of workers on the payroll).

CAP: Discounted value of fixed assets in use.

NSUBS: Net subsidies (the sum of formal subsidies and quasi-subsidies minus the sum of formal taxes and quasi-taxes).

positive association between personal earnings per worker and income per worker, as well as between profitability and income per worker, and hence between personal earnings per worker and profitability. On the other hand, if a distribution control were not effective or binding, the relationship between personal earnings and profitability could be either positive or negative, and would be, on average, unpredictable. Depending on the firm’s investment opportunities, workers could allocate more resources either to retained earnings to increase investment, or to personal earnings to increase current consumption. This suggests another test of whether the social control mechanism of income distribution was a true constraint on earnings increases, and of the effectiveness of its enforcement.

The results of the equations for personal earnings and profitability are displayed in Tables 1 and 2, respectively. Both are in per capita form, use ordinary least squares, and include industry dummies (not reported). The dependent variable in the equation for personal earnings is net personal earnings divided by *N*, the number of workers in the firm.² The dependent variable in Table 2 is profitability, defined as the rate of return on equity — that is, the ratio between net profits and equity.³ The other symbols are defined in Table 1.

The estimated parameters are of the expected sign and highly significant (except net subsidies and the inverse squared income per worker in the equation for personal earnings — the latter is significant at 7 percent), and the overall fit is reasonably good for cross-sectional data. The equation for personal earnings per worker confirms

TABLE 2
Profitability Functions

Variables	(1)	(2)
INC/N	1.003 ^a (14.1)	—
(INC/N) ²	-0.00445 ^a (-10.69)	—
WAGES/N	—	9.626 ^a (6.16)
(WAGES/N) ²	—	-0.191 (-4.81)
INTERCEPT	-24.65 ^a (-7.89)	-102.98 (-6.70)
R ²	0.457	0.344

The dependent variable is the ratio between net profits and the business fund. Values in parentheses are *t*-ratios. ^a indicates significance at the 1 percent level.

INC: Firm's realized income (including depreciation).

N: Number of workers in firm (yearly average of the number of workers on the payroll).

WAGES: Net personal earnings.

the postulated nonlinear relationship between the income per worker and the personal earnings per worker, thus substantiating compression of personal earnings differentials across firms. The coefficient of *NSUBS* is positive, as expected, but its insignificance shows that control of personal earnings was tight: it did not allow subsidies to leak directly to personal earnings. The coefficient of *CAP/N* is negative, as predicted. Indeed, the empirically identified pattern of income distribution is the one stipulated by the control, implying a binding constraint imposed by the control.

What do the above results say about the effect of capital intensity on workers' earnings, the topic debated so vigorously in the literature? As the negative coefficient of *CAP/N* indicates, the more capital-intensive the firm, the lower its personal earnings per worker — *ceteris paribus*, that is, keeping the income per worker constant. But the *ceteris paribus* clause is not warranted: increasing capital intensity also increases the output (and hence the income) per worker via production relationship, and, therefore — as called for by the control mechanism — also earnings per worker. In other words, increasing capital intensity has two effects on earnings per worker: a negative cost effect, stemming from the charge for the use of social capital; and a positive output effect, via increased output (and income) per worker.

Further computations show that an increase in capital intensity modestly increased earnings per worker. In other words, even though the firms were charged for the "rented" capital (the negative cost effect as suggested by the negative coefficient of *CAP/N* in the earnings function), such a charge was more than offset by the positive output effect. But such an effect, though statistically significant, was small — the elasticity of earnings per worker with respect to capital intensity, estimated for the

mean of the sample in question, was 0.04 (see Appendix B). The low estimate of the elasticity is thus in line with the findings of the "labor school" for the period of the Yugoslav liberal socialism (for example, the one of Estrin and Svejnar [1993]), and gives little support to the critics of the Yugoslav system who attribute its failure to the ability of workers in capital-intensive firms to appropriate rents accruing to capital [Hinds, 1990].

Turning to the results on profitability, one finds, as expected, that this variable was positively associated with firm income (personal earnings), but, as the coefficients of the squared terms suggest, at a decreasing rate. The negative sign of the squared terms of *INC/N* and *WAGES/N* is contrary to the above prediction (taxation will indeed be shown to be progressive). Especially interesting is the variant for which personal earnings is an explanatory variable. It confirms a positive relation between personal earnings and profitability and thus the "crowding-in" effect of personal earnings on retained earnings, as mandated by the control mechanism. This provides additional evidence of how effectively income distribution was controlled.

To sum up, the econometric results confirm that Yugoslavia's mechanism for the social control of the distribution of a firm's income was both binding and effectively enforced. This has two important implications. First, as the result of such control, personal earnings differentials among Yugoslav firms were compressed. Second, except for deciding to take a slice of the pie as large as the authors of the regulations allowed (a decision anticipated and accounted for by the regulations' authors), workers had their hands completely tied regarding the distribution of firm income.

THE MECHANISM OF INTERFIRM REDISTRIBUTION

Such findings represent but part of the story of the Yugoslav firm's distribution of income — the less exciting part, at that. The mechanism that enabled inefficient firms to pay the socially warranted personal earnings even though such earnings exceeded their net revenues is still missing. As one can infer from the regressive relationship between profitability and income per worker, this lay in Yugoslavia's peculiar system of taxation and subsidization, that is, in the Yugoslav version of the soft budget constraint (e.g., Kornai [1980]), to which we turn now. I will describe briefly the channels of interfirm redistribution, quantify the accompanying transfers, and analyze the pattern of redistribution.

Channels of Transfers

In the Yugoslav economy, formal taxes and subsidies represented only the tip of the iceberg of income transfers. Others included (1) the alienation of resources from the original owner through forced financial investments with large stipulated negative returns — quasi-taxes and quasi-subsidies, and (2) the appropriation of financial savings through an inflation tax — losses and gains on money.⁴

Quasi-taxes and quasi-subsidies are defined as appropriations of resources by one agent that were formally accounted for as financial investments by another

TABLE 3
Interfirm Transfers

Variable	Mean	Coefficient of Variation	Minimum Value	Maximum Value
formal taxes	16.4	24.9	0.2	134.1
quasi-taxes	23.1	93.7	0.0	201.7
losses on money	63.1	66.8	1.2	611.8
formal subsidies	0.4	821.3	0.0	63.8
quasi-subsidies	7.4	200.7	0.6	377.3
gains on money	60.5	89.3	-45.9	852.5
net subsidies	-34.2	-108.5	-157.5	533.5

All variables are in the form of rates (a percentage of the firm's income); their mean is the income-weighted mean. Net subsidies are defined as the difference between the sum of subsidies and the sum of taxes.

agent. The resources appeared on the asset side of the investor's balance sheet, but were typically written off after several years (clearly, such investments were mandatory). *Losses on money* are defined as inflation tax on money assets held voluntarily; *gains on money* are the counterparts to losses on money. Taxes are thus defined here as the sum of formal taxes, quasi-taxes, and losses on money, and subsidies as the sum of formal subsidies, quasi-subsidies and gains on money (see Vodopivec [1989] for precise definitions).

Quantification of Transfers

For a sample of 416 Slovenian enterprises for 1986, formal taxes amounted to 16.4 percent of income, with little variation in the tax rate, as the coefficient of variation (24.9 percent) suggests (see Table 3). The informal components of taxation, on the other hand — quasi-taxes and losses on money — were both greater and more variable. Quasi-taxes were nearly 50 percent larger than formal taxes, and varied greatly. The variation of losses on money, the largest component of taxation, was somewhat lower than that of quasi-taxes.

Formal subsidies amounted to 0.4 percent of income in the sample. Formal subsidies varied greatly; most enterprises were profitable and so were not subsidized while others received large amounts. These subsidies varied more than other flows. Quasi-subsidies were considerably larger — 7.4 percent — and also varied greatly. Gains on money were the largest subsidies, amounting to 60.5 percent of income. They varied least of subsidy flows, but more than formal taxes and losses on money, and only a little less than quasi-taxes.

Total taxes exceeded total subsidies for the sample of enterprises. Their net taxes amounted to 34.2 percent of income. Many social services in Yugoslavia were

financed directly from enterprise income (they are in part financed through personal income taxation in capitalist countries), so the fact that enterprises were net taxpayers should not come as a surprise. But many enterprises — 75 of them, or 18 percent — received a net subsidy. Significant intra-industry differences confirm the general finding that redistribution was highly selective and discretionary.

These results suggest some interesting conclusions:

1. Informal taxation (quasi-taxes) was proportionately heavier than formal taxation. Moreover, the formal tax rate was quite uniform, the informal tax rate selective.
2. Formal subsidies and quasi-subsidies (which were largely gifts) together represented a significant 7.8 percent of income and were not evenly distributed.
3. Total taxes (formal taxes, quasi-taxes, and losses on money) exceeded total income by 2.5 percent. Total subsidies were significantly lower, but still amounted to 68.3 percent of income. Both were clear evidence of the heavy resource transfers.

The Pattern of Interfirm Redistribution

What was the driving force behind the redistribution of income between firms? I contend that it was the desire for job and wage security.⁵ The redistribution was carried out by pervasive leveling of personal earnings among firms. To be able to pay proportionately more of their value added as personal earnings (sometimes more than the firm's value added) than other firms did, enterprises with below-average income per worker received subsidies of various kinds. The donors of these subsidies were the firms with above-average income per worker — which is why the process is called "interfirm redistribution."⁶

The existence of this mechanism for income redistribution is confirmed by the regression equations for interfirm redistribution flows (Table 4).⁷

Net subsidies per worker are inversely and progressively related to income per worker. This confirms that quasi-taxes and quasi-subsidies were applied selectively: only profitable firms were taxed, and only unprofitable firms were subsidized. With the mechanism for controlling personal earnings as described above, profitability was primarily affected by net subsidies,⁸ and net subsidies are indeed inversely related at a progressive rate to income per worker — a result that is consistent with the regressive relationship between income per worker and profitability.

Net money gains per worker are also negatively related to the firm's income per worker: INC/N has a negative sign, but the squared term is positive. This means that net money losses (gains) per worker increased (decreased) with income per worker, but less than proportionally. The reason for regressiveness is that money gains and losses were not exclusively connected with bailing firms out. There were also credits for other purposes (such as investment in fixed assets), the approval of which was, at least to some extent, related to a project's financial viability, and firms with more income per worker were more likely to receive those credits. These credits

TABLE 4
Interfirm Redistribution Functions

Variables	Net subsidies per worker	Net money gains per worker
INC/N	-0.282 ^a (-3.82)	-0.313 ^a (-3.14)
(INC/N) ²	-0.000168 ^a (-3.51)	0.00130 ^b (2.01)
CAP/N	0.049 ^a (2.91)	0.052 ^b (2.29)
INTERCEPT	1.148 (0.35)	4.806 (1.09)
R ²	0.641	0.265

The dependent variables are net subsidies per worker (defined as the sum of formal subsidies and quasi-subsidies, minus the sum of formal taxes and quasi-taxes), and net money gains per worker (defined as the differences between gains and losses on money). Values in parentheses are t-ratios. ^a indicates significance at the 1 percent level and ^b indicates significance at the 5 percent level.

INC: Firm's realized income (including depreciation).

N: Number of workers in firm (yearly average of the number of workers on the payroll).

CAP: Discounted value of fixed assets in use.

were granted under less concessionary conditions than those given to unprofitable producers, but historically they brought money gains (that is, they were granted under negative real interest rates).

Capital intensity is also included as an explanatory variable in the above interfirm redistribution functions. There was little self-financing of Yugoslav firms; firms usually financed a substantial part of their investment with outside credits. Under these circumstances, firms with higher capital intensity were likely to receive bigger investment credits, so (other things equal) they received (1) larger net subsidies (for example, by pooling resources) and (2) larger net money gains (assuming that credits were associated with money gains).

Finally, as the sum of the coefficients of the *INC/N* terms in the first and second column indicates, the marginal (overall) "taxation" rate of value-added was a very high 59.5 percent.

CONCLUDING REMARKS

In the 1970s and 1980s, Yugoslav workers only appeared to be residual claimants, and thus the system only appeared to be labor managed.⁹ In reality, the external control of income distribution prevented firms with above-average business success from paying out higher earnings and allowed below-average firms to benefit from a massive and pervasive interfirm redistribution of income. As a result, the main characteristic of the system was that returns were not appropriable.¹⁰

Since workers had no real autonomy in determining their earnings, the Yugoslav system violated one of the main premises of labor management. Thus inferences derived from the analyses that assume the Yugoslav system to have been labor-managed appear to be unwarranted. In particular, in a search for a model for post-socialist economies of Eastern Europe, Yugoslavia's poor performance in the 1980s should not be taken as proof that worker (participation in) management cannot and does not work, as some have asserted.¹¹

Two policy implications also follow. One is a plea for privatization. The reason for the nonappropriability of returns created by income controls was the society's pursuit of job and wage security — that is, the socialization of risk. In a system supersensitive to layoffs, the official stance — that labor, to avoid being exploited, should have claimed the residual — was unsustainable. Thus the obvious prescription is to shift risk-taking from society at large to individual capital owners who can diversify their portfolios.¹²

The second policy implication addresses the government's ability to redistribute income. What makes such massive redistribution possible in a socialist economy is a political monopoly that — without checks and balances — gives the government unchallenged power. Yet that same political monopoly effectively prevents the government from committing itself to previously announced policies — hence the lack of government credibility.¹³ Thus the emergence of a democratic political system not only brings political liberties but also may contribute to economic efficiency by blocking discretionary redistribution of income.

APPENDIX A

Data and Calculation of Interfirm Redistributive Flows

The empirical analysis is based on a sample of 416 Slovenian manufacturing enterprises for 1986. Only firms directly engaged in production activities were selected (so-called working communities performing general services such as marketing, planning, and analyses were dropped). The units are mostly Basic Organizations of Associated Labor (BOALs), but sometimes also so-called uniform Working Organizations (WOALs, units that are not BOALS). The enterprises in the sample account for about 10 percent of total gross material product of the republic of Slovenia, the most developed of the republics and autonomous provinces of Yugoslavia.

The data source is the Social Accounting Service data (the income statement, balance sheet, and additional special accounting data). For each firm, the data include 149 variables on the income statement, 362 variables on the balance sheet, and 110 variables from the special accounting data set.

Only important industries (those with 10 or more firms, as defined at the lowest, 5-digit level) were selected: drawn and rolled steel, cast metal products, brick production, building materials, sawmilling, board manufacturing, furniture, paper and paper products, cotton fabrics, wool fabrics, knitwear, underwear, garments, footwear, bread and pastry, vegetable and fruit processing, slaughtering, wine production, and printing.¹⁰

APPENDIX B

**Computation of the Elasticity of Earnings per Worker
with Respect to Capital Intensity**

The elasticity of earnings per worker with respect to capital intensity is

$$(1) \quad E = d \ln(W/N) / d \ln(K/N) = (K/W)(dW/dK),$$

assuming that the number of workers does not change (W is the wage bill, N is number of workers, and K is capital).

As discussed in the text, earnings per worker equal to

$$(2) \quad W/N = a(Q/N) + b(Q/N)^2 + c(Q/N)^{-2} + d(K/N),$$

where Q is income of the firm, and a , b , c , and d are the estimated parameters (variant 2 of the earnings function of Table 1).

Assuming Cobb-Douglas technology ($Q = AK^\alpha N^\beta$), we have

$$(3) \quad dQ/dK = \alpha(Q/K).$$

Differentiating (2) with respect to K yields:

$$(4) \quad dW/dK = [a + 2b(Q/N) - 2c(Q/N)^{-3}](dQ/dK) + d.$$

Inserting equation (4) into equation (1) and taking account of equation (3), as well as using the estimate of 0.19 for α from Vodopivec [1989], gives the estimate of the elasticity of 0.04 (at the sample mean).

To check whether earnings are significantly affected by capital intensity, I estimated equation (2) with the following restriction on the estimated parameters:

$$[a + 2b(Q/N) - 2c(Q/N)^{-3}]\alpha(Q/K) + d = 0.$$

(that is, setting equation (4) to zero). The restriction proved to be significant ($F=62.9$).

NOTES

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1. Advocates of worker participation (notably, Vanek [1970]) argue that it induces workers to work harder by boosting team spirit, improving morale, and reducing absenteeism, thus reducing costs of monitoring and conflict resolution. Worker participation is also believed to improve firm-specific human capital both by increasing job longevity and enhancing workers' training. Among critics, Jensen and Meckling [1979] point out a control problem and Williamson [1975] points out the transaction costs arising from collective decision making. But, contrary to the experience with Yugoslavia's self-management, the empirical evidence on Western cooperatives shows that worker participation increases productivity (for an excellent survey, see Bonin, Jones, and Putterman [1993]).
2. Data are described in Appendix A.
3. Net profits are the difference between retained earnings and total losses.
4. Given Yugoslavia's historical practice of holding the interest rate significantly below the inflation rate, the borrower thus accrued large gains on money and the lender losses on money.
5. For an explanation of the persistence of job security in reforming socialist countries as a predictable outcome of bargaining among distributive coalitions, see Vodopivec [1991].
6. Strictly speaking, the household sector was also a net donor, by the virtue of holding net financial assets.
7. To control for possible differences among industries (such as differences in price regulation), industry dummies are included among explanatory variables, but their coefficients are not reported.
8. This is so because formal taxes and formal subsidies, as well as quasi-taxes and quasi-subsidies, were assessed only on the basis of known financial results, and were charges against income (value added). Money gains and money losses, on the other hand, affected mainly revenues and costs of the firm (for example, by underpaying interest on debt). A notable exception was the interest payments on credits for fixed assets, which were paid from income (that is, they did not enter into the costs of production).
9. The labor-managed nature of Yugoslav firms can be questioned also from the aspect of workers' participation in decision making: the majority of important decisions (prominently, decisions about investment and appointment of managers) were accepted by the political sphere [Obradovic, 1978].
10. The above insight also sheds light on the so-called horizon problem of the Yugoslav firm [Furubotn and Pejovich, 1970]. The above argument suggests that the nonappropriability of returns due to interfirm redistribution strongly affected workers' preferences in favor of current consumption. Indeed, one may argue that it was the nonappropriability in the sense introduced above and not Furubotn-Pejovich's notion of nonappropriability due to the workers' inability to recover fully investment in the firm, that was the main driving force behind the horizon problem of the Yugoslav firm.
11. The fact that personal earnings in Yugoslavia followed the same pattern of compression as that in other socialist economies suggests that the failure of Yugoslavia's system has much in common with the failure of other socialist economies (the income-leveling effects of redistribution have been confirmed by Kornai and Matits [1987] for Hungary and Schaffer [1990] for Poland). Indeed, Yugoslavia shared basic inefficiencies of socialist economies — inadequate work motivation (X -inefficiency), the suppression of entrepreneurship (dynamic inefficiency), perpetuation of the structure of production (allocative inefficiency), and macroeconomic instability — all of which were intimately connected to egalitarianism.
12. Paradoxically, Marx argues for the "negation" of private ownership precisely because he worries that private property ultimately deprives human beings of some of the basic rights (alienation!). But a rationale for current privatization of Eastern Europe and the former Soviet Union is that it will ensure economic rights of workers.
13. A paradox: the government is too strong to behave consistently. It can never sustain the commitment not to interfere, for example, to rescue lossmakers [Schaffer, 1989].

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