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FAREWELL TO THE ILLYRIAN FIRM

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Ben Ward's seminal article of 1958 established a new discipline: the theory of the Illyrian firm. By now the bibliography has swollen to many hundreds of items. Though the latest sophistications of micro-economic theory have since been exploited, Ward's basic results are still held as universally valid (outside Yugoslavia). They boil down to the conclusion that an Illyrian firm is allocationally less efficient than a capitalist firm. Later authors uncritically changed the adjective 'Illyrian' to 'worker-managed'.

Defects in efficiency comprise five perversities in the behaviour of a worker-managed firm (WMF). Four of these are derived from Ward's analysis; the fifth was added by Furubotn and Pejović (1970).

Ward's perversities result from the ratio form of the objective function. The proper target of a capitalist is also a ratio: profit per unit of capital. However, that is somehow forgotten and it is generally assumed that a capitalist-managed firm (CMF) maximizes absolute profit — not the rate of profit — while a WMF maximizes income per worker.

ILLYRIAN THEORY

Since in terms of nonlabour inputs the two firms behave identically, I shall simplify the analysis by considering the production function with only one variable input, labour (x), and with fixed cost *k:*

$$q = f(x, k) \tag{1}$$

The objective function is per worker income

$$y = \frac{pq - k}{x} \tag{2}$$

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for whose maximization the following first order condition must be satisfied

$$\frac{dy}{dx} = 0, \qquad pq'(x) = y \tag{3}$$

The value of the marginal product of labour must be equal to per worker income y. Four unpleasant consequences follow:

1. If in an identical capitalist firm profit is positive, $\pi > 0$, socialist workers' income must be higher than capitalist wages, $y > w$. Assuming diminishing returns, a WMF will employ a smaller number of workers and, consequently, produce smaller output. Prediction: socialist firms are smaller and there will be unemployment.

2. If the price of the product increases, y increases as well and the contribution of the marginal worker is now below his income, $pq' < y$. In order to restore equilibrium, some workers will be dismissed. Prediction: perverse supply response; price increases generate contraction of supply, price decreases expansion. The Illyrian market is dangerously unstable: if excess demand is not met by a larger supply it is made worse by further reduction in supply.

3. An increase in fixed cost reduces y; the marginal worker is now relatively more productive and so it pays to add new members to the work collective whereby the increased fixed cost is spread over a larger group. Prediction: increases in fixed cost (e. g., higher depreciation rates, capital tax) induce firms to expand output and *vice versa.*

4. In a CMF a wage is market-determined and is assumed equal for all firms, while profits may vary. Consequently, workers are efficiently allocated because marginal workers produce the same value of product in all firms. In identical LMFs, incomes per worker differ and so marginal workers produce different value products in different firms. It would, therefore, be possible to increase national output by reallocating workers among the firms.

5. If workers save directly by investing part of income in their firm, they benefit from higher wages in the future but they cannot recoup invested capital because all capital is socially owned. If, instead, they distribute all income among themselves, individual workers may open their own deposit accounts with banks and collect not only interest but also principal at some future date. Prediction: there will be a tendency to underinvest and to distribute all income in wages.

The theory summarized in the above five points is accepted abroad practically universally and is also shared by a number of Yugoslav theorists. It represents a fine example of ideological bias in the history of economic thought. The example is so interesting because the theory is shared even by those who are enthusiastic supporters of workers' management. Their standard argument runs as follows: true, worker management is somewhat less efficient, but it is more humane, morally superior and makes workers happier. The theory also depicts well the shortcomings of neoclassical economics. Besides naive predic-

tions, it deals exclusively with allocational efficiency and leaves out the immensely more important question of productive efficiency.

Each theory must pass three crucial tests: it must be logically consistent, must make valid predictions and, if at all posible, must be based on verifiable assumptions. Logical consistency is ensured by the mathematics used, and thus it only remains to evaluate predictions and assumptions. Wrong predictions make theory useless, false assumptions destroy its explanatory power.

WRONG PREDICTIONS

1. Socialist firms (as distinct from plants) tend to be smaller, and there is widespread unemployment in Yugoslavia. Both facts have been used to prove the validity of the theory. Yet, they have no relation whatsoever to neoclassical theory. Since (1) no existing firm can be bought or sold, (2) nor can a big firm be preserved if some plants want to break away, and (3) workers' management becomes more difficult as the firm increases in size — mergers, conglomerates and very big firms are much less common under worker than under capitalist management. As far as unemployment is concerned, it is the result of a drastic fall in the rate of growth. When the Yugoslav economy was expanding at high rates there was no unemployment. Low rates of growth are due to erroneous economic policy and belong to the sphere of macro — not micro-economics.

2. No one has ever observed a perverse supply response. On the contrary. Yugoslav firms are quick to abandon unprofitable lines — as consumers are only too well aware — and to shift to products with high prices. The economy is highly unstable but that is due to business cycles thoroughly researched elsewhere (Horvat, 1969).

3. When capital tax was abandoned in the 1960s in the Yugoslav economy, nobody observed the theoretically predicted reduction in output. If anything, output expanded because the internal resources of finance were increased.

4. The fourth conclusion is more of a normative nature and the predicted effect cannot be quantified (at least not easily). What is wrong about it is its logical inconsistency. If profits are *different*, then by reallocating entrepreneurs output could be increased. Why should poor allocation of capitalist entrepreneurs be consistent with Pareto effeciciency and a similar allocation of socialist workers not? The inconsistenncy is even more serious than that. Unlike hired workers, worker-managers are also entrepreneurs and so, by assumption, income per worker must be different in different firms. If one is incliend to indulge in pastime theorizing, one may assume that the wage-part of income — representing labour input — is equal throughout the economy and only profit shares — representing entrepreneurial income — differ.

5. In Yugoslavia there is a chronic tendency to *overinvestment* — not underinvestment — and that is explained by reduced risk and the availability of investment finance. On the other hand, it is true that Yugoslav firms tend to rely largely on external finance. But this has

nothing to do with the Furubotn-Pejović effect and represents a rational response to negative interest rate.

THEORETICAL FLAWS

1. Even if in a CMF profit is positive, that does not imply that in the worker-managed twin this profit will be entirely distributed in wages. Behaviour is determined by the distributed — not total — income per worker. Distributed income may be higher, lower or equal, as compared with the wage in the capitalist twin. In the general equilibrium framework — not considered by the Illyrian theory — distributed income will be lower, (and, consequently, undistributed profits higher), if the worker-managed economy is expanding at a higher rate than the capitalist-managed economy, *ceteris paribus*. If $y < w$, WMF will employ more workers than the capitalist twin.

2. Perverse supply effect is a consequence of a serious analytical error. The law of variable proportions (diminishing returns) applies only if (1) the achieved adjustment is optimal, (2) there are no indivisibilities, (3) technology is fixed and (4) other inputs are kept constant. Since technological progress is a positive function of time, and actual production proceeds in real time, diminishing returns are not justified. In other words, the behaviourally relevant production function must include time as one of its variables,

$$q = f(x, t) \tag{4}$$

and the marginal product of labour

$$q' = \frac{dq}{dx} \tag{5}$$

makes no sense because t is not fixed. Whenever a firm employs a new worker, it moves to a new time interval, uses a new, superior, technology, and readjusts all its inputs, including capital. It is inadmissible to use static production function (time fixed, the law of diminishing returns operative) to make predictions about the dynamic production trajectory (see Horvat, 1986).

In the real world returns are not diminishing but increasing. For this reason *real wages increase* and do not remain constant or fall as employment increases. Increasing returns are due to indivisibilities and technological progress and so we must distinguish two cases: underutilization of capacity (less than three full shifts) and full utilization of capacity. The former case is typical. If capacity is not fully used, and marginal cost curve is a horizontal line (as econometric studies suggest), average cost decreases (per worker income increases) as output expands. Thus it pays to employ new workers and every member of the work-collective will earn higher income. The same, of course, is true if the existing workers work overtime. Capacity is not fully utilized because of the negatively sloped demand curves. That,

in turn, is due to insufficiency of demand because of imperfect competition, gradual satiation and or increasing transportation costs for larger markets.

If the existing capacity happens just to match demand, an increase in demand will induce an expansion of capacity. This will not be done by simply adding an additional worker, but by readjusting all inputs under a new production function. As a result the work force may even be reduced. Whether an increase in price — reflecting and increase in demand — will induce larger supply depends on the price elasticity of demand and the freedom of entry which are the two constituents of the strength of monopoly.

If returns are typically increasing and the market is normally competitive, perverse supply response is a fake phenomenon arising from a fallacious theory.

3. An increase in fixed costs imposed from the outside (such as a capital tax) will simply reduce undistributed profits. It will not touch wages, but the relative costs of inputs will be changed. If the tax is so high as to wipe out profits and reduce wages, then a disequilibrium situation will be created in which labour cost will be absolutely and not just relatively reduced as compared with capital cost. The same reasoning applies to the capitalist twin.

4. The problem of appropriate distribution theory is too involved as to allow treatment within a paragraph. At a very simplified level this much may be said. Assuming free entry — which is more easily established under social than under private property — incomes per worker will tend to become equal throughout the economy. If a uniform price for the use of capital (interest rate) is imposed, the remaining part of income per worker will be equalized. This part consists of distributed wages and undistributed profits. In rapidly expanding industries the share of profits (undistributed income) will be higher (consequently, the share of wages, i. e., distributed income, lower) than in the rest of the economy. However, rapid expansion leads to high technological progress and so both wages and profits tend to be higher. It is the task of economic policy to equalize wages in order to realize the principle of distribution according to work. And whenever conflict arises, Pareto efficiency must be replaced by growth efficiency because in the long run it is the higher rate of growth that creates higher output.

5. The Furubotn-Pejović argument is based on a tacit — but unwarranted — assumption that worker-managers behave like hired workers in a capitalist economy. Since worker-managers are responsible themselves for their economic fate, they must invest in order to survive in the market. This has little to do with the relation between internal profit and external interest. Next, even if the firm relies on external finance, it must accumulate because internal investment funds are used as collateral. These two institutional conditions suffice to induce the necessary investment regardless of whether the Furubotn-Pejović effect exists or not. That is, however not all. If neither profits nor wage bill are taxed under either regime, and collective needs are financed out of a graduated personal income tax, the following consequence must be noticed. If all profits are distributed in wages,

workers will have to pay income tax before they can take their money to banks. Thus saving taken out of the firm will be reduced, perhaps substantially, as compared with saving used to build up internal investment funds. The likely quantitative effects may be illuminated by an example.

Suppose the wage bill is given by wL, while profits amount to π. Profits may be invested in the firm or distributed and taken out to be put in individual savings accounts in banks. Since this is marginal income, it will fall in a higher tax bracket, say the one with 30% personal income tax. Thus it will be possible to transfer to saving accounts only $0.7\,\pi$. Suppose that life expectancy of new capital and the planning horizon are both 10 years. New equipment is labour saving and so output may be increased without any increase in labour force. Suppose capital-value added ratio is 4 : 1 and depreciation is 7.7% if the bank rate of 5% is used for capitalization (in other words, if a fixed asset lasts 10 years and costs 100 dinars, the annual depreciation quota must be 7.7 dinars because annual investment of 7.7 dinars at 5% will in ten years accumulate to 100 dinars). Consequently, the rate of profit in the first year is $25 - 7.7 = 17.3\%$. The bank rate of interest i sa standard 5%. In this situation workers face the following choice. If money is invested within the firm, wages will increase $0.173\,\pi$. If money is lent to the bank by individual workers to secure annuity payments over the next ten years, their annual rent will be $0.13\,\pi$. Thus, investment in the firm will be stronly preferred. The case for internal investment is considerably further strengthened if depreciation is accumulated at the internal rate of return (and not at the three times lower bank rate) and if the life span of fixed assets (on average, about thirty years) and the planning horizon are longer.

CONCLUSION

It appears that the standard neoclassical theory of the WMF explains nothing — because it is fallacious — and predicts nothing — because its predictions are wrong. How do worker-managers really behave? The answer to this question is not a matter of desk room theorizing but of empirical observations. As I pointed out many years ago (Horvat, 1967), workers solve some kind of dynamic programme which determines the current level of aspiration wages. These wages are used as a calculating price of labour and represent advances until the end of the calculating period when final wages are paid out and new aspiration wages are determined. The undistributed part of income, the surplus, is maximized. The objective function is no longer in ratio form and so all perversities disappear. Since (1) part of income is not distributed, (2) workers are not owners of capital but (3) capital investment is a precondition for wage increases and economic survival, it makes no sense to maximize surplus per worker, or total income per worker which is the same thing. Consequently, workers behave rationally if they use aspiration wages as a price for labour and maximize the absolute amount of surplus. That much is known. But a full-fledged theory of the worker-managed firm still remains to

be made. It is a great merit of Ward's original article, which so bluntly stated the absurd neoclassical consequences, that it has forced us to undertake the reexamination of the theoretical foundations.

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