KOMUNIKACIJE — SHORT PAPERS

ECONOMIC ANALYSIS AND WORKERS' MANAGEMENT, 2, XXVI (1992), 173—181

DIVERGENT EQUILIBRIA IN THE LABOR-MANAGED SYSTEM

*Ljubomir MADŽAR**

1. INTRODUCTION

The Illyrian firm does not cease to intrigue the scholars interested in comparative efficiency of organizational alternatives for a socialist economy. Now that the labor-management system (LMS) has experienced its ignoble demise, the appeal of this once popular subject of study has been somewhat reduced and its practical relevance has certainly diminished. Yet, it does call for further thought and inquiry, if only to clarify why one more of the great social(ist) experiments had to be terminated in such an uninvited way. Further study of the reasons of the failure of the LMS is certainly bound to contribute to a more thorough understanding of the wide-spread but not quite wide-understood dangers of social experimentation. It may also help identify a number of dead ends in the precarious business of institution building: along with accumulating knowledge about promising directions of institutional development, it is equally — or, perhaps, even more — worthwhile to investigate the paths which end as blind alleys. Useful knowledge about policies and institutions comprises not only propositions about what should be done but also warnings about what should be avoided.

Dr. Bogetić's recent paper (1991a) contains a new approach to the proverbial deficiencies of the labor-managed market economy. Beside displaying the often discussed pattern of perverse reactions to the exogenous shifts of the underlying allocational parameters, it seems to feature another disturbing structural deficiency by being unable to reach and maintain equilibria in all of its relevant markets. Equilibrium in one is inconsistent with that in another market, and the LMS may turn out to prove incapable of reaching equilibria in any of the relevant markets. A heavy strain on economic policy — the need to equilibrate the system by careful application of a set of instruments rather than enjoying the advantages of an automatic, self-regulating mechanism —

* Faculty of Economics, Beograd.

I am indebted to Dr. Milić Milovanović for a number of helpful suggestions. The remaining errors are all mine.

is an important and indeed far-reaching implication of this finding. For, economic policy may turn out to be unable to come to grips with such a complex, intellectually demanding and informationally perhaps forbidding problem.

2. BOGETIĆ-VANEK EXCHANGE

Dr. Bogetić's paper provoked a strong and decisive denial of its principal proposition. The reaction came from no less an authority in the field than Professor Vanek (1991), by now a classic in the area of the theory of the LMS. Professor Vanek denies the validity of the finding by pointing out that: (1) in such a one good, one nonproduced factor system no justification can be found for introducing of the absolute product price P; various normalization procedures are possible and Professor Vanek suggests the usual one of setting it identically equal to one, (2) the number of equations in Bogetić's model exceeds the needed (and correct) number by one, since one of them is redundant on account of Walras' Law, and (3) the part of the income not appropriated by labor is not accounted for, sa that demand and supply do not properly balance at the level of the system as a whole. The eventual errors implied by the objections (1) and (2) are compensatory in the sense of not having disturbed the balance between the number of equations and the number of variables: both numbers are reduced by one. It is also curious that no doubts about relevance of investigating the properties of equilibria have been raised. Such doubts however, might have been expected in view of the perverse reactions to changes in prices — once disturbed, the equilibrium cannot through such reactions be restored ever again.

Objection (3) was met in Dr. Bogetić's subsequent work (Bogetić and Heffley 1992). One could perhaps conclude that it is implicitly accepted and rectified through the modification of his model.

The objections however, did not demolish the basic finding on divergent equilibria. As for objections (1) and (2), it is interesting that the author does not appear to have attempted to counteract them. In his reply (Bogetić 1991b) satisfies himself with asserting that the supply function of a labor-managed firm is not specified but only implied by a number of generally accepted assumptions and by insisting on the perverse reactions to changes in the product price as if it had been unequivocally established that it in this one-sector model must exist. The same conviction in its existence is revealed in his repeated claim that there must exist a connection between the product price and the income per worker. Objection (2) in Professor Vanek's comment is not addressed in Dr. Bogetić's reply.

The purpose of this note is to demonstrate that Dr. Bogetić's finding remains intact even if one fully accomodates objections (1) — (3) advanced by Professor Vanek. Before that it is apposite to point to some objectionable elements in the Professor Vanek's view of the functioning of the LMS. Surely free entry does provide a powerful adjustment mechanism for the LMS and a means for its approaching full employment equilibrium. But that *deus ex machina* can save any

system. Free entry takes time and leads to a long-run equilibrium. The thrust of the Bogetić's paper is the pattern of the behavioral reactions and the (impossibility of) equilibrium in the short run. Whether the entry will be rapid and easy or not has, strictly speaking, nothing to do with the functional characteristics of the LMS as such. In one way or another it, unfortunately, relies on the heavy hand of the state. Chapter 7 of Professor Vanek's seminal book (1970) does not really offer any assurance that the system of formation and use of investible resources, proposed there, would not invite an all-pervading and powerful state. Everyone should by now be clear — without any help on the part of theory — what can realistically be expected when the state assumes an economic role of any importance.

One is intrigued by his reference to Walras' Law and, in the same context, to the possibility of the system not being able to secure full employment. Under usual assumptions, the class of simple general equilibrium models, to which the one dealt with in the Bogetić-Vanek exchange certainly belongs, does not permit less-that-full employment of the production factors. Namely, the non-negative excess demand functions, defining the equilibrium of the system, have a definite relation to the corresponding prices: the scalar product of excess demand functions and prices is equal to zero (Arrow and Hahn 1971, p. 21). Not suprisingly, unemployment would entail zero price of labor, a result difficult to envisage any system, particularly in the LMS. The (in)applicability of Walras' Law to such a labor-managed economy is yet to be investigated. On the other hand, it is hard to imagine less-than-full-employment equilibrium in such a rudimentary model lacking savings, money, liquidity preference and frictions in the adjustment process. Moreover, if, as asserted by Professor Vanek (1991, p. 300), the conventional demand for labor does not exist, can we make reference to Walras Law? In the sequel of this paper a specific demand schedule for labor will be taken to exist.

Speaking of unemployment, the observation that labor income and unemployment in the LMS will be higher than in the corresponding capitalist economy — does not speak all that favorably to the credit of the former. One should not forget that high profits, coupled with healthy incentives for re-investment, are the only realiable way of eliminating surplus labor in a long run context. Equally important is, again, the short run behavior of the system. Of course, it is true that even the capitalist system will not be able to secure full employment if one assumes an arbitrarily large number of job claimants in relation to the available number of jobs. But that is beside the point. The really relevant is the fact that there are some reasonable ranges of parameters within which the capitalist system *will* secure full employment, whereas the LMS *will not*.

It is not advisable to dismiss offhand the important Bogetić's observation about (wide) differences of the two systems in generating entrepreneurship. They have an obvious bearing on the entry problem and cast doubt on the ability of the LMS to perform efficiently the needed long run adjustments. Those who follow the contemporary literature on property rights and incentive effects of ownership will

not find it difficult to accept Dr. Bogetić's claims. That part of his short text is really worth rereading.

3. A MODEL WITH UNITARY PRICE

In the announced one-good model all magnitudes are expressed in terms of the only good that is being produced in the system. The price of the good is, therefore, identically equal to unity. The equivalent alternative of putting (identically) equal to unity one of the factor prices will not be considered here. There are two remaining prices which can possibly be fixed in terms of the wage rate w and the use price of capital r. Two independent factor prices are, of course, possible only in a full fledged market economy; the LMS has no alternative but to make do with one single factor price r. This is where the trouble detected by Dr. Bogetić really begins.

Following the injunction of Professor Vanek, one can drop the product price P and let product Q be measured in terms of itself. As tax and subsidy rates, as well as production function parameters play no substantive role in reasoning and derivations, they will be omitted. This simplifies the matter and does not produce any departure from the relevant part of the framework on which Dr. Bogetić bases his analysis. The maximand synthesizing the inner logic of the LMS is then simply

$$Y = \frac{Q(K, L) - rK}{L} \tag{1}$$

The usual optimality conditions are obtained by setting both partial derivatives equal to zero:

$$Q_L L - (Q - rK) = 0 \tag{2}$$

$$Q_k - r = 0 \tag{3}$$

whereby the mentioned partial derivatives are denoted by Q_L and Q_k, in accordance with the widely accepted convention. Relation (3) reflects the assumption that the required optimum is to be reached by adjusting not only L but also K. In other words, it is the *long run adjustment* that is being examined in this model.

Due to the lack of P the classical Ward paradox, conceived, of course, as a short run phenomenon, and negatively sloped demand curve for labor-with P as the relevant argument — are no longer possible. But perverse reactions survive nevertheless. Differentiating (2) w.r. to r, one gets

$$\frac{dL}{dr} = -\frac{K}{L\,Q_{LL}} > 0 \tag{4}$$

An increase of the cost of capital, reducing the profitability of the production process, induces the firm in the LMS to *increase* employment and output.

Demand curves for production factors can be readily derived from (2) and (3):

$$L_d = L_d(r), \quad K_d = K_d(r) \tag{5}$$

The doubts relating to the existence of the demand function for labor can be counteracted by refering to (4) which surely implies the connection between the required (optimal) quantity of labor and the only available factor price in this setup, the use price of capital r. It certainly stands to reason that the change of capital charge *must* change the optimal size of the labor managed collectives, notwithstanding Professor Vanek's well grounded doubts as to whether they will, on account of solidarity, really perform *all* adjustments.

By inserting (5) into the production function, one immediately obtains the supply curve of output, indicating again its dependence on the only existing factor price:

$$Q_s = Q_s(r) \tag{6}$$

Capital income has to be disposed off in some way, thus meeting one of Professor Vanek's important objections. The simplest approach is to assume that it is equally distributed over N_h households which are, just like firms, assumed to be identical. Each household will obtain and equal amount of social dividends s:

$$s = \frac{r\bar{K}(r)}{N_h} = s(r) \tag{7}$$

where $\bar{K}$ stands for the total capital in the economy.

Households are assumed to spend all disposable income y, which consist of their earned income (T—Z) and the respective social dividend

$$y(r) = (T—Z)\,Y(r) + s(r) \tag{8}$$

T being the total available time per household and Z leisure time per household, both within the reference time period.

If the Q_d is the amount demanded by household, its budget constraint is simply

$$Q_d \leqslant y(r) \tag{9}$$

where the equality sign will prevail due to the non-saturation assumption and to savings being assumed away. Maximizing the utility function $U(Q_d, Z)$ subject to (9) and following the usual procedure

(cf Bogetić 1991, pp. 291—2) one gets the demand function for the good and the supply function of labor:

$$Q_d = Q_d(r), \quad L_s = L_s(r) \tag{10}$$

With N_f identical firms and N_h identical household and with latter representing the agents who supply capital, the equilibria in the good and the factor markets will be defined by

$$\begin{aligned} N_h Q_d(r) &= N_f Q_s(r) \\ N_h K_s(r) &= N_f K_d(r) \\ N_h L_s(r) &= N_f L_d(r) \end{aligned} \tag{11}$$

No less than three equations in one unknown are obtained. One of them can be dropped by virtue of Walras' Law, but there are still two independent equations in one variable. The system is inconsistent, equilibria are divergent. Note that such result does not obtain in the corresponding system for a capitalist economy, which features both factor prices (r and w) as the arguments in the relevant functions. No problems arise in the capitalist world because the system is reduced to two independent equations in two unknowns.

The proposition advanced by Dr. Bogetić is confirmed. While the substantive objections formulated by Professor Vanek — as well as those of a general nature and not connected with the model itself — seem to be well taken and incontravertible, they do not demolish the crux of Dr. Bogetić's argument. There are too few prices for the number of independent equations needed to describe the equilibrium of the system. The phenomenon of divergent equilibria does not show up in the capitalist market economy. Maximizing profits $\Pi = Q - rK - wL$ gives the usual optimality conditions $Q_k = r$ and $Q_L = w$. The solution of this system consists of two factor demand equations analogous to (5), except that in both functions two arguments — r and w — are contained. Substitution of these demand functions into the production function yields again the microeconomic supply function analogous to (6). Once more, its only difference with respect to (6) is that it contains these *two* arguments, r and w. The theory of household behavior gives again the demand function for the good and the supply function of labor in the same way as in the LMS. Both will depend on *both* factor prices because the households are assumed to appropriate capital income and savings are assumed away. The derivation can follow the description of equation (7)—(10) as fully described in Bogetić (1991a, pp. 291—2). The end result is the equilibrium system analogous to (11), with the only diference that, again, two arguments — r and w — rather than one figure in it. One equation is redundant and one is left with the orderly situation of two equations with two unknowns. The divergent equilibria phenomenon does *not* obtain.

It is of some interest to note that the divergent equilibria phenomenon, even for the LMS, does *not* emerge in the context of short run analysis. That is due to the fact that — because of the fixity and,

therefore, parametric nature of capital — the number of equations determining the equilibrium is reduced by one. Namely, the demand-for-capital equation drops, as well as the equilibrium condition (3) from which it is derived. In fact, all the remaining equations remain unchanged, it being understood that capital figures in them as a parameter. The system (11) is then reduced to only two equations. Of the remaining two, one drops because of the Walras' Law and one is left with one equation with one variable. Everything else within the system falls neatly in its proper place.

The overall result is in a sense unfortunate. The LMS is plagued by divergent equilibria in the long run context which is for it the most important. The entry of new units and long run adjustment are embraced as the cure for all major systemic weaknesses. Yet, it is precisely there that all markets cannot be equilibrated simultaneously. Whatever stream of new units is generated by the state controlled *deus ex machina* of free entry, the price which would assure the full use of capacity cannot at the same time bring about the full employment of the labor force.

4. FALLACIES IN THE EMPIRICAL TREATMENT OF THE LMS

In the course of this discussion of the efficiency of the LMS, Professor Horvat predictably did not resist the temptation to add a few remarks of his own about the merits of the "best system in the world" (1991). He has repeatedly advanced his claims about the superiority of the system of his youth, but some scholars have remained utterly unconvinced. The purpose of this passing observations is just to remind that there are *widely* differing opinions on this traditionally divisive issue.

The trouble with Professor Horvat's thinking is that he considers *in isolation* the performance of the economy *within a given time interval.* He fails to take account of the temporal interdependencies of performance within various periods. He also ignores the exogenous, system-irrelevant determinants of the growth indicators. During the period 1952—1964, cited by him as an empirical confirmation of the efficiency of the system, Yugoslavia received an equivalent of some 7% of her GNP by the way of unilateral transfers of supplementary foreign resources (in the 1952—1960 interval it was 9% and in the 1961—1964 interval 6% — social product, Yugoslav definition) (Madžar 1991). That surely makes for a fantastic injection; it is not easy to imagine a system which would not deliver awe-inspiring growth indicators under such conditions. Supplementary foreign resources continued in various ways to pour into the economy right up to the end of 1970's; when the flow discontinued, the economy collapsed.

The growth experience of any conutry cannot be understood unless one clearly distinguishes the temporary, exogenously induced upsurges in the rate of growth from those growth processes which are sustainable in the long run. There are a host of other factors which helped accelerate the growth in that period at the expense

of an inevitable future deceleration and, ultimately, stagnation and even decline (Madžar 1990, pp. 154—168, pp. 191—196). It is important forcefully to point out that the inflow of foreign resources *raises* even the global productivity of resources (by ironing out the structur al bottlenecks (in the economy) — a regularly and regrettably neglected fact.

After all, even the deplorable reversal to etatism, adduced by Professor Horvat as a cause of the decline of economic efficiency, should not, contrary to what he implies, be considered as an exogenous *deus ex machina.* It should be ascribed as a serious weakness to the broader socio-economic system, which, being under domination of the unbriddled, democratically uncontrolled political elite, was structurally susceptible to such malignant distortions. Professor Vanek's observation about lamentable constructive mistake having been built into the actual Yugoslav system — can be countered in a similar way. The mistake consists in the failure to supply the system with a mechanism which would generate new production units and thus solve the entry problem. The very possibility of failing on account of a *constructive* mistake should be debited as a grave drawback of the system.

5. CONCLUSION

Dr. Bogetić has proposed a new approach to examining the functional characteristics of the LMS and has identified one deficiency which has not been known in the profession nor even hinted at in the literature. He has produced a contribution which in the future discussions it will not be possible to ignore. Dr. Vanek has made a number of objections which pass successfully the test of logical scrutiny. However, they do not demolish Dr. Bogetić's finding. Future analyses will undoubtedly sharapen and refine this important result, but it will have to be considered in further — probably destined to be gradually fading away — discussions of the system.

The Bogetić's effect does not show up in the standard market economy. It also does not appear in the labor-managed economy when it comes down to the short run. But, while every situation is one of the short run variety, no short run of a given sort can last forever. The long run tendencies retain their relevance because they determine the nature of the various short run constellations which will prevail in the future. Dr. Bogetić's discovery would have been a reason for serious worry had it not bean for the dismissal of the system in the only country in which it had been ever tried. Yet, this new result remains important for the light it throws upon the structural deficiencies of a particular implementation of the labor-based system of economic management. It is also useful as an orientation for future policies lest anything analogous to the LMS be tried in the future.

Received: 15. 06. 1992.
Revised: 13. 07. 1992.

REFERENCES

1. Arrow, Kenneth J. and F. H. Hahn (1971), *General Competitive Analysis*, San Francisco and Amsterdam: Holden-Day, Inc. and North-Holland.
2. Bogetić, Željko (1991a), " 'Divergent Equilibrium' in a Labor-Managed Economy", *Economic Analysis* XXV, № 3, 289—295.
3. ————————, (1991b), " 'Divergent Equilibrium' in a Labor-Managed Economy: A Rejoinder", *Economic Analysis* XXV, № 3, 303—305.
4. Bogetić, Željko and Denis Heffley (1992), *Divergent Equilibria and the Role of Government in a Labor-Managed Economy*, Paper presented at the Annual Meetings of the Eastern Economic Association, New York, Marc, 27—29.
5. Horvat, Branko (1991), "Labor-Management and Neoclassical Economics: Editor's Comment", *Economic Analysis* XXV, № 3, 307—309.
6. Madžar, Ljubomir (1990), *Suton socijalističkih privreda*, Beograd: Ekonomika i Institut ekonomskih nauka.
7. ————————, (1991) „Prilog demistifikaciji jugoslovenskog privrednog čuda", Nikola Čobeljić, ur., *Jugoslovenski model socijalističke privrede (tržišnog socijalizma): teorijska zasnovanost i mogućnost operacionalizacije* Beograd: SANU — Odeljenje društvenih nauka, Ekonomski zbornik VIII, 103—114.
8. Vanek, Jaroslav (1970), *The General Theory of Labor-Managed Market Economies*, Ithaca: Cornell U. P.
9. ————————, (1991), "Comment on the Bogetić Paper", *Economic Analysis* XXV, № 3, 297—302.