9 Economic Calculation in Socialism*

LUDWIG VON MISES

Mises denies the possibility of economic calculation and rational resource allocation in socialism. He argues that economic calculation can take place only by means of money prices established in a market for producer goods resting on private ownership of the means of production. Because such markets cannot, by definition, exist in socialism, he concludes that a socialist economy cannot achieve efficient allocation of resources. "Artificial" markets in socialism cannot successfully replace the true markets of capitalism in pricing producer goods so as to use them most effectively.

Without calculation, economic activity is impossible. Since under Socialism economic calculation is impossible, under Socialism there can be no economic activity in our sense of the word. In small and insignificant things rational action might still persist. But, for the most part, it would no longer be possible to speak of rational production. In the absence of criteria of rationality, production could not be consciously economical.

For some time possibly the accumulated tradition of thousands of years of economic freedom would preserve the art of economic administration from complete disintegration. Men would preserve the old processes not because they were rational, but because they were sanctified by tradition. In the meantime, however, changing conditions would make them irrational. They would become uneconomical as the result of changes brought about by the general decline of economic thought. It is true that production would no

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longer be "anarchical." The command of a supreme authority would govern
the business of supply. Instead of the economy of "anarchical" production
the senseless order of an irrational machine would be supreme. The wheels
would go round, but to no effect.

Let us try to imagine the position of a socialist community. There will
be hundreds and thousands of establishments in which work is going on.
A minority of these will produce goods ready for use. The majority will
produce capital goods and semimanufactures. All these establishments will
be closely connected. Each commodity produced will pass through a whole
series of such establishments before it is ready for consumption. Yet in the
incessant press of all these processes the economic administration will have
no real sense of direction. It will have no means of ascertaining whether a
given piece of work is really necessary, whether labor and material are not
being wasted in completing it. How would it discover which of two processes
was the more satisfactory? At best, it could compare the quantity of ultimate
products. But only rarely could it compare the expenditure incurred in their
production. It would know exactly—or it would imagine it knew—what it
wanted to produce. It ought, therefore, to set about obtaining the desired
results with the smallest possible expenditure. But to do this it would have
to be able to make calculations. And such calculations must be calculations
of value. They could not be merely "technical"; they could not be calculations
of the objective use-value of goods and services. This is so obvious that it
needs no further demonstration.

Under a system based upon private ownership in the means of production,
the scale of values is the outcome of the actions of every independent member
of society. Everyone plays a two-fold part in its establishment, first as a
consumer, secondly as producer. As consumer, he establishes the valuation
of goods ready for consumption. As producer, he guides production-goods
into those uses in which they yield the highest product. In this way, all
goods of higher orders also are graded in the way appropriate to them
under the existing conditions of production and the demands of society.
The interplay of these two processes ensures that the economic principle is
observed in both consumption and production. And, in this way, arises the
exactly graded system of prices which enables everyone to frame his demand
on economic lines.

Under Socialism, all this must necessarily be lacking. The economic admin-
istration may indeed know exactly what commodities are needed most ur-
rently. But this is only half the problem. The other half, the valuation of
the means of production, it cannot solve. It can ascertain the value of the
totality of such instruments. That is obviously equal to the value of the
satisfactions they afford. If it calculates the loss that would be incurred by
withdrawing them, it can also ascertain the value of single instruments of
production. But it cannot assimilate them to a common price denomina-

1 Editor's note: Producer goods.
which could neither be predicted beforehand nor ascertained after they had taken place. Everything would be a leap in the dark. Socialism is the renunciation of rational economy.

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Some of the younger socialists believe that the socialist community could solve the problem of economic calculation by the creation of an artificial market for the means of production. They admit that it was an error on the part of the older socialists to have sought to realize Socialism through the suspension of the market and the abolition of pricing for goods of higher orders; they hold that it was an error to have seen in the suppression of the market and of the price system the essence of the socialist ideal. And they contend that if it is not to degenerate into a meaningless chaos in which the whole of our civilization would disappear, the socialist community, equally with the capitalistic community, must create a market in which all goods and services may be priced. On the basis of such arrangements, they think, the socialist community will be able to make its calculations as easily as the capitalistic entrepreneurs.

Unfortunately, the supporters of such proposals do not see (or perhaps will not see) that it is not possible to divorce the market and its functions in regard to the formation of prices from the working of a society which is based on private property in the means of production and in which, subject to the rules of such a society, the landlords, capitalists, and entrepreneurs can dispose of their property as they think fit. For the motive force of the whole process which gives rise to market prices for the factors of production is the ceaseless search on the part of the capitalists and the entrepreneurs to maximize their profits by serving the consumers' wishes. Without the striving of the entrepreneurs (including the shareholders) for profit, of the landlords for rent, of the capitalists for interest, and of the laborers for wages, the success in the functioning of the whole mechanism is not to be thought of. It is only the prospect of profit which directs production into those channels in which the demands of the consumer are best satisfied at least cost. If the prospect of profit disappears, the mechanism of the market loses its mainspring, for it is only this prospect which sets it in motion and maintains it in operation. The market is thus the focal point of the capitalist order of society; it is the essence of Capitalism. Only under Capitalism, therefore, is it possible; it cannot be "artificially" imitated under Socialism.

The advocates of the artificial market, however, are of the opinion that an artificial market can be created by instructing the controllers of the different industrial units to act as if they were entrepreneurs in a capitalistic state. They argue that even under Capitalism the managers of joint stock companies work not for themselves but for the companies, that is to say, for the shareholders. Under Socialism, therefore, it would be possible for them to act in exactly the same way as before, with the same circumspection and devotion to duty. The only difference would be that under Socialism the product of the manag-er's labors would go to the community rather than to the shareholders. In such a way, in contrast to all socialists who have written on the subject hitherto, especially the Marxians, they think it would be possible to construct a decentralized, as opposed to a centralized, Socialism.

In order to judge properly such proposals, it is necessary in the first place to realize that these controllers of individual industrial units would have to be appointed. Under Capitalism, the managers of the joint stock companies are appointed either directly or indirectly by the shareholders. In so far as the shareholders give to the managers power to produce by the means of the company's (i.e., the stockholders') stock they are risking their own property or a part of their own property. The speculation (for it is necessarily a speculation) may succeed and bring profit; it may, however, misfire and bring about the loss of the whole or a part of the capital concerned. This committing of one's own capital to a business whose outcome is uncertain and to men whose future ability is still a matter of conjecture whatever one may know of their past, is the essence of joint stock company enterprise.

Now it is a complete fallacy to suppose that the problem of economic calculation in a socialist community relates solely to matters which fall into the sphere of the daily business routine of managers of joint stock companies. It is clear that such a belief can only arise from exclusive concentration on the idea of a stationary economic system—a conception which no doubt is useful for the solution of many theoretical problems but which has no counterpart in fact and which, if exclusively regarded, can even be positively misleading. It is clear that under stationary conditions the problem of economic calculation does not really arise. When we think of the stationary society, we think of an economy in which all the factors of production are already used in such a way as, under the given conditions, to provide the maximum of the things which are demanded by consumers. That is to say, under stationary conditions there no longer exists a problem for economic calculation to solve. The essential function of economic calculation has by hypothesis already been performed. There is no need for an apparatus of calculation. To use a popular but not altogether satisfactory terminology we can say that the problem of economic calculation is of economic dynamics; it is no problem of economic statics.

The problem of economic calculation is a problem which arises in an economy which is perpetually subject to change, an economy which every day is confronted with new problems which have to be solved. Now in order to solve such problems it is above all necessary that capital should be withdrawn from particular lines of production, from particular undertakings and concerns and should be applied in other lines of production, in other undertakings and concerns. This is not a matter for the managers of joint stock companies; it is essentially a matter for the capitalists—the capitalists who buy and sell stocks and shares, who make loans and recover them, who make deposits in the banks and draw them out of the banks again, who speculate in all kinds of commodities. It is these operations of speculative
capitalists which create those conditions of the money market, the stock exchanges, and the wholesale markets which have to be taken for granted by the manager of the joint stock company, who, according to the socialist writers we are considering, is to be conceived as nothing but the reliable and conscientious servant of the company. It is the speculative capitalists who create the data to which he has to adjust his business and which therefore give direction to his trading operations.

It follows, therefore, that it is a fundamental deficiency of all these socialist constrictions which invoke the “artificial market” and artificial competition as a way out of the problem of economic calculation, that they rest on the belief that the market for factors of production is affected only by producers buying and selling commodities. It is not possible to eliminate from such markets the influence of the supply of capital from the capitalists and the demand for capital by the entrepreneurs, without destroying the mechanism itself.

Faced with this difficulty, the socialist is likely to propose that the socialist state as owner of all capital and all means of production should simply direct capital to those undertakings which promise the highest return. The available capital, he will contend, should go to those undertakings which offer the highest rate of profit. But such a state of affairs would simply mean that those managers who were less cautious and more optimistic would receive capital to enlarge their undertakings while more cautious and more sceptical managers would go away empty-handed. Under Capitalism, the capitalist decides to whom he will entrust his own capital. The beliefs of the managers of joint stock companies regarding the future prospects of their undertakings and the hopes of project makers regarding the profitability of their plans are not in any way decisive. The mechanism of the money market and the capital market decides. This, indeed, is its main task: to serve the economic system as a whole, to judge the profitability of alternative openings, and not blindly to follow what the managers of particular concerns, limited by the narrow horizon of their own undertakings, are tempted to propose.

To understand this completely, it is essential to realize that the capitalist does not just invest his capital in those undertakings which offer high interest or high profit; he attempts rather to strike a balance between his desire for profit and his estimate of the risk of loss. He must exercise foresight. If he does not do so, then he suffers losses—losses that bring about that his disposition over the factors of production is transferred to the hands of others who know better how to weigh the risks and the prospects of business speculation.

Now it is to remain socialist, the socialist State cannot leave to other hands that disposition over capital which permits the enlargement of existing undertakings, the contraction of others, and the bringing into being of undertakings that are completely new. And it is scarcely to be assumed that socialists of whatever persuasion would seriously propose that this function should be made over to some group of people who would “simply” have the business of doing what capitalists and speculators do under capitalist conditions, the only difference being that the product of their foresight should not belong to them but to the community. Proposals of this sort may well be made concerning the managers of joint stock companies. They can never be extended to capitalists and speculators, for no socialist would dispute that the function which capitalists and speculators perform under Capitalism, namely directing the use of capital goods into that direction in which they best serve the demands of the consumer, is only performed because they are under the incentive to preserve their property and to make profits which increase it or at least allow them to live without diminishing their capital.

It follows, therefore, that the socialist community can do nothing but place the disposition over capital in the hands of the State or to be exact in the hands of the men who, as the governing authority, carry out the business of the State. And that signifies elimination of the market, which, indeed, is the fundamental aim of Socialism, for the guidance of economic activity by the market implies organization of production and a distribution of the product according to that disposition of the spending power of individual members of society which makes itself felt on the market; that is to say, it implies precisely that which it is the goal of socialism to eliminate.

If the socialists attempt to belittle the significance of the problem of economic calculation in the Socialist community, on the ground that the forces of the market do not lead to ethically justifiable arrangements, they simply show that they do not understand the real nature of the problem. It is not a question of whether there shall be produced cannons or clothes, dwelling houses or churches, luxuries or subsistence. In any social order, even under Socialism, it can very easily be decided which kind and what number of consumption goods should be produced. No one has ever denied that. But once this decision has been made, there still remains the problem of ascertaining how the existing means of production can be used most effectively to produce these goods in question. In order to solve this problem, it is necessary that there should be economic calculation. And economic calculation can only take place by means of money prices established in the market for production goods in a society resting on private property in the means of production. That is to say, there must exist money prices of land, raw materials, semimanufactures; that is to say, there must be money wages and interest rates.

Thus the alternative is still either Socialism or a market economy.
11 The Computer and the Market*

OSKAR LANGE

In the preceding selection, written in the 1930s before the development of electronic computers, Lange presented a model intended to minimize centralized calculation by relying on market forces to "solve the millions of equations" involved in resource allocation and income distribution in a modern economy. In this article, written 30 years later, after the development of computers, Lange argues that centralized calculation, involving mathematical programming with computers, is both feasible and necessary for various purposes, especially long-term planning. But it still must be used in combination with, rather than in place of, the market in a socialist economy.

Not quite 30 years ago I published an essay On the Economic Theory of Socialism.1 Pareto and Barone had shown that the conditions of economic equilibrium in a socialist economy could be expressed by a system of simultaneous equations. The prices resulting from these equations furnish a basis for rational economic accounting under socialism (only the static equilibrium aspect of the accounting problem was under consideration at that time). At a later date Hayek and Robbins maintained that the Pareto-Barone equations were of no practical consequence. The solution of a system of thousands or more simultaneous equations was in practice impossible and, consequently,


the practical problem of economic accounting under socialism remained unsolvable.

In my essay I refuted the Hayek-Robbins argument by showing how a market mechanism could be established in a socialist economy which would lead to the solution of the simultaneous equations by means of an empirical procedure of trial and error. Starting with an arbitrary set of prices, the price is raised whenever demand exceeds supply and lowered whenever the opposite is the case. Through such a process of tâtonnements, first described by Walras, the final equilibrium prices are gradually reached. These are the prices satisfying the system of simultaneous equations. It was assumed without question that the tâtonnement process in fact converges to the system of equilibrium prices.

Were I to rewrite my essay today, my task would be much simpler. My answer to Hayek and Robbins would be: so what's the trouble? Let us put the simultaneous equations on an electronic computer and we shall obtain the solution in less than a second. The market process with its cumbersome tâtonnements appears old-fashioned. Indeed, it may be considered as a computing device of the pre-electronic age.

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The market mechanism and trial and error procedure proposed in my essay really played the role of a computing device for solving a system of simultaneous equations. The solution was found by a process of iteration which was assumed to be convergent. The iterations were based on a feedback principle operating so as to gradually eliminate deviations from equilibrium. It was envisaged that the process would operate like a servomechanism, which, through feedback action, automatically eliminates disturbances.

The same process can be implemented by an electronic analogue machine which simulates the iteration process implied in the tâtonnements of the market mechanism. Such an electronic analogue (servomechanism) simulates the working of the market. This statement, however, may be reversed: The market simulates the electronic analogue computer. In other words, the market may be considered as a computer sui generis which serves to solve a system of simultaneous equations. It operates like an analogue machine: a servomechanism based on the feedback principle. The market may be considered as one of the oldest historical devices for solving simultaneous equations. The interesting thing is that the solving mechanism operates not via a physical but via a social process. It turns out that the social processes as well may serve as a basis for the operation of feedback devices leading to the solution of equations by iteration.

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An important limitation of the market is that it treats the accounting problem only in static terms, i.e. as an equilibrium problem. It does not provide a sufficient foundation for the solution of growth and development problems. In particular, it does not provide an adequate basis for long-term economic planning. For planning economic development long-term investments have to be taken out of the market mechanism and based on judgement of developmental economic policy. This is because present prices reflect present data, whereas investment changes data by creating new incomes, new technical conditions of production and frequently also by creating new wants (the creation of a television industry creates the demand for television sets, not the other way round). In other words, investment changes the conditions of supply and demand which determine equilibrium prices. This holds for capitalism as well as for socialism.

For the reasons indicated, planning of long-term economic development as a rule is based on overall considerations of economic policy rather than upon calculations based on current prices. However, the theory and practice of mathematical (linear and non-linear) programming make it possible to introduce strict economic accounting into this process. After setting up an objective function (for instance, maximizing the increase of national income over a certain period) and certain constraints, future shadow prices can be calculated. These shadow prices serve as an instrument of economic accounting in long-term development plans. Actual market equilibrium prices do not suffice here; knowledge of the programmed future shadow prices is needed.

Mathematical programming turns out to be an essential instrument of optimal long-term economic planning. In so far as this involves the solution of large numbers of equations and inequalities, the electronic computer is indispensable. Mathematical programming assisted by electronic computers becomes the fundamental instrument of long-term economic planning, as well as of solving dynamic economic problems of a more limited scope. Here, the electronic computer does not replace the market. It fulfills a function which the market never was able to perform.