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Market Socialism and Neoclassical Economics

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The idea of market socialism has had a strong influence over economists: it seemed to hold open the possibility that one could attain the virtues of the market system—economic efficiency (Pareto optimality)—without the seeming vices that were seen to arise from private property. In the wake of the fall of the socialist economies and the repudiation of market socialism by countries such as Hungary and Poland which had tried it, there were two reactions: defenders of market socialism argued that because communist governments had dominated these countries, the idea of market socialism had not really been given a fair trial; and critics of market socialism said, in so many words, "I told you so: it was clear that socialism, in any form, simply could not work."

In this essay I argue that the idea of market socialism is fundamentally flawed—and for many of the same reasons that the Arrow–Debreu model on which it is based is flawed as a description of the market economy. I contend that if that model (or its precursors) had provided a correct description of the economy, then market socialism would indeed have had a running chance of success. Thus the failure of market socialism serves as much as a refutation of the Arrow–Debreu model of market economy as it does of the market-socialist ideal.

The fundamental problem with *both* models is that they fail to take into account a variety of problems which arise from the absence of perfect information—and the costs of information—as well as the absence of certain key risk markets; the absence of these risk markets, in turn, can—to a large extent—be attributed to informational problems. Within the purview of informational problems I include those that are concerned with *selection,* those concerned with *incentives,* and those concerned with *learning.*

These information-theoretic concerns have changed both the questions economics asks and the answers it provides. To the classical three questions of economics—What should be produced? How should it be produced? For

whom should it be produced?—we now add a fourth: How should these decisions be made, and who should make them?

In the economy of Joan Robinson, or Arrow and Debreu, decision makers and the structure of decision making play no role. Robinson described the job of the manager of a firm as simply looking up in the book of blueprints the appropriate page corresponding to current (and future) factor prices. Were life so simple! Of course, if life were so simple, being a manager would be a truly boring job, worthy of the disdain cast by the traditional British academic. Further, the lack of concern of Lange, Lerner, and Taylor for managerial incentives would be of little moment: managers could essentially be replaced by automata.

The view of economics encapsulated in the Arrow–Debreu framework (and reflected in the contemporaneously written textbooks, such as Samuelson's) is what I call "engineering economics," intending no slur on the engineering profession. Economics consisted of solving maximization problems.[1] Accordingly, in Arrow and Debreu, as I have noted, the advantages of decentralization amount to little more than a convenient computing algorithm, a way of solving, once and for all, a complicated programming problem. But there are alternative ways of obtaining exactly the same solution, and some applied mathematicians have even suggested that there are better algorithms than those that have a price interpretation.

The central point is that in that model there is not a flow of new information into the economy, so that the question of the efficiency with which the new information is processed—or the incentives that individuals have for acquiring information—is never assessed.[2] Indeed, it was only recently noted that there was a conflict between these two objectives: if, say, stock market prices perfectly and instantaneously transmitted information, then no investor would ever have any incentive to acquire information. Stock markets *must* be characterized by imperfect information, so long as information is costly; there is, as Grossman and Stiglitz (1980a) put it, an equilibrium amount of disequilibrium. But the fundamental theorems of welfare economics have absolutely nothing to say about whether that equilibrium amount of disequilibrium—that is, whether the expenditures on information acquisition and dissemination—is, in any sense, efficient. (In fact, the Greenwald–Stiglitz theorems, which I shall shortly describe, establish that they are not.)

Given the implicit assumptions that went into the Arrow–Debreu model, it is no wonder that standard economic theory paid so little attention to the processes by which resources were allocated. In the standard formulation, there was a fixed set of resources (endowment) and fixed preferences; there was a once-and-for-all problem of allocating resources. Arrow and Debreu had the insight that, within that formulation, it made little difference whether there was a static, one-period resource allocation problem or a multiperiod resource allocation problem. That result, in itself, should have alerted us that something was seriously flawed about the Walrasian perspective.

Thus the standard paridigm was concerned with the *rules* for allocating resources (e.g., setting marginal rates of substitution equal to marginal rates

of transformation), not with the *processes* by which resources get allocated: how decisions about resource allocations get made, who makes those decisions, and how those who make those decisions are selected. By the same token, the much-heralded results of the Arrow–Debreu model concerning the decentralizability of the economy were not so much results concerning the decentralization of decision making—for there was really little scope for decision making within the Arrow–Debreu framework—as they were descriptions of a computer algorithm.

We all believe, of course, that both the structure of decision making and who makes decisions make a difference. An enormous emount of managerial time is spent in choosing who will fill various positions in the firm—just as an enormous amount of faculty time, at least in the United States, is devoted to who will fill various tenure positions. We worry about who is entitled to vote on various issues because we believe that the outcomes may, in certain critical cases, depend on how that question is answered.

Indeed, we now have general theorems establishing that, in the absence of a complete set of Arrow–Debreu markets, there will not be unanimity among shareholders about the appropriate course of action which the firm should take.[3] While the earlier literature on nonunanimity stressed the divergences of interests or tastes, the more recent literature (Sah and Stiglitz, 1985, 1986, 1988) stresses divergences in information, divergences that lead different participants to come to different views concerning the desirability of, say, some project even were they to agree on the firm's objectives.[4]

These and the other criticisms of the traditional paradigm are offered not to suggest that the Arrow–Debreu work has not been useful. In retrospect, it was more valuable in helping us identify what is wrong with the standard competitive paradigm and in developing the market-failures approach to government interventions than in helping us understand how resources are actually allocated in modern capitalist economies.

Does Modern Theory Suggest a Greater Plausibility for Market Socialism?

At least two of the central results of modern economic theory should, if anything, have reinforced the belief in market socialism.

Absence of Futures Markets and the Role of Government in Allocating Investment

One of the underlying assumptions in the now-standard model of (competitive) market economies—the model that seemingly provides the intellectual foundations for whatever belief one has in the market economy—is that there is a complete set of futures markets. These futures markets are essential for making the correct investment allocations. Indeed, without a complete set of

futures markets extending infinitely far into the future, the economy can set off on a path which is locally intertemporally efficient, looking exactly like an ordinary rational expectations path, and only in the distant future does it become evident that the economy is inefficient. There appear to be no private incentives to correct this seeming long-run inefficiency.[5] Concern about the market's ability to allocate and coordinate investment in a socially productive way underlay, of course, many of the calls for socialism, both in this and the previous century.

The Principal–Agent Problem and the Separation of Ownership and Control

Moreover, the early work of Knight (1951), Berle (1926), and Berle and Means (1932) on the separation of ownership and control reached fruition in the principal–agent[6] literature (growing out of the papers by Ross [1973] and Stiglitz [1974]):[7] with costly information, shareholders could exercise only limited control over managers. Contemporaneous and subsequent theoretical literature on takeovers (Stiglitz, 1972a, 1975b; Grossman and Hart, 1980) and other control mechanisms (Stiglitz, 1982b) further reinforced the conclusion concerning (at least limited) managerial autonomy. These theoretical observations have, if anything, been confirmed by the subsequent developments during the merger and takeover mania of the late 1970s and 1980s. For large firms, there is no "single owner" maximizing the expected present discounted value of profits, or even long-run market value.[8] Does ownership really matter? Is BP any less efficient than Texaco?[9] Canadian National Railroad than Canadian Pacific?[10] Has there been any rape of the public interest greater than that of Ross Johnson and his cronies of the shareholders of RJR?[11]

Is Market Socialism Less Necessary than Previously Thought?

Modern theory has been somewhat more evenhanded in weighing in on the debate over market socialism than the previous discussion might have suggested. Two further results of modern theory have more ambiguous implications.

Competition

At least some advocates of market socialism believed that the relevant choice was not between competitive markets and market socialism but between monopoly capitalism and market socialism (see Persky, 1989). They believed that in large sectors of the economy competition was not viable. An essential assumption in the analysis establishing the efficiency of market economies is that every firm be a price taker, in that it believes that it has no effect on the prices it receives for the goods it sells or the prices it pays for the factors it buys.

The growth of large enterprises in the early part of the twentieth century led many economists to extrapolate the trend and to envisage a market economy in which each of the major sectors—steel, oil, automobiles, aluminum, and so on—was dominated by one firm, or at most a few. Economic theory bolstered these predictions: the technologies involved large fixed costs. New organizational techniques (such as those introduced by Alfred Sloan at General Motors) meant that the increasing costs associated with larger scale enterprises, arising from lack of organizational control, could be limited. The establishment of national markets, and national media to advertise in those national markets, provided further bases for returns to scale. With no major source of decreasing returns to the firm, and some major sources of increasing returns, one would expect each industry to be dominated by at most a few firms.[12]

Thus the alternatives facing economies were to allow monopoly capitalism to take hold, with the distortions in resource allocations (and almost inevitably the concentration of political power) that might follow; to have direct government control of these sectors; or to attempt to regulate and control the exercise of monopoly power, either by breaking up the monopolies (with the possible resulting loss of efficiency from failing to exploit economies of scale) or by controlling monopoly practices. Few democratic governments found the first acceptable. The United States was perhaps most aggressive in pursuing the third strategy. But by midcentury, more than fifty years after the passage of the landmark antitrust legislation, many of the core American industries remained highly concentrated; even successes, like the breaking up of Standard Oil, had ambiguous effects, as there was widespread belief that the Seven Sisters acted much like a cartel, with tacit collusion and an understanding of common interests in limited competition replacing outright collusion. The antitrust laws had led to greater subtlety! These events simply reinforced belief in the second strategy—government ownership and control.[13]

Countervailing this intellectual trend, which one might have thought would have provided greater support for market socialism, is the internationalization of the world economy. Competition is limited by the scale of the market, and as the scale of the market has changed, so has the effectiveness of competition. Thus, whereas GM, Ford, and Chrysler dominated the American automobile market through the 1960s, their market power recently has been eroding as they face effective competition in all segments of the market from Japanese and European producers. While the American market may have been large enough to sustain only three large producers, the world economy is large enough to sustain many more.

Keynesian Economics

Of all the market failures, the one whose impact in eroding public confidence in market processes was the greatest was the Great Depression, the worst example of the periodic slumps that have plagued market economies throughout the centuries of capitalism. Keynes provided more than an explanation: he showed that the market failure could be corrected without abandoning

market processes. Only limited government intervention—the fiscal stimuli of increased government expenditures or reduced taxes—was required. Indeed, this intervention was even more limited than that for those who saw the problem as too-high real wages: the government did not have to intervene in the price- and wage-setting behavior of firms and unions.

Ironically, the past twenty years has seen a reduction in confidence in Keynes's analysis. The tendency in American universities to disregard economic history as part of the study of economics has reinforced a shortness of memory leading many American academic economists to conclude that recessions were a problem of the past—if they were a problem then. Just as we discovered Keynes was wrong, we fortunately discovered he was irrelevant! But unfortunately, the major recession of the early 1980s, the recession of 1990–1991, and the persistence of high unemployment rates in Europe provided a rude awakening to those who believed that cyclical unemployment was a thing of the past.[14]

Curiously, the debate on market socialism did not focus on the relative macroeconomic merits of the alternative systems, and the historical evidence is of limited value: though the socialist economies "solved" the unemployment problem, their solution may have been to make it disguised rather than open. The socialist economies did seem to exhibit fluctuations in growth rates, evidences of fluctuations in economic activity. As socialist economies tried to decentralize, moving more toward some versions of market socialism, they exhibited greater difficulties in macroeconomic control (consider the experiences in Yogoslavia and China). As important as these issues are, a fuller treatment would take me beyond the scope of this chapter.

But these Keynesian experiences should have sent one message: something was fundamentally wrong with the Arrow–Debreu model, for if that model were correct, unemployment would not exist, and it would be hard to explain the volatility of the economy given the role of prices in absorbing shocks and given the role of inventories, savings, and insurance markets in buffering both individual firms and households from the impact of shocks.

But there was another message of Keynes that was heard more clearly: the macroeconomic ills of capitalism were curable. The economic system needed no fundamental reforms but only selective government intervention. It is in this sense that Keynesian economics greatly weakened the case for market socialism.

Doubts on the Relevance of the Lange–Lerner–Taylor Theorem: Some Preliminary Thoughts

On balance, I suspect that the developments in modern economic theory which I briefly reviewed—the recognition of the importance of the absence in market economies of a complete set of futures and risk markets; the separation of ownership and control; and the imperfections of competition—should have led to greater doubts concerning the effectiveness of market processes.

Yet most economists today would express greater, not less, confidence in market processes than they would have fifty years ago. They would cast doubt on the *relevance* of the Lange–Lerner–Taylor theorem asserting the essential equivalence of competitive markets and market socialism. The model of market socialism underlying that theorem is seriously flawed; and, equally important, the model of the market economy—underlying not only that theorem but also the fundamental theorem of welfare economics—is seriously flawed. With a bad model of the market economy and a bad model of the socialist economy, no wonder that any semblance of the equivalence of the two could, at most, be a matter of chance!

In my Wicksell lectures, I present five central economic reasons for the failure of market socialism. I argue that the model of market socialism

1. Underestimated the significance of the incentive problem;
2. Underestimated the difficulty of making a "full-pricing" system work and, correspondingly, underestimated the role of non–price allocation mechanisms within the economy;
3. Underestimated the difficulty of allocating capital;
4. Misjudged the role and function of decentralization and competition; and
5. Simply ignored the role of innovation in the economy.

In these errors, market socialism was not alone, as I have emphasized: each of these charges could be leveled—in my judgment, fairly so—against the standard neoclassical model of the economy, the twin of the market-socialist model. In this chapter I limit my discussion to the second and third errors.

Market Rationing and Non–Price Allocation Mechanisms within Market Economies

Just as the market socialism model underestimated the importance of incentive problems, it overestimated the role of prices and underestimated the difficulties of making the price system work. It is, of course, not surprising that Lange, Lerner, and Taylor, basing their analyses on the traditional paradigm, which argued for the primacy of the role of prices in allocating resources, with prices determined to equate demands and supplies, would similarly stress the role of prices in allocating resources. They differed from the traditional model only in their view of the processes by which prices were to be determined. Rather than relying on market forces, or a mythical Walrasian auctioneer, to equate demands to supply, they wanted to rely on the visible hand of government. But the prices in the two theories were performing exactly the same role.

As I explain more fully later, prices play a rather different role in resource allocation than is captured by the standard competitive paradigm, and, more importantly for our purposes, nonprice signals play a more important role in resource allocation.

Why Prices Cannot Function in the Way Presumed by the Standard Model

In a sense, the underlying problems with the "price" model arise from the complexity of the commodity space. In the examples we teach our students, we talk about apples, oranges, and wheat. But any farmer can tell you that there is no such thing as a price for an apple. The price depends on the kind of apple, its freshness (and a variety of other quality characteristics), its location, and the time of year. Industrial commodities are even more complicated, having a myriad of relevant attributes.

An example of the complexity of the product space was recently provided by the U.S. Defense Department, when it put up for bidding a standard white T-shirt, the kind of commodity that can be purchased in any clothing store for a few dollars. The specifications covered thirty pages in small print. Even then, I suspect that the product was incompletely specified. Of course, typical consumers do not have to articulate completely what it is they are buying when they buy a T-shirt, suggesting that there is a fundamental difference between the way actual markets work and how they are envisaged to work in the market-socialist model.

The complexity of the commodity space has two fundamental implications. First, it makes it virtually impossible for a central planner to set prices, or to set prices in a way that adequately reflects this diversity of characteristics and results in products of the right characteristics being produced. For instance, there would have to be prices for *each* quality level (a continuum), and each quality level would have to be precisely specified. Moreover, since every commodity has many dimensions, even if there were a limited number of specifications in each direction, the full dimensionality of the product space is enormous. (Think of a commodity with ten characteristics, such as color, durability, length, width. If each dimension could take on ten values, then the dimension of the price space for this single commodity would be ten billion!)

Market-socialist economies (and government procurement agencies in market economies) learned the hard way what happens when the product is incompletely specified. If a price is specified for "nails," short nails made out of any cheap material will be produced. If the length is specified, but not the thickness, then excessively thin nails will be made. If length and thickness are specified, the producer may still make nails out of a cheap material, which may be excessively brittle. For more complex commodities, almost no matter how many characteristics are specified, there remains scope for discretion—and, in particular, cost cutting—which adversely affects how well the commodity performs the task for which it is intended.

On the other hand, it is extremely costly to provide complete specifications of very complex commodities, as the T-shirt anecdote illustrates. Moreover, if all the inputs (materials, etc.) are fully specified—for instance, the material of which the nail is to be composed—opportunities for finding alternative materials which meet the user's needs as well or better, but which are less expensive,

are foreclosed. If only the characteristics of the nail were specified, whether those "characteristics" have been satisfied may become a matter of judgment. And even then, there remain questions of trade-offs: some material might exceed the original standard in some characteristic and fall short in another. What price should the producer receive for such a commodity? Market socialism provides no answer—other than requiring the planner to provide a complete set of prices (an impossible task).

The market-socialist model—and the neoclassical model—both fail to recognize the importance of the interface between producers and those who used the products being produced. *The central message of these models, that communication between the two could be limited to price signals, is fundamentally wrong.*

The process of production is often more one of "negotiation" than of "price-taking." Firms negotiate delivery times and product characteristics, as well as price. Information (about the needs of the buyers, the technological capabilities of the sellers, etc.) is transmitted in the process. Prices do play an important role in this interaction. The qualitative statement "It would be hard to make a nail which will do what you want it to do" becomes a quantitative statement: "I can do it, but the cost will be $1.23 per nail."

The second important aspect of the complexity of the product space is that markets are frequently—perhaps I should say usually—imperfectly competitive. The products produced by one firm usually differ slightly, in one or more of the many characteristics, from those produced by others.

There is, to be sure, competition: the buyer will check with other producers, to see if they can make a better offer. But it is not perfect competition, and in particular, it is not even the kind of competition described by the Arrow–Debreu model or its extensions.[15]

Imperfect Information and the Limited Role of Prices

The complexity of the commodity space, which by itself would be sufficient to explain why the price model is inappropriate, is not the only reason for its failure. A second explanation[16] has to do with the costs of observing differences in the commodities; that is, even if we could costlessly *specify* all the relevant characteristics, ascertaining whether a particular item does or does not have those characteristics is expensive.

In such a situation, prices may affect the average quality of what one in fact obtains in a market transaction. Elsewhere, I have explained at length the causes and consequences of the dependence of quality on price (Stiglitz, 1987a). Perhaps the most important consequence is the "repeal" of the law of supply and demand. We now know that when the quality of labor depends on the wage rate paid, or the "quality of a loan" (the likelihood that the loan will be repaid) depends on the interest rate charged, or the quality of a product depends on the price charged, the (competitive) market equilibrium may be characterized by rationing—demand not equaling supply. This may provide part of the explanation of the widespread phenomena of unemployment in

the labor market and credit rationing in the capital market. Even though there is an excess supply of labor, firms do not cut the wage they pay, because doing so may reduce the quality of labor, with a resulting reduction in profits. By the same token, there may be credit rationing, as lenders may not raise the interest rate charged, even when there is excess demand for credit, because doing so would adversely affect the probability of a default.

Three things are important about these non–market-clearing results (which emphasize that prices do *more*—and less—than is envisaged in the traditional paradigm):

1. They emphasize the importance of a set of economic functions, *screening and providing incentives*, which were almost totally omitted from the traditional paradigm.
2. When markets do not clear or, more generally, when there are selection, incentive, and other incomplete information problems, nonprice mechanisms are generally employed to help allocate resources.
3. When markets do not clear, prices do not necessarily convey the kinds of signals concerning scarcity which were presumably the major insight of the Arrow–Debreu model (and the market-socialist model, which was based on the same set of concepts). With wages set by efficiency wage considerations (e.g., to make sure that workers do not shirk), wages may well be above the opportunity cost of labor. Information about scarcity may be conveyed in ways other than through prices; firms respond, for instance, to signals such as "orders" and "changes in inventories."

Nonpricing Mechanisms in Resource Allocation

The importance of the nonpricing mechanisms in resource allocation can be seen in two different ways. First, a large fraction of all production occurs *within* firms, within a context in which there is only limited reliance on pricing. General Motors is larger than many countries. While a full discussion of what determines the boundary of firms, what production takes place within firms, would take me beyond the scope of this chapter, the important point I want to stress is that much economic activity is not governed, except indirectly, by price relations.

The allocation of capital provides the second important example. Capital is not allocated by an auction market, with those who are willing to bid the highest getting the capital. The reason is obvious: the bid is a promise to pay back a certain amount in the future, and that promise may be broken. In allocating capital, it is important to know not only what the user "promises" but what is actually likely to be repaid. A wide array of financial institutions has arisen to do just that. Banks "allocate" capital, but they do not simply rely on the price mechanism.

The fact that the price system is limited implies that economic relations are frequently governed by both *contracts* and *reputations*, factors which are

totally ignored in the Arrow–Debreu model and in the models of market socialism, both of which focus exclusively on prices. The importance of contracts and reputations can be seen in almost every market to which we turn. Consumers, for instance, rely heavily on reputations in choosing products. In our earlier example of the consumer buying a T-shirt, we noted that the typical consumer does not have to articulate completely what it is that is being bought. If the product is disliked—if it is not as durable as the seller claims—the product is simply not bought again. The buyer (and the producer) rely on reputations. By the same token, lenders rely heavily on the reputation of the borrower.

Contracts almost always involve nonprice terms. Credit contracts, for instance, often have provisions for collateral. The earliest principal–agent literature stressed the importance of nonprice terms, such as the amount of land that a landlord would provide a tenant, and the provisions of other inputs. Insurance and employment contracts often have "exclusivity" provisions: the insured agrees to report the purchase of any other insurance for the same risk from other insurance firms; the worker agrees not to work for other employers. Insurance contracts often have other "quantity" provisions; for example, the insured agrees to install fire extinguishers.

Thus contracts are required because "markets" simply do not exist for all the possible commodities (where we differentiate among commodities at different locations, dates, states of nature, qualities, etc.) in the world; further, reputations are required simply because we cannot write down all the desired characteristics, and even if we could, it would be impossible (and/or expensive) to adjudicate through a legal system all the possible disputes that might arise.[17]

Finally, both the Arrow–Debreu model and the model of market socialism simply fail to take either of these forms of economic interaction into account.

Rents and the Reputation Mechanism

It is not only true that the Arrow–Debreu model and the models of market socialism ignore those sectors of the economy in which reputation mechanisms are important—as they so frequently are—but it is also the case that reputation mechanisms require a modification of how we view the pricing system as working.

In particular, if the maintenance of reputation is to provide an incentive, there must be a cost to losing one's reputation. This, in turn, means that at the margin, sellers cannot be indifferent to whether they do or do not sell the commodity (workers cannot be indifferent to whether they do or do not work). Economic relations *must* entail rents, payments in excess of the minimum necessary to induce an individual to be willing to engage in the transaction. Profits, in the conventional sense, cannot be driven to zero; price cannot equal marginal costs. The basic pricing relations underlying the "theory of value" are in that sense wrong, and the corresponding model of market socialism, based on the standard theory of value, must on that account also be incorrect.[18]

Underestimation of the Difficulties of Allocating Capital

In the traditional view of market socialism, markets were used to allocate goods—given the capital stock—but capital was not allocated by a market system. The failure of markets to allocate capital efficiently, including the failure to coordinate investment decisions, provided part of the rationale for the turn to market socialism.

Market socialists were correct here in identifying a market failure. As we saw in the previous section, although they did not fully grasp the problems that arose from the absence of a complete set of prices, they thought they understood the consequences of the more obvious absence of a complete set of futures and risk markets. But while the Arrow–Debreu model simply ignored this problem, the market socialists were naive in believing that the government could easily remedy this market failure. They did not inquire deeply into its source.

But the very reasons—largely information—that lead markets to have problems with allocating capital (which we shall discuss next) all posed serious problems for alternative allocative mechanisms. The absence of futures markets means that firms have to estimate future prices of what they sell and of the inputs that they purchase; so too must the government estimate the shadow prices of goods and services. But what are the incentives provided that those estimates be accurate, that all relevant factors be taken into account? In the market, those who make a mistake are (in theory) disciplined, and they bear a large part of the costs of those mistakes. This is not so in the case of publicly owned enterprises, particularly if they face soft budget constraints.

The failure of the Arrow–Debreu model was thus not just that it assumed that there was a full set of futures and risk markets. Its failure was deeper: it failed to recognize the inherent information problems associated with the allocation of capital. And, again not surprisingly, there was a parallel failure of market socialism.

Thus capital markets cannot be well described as auction markets. Capital is not simply given to the highest bidder. There is what may be viewed as a *direct* allocative mechanism at work. Banks *screen* loan applicants, just as a central planner would, in principle, screen project applicants.

The fact that both markets and market socialism engage in direct allocative mechanisms does not mean, of course, that they are identical. The incentives of banks and planners may differ. Critics of market socialism emphasize the failure of incentives to ensure an efficient allocation of investment, particularly in the presence of soft budget constraints. But as the recent S&L debacle in the United States illustrates, there may be marked discrepancies between private incentives and social returns in market economies as well. The S&Ls squandered a considerable fraction of the entire savings of the United States for one year![19] To be sure, the blame may be put on government programs.

But the more general observation of the potential inefficiency of market allocations of investment remains valid.

There is another implication, to which I referred earlier: lenders employ a variety of nonprice provisions in the loan contract in an attempt both to sort among loan applicants better and to provide better incentives. Loan contracts are not described simply by the interest rate; a variety of terms, including collateral, and provisions relating to default have important consequences for both parties to the contract.

But while markets may not work perfectly, markets provide incentives to ensure that funds are allocated to profitable ventures and that the funds are used in the way allocated, and they provide what may be viewed as an automatic discipline mechanism for those institutions (banks) which do not do their job well. A major failure of market socialism was the absence of both the incentive structure and the discipline mechanism.

Moreover, the introduction of nonfinancial concerns into the social objectives of choosing investments made the task of ensuring that good decisions were being made all the more difficult. When a project incurred losses, was it because of the ineffectiveness of the decision makers, or was it because other social objectives (employment, the environment) were brought into play? Though in principle one might be able to disentangle the two, in practice it proved impossible.

Markets, Market Socialism, and Models of the Market Economy

This chapter has looked at two central aspects of how the standard Arrow–Debreu (neoclassical) model looks at the economy. While the Arrow–Debreu model makes the strong assumption that there is a complete set of markets,[20] it stresses the role of prices in allocating resources. Market socialism borrows that idea, recognizes the absence of the Walrasian auctioneer ensuring that prices are set at their market-clearing levels and the absence of futures/risk markets for coordinating investment decisions, uses prices as the key mechanism for allocating resources *given* the stock of capital, and uses direct allocative mechanisms for investment. I have stressed that *both* views are wrong concerning the role of prices: prices (and markets) play a more limited role in resource allocation; nonprice mechanisms a more important role.

Market socialism was correct in identifying the existence of problems of the standard paradigm (and actual markets) in allocating investment, but it did not correctly identify what the nature and source of those problems were.

Asymmetries of information mean that capital markets are characterized by credit rationing and equity rationing. Equity markets—which have important risk-spreading advantages over loan markets—account for a relatively small fraction of new capital raised in almost all countries. Recent empirical evidence suggests why: when firms issue new equities, there are marked

declines in share prices. The information-theoretic research has provided explanations, based on incentive and selection effects, for why these price declines are expected.[21]

If the neoclassical model paid insufficient attention to the problems of allocating capital, market socialism paid insufficient attention to the problems of incentives. But *neither* really paid adequate attention to incentives: we have seen that the price system deals with only a limited subset of the incentive problems facing real economies.

The competitive market paradigm has exercised an enormous influence over our thinking about how the economy functions. It provides some valuable insights on the importance of competition, the role of prices, the interdependence of markets, and the potential for decentralization. But most of these insights are incomplete: though competition is important, it is not well described by the kind of price competition of the Arrow–Debreu model; prices are only one part of the market resource allocation mechanism; the interdependence of markets operates not only through prices but also through credit; and decentralization is limited, as much production, even under capitalism, operates within large organizations that make limited use of price systems for the internal allocation of resources.

Conclusion

One of Keynes's most frequently quoted remarks dealt with the power of ideas: "The ideas of economists, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed, the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist" (1936, p. 383).

The ideas and ideals of market socialism have held great sway for more than half a century. These ideas, in turn, were greatly influenced by ideas of how market economies function—ideas of Smith, Walras, Arrow, and Debreu. Research in the past twenty-five years has shown how badly flawed *both* sets of ideas are.

We need not speak of the economic miseries which may have followed from the too-ardent pursuit of the policies based on either set of models. We have seen how, by focusing on a particular set of information problems, and a particular mechanism (the price system) by which information is transmitted, they have ignored a wider range of information problems and a wider range of mechanisms by which information is exchanged. These models have diverted attention, both of economists and of governments, from attaining a more balanced view of the role of the government. It is perhaps no accident that in the major successes in economic growth during the past quarter-century—the "Asian miracle"—neither neoclassical economics nor market-socialist ideas have played an important role.

Notes

1. See below for a further elaboration on this point.

2. To be sure, the Arrow–Debreu model can be viewed as having a certain informational economy in the transmission of certain types of information: firms do not have to know the detailed information concerning the preferences of consumers, and consumers do not have to know the detailed information concerning firms' technologies.

As noted earlier, the fact that uncertainty is explicitly introduced in the Arrow–Debreu model means that there is, in a sense, an implicit recognition of imperfect information. But the "trick" of their formulation was to develop a framework in which choices under uncertainty are no different from conventional choices with no uncertainty (just as choices about the future are no different from static choices). Firms simply maximize the value of the firm, using state-contingent prices, and consumers simply have preferences defined over state-contingent commodities. Firms and consumers are precluded, by assumption, from gathering information. There is no exploration of new technological possibilities, no new products, no scope for judgment concerning how the market might react to new possibilities.

3. The intuition behind this result is simple: when there is a complete set of markets, and each firm is small, then the only issue facing a firm is how to maximize its stock market value, i.e., valuing its outputs and inputs at the (competitively given) prices. It does not have to make any judgments about the likelihood of different events (market judgments on those likelihoods are reflected in the market prices). Maximizing market value shifts each shareholder's budget constraint out as much as possible; and since prices are taken as given, the only thing the firm can do for its shareholders is shift the budget constraint.

When there is not a complete set of futures and risk markets, individuals will differ in their judgments about the likelihood of different events; they cannot, in general, turn to the market to "arbitrate" these differences in judgments. Formally, different individuals may be thought of as having different marginal valuations of income in different states; and it may even be the case that different policies may affect those marginal valuations.

The issue of whether there would be unanimity among shareholders in the context of a model without a complete set of Arrow securities was a question which, to my knowledge, was first raised in my 1970 Tokyo lecture. I showed there that, within a simple mean variance model, (1) maximizing stock market value would not in general be welfare-maximizing and (2) unless all shareholders planned neither to buy nor to sell shares, different shareholders' expected utility would be maximized by different policies. There would not be shareholder unanimity. Subsequent literature (e.g., Radner, 1974) showed that unanimity could be obtained under slightly weaker conditions than the existence of a complete set of Arrow securities; but then Grossman and Stiglitz (1980b) established that these extensions were of extremely limited interest. They formalized and extended the nonunanimity results.

4. The literature which focuses on the consequences of divergences in objectives (so that individuals have to be motivated by incentives) is today commonly referred to as the principal agent literature; for a brief recent survey, see Stiglitz (1989c). By contrast, the literature focusing on decision making in organizations in which all members have common objectives, although problems of decision making, communication, and coordination remain, originated as the theory of teams. See, e.g., Marschak and Radner (1972).

5. See Hahn (1966), Shell and Stiglitz (1967), Stiglitz (1973), and Samuelson (1967). For a brief discussion of how these considerations have been inadequately taken into account in more recent dynamic analyses, particularly of the rational expectations school, see Stiglitz (1990c).

6. This literature can be thought of as providing rigorous underpinnings to the literature of the 1950s stressing managerial discretion (e.g., March and Simon, 1958, and Marris, 1964).

7. The most widely cited paper applying these ideas in detail is perhaps that of Jensen and Meckling (1976).

8. Indeed, as I noted in my Tokyo lecture (1972), in the absence of a complete set of markets, there will not, in general, be unanimity among shareholders concerning the objective which the firm should pursue. See footnote 3 above.

9. Until recently, majority interest in BP (British Petroleum) was held by the British government. Texaco, a private American oil company, had earned a reputation among those in the industry for a combination of managerial arrogance and incompetence; when Texaco lost a multibillion dollar suit that Pennzoil had filed against it. for inducing Getty Oil to breach a contract to sell itself to Pennzoil, there was little sympathy for Texaco.

10. Evidence that it is not is provided by Daves and Christensen (1980). Canadian National Railroad is government-owned; Canadian Pacific, privately owned.

11. RJR–Nabisco was a major American conglomerate, originally known for its two principal product lines, the cigarettes sold by R. J. Reynolds and the bakery products produced by Nabisco (although it included other products, such as Dole Pineapple). It increasingly became known for the life-style of its managers, which included a large fleet of corporate jets and vacation homes at ski resorts. For a popularized version of this takeover story, see Burrough and Helyar (1990). There is a growing theoretical and empirical literature discussing the conflict of interest between managers and shareholders. See, for instance, Shleifer and Vishny (1989), Jensen (1986).

12. The theoretical literature in the late 1920s and early 1930s reflects this concern with increasing returns and the importance of overhead costs; see, for instance, Lewis (1951) and Clark (1923). Among the concerns were the nature of equilibrium; see, for instance, Young (1928). Out of these concerns arose the theory of imperfect competition. In this respect, although Chamberlin's (1933) contribution may have been the more original, Robinson's (1933) was more directly concerned with the central issues.

13. I should, perhaps, mention one development which argued that imperfections of competition had far fewer consequences than had previously been thought: the contestability doctrine, which held that potential competition was all that was required to ensure economic efficiency; and even with one firm, the benefits of competition would be passed on to consumers, as profits would be driven to zero. But a closer examination of how markets function showed that competition was even less robust than economists had thought earlier: incumbent firms could use a variety of strategies (beyond outright collusion) to deter entry and to restrict competition among themselves. Competition might be limited even with very small sunk, fixed costs. See, e.g., Stiglitz (1988c).

14. Indeed, some studies even suggested that output variability was as great in the postwar (post-Keynes) period as it had been earlier. See Romer (1986).

15. The fact that competition is limited must be attributed not only to the high dimensionality of the product space but also to fixed costs of production (without such fixed costs, any firm could produce *all* commodities)and to costs of search/negotiation

(it takes time to find the firms producing the particular characteristics one is interested in, so that even if there were many such firms, finding them might be difficult).

There have been several extensions of the standard Arrow–Debreu model to include a continuum of commodities. These mathematical extensions might suggest that that model could indeed handle complex product spaces, but these extensions demonstrate the important distinction between economic and mathematical "limits" of the standard model. The problem with the Arrow–Debreu model is *not* that it assumed a finite number of commodities. I have stressed here the *economic* problems of defining commodities, and of how the presence of even small fixed costs will, in a world of product differentiation, lead to imperfect competition.

16. There are other explanations, one of which is discussed more fully below: as we have seen, in the presence of imperfect information, efficient economic relations cannot be "supported" by (linear) price relations.

17. We sometimes distinguish between the observability of a variable by the parties to the contract, required for reputation mechanisms to work, and the verifiability of a variable, required for disputes to be resolved by third parties (courts). See, e.g., Newbery and Stiglitz (1987) or Hart and Holmstrom (1987).

18. This basic insight was noted and modeled independently, in different contexts, by Becker and Stigler (1974), Shapiro (1983), and Eaton and Gersovitz (1981). For a model analyzing the implications for the labor market, see Shapiro and Stiglitz (1984a), and for a discussion of the implications for macroeconomics, see Stiglitz (1992). For a discussion of more formal game-theoretic analyses, see Kreps (1990).

The earlier analyses of reputation in product markets were not complete, in that they omitted an adequate discussion of the entry conditions (the conditions for long-run equilibrium). While profits might be positive in the short run, long-run profits might be zero. For an analysis of the relation between short- and long-run profits, see Stiglitz (1989a).

19. One could, of course, argue that the problem was not one of incentives but incompetence, but this is an equally damning criticism: somehow the market did not do a good job in selecting evaluators.

20. It should be emphasized that this is an assumption not made just to simplify the analysis; it is essential to the conclusions concerning the efficiency of market resource allocations.

21. See Greenwald, Stiglitz, and Weiss (1984), Myers and Majluf (1984), Jensen and Meckling (1976), etc.

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