

Lee, Dwight R. and Robert F. McNown. "Order from Chaos."
Economics in Our Time: Concepts and Issues Chicago :
Science Research Associates, 1983.15-25.

ISBN: 0574194355

OFC 14090706

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chapter 2

Order from Chaos

1. THE PROBLEM OF ECONOMIC ORGANIZATION

Consider for a moment the awesome task that our economic system faces. Eleven million business units produce almost \$3 trillion worth of goods and services for over 200 million consumers. In the process, the skills of 100 million workers and a multitude of raw materials are used. How do we manage to coordinate the activities of all these firms and induce them to use the appropriate methods of production? Why does it happen that the goods produced are the ones that consumers want? Or does our system fail to accomplish all of this? In fact, given completely selfish and independent action by individuals in this economy, should we not anticipate absolute chaos? In this chapter we want to analyze the nature of the economic problem just hinted at and the means by which the capitalist system attempts to solve the problem.

The basic task of any economic system is deciding how to ration scarce resources among an unlimited number of competing uses. The goal of a rational economic system is to provide a collection of goods and services that corresponds to consumers' or society's desires while economizing on the use of scarce resources. As long as people desire more

goods (broadly defined to include leisure time, a clean environment, and the usual material products of industrial society), a well-designed economic system will attempt to squeeze as much satisfaction as possible out of the limited productive materials available.

This requires that a great deal of information about consumer preferences, available resources and laborers, and alternative production techniques be made available to the relevant parties. It also requires that the activities of individual firms and households be coordinated and that incentives to economize on scarce resources be provided. In a market system, this is accomplished through decentralized decision making with individual market prices conveying the appropriate information; firm and household activities are coordinated through markets, and incentives are provided by profits and wage differentials. A pure market system functions without centralized planning. Exactly how this is accomplished and the extent to which the price system is likely to function properly is the primary subject of this chapter.

There is, of course, an alternative to using markets to organize production; this is centralized planning.* One way to appreciate what the price system does accomplish is to consider the dimensions of the task faced by a planning bureaucracy in an advanced industrialized society.

2. THE PLANNING APPROACH

Imagine a society that has done away with the "chaotic" and "exploitative" institution of the market. People no longer sell themselves as commodities in return for life's necessities. Production is no longer subject to the whim or avaricious nature of the capitalists but is now based on social needs.

When the new economic system was first instituted, the government attempted to acquire information on individual preferences by means of a questionnaire. Every year the citizens were required to submit an itemization of their consumption needs for the coming twelve months, so that the Planning Board could make a reasonable decision about what was to be produced. But the itemization was not sufficient, for peoples' desires exceeded the \$3 trillion in goods and services that the economy was capable of producing. The planners needed information on the relative intensity of consumers' desires for various products. Also, the questionnaire did not elicit detailed enough information about the particular products individuals wanted.

To rectify this problem the Planning Board developed the Complete

*A third alternative is an organization of production and commerce according to social traditions. This form of economic organization is found in most primitive societies but is of little practical importance to modern industrial societies.

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Preference Inventory form, which was to provide more detailed information on consumption desires and some measurement of the intensity of these desires. The typical entry looked like this:

Item 4893: Pen
 Consume in 1984? Yes No
 Ballpoint, fountain, or cartridge
 Color _____
 Width _____ Length _____
 Weight _____
 Fine, medium, or heavy point _____
 Retractable head or removable cap _____
 Ink color _____
 Desired lifespan _____
 Intensity of preference:
 Relative to other products desired, give intensity rating (1-100) _____
 How many of the following items would be necessary to compensate you for not obtaining the item in question?
 Pencils _____
 Typewriter _____ (use decimal fractions)

The project was wisely abandoned when it was discovered that a complete description of an automobile with accessories would fill 500 pages.

Instead, a body of consumer "experts" was established to decide what the public really needed. Many considered this a major improvement, since individual tastes led to the consumption of many commodities that were deemed unnecessary.

With the problem of collecting information on consumer preferences obviated by the planners' decision on what was to be produced, the Planning Board turned to the question of how production should be organized.

Again a mountain of information was needed. The planners had to have an inventory of the kinds and qualities of raw materials, equipment, and laborers available and information on where these resources were located. They needed to know the productive capabilities of every factory, mine, utility, and acre of farmland, and how an increase in resources available to each plant would affect production in other plants. Particular information on the techniques of production was also collected to make sure that each plant was organized as efficiently as possible.

Given this information and the planners' decision on the output of final goods and services to be produced, it was necessary to decide how production should be organized and give each plant the appropriate directive. Should basketballs be produced with leather or a synthetic material? Should wheat farming use light hand equipment and much manual labor or heavy machinery? Should computers be used for scientific research or for accounting purposes? Where were engineers

most needed, and how much of available resources should be used to train more technical personnel? Questions such as these numbered in the millions, and the complexity of the problem forced the planners to rely on individual plant managers to make many of the decisions.

It was decided that the decisions relating to the production processes of each plant—what resources to use, which production techniques to employ—would be made by the individual plant managers, while the Planning Board would coordinate the activities of every firm so that each industry's output would be consistent with the needs of other firms and the final output requirements of the plan. Directives were provided in the form of quotas for each plant.

Plant managers were obligated to meet these quotas in order to retain their jobs. Managers who exceeded their quotas were often rewarded with bonuses or the possibility of advancement. Eager to satisfy the requests of the Planning Board, many plant officials found that they could meet their quota or even exceed it if they concerned themselves less with the quality and variety of product turned out. One over-zealous manager exceeded his quota of underwear by 150 percent, unfortunately, not every interested consumer had a twenty-eight inch waist. Other producers were able to meet their quotas only by employing very scarce and valuable inputs. Their only concern was producing a maximum quantity of output; there was no reward for an economical use of scarce resources. Quotas simply did not provide sufficient information on what should be produced or how production should be organized in order to economize on scarce resources. Even if plant directors could be motivated to provide society with the correct kinds of goods at a low cost, they did not have the information necessary to carry this out. Was it worth the extra cost to consumers to have longer-lasting jewels in their wristwatches? Did society want to economize on the use of computers in banking operations by employing additional accountants? Did individuals want to pay the additional cost for hardcover books or were paperbacks adequate? No plant manager could make this decision accurately, since he was not provided with the appropriate information on relative scarcities of resources or the actual value consumers placed on the goods his plant was producing.

As a result of these problems, the planned society found that it was not making the most effective use of its scarce resources to satisfy human wants. Productive materials were not being used in those lines of activity where their contribution to society's welfare was the greatest. And, of course, this society brushed aside the problem of collecting and transmitting information on consumer preferences.

The basic point of this illustration is that any large industrial economy faces formidable problems of information and coordination that must be solved if production is to (a) correspond to consumer preferences, and (b) provide maximal output for a given use of scarce re-

sources. If these problems are enormous for a centrally planned economy, how is the allocation problem solved in a market economy, in which no direction from governmental authorities is provided? Without some planning organization, shouldn't we expect the market system to result in complete chaos? The answer, to be discussed in the following sections, is that not only is production nonchaotic, but rather it is likely to be organized on a highly rational basis. To see this, we must analyze how prices and markets serve to organize production in a capitalist economy.

3. MARKET PRICES AND PRIVATE PROPERTY

A rational economic system should organize production so that (a) the goods and services produced are in harmony with individual consumer preferences, and (b) this output is achieved with a minimum use of scarce productive resources. We wish to examine the extent to which we expect a market system to accomplish these goals.

Advanced industrialized economies are dynamic; there are continual changes in consumer preferences, in technologies of production, and in relative scarcities of productive resources. A rationally organized economy must continually respond to these changes to assure an output that corresponds to consumer preferences and is efficient in its use of scarce resources. In a market system, this comes about through changing prices and profits in the various individual markets. Prices convey the appropriate information on relative scarcities and consumer preferences; markets serve to coordinate the activities of individual producers and consumers; and profits and wage differentials provide the incentives for individual economic agents to respond to changing economic conditions.

To comprehend how market prices provide the information necessary to guide appropriate economic decisions, you need to understand the importance of private transferable property rights. In a market economy, most resources are privately owned. The owner of a resource has the right to employ it as he or she chooses or sell it to someone else. One advantage of private ownership is immediately obvious. People have more incentive to take care of things they own than things they do not own. Ask yourself where you are most likely to see graffiti carved into a wall: in bathrooms in private homes or bathrooms in public buildings? You can surely think of many other examples in which people take better care of their personal property than they do of public property—property owned by everyone and therefore owned by no one in particular. In a world of scarce resources, it is no small advantage to provide incentives for people to exercise care in the use of resources.

The second advantage of private ownership comes from the transfer-

ability of ownership rights. When resources can be bought and sold, prices for these resources materialize, and these prices provide crucially important information. The owner of land, for example, will generally consider selling it only to the prospective buyer who offers the highest price. And only if the highest bidder offers a price for the land that is higher than the value the owner places on the land will it actually be sold. Therefore, the prices that buyers face in the marketplace reflect the value of resources in their highest-valued alternative use. *The market price of a good is equal to its opportunity cost.*

Prices therefore guide resources into their highest-valued uses. People will only buy something that is more valuable to them than the price they pay for it. With prices equal to opportunity cost this means that people will buy only those items that are worth more to them than the items are worth in their best alternative employment. This is really quite amazing if you think about it. We certainly cannot expect the user of a resource to be informed about all the millions of alternative uses the resource has or even to care about them. The user is primarily concerned with his or her own use for it. Yet the market price of the resource reveals all one needs to know to make a decision that fully considers the value of these alternative uses. Furthermore, the market price provides the individual with the incentive to care about these alternative values and act accordingly.

As production technologies, consumer preferences, and relative scarcities of raw material change, there will be corresponding changes in the opportunity costs of various products. If producers and consumers are to make appropriate decisions in their use of scarce resources, they need to respond to these changing circumstances. Fortunately, market prices will change to reflect movements in the pattern of opportunities. As a result, economic decision makers are able to adjust their behavior so that resources are continually being directed into those activities that have become more valuable and out of those that have become less valuable. The next four sections provide examples of how a market economy motivates the appropriate responses to changing conditions.

4. THE ECONOMICAL USE OF SCARCE RESOURCES

Consider first how the market would respond to a severe depletion of a resource like oil. Since oil has so many alternative uses, there would be extremely strong competition among oil users for this increasingly scarce resource. With many buyers wanting to purchase the limited supply of oil, its price would be bid up. This increase in the price of oil informs firms and individuals that the relative scarcity of oil has increased, and its use should be reduced. But in addition to providing

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valuable information, the increased price motivates self-interested energy consumers, rather, individuals or firms, to respond in a socially desirable way by conserving their use of oil.

Profit-maximizing firms and budget-conscious consumers would attempt to substitute other forms of energy. Coal, natural gas, and hydroelectric power would be used more extensively. New forms of energy—nuclear, solar, geothermal—would become economically feasible. The higher price of oil would also stimulate research in the development of alternative oil-saving technologies. More trains and cars would be powered by electricity, as more conventional forms of transportation became increasingly costly. In sum, consumers and firms would react to these changes in the structure of prices by reducing all oil-consuming activities.

Oil would continue to be used, but chiefly in those activities where it is socially most useful. Where substitutes do not exist, where oil is extremely productive, and where consumer demand for an oil-using activity is greatest, the higher price would be paid. The higher price paid reflects the higher value of the alternatives forgone, namely, the multitude of activities that were curtailed as a result of the oil scarcity. Oil had to be bid away from people who wanted to drive a car with 500 cubic inches of gas-guzzling machinery, from people who preferred air freight to the slower rail freight, and others.

So the higher price of the resource not only provides information on its greater value or opportunity cost; it also gives consumers and firms the incentive to economize on its use. Firms, in trying to minimize costs, and consumers, in attempting to spread their limited budget over a wide range of wants, will restrict their use of this high-priced resource. This information on the increased scarcity is transmitted via markets through several stages from oil producer to consumer. Additional markets transmit the information on secondary effects—the impact on other energy sources and on consumption of all energy-using activities.

But economical use of scarce resources is only one part of the story. We also require an economic organization to provide a collection of goods that corresponds to consumer preferences. Again, the workings of competitive prices and markets lead to this result.

5. PRODUCTION TO SATISFY CONSUMER WANTS

Before a firm begins to consider what resources are needed for production, it decides what it is going to produce. Assuming its goal is profit maximization, the firm will want to produce in markets where consumer demand is strong enough to yield revenues that more than

offset costs. The information on intensity of consumer preferences is summarized in relative commodity prices. Obviously firms are attracted into the production of those commodities whose prices are greater than the costs (measured by input prices) of producing them. With input prices reflecting opportunity cost, this profit motive results in a pattern of resource use that provides more value for consumers than alternative patterns of resource use.

Consider, for example, the recent surge of interest in camping and backpacking. Many new outdoor enthusiasts have entered the market for camping equipment. Sleeping bags, tents, cross-country skis, backpacks, and boots have all experienced a tremendous boom in sales. Retailers, discovering their inventories being depleted, increase the size of their orders; the information on increased consumer demand is thus transmitted to the producers. In order to increase production, they must lure additional resources away from alternative uses; goose down, nylon, skilled workers, and designers are all attracted to this industry by the lure of higher prices. These resources are now worth more to society in the production of camping equipment than in their previous line of activity. But to attract scarce resources into this industry, the higher cost of production will have to be covered by the consumers of camping equipment. This change in consumer tastes in favor of the consumption of these goods will have repercussions in other markets. Other industries using the same materials and skilled labor as the camping-equipment industry will experience rising production costs; their products will show a price increase, and consumers will cut back on their purchase of these goods. With a limited quantity of resources available, it is necessary that the increased consumption of camping equipment be offset by reduced consumption elsewhere.* It is the job of markets and prices to make sure that resources shift according to consumer preferences. This is accomplished by increasing the profit opportunities in those fields where prices rise as the result of increased consumer demand and reducing incentives in industries where the consumers deem the use of scarce resources to be less important.

6. CHANGES IN TECHNOLOGY AND THE ROLE OF PROFITS

A dynamic economy must also react to changes in technology. Inventions and innovations must be fostered as well as incorporated into the

*This is really only true for a static economy with no technological progress. Productivity gains may permit us to have increased consumption of camping equipment with some increase, or only a small decrease, in consumption elsewhere. But this increase will be smaller, or the decrease larger, than it could have been without the increased consumption of camping equipment.

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system. One of the great virtues of the market system has been its ability to encourage technological changes, for these have contributed to the present state of development of capitalist countries. In a market system, the opportunity to reap profits provides the incentive to develop new techniques and products for commercial purposes. An example of this is the development of the ballpoint pen industry; here we see not only the tremendous profit potential associated with innovation but also the automatic responses of the price system to technological change.

In 1945 Milton Reynolds began production of the first ballpoint pen. Costing 80 cents to produce, this pen retailed for \$12.50. Consumer interest was immediately strong, and profits were accordingly large—as much as \$500,000 per month on an initial investment of \$26,000. But unfortunately for Mr. Reynolds, the huge profits were both a signal and a strong inducement for other producers to enter this line of business. In spite of the threat of patent-infringement suits, other manufacturers of ballpoint pens began marketing their own products. Since Reynolds was selling at a price so high above costs, many firms found they could undercut him, capture a share of the market, and make a healthy profit. By the end of 1946, there were approximately 100 ballpoint pen manufacturers, and prices were as low as \$3. By 1948, less than three years after the sale of the first pen, the price fell to 39 cents, and production costs had been reduced to 10 cents.

Notice that the movement of firms into this line of production took place automatically. No research grant from the National Science Foundation was necessary to induce Mr. Reynolds to invent the ballpoint pen—the potential for huge profits was sufficient motivation. No planning agency was needed to direct new firms to begin production of more pens—the observation of a price in excess of cost told potential producers that this was a worthwhile venture. The quickness with which new firms moved in response to the existence of excessive profits, in spite of a possible barrier imposed by the patent laws, provides a striking illustration of the responsiveness of the market system to consumer demands. It is important to note that it is the ability of firms to make profits, often gigantic profits, that gives consumers ultimate control over production decisions. The surest way to leave the consumer powerless in the marketplace would be to have the government tax away business profits while bailing out those firms not able to make a profit. If owners of businesses found that responding to consumer demands generated no more profit than ignoring these demands, they would have neither the motivation nor the resources to innovate and expand the production of those products that consumers value most.

The ballpoint pen example also illustrates how the market system leads to the development and application of low-cost production tech-

niques. With the huge potential for profit in this industry, there was a tremendous incentive for innovation in production techniques. The firm that was able to produce ballpoint pens more cheaply could undercut competitors and expand sales and profits. With such incentives, it is not surprising that production costs were cut by 90 percent within three years. And, of course, once better production techniques had been developed, firms were induced to phase out older methods in order to minimize costs. In highly competitive industries, in fact, the adoption of least-cost production is necessary for survival; if profit margins are low, firms need to be very attentive to their production techniques. But in any case, a profit-maximizing firm will want to minimize costs, and one important component of this goal is choosing a method of production that is of least cost.

7. THE INTERDEPENDENT ECONOMY

For each particular market, it is seen that prices convey information on technology, resource scarcity, and consumer preferences. But more than this, prices transmit information that is needed to coordinate the activities of many diverse but interrelated markets. Fundamental to solving the problems of economic organization is the recognition of the tremendous degree of interdependence in any advanced industrialized system.

The output of automobiles involves the use of workers and raw materials that otherwise could be used in the production of, for example, tractors. The level of tractor production, in turn, affects the amount of wheat that can be produced, and this influences the price of flour and bread. The price of bread affects the quantity of other foods consumed, and so on. Because of complex interdependencies in the economy, a decision or event in one sector of the economy can have far-reaching effects elsewhere. The smooth functioning of an economy requires that relevant information about changing economic conditions be transmitted to all parties affected, and that the actions of all firms and individuals somehow be coordinated.

An illustration of economic interdependence is provided by a little known and seemingly unimportant event: in 1972, the anchovies failed to run off the coast of Peru. Anchovies are an important ingredient in animal feed, and the poor showing made by these fish in 1972 was one factor contributing to the agricultural shortages of the following year. The anchovy shortage was immediately obvious to the producers of animal feed, and they consequently turned to other sources of protein for their products. Animal-feed producers did not have to know *why* there was a shortage of anchovies; they merely had to economize on

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anchovies in their products that year. Given this information, feed producers became more active purchasers of soybeans, a substitute for anchovies, bidding this protein source away from alternative uses. These other users of soybeans—makers of margarine, salad oil, paint, plastics, soaps—found the beans more difficult to obtain. Again, information on the protein shortage needed to be communicated to these producers so that they could take it into account in their production decisions. With a market system, such information is conveyed by higher soybean prices. Consumers needed to be urged to economize on the consumption of meat, because cattle production required a greater use of the valuable soybean. Continued lavish consumption of meat would require the diversion of soybeans away from its other valuable uses. Through higher meat prices, families were induced to find other sources of nourishment during this period. Few shoppers were aware of the poor anchovy harvest, but they did respond correctly to the situation.

These were only the more direct effects of the anchovy shortage. In addition, farmers were induced to respond to the increased demand for agricultural sources of protein by planting more crops. More land had to be brought under cultivation, and increased production required more machinery and fertilizer. The production of tractors and combines diverted resources away from automobiles and industrial machinery. Increased fertilizer production required greater amounts of natural gas, and, with plants operating near capacity, additional fertilizer plants were needed. The demand for natural gas by fertilizer producers, of course, required the diversion of this resource from other uses, such as heating homes and offices. Some users responded by employing other sources of heating fuel, and the entire allocation of petroleum among its alternative uses was thus affected. The construction of new fertilizer plants required the employment of engineers, construction workers, materials, and so forth, which had to be diverted from other uses. This in turn curtailed the construction of new industrial plants required in the production of other goods.

The indirect and longer-run effects are endless. Without further elaboration, it becomes clear that there exist interdependencies of vast complexity. When a shortage of anchovies in Peru affects the demand for natural gas in Peoria, for example, it is clear that the tasks of economic organization are formidable. But what would be impossible for a planning agency is performed automatically by the market system. The essence of the price system is that the relevant information about economic changes is carried to all parties concerned through market prices and that in addition these prices provide the inducement to act in a manner consistent with the change in conditions. A housewife may not know the first thing about Peruvian anchovies, but she