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SUB-SECTOR LINKAGES IN A DYNAMIC PERSPECTIVE

Allen B. Paul
Economic Research Service
USDA

The assigned topic probably was inspired by my recent article (9) on the role of competitive market institutions. The present title is rather broad but it provides scope for further exploration of problems in vertical coordination. I will restate the main theme of the article and then try to relate this theme to (a) the nature of firm and (b) how inflation impinges on firm behavior and economic growth.

RESTATEMENT OF A THEME

The article is concerned with economic growth and its bearing on the organization of markets. Economic growth has been the dominant feature of the modern era, and it still deserves our attention despite reservations over whether it can or should continue.

Kuznets (6) concluded from his studies that the real per capita product of the developed non-Communist countries increased five-fold over the last century—a remarkable achievement, especially in light of a three-fold increase in population. Further growth appears sustainable for some years to come, even allowing for further increased in population and fuller compensation for external diseconomies. This assumes no permanent economic dislocations arising out of cartelized pricing, of hitherto cheap energy—an assumption that merits scrutiny.

Of course, in thinking about sustainable growth over a very long period, one must face up to the idea stated by Georgescu-Roegen (5) that all economic activity rests on the principles of thermodynamics, namely on the irreversible process of turning concentrated forms of mineral matter into dispersed forms. It suggests that sooner or later we may have to plan on the increasing real cost of output. This has grave implications indeed. But this prospect is much beyond our purview.

What reorganization of markets is implied by economic growth? Reorganization must occur on two levels, one "real" (commodities, machines, land buildings, labor skills, knowledge) and the other "institutional" (attitudes, customs, procedures, rules and regulations affecting property, ownership and exchange).

Growth implies a continued reorganization of production by more efficient methods. The lowering of unit cost in an industry is associated with output expansion, or release of resources to other industries. As one industry expands, it furnishes a larger market for the output of other industries, which then find it feasible to further rationalize their own production. The latter industries either grow or release resources.

If they grow, they furnish enlarged markets to still others. If not, the released resources enter other employments and expand output. So, the process feeds on itself with potentials for increased specialization, economies of scale and applications of technology. Industry after industry becomes caught up in the need to modernize, write off old equipment, retrain personnel, make different products, and so on—or it will eventually decline.

The process of growth exposes the individual (or firm) to large hazards. For one thing, encroachment on his economic opportunities may arise from substitute products, processes, or modes of business. When this occurs, he must consider among his various options whether to further specialize, invest in new equipment and knowledge, or change activity.

Moreover, specialization may create short-run instabilities. Specialization of production tends to decrease the elasticity of supply because equipment and skills tend to become highly specialized and less mobile. The relevant price spreads become narrower and given percentage changes in price for commodities bought and sold in the course of production can cause a larger percentage change in returns. Other things equal, the greater the specialization, the more unstable the returns.

The instability is compounded wherever there is decreasing price elasticity of demand for a product—as a result of it becoming a smaller item in household budgets or having fewer substitutes as an intermediate good.

Yet specialization in food and agriculture has proceeded by finding ways to lessen exposure of the firm to these losses. The principal technique for individual survival is to divide up the financial commitment to any hazardous undertaking and share it with others. By various institutional means, the preponderant share of one's capital need not be tied up in one venture. The larger the scale of production, the more capital usually is required and the more urgent the need to devise suitable institutions for spreading out the economic responsibility in order to mobilize the necessary capital.

There are two separate though not mutually exclusive routes to mobilize capital through enterprise sharing. One, of course, is the pooling of sufficient capital under the command of a single economic unit to survive the most hazardous venture that the managers may elect. Syndicates, partnerships, and corporations—in their various forms—are the main arrangements. Cooperatives, for example, are partnership or corporate units whose distinguishing mark is that residual rewards go primarily to (or are reserved for) patrons of the enterprise who also are its main owners.

The other route is to bind sufficient capital to a specified course of production by voluntary agreements among sovereign economic units. Joint-account production, contract farming, forward purchases, partici-

pation agreements, and organized futures trading are the usual instruments. It is beyond the scope of this paper to compare the merits and survival power of the two different routes for mobilizing capital. I only need to point out that any deal between two sovereign economic units implies that a mutually determined exchange has occurred. In the real world, this is what a market is about, whatever its complexities, strengths or deficiencies.

Ways always are being sought to mobilize capital in the face of increasing hazards to its owners. The nature and meaning of complementary and competing institutions for ownership—partnerships, pools, syndicates, corporations, cooperatives, forward commodity dealings, production contracts and organized futures trading—may be made intelligible in this context.

In addition to the emergence of these private market arrangements for mobilizing capital, various public means have emerged for fostering investment—price and income supports, tax concessions, underwriting of loans and so forth. Indeed, the Employment Act of 1946, declaring that it is the continuing policy of Government to promote maximum employment, production and purchasing power, as much as anything signaled the beginning of wider public acceptance of responsibility for mitigating pervasive economic hazards.

Both public and private means for mitigating hazards of loss have this in common: they amount to a "pooling of risk." But there is an important interaction between them. The more public assurances that are devised, the more encouragement to private investment for new products, processes, or modes of business wherein there are hazards specific to the undertaking. Put another way, the pursuit of the untried is encouraged by freeing venture capital from financing projects that now appear surefire, by substituting loan capital.

This appears to lead to an interdependent process on the financial side which is one of the self-reinforcing mechanisms of economic growth. That is, private ventures into new realms promote the growth of output; growth of output tends to promote more public measures that allow more individuals to escape the big economic hazards. This in turn, tends to foster more investment in new realms with its individual hazards but which, in the aggregate promotes growth of output; and so on.

To summarize: *Specialization of production (with attending enlargements of scale and further applications of technology) marches on in a growing economy, as both a cause and a consequence of growth, but at no faster pace than permitted by the reduction in investment hazards through public and private techniques, which techniques are themselves a cause and consequence of economic growth.* This then is the nexus between the "real" world and the "institutional" world that we have searched for—a recursive model, so to speak, involving two quite different sets of forces interacting on one another over time. It appears as a root process underlying the sustained growth of non-socialized economies of the world.

NATURE OF THE FIRM

What does the forgoing argument imply about the nature of the firm? We will examine forces operating through the real side and, then, forces operating through the institutional side.

Influences of Real Processes

The minimum size of firm, in terms of capital required of it for an efficient operation, depends on (a) the value of resources needed for the particular production it chooses minus (b) the amount of this value that other economic units would finance through enterprise-sharing arrangements, loans and rental agreements.

The "disintegration" of production (E.A.G. Robinson's (10) term), resulting from specialization, would tend to curtail the resources needed because production becomes split into parts for separate undertaking. But the parts would tend to become larger thus enlarging the resources needed because specialization implies scale economies. The degree of expansion would be governed by the price elasticity of demand for output of the specialized process in relation to lower unit costs. Conceivably, each specialized operation that emerges as a result of disintegration of a process might be larger than the original one.

On these grounds, the capital requirements for an efficient physical operation, and hence the minimum size of firm, may be larger or smaller than before the process was split up, depending on circumstances.

Any reduction in a firm's size in an industry as a result of specialization would not necessarily reduce the overall size of the firm. Specialization usually means that some firms now find that they could buy an item or service more cheaply than they can produce it. Hence, if the firm were to buy the entity, it should have surplus capital for other uses. It could expand and modernize its remaining operations or it could invest outside the industry.

A major deterrent to investment in new facilities to make the item is that the scale of specialized plant that would substantially lower unit costs may greatly exceed the output that could be usefully absorbed by the firm. Hence, much of the output must be sold to other firms, including competitors. Unless there were a fear of having to pay monopoloid prices to get the item from a specialized supplier, a better choice may be to use the capital to expand and modernize the remaining production process. Presumably, in the growing phase of the industry, firms would tend to look favorably on such investment. But in the maturing phase, the opposite probably would be true.

In sum, the further specialization of production probably would not reduce the size of the firm, but it may reduce the size of its operations within a particular industry, in which case the make-up of the firm's enterprises may change substantially.

Influences of Institutional Processes

The problem of investing capital freed by a decision of the firm to purchase rather than to produce an item is part of the general problem of portfolio selection. In a well-developed exchange economy, decisions on what to produce and what assets to own are somewhat independent. To undertake a given type and scale of production, a firm must acquire the right to use the necessary resources. But it may do this in various ways. It may lease rather than buy land, buildings and machinery; commit commodity inventories under forward delivery agreements or buy hand-to-mouth; hire business services rather than produce them; hire experienced employees rather than invest in training of inexperienced ones; and buy patent rights rather than develop own patents. The extreme case is the firm that owns title to few resources but enters into contracts with different resource owners to provide inputs into the production process as needed.

Different sets of choices involve different commitments of capital. The particular combination of investments that a firm makes may be viewed as a problem in portfolio choice in the context of its expectations and evaluation of uncertainties.

An important result of having leeway in making investment decisions independent of production decisions is that it reduces the need for any one firm to undertake a large-scale production project by itself.

The many enterprise-sharing agreements in the agricultural sector are substitutes for having large firms assume the whole of the enterprise responsibility. This is why, for example, a relatively modest size firm can go into the cattle feeding business on a large scale. Most of the funds required for purchasing feeder cattle, and feed evidently can be secured from lenders when a large share of the enterprise responsibility is assumed by outside interests under "custom feeding" agreements. And, what amounts to the same thing, the prospective output of fed cattle often can be sold forward at firm prices to packers or other interests, which agreements form the basis for increased lending to finance the purchase of feeder cattle and feed (8).

Many other specialized operations in the growing, storing, handling, transporting and processing of agricultural commodities require large doses of capital in order to be conducted efficiently. A large share of the necessary capital is placed at the disposal of the firm as a result of similar agreements with other economic units who share in the enterprise responsibility. This mechanism for mobilizing equity across the market appears to be a major reason why relatively small firms often can compete successfully alongside large firms who alone can provide the necessary equity backing for an efficient operation.

Further Considerations

Our formulation describes only part of the forces that influence firms. The literature (3) abounds with other types of inquiry.

Much of the discussion about the size of the firm in an industry comes down to comparisons between (a) the costs of securing a given output through the firm's internal organization and (b) the costs of securing the same output by market purchases. Failures of markets to perform well make for greater internal organization, whereas failures of internal organization make for greater reliance on markets.

For example, Williamson (11, p. 112) said that "mainly on account of bounded rationality and greater confidence in the objectivity of market exchange in comparison with bureaucratic processes, market intermediation is generally to be preferred over internal supply in circumstances in which markets may be said to 'work well' ". By the latter he meant that prices are non-monopolistic and reflect acceptable risk premiums, and that exchange incurs low transaction costs and realizes essential economies. But where markets do not work well, internal organization would be a good substitute for markets wherever sensitive control over activities is essential—especially in the manufacturing sector. The firm has superior instruments to evaluate performance and mete out rewards and penalties than the market.

Recently, Alchian and Demsetz (1) gave this rationale for internal organizations of production a new twist. They conceive of the firm as *a set of contractual relations entered into freely between various input suppliers and a central contractual agent* wherever there are important gains to be realized through *team effort*. In team production, the marginal cost of shirking by one member of the team is high. Hence, the best arrangement is for one agent to become party to all the separate contracts for joint inputs with the different owners. By holding the residual claim, the central agent is motivated to detect shirking and meter inputs and rewards accordingly. For this he must be able to revise the terms of contract with any team member independent of other contracts.

In this formulation, production takes place within the firm because it is less costly to monitor shirking in this way than by organizing the team effort across the market. In effect, the firm is an information specialist. By contracting for inputs, it becomes a privately-owned market for information on the quality and potential performance of these inputs. The opportunities for profitable team production by inputs already under contract to the firm may be ascertained more economically and accurately than for outside resources. On these grounds alone, the firm might produce otherwise unrelated products. "Efficient production with heterogeneous resources is a result not of having better resources but in knowing more accurately the relative productive performance of those resources." (1, p. 793). A further conjecture is that "the market suffers from the defects of communal property rights in organizing and influencing uses of valuable resources." (1, p. 795).

The Alchian-Demsetz formulation leads to interesting conjectures about the nature of competition for the best use of resources. There is

no necessary conflict between their formulation and the one I proposed in the first section of this paper. Both sets of influences could operate at the same time. It is possible that the more technical and specialized production becomes, the more advantage the large firm would have in securing good information (by having more sources of inputs under its wing to observe), and hence in being able to obtain greater productivity from selected resources than would be suggested by their relative market values. This enriches the explanation of scale economies.

However, Alchian and Demsetz leave one questionable implication. Having advanced their thesis that a central monitor is needed to accurately meter inputs and rewards for effective team production, they properly deny that the producing firm ("the classical firm" in their terminology) exists because of a need to bear risks of wealth changes. They recognize that special kinds of firms exist for the latter purpose, namely investment trusts that pool capital to average out risks.

This implies that the "classical firm" has no investment choices, once it decides on a particular course of production. It must buy the necessary inputs to get the output. There is nothing logically wrong with this proposition, but it assumes (a) markets always provide the classical firm the opportunity to buy the set of services (and single-use goods) required for each production period and (b) contingency reserves are not required to meet reverses. Neither condition is true. This is the reason that producing firms usually do have surplus capital beyond that needed for acquiring inputs for production.

The interesting task is to further delineate the problem area by investigating the processes by which the market evolves arrangements that offer more opportunities to buy and sell the various services needed in modern production and impediments to their further development. This would be an extension of the line of thought presented in the first section.

INFLATION, FIRM BEHAVIOR AND ECONOMIC GROWTH

The matter of needing to invest "surplus" capital to advantage becomes particularly important in times of rapid inflation. It seems inflation is taken seriously in this country only in wartime. We have lived with mild doses of inflation for most of the post-World War II era. Many people have come to accept this as a practical way of taking rigidity out of relative prices. Now we are witnessing what has been called "double digit" inflation both here and in most developed countries. (The phrase "double digit" is not particularly apt because it does not distinguish between annual rates of inflation that fall between 10 percent and 100 percent).

The great fear is that acceptance of a 10 percent rate of inflation might someday lead us to experience a 20 to 30 percent rate. A 30 percent rate might then be brought down, by concerted effort, to a 15 to 20 percent rate which would then find general acceptance. If so,

the grounds will have been set for subsequent increases in price levels. The process may cover many decades, but—judging from the experience of other countries (e.g. Brazil)—it could happen here.

There are times and places where rapid inflation may stimulate economic growth. This outcome depends on having the income that is redistributed by inflation channelled into investment rather than consumption. Presumably when there are many idle or underused resources, including unexploited technologies, this impetus to growth can be substantial.

But in highly developed countries, like the United States, there are reasons for thinking that rapid inflation is deleterious to output. Rapid inflation tends to rob business firms of a meaningful yardstick by which reasonably accurate accounting of performance can be measured. Profit statements tend to be strongly colored by sudden re-evaluation of assets and therefore distort what really is happening. Managers and investors need to know how efficiently inputs are being transformed into outputs, and how well decisions are made on what to produce and on the choice of inputs. This presumably is why modern management had so assiduously developed the concept of profit centers. How meaningful are profit center comparisons in times of rapid inflation? Can accounting techniques be adapted to give a true picture?

To better understand the adjustments under conditions of rapid inflation, one should explore what business firms do differently than in normal times. One would surmise that under rapid inflation the nature of uncertainty would be such that firms and individuals would seek refuge in high mark-ups, partial withdrawal from markets by operating on a hand-to-mouth basis and a general reticence to engage in forward planning. All of these are inimical to economic growth.

To attract firms into making more forward commitments, it might be necessary to include formula adjustments to compensate the firm for adverse effects of continued inflation. When use of such devices become general, the sharing of enterprise responsibility becomes blurred. Yet it might be the best that can be done and, conceptually, could permit continued specialization and growth under such difficult conditions.

The economics of these processes merit investigation. To what extent and speed do the cumulative affects of such individual escalator adjustments on the general price levels become the basis for a further adjustment in individual contracts. Under what conditions do such circular processes result in stabilizing or further destabilizing price levels?

CONCLUDING REMARKS

Underlying the discussion in this paper is a view that there is pay-dirt in achieving a better integration of *real analysis* and *institutional analysis* for better understanding of how a market economy functions.

Indeed much progress along such lines has been made on the macroeconomic level, especially following Keynes' stimulus to investigations of the relations between monetary phenomena and effective demand, employment and price levels. Less should be claimed for progress in understanding how institutional phenomena relate to real phenomena at the microeconomic level—e.g. how the mechanisms of exchange affect performance of individual commodity sectors. Yet there is a great interest in this subject as reflected in much of the so-called "property rights literature" (4).

Part of the difficulty, of course, is the great diversity of conditions in different commodity markets. This makes the cumulation of empirical knowledge, on which valid generalizations are built, a slow and costly matter. But part of the difficulty is the paucity of fruitful approaches that would, in fact, unify real and institutional analyses.

I have long believed that Commons (2) was on the right track when he made his unit of inquiry "the transaction." His idea was that both individual action and collective action could be understood under the opportunities and constraints posed by the particular "working rules" or customs which had evolved through experience. Covered here are transactions in the marketplace through bargaining; transactions in the working group through managerial directives; and transactions between the individual and the State through its rationing powers. But how does one proceed from here?

The need is for operationally meaningful propositions in Commons' context. A proposition drawn from my own studies (8) illustrates the point: On a given date, the difference between the market price for a spot commodity and the market price for a related forward commodity is itself a market-determined price for the services required to turn the spot commodity into the forward commodity. One can proceed to test this proposition in actual situations. Wherever the proposition holds, it can throw light on the economic significance of changes in contract terms. The significance is based on the notion that a production process uses a collection of individual services to make a commodity.

Other kinds of contracts that we observe in agricultural markets need to be analyzed in operationally meaningful terms before we can fit them into a general framework of understanding. This requires careful thought (The Alchian-Demsetz novel concept of the firm *as a set of contracts* freely entered into, is attractive because it yields testable implications). With a little luck and much effort, real progress in gaining a better understanding of agricultural commodity markets seems possible.

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