The Corporate Structure of the Economy and its Effects on Income

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Abstract: Transactions in the economy are conceived as exchanges in which the terms of the exchange depend on relative power of the two parties to it. An indicator of that power is industry concentration (or in the case of labor, unionization). Effects of the factors are estimated for the U.S. economy, and a procedure is outlined for comparing the terms of exchange to those in a wholly unconcentrated economy. This allows, in conjunction with an input-output matrix, the comparing of the level of activities and distribution of income in the economy with that which would be found in a wholly unconcentrated economy. The procedure for doing this is outlined, but further work remains before the comparison can be carried out.

Power in industrial society is difficult to conceptualize, as it is difficult to study, once the conceptual house is put in order. But if these difficulties can be overcome, the potential payoff is enormous. For power derives from rights, whether constitutionally given, legally created, or technologically induced. And knowledge about the consequences of power distributions can lead to a reexamination of the distribution of rights. Thus the kind of social change which such knowledge can spawn is change in a very fundamental sort: change in the distribution of rights in society.

In this paper, we will develop a conception of the modern corporation and the modern government as instruments of redistribution, and then examine evidence about factors affecting that redistribution, that is, factors that affect the power of parties to get a larger slice of the pie. Before doing that, however, some conceptual clarification is in order, to prevent later confusion.

Meanings of power

We will be examining evidence of the exercise of power by parties in modern society, in particular contexts. In order to do this without confusion, it is necessary to begin by distinguishing this from other exercise of power, and other meanings of power.

A first and most straightforward meaning of power in an economic system is one which equates power to wealth. If we conceive of a perfect market, then each actor's power in that market is simply the market value of the resources with which he enters it. If there is a unit of account such as money, each actor's power in the perfect market is measured by the amount of money he has, plus the market value of the goods he has. He will leave the market on a higher utility surface than he entered, because his new set of goods is more useful to him, but the value of this set is no greater or less than that of those with which he entered the market. It is this meaning of power that one of us (COLEMAN, 1973) has used earlier in establishing a paradigm of exchange. In that paradigm, each actor has interests in outcomes of events and control over events. The market for exchange is assumed perfect, and power consists of control over those events in which powerful persons have interest. Systems of exchange of private goods in economic markets are a special case of this paradigm (which is
identical in structure to a WALRASian general equilibrium), and perhaps the closest to a pure representation of it. Note, however, that power as defined here has to do with control over outcomes of events, not (as some, such as DAHL, MARCH, and others would have it), with control over other persons.

This definition of power as wealth in a perfect market is a clean and simple one, and certainly accounts for most of the differences that exist in society on the ability of different actors to get what they want. But it is not the only kind of power there is.

Power can go beyond this first kind of power (which may for convenience be termed "market power") in, two ways. First, there is additional power that can be exercised in a market, not by virtue of wealth, but because of certain structural features of the market that make it imperfect, and give some parties an advantage. These are discussed in more detail below, for it is this kind of power with which the paper is concerned. This kind of power can be termed "extra-market power". A second kind of power that goes beyond wealth is the capability of achieving desired outcomes in other transactions, outside the economic system. The most important case of this is the political arena. Control of political actions lies in the hands of officials with legal rights to take these actions, and does not derive directly from wealth. Further, there is no direct analogue of money with broad fungibility in political arenas. Various parties with various types of resources can bring them to bear on a political action, but other parties with other types of resources can bring them to bear on other actions. One of these resources may be wealth, but it is only one such resource. Consequently, an actor's market power is distinct from his power in various political arenas even though the wealth that defines market power may be among the resources that can be used to achieve power in a given political arena.

"Extra-market power" is the power to be addressed here. That is, taking as given the power of wealth that is directly exercised in a perfect market, what can we say about the economic power exercised in the market due to market imperfections? In order to do this, however, it is necessary first to look at a corporate actor in a particular way.

Corporate actors as redistributors

It is possible to conceive of any actor in society as a redistributor of resources. If for convenience we think of a manufacturing corporation, that corporation first of all is a creator of value (in the sense that the products that come from its activities have a greater market value than the factors that went into their production). Given that this is so, it becomes natural to ask just what becomes of that value. To answer this requires conceiving of the corporation as engaged in various sorts of transactions with different transaction partners. For simplicity, we can think of four: customers, suppliers of materials, suppliers of capital, and suppliers of labor. Some of these transactions are carried out in markets (some of which are more imperfect than others) and some are carried out in other ways, as in negotiations with a labor union. Thus the value created through the corporation's productive activity can be seen as distributed among the various parties, depending upon the power they are able to exercise in their transactions with the corporation. If the corporation is itself especially powerful in all these transactions, it will be able to hold a large portion of that value to itself, for reinvestment, and not distribute it to any of the transaction partners.

In all this, it is useful to see the corporation as a utility maximizer in carrying out its redistribution: it can allocate effort toward each of the transactions it engages in (with consumers, suppliers of materials, labor, and capital), and it may be presumed to balance these efforts such that an additional resource applied to each of the transactions will yield an equal benefit in changing the terms of the transaction — and a benefit equal to the value of the resource applied. Thus if all transaction partners were of equal extra-market power, and of power equal to the corporation itself, each of the five would obtain an equal share of the value that has been created. If they differ in this power, then those with more power will be able to extract more

1 Technically, such reinvestment accrues to the suppliers of capital, who are the owners of the corporation. However, it is less in the owner's interest than would be the full distribution of profits to owners, so that they may determine the investments optimal for them.
of the value. None will lose in absolute terms in its transactions, because since this is a system of voluntary transactions, it will break off the transaction and go elsewhere if the value it is to receive is less than the market value of what it brings to the transaction. Thus customers will go elsewhere if the price is so high that they can better satisfy their utility elsewhere. And similarly with each of the other transaction partners.

Beyond the market value of their resources, however, each of the transaction partners may have other kinds of resources which allow it to extract a larger share of the value created in production. Now depending on just how these resources are distributed, that extra value will drift or float toward certain sectors of the economy and certain segments of the population. In an interdependent structure of economic activities such as is found in a modern economy, such floating value can be traced out to determine where it accumulates. By definition, it will accumulate in an actor (or a set of actors) whose power is greater than each of its transaction partners. Such an actor will constitute in effect a "value sink", because it absorbs a large fraction of the value created in its activity.

It is possible to view, not only corporations, but also other types of corporate actors as well as persons in this way. A person can be seen as a creator of value, in joint activity with his transaction partners (those from which he receives income and those to which he makes expenditures). If he creates a large amount of value, then from this perspective there is a large range between what he would find it necessary to pay (at the minimum which sellers were willing to accept) for the resources necessary to sustain him and what he is able to obtain (at the minimum which buyers of his skills were willing to pay) for his labor or for other resources he has to offer in economic markets. If he has no extra-market power, then the value he creates is fully extracted from him by employers and merchandisers, and he receives a subsistence wage.

If he does extract a portion of this value, so that income is above subsistence, then either of two things can happen: either he can invest this surplus in savings, or he can increase expenditures on subsistence beyond the minimum necessary. If he does the latter, by increasing his cost of living, this can be seen as the ultimate sink for the floating value which he was able to capture. If he invests it and leaves an inheritance to the next generation, then the value floats over time into the future. The result of the latter action is that the productive capability of the next generation, endowed with value passed on from the preceding generation, is enhanced.

For the individual worker, there appears to be either of two ways in which he can exercise extra-market power. One is through monopoly or near-monopoly conditions created by his membership in a labor union. Price theory would argue that if labor could exercise a monopoly, it could charge a price for its labor such that any higher price would sufficiently reduce the demand for labor that would result in a lower total to labor. A second way of exercising extra-market power is through holding some skill or resource (such as that held by a basketball player or a movie star, or at lower levels anyone with a special talent seen to be different from that of anyone else) as an effective monopoly. The training or talent or dedication it takes to achieve a comparable level of skill act as effective barriers to entry into the market by potential competitors, and thus allow him to exercise extramarket power.

The assumption that the surplus value was squeezed from the worker by the employer, who paid him only a subsistence wage, was the assumption implicitly made by MARX in his theory of surplus value which was central to his theory of the functioning of a capitalist economy.

In contrast to MARX, neo-classical economics, with its perfect market assumptions, has no place for such surplus value, because in a perfect market, the realization of excess value by any competitor in a market is prevented by the entrance of new competitors from less lucra-

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2 The theory, of course, would have to be revised to recognize the fact that a labor union is unlikely to be maximizing the total aggregate return to labor, but something else which depends upon the decision process among the individual maximizers who are its members.
tive activity. It is evident, of course, that such perfect-market conditions do not obtain, and that there is a range (which may be of considerable size in some markets) between the minimum price at which the seller would be willing to sell, and the maximum price that the buyer would be willing to pay.

Although Marxist and non-Marxist economists agree that there is a surplus, there is full disagreement over where that surplus or floating value tends to accumulate. BARAN and SWEENEY (1966), leading American Marxist economists, have put forth a theory of “the tendency for the surplus value to rise”. They argue that in many sectors of the economy, there is something equivalent to monopoly power on the part of the corporations; and that this monopoly power is capable of driving costs down and of driving prices up. According to BARAN and SWEENEY, then, the large corporation in concentrated industries is the value sink, and profits continue to widen.

Non-Marxist economists argue that there is effective price competition, even in highly concentrated industries, which make impossible the maintenance of monopolistic or oligopolistic prices. SCHUMPETER argues that technological innovations which undercut existing products and prices make price competition a less essential element to reduction of monopoly prices. Other economists argue that the cost pressures on the corporation, particularly from labor unions, result in a squeeze on the corporation between costs and prices, with the corporation being in the position attributed by MARX to the worker: the position of subsistence. They argue, in fact, that this squeeze is sufficiently great that too little funds are generated for investment.

The arguments between Marxist and non-Marxist economists is in effect an argument over what we have called extra-market power: the Marxists arguing that corporations have large amounts of such power, and the non-Marxists arguing either that competitive conditions in the market prevent any party from having such power or else that such extra-market power does exist, but it is not held by corporations.

If we accept that there are market imperfections which are susceptible to extra-market power of the sort we have discussed, then the empirical question becomes a question of where this floating value goes, and what the overall impact of its movement is upon the distribution of income or wealth in the society — not only its distribution among persons, but its distribution among both persons and corporate actors. The conception moves away from that of “monopoly capitalism” or “monopoly labor”, and back to the more general conception of each actor in the system as a redistributor of the value created by its activity, with the direction of redistribution dependent on extra-market power of the sorts discussed earlier.

But if this is so, it must also be the case that governments can be conceived in a similar way. Indeed, the notion of government as a redistributive system is considerably more common than that of corporations or persons as redistributive mechanisms. However, governments function in a somewhat more complex fashion than private market corporations. In one set of activities, government is like a corporation in that it provides a product (various services, such as education, sanitation, police and fire protection, etc.) in return for a price, in this case in the form of taxes. A difference, of course, is that the product is not, and often cannot be because of its public-good quality, sold in a private market. Otherwise the parallelism is rather direct, with the major difference being that the government’s productive activity is simpler, since it consists primarily of services, and requires little in the way of supplies of materials and capital. This means that there are two principal transaction partners to government, its taxpayers on the one hand and its employees and contractors on the other.

Further, it is less clear that government services can be considered a productive activity in which surplus value is created, because of an essential difference from the private market: taxes are collected coercively, while goods and services on the private market are bought voluntarily. Consequently, we cannot be certain that this transaction partner, the taxpayer, is receiving something worth at least as much to him as the value he gives up. Apart from this, however, the question remains the same, although simpler: with taxpayers and employees or contractors as its two transaction partners, which party gets from the transactions it is party to the greater value, relative to the value of its contributions?
There is, however, another kind of transaction in which governments engage, which is traditionally seen as the redistributive function of government. This is the transfer payment, in which taxes are used to pay dependents, through welfare benefits or other support. Here there is no question of value being created; there is merely a redistribution from those who pay taxes to those who receive benefits—a redistribution generally from those with more money to those with less.

Here, although there is not an exchange of services for taxes as in the preceding situation, a weaker, comparative question can be asked: comparing different governments, are some transfer payment recipients able to obtain better terms than others? And if, as we know is the case, this is true, what are the characteristics of governments or recipients that affect the terms?

When we look at governments more generally, including their transactions with taxpayers, with employees, with contractors, and with dependent-recipients, a structure not unlike that of a corporation with its customers and its suppliers of labor, materials, and capital emerges. There are multiple transaction arenas, and multiple claimants, and depending upon various aspects of extra-market power (such as the rights to organize or the absence of rights to organize on the part of government employees), different parties get greater or lesser value. As before, it is possible to ask what the government as a corporate actor is itself able to extract from these transactions, a question which is related to the existence of budget surpluses or deficits. There can, however, be no conception of a floating surplus value here, however, since it is meaningless to speak of value created by these transactions.

**Empirical examination**

With all this as a general conceptual background, we can ask whether it is possible to discover empirically anything about the direction that the floating value moves in transactions within the economy. The problem is, of course, a difficult one, because money, the measure of value that is available for economic analyses generally, cannot easily measure the floating value in question here. The reason is that money prices or wages give only the terms arrived at for the transaction and give no hint about the minimal terms that would have been acceptable.

There are, however, indirect points of attack that can be made on the problem. One of these is to ask the question of what characteristics of the corporation affect the share of value it is able to capture for itself. A number of economists have made attempts at this question, looking at variations among industries (not single firms), and in particular at a single characteristic of the industry, its concentration. Although economic theory has no proposition about prices when concentration is high but short of monopoly, there has been a theoretically weak but strongly-held belief that concentrated industries have greater control over their prices, and over their price-cost margins, than do un-concentrated industries. Consequently, a number of studies have been carried out regressing the price-cost margin in an industry on a measure of concentration in the industry.

In this kind of analysis, there are several weaknesses. First, the dependent variable, price-cost margin, is not in fact a measure of what its name implies. The costs do not include capital costs, but only variable costs: costs of labor and costs of materials. Consequently, what most authors have done is to attempt to rectify this, not by a correction of the costs to include depreciation on capital, and then creation of a new price-cost margin, but rather by including capital as one of the regressors. A second difficulty lies in the fact that the condition *ceteris paribus* certainly does not hold: there is only one characteristic used as an independent variable (other than capital), i.e., the concentration ratio. Yet there may be many other characteristics of industries, some correlated with concentration ratio, that affect the price-cost margin in the industry. Industries with inelastic supply, for example, may require a higher price cost margin in order to damp out imbalances between supply and demand. And the price-cost

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3 The concentration measure is the fraction of value added in the industry that is produced by the four largest firms in the industry. This has been calculated for U.S. manufacturing industries at 4-digit or 5-digit SIC levels, at several points in time. The most recent published measures are given in U.S. Office of Management and Budget (1972).
margin may accurately reflect the profitability in some industries, but not in others.

Some of these studies have shown a positive effect of concentration ratio on price-cost margin\(^4\). The effect is not a large one; the estimates indicate that a fully concentrated industry by the measure of concentration used (one in which four firms comprise the whole industry) has somewhere on the order of 10% greater price-cost margins than does a fully dispersed industry, in which the four largest firms account for only a negligible share of production. Some authors (e.g., DEMSETZ, 1973, in a review of the field), argue that no consistent effect has been found at all. Overall, the indication is that concentration of the industry may have a small, but certainly not a large, effect in enabling the industry to capture a large fraction of the floating value by maintaining a wide margin between cost and price.

Another empirical strategy is to examine not only the effect of characteristics of the industry itself, but also those of its transaction partners. Since the outcome of the transaction is determined by the power exhibited by both parties, then characteristics of both parties should enter the analysis. An illustrative analysis can show the general point. This is an analysis in which the dependent variable is wages, in absolute terms, and the independent variables are concentration ratio of the industry and the concentration of labor. The latter is measured as the fraction of the total production labor force in the industry that is unionized. The results of the analysis should not be taken seriously, because the level of aggregation is very high: only 22 industry classifications are used, that is the SIC code at the 2-digit level\(^5\). This degree of aggregation should discourage any inference from the results, which are presented here only to indicate the nature of the questions being posed and the kind of results that may be expected.

With wages as the dependent variable we would expect that concentration of labor would increase the wage. The effect to be expected of concentration of industry is not so clear. The direct effect on the wage should be to depress it, insofar as the labor is specific to that industry (thus making labor unable to substitute other industry employment for employment in this industry); but if the effect of concentration upon other transactions (i.e., the transaction with customers) is to enable the industry to extract higher prices, the firms have a less rigid constraint against higher wages, and can “pass them through”, which they cannot do in an unconcentrated industry.

Thus the expectation is for a positive effect of labor concentration on wages, and an indeterminate effect of industry concentration. This illustrative analysis is in accord with the first expectation, showing an effect of unionization on 1970 hourly wages of production workers of $0.79, putting them 30% above the $2.67 non-union wages (in non-concentrated industries). It shows also a positive effect of concentration of $0.50 or 19%, comparing fully concentrated to fully non-concentrated industries\(^6\). While the results cannot be taken as serious estimates because of the level of aggregation, the example shows the kind of analysis relevant to these questions. It suggests that power does arise from concentration, and if these results are confirmed at the less aggregated levels, it suggests that the concentration of an industry has more effect in increasing prices than it does in depressing wages. The results are in direct contradiction to

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\(^4\) See COLLINS and PRESTON (1968, 1969); STRICKLAND and WEISS (1976).

\(^5\) The high degree of aggregation occurs because unionization by industry is not known in the U.S. for finer classifications of industry, and because wage data, which exist at 4-digit levels of industry, have not been aggregated down to the 3-digit level. We have, however, created a measure of unionization at the 3-digit level of SIC codes, which we have used in analyses reported below.

\(^6\) All data except concentration are from the 1972 Handbook of Labor Statistics. Hourly earnings exclude overtime. Proportion unionized is obtained by dividing union reports of union membership by firm reports of employment of production workers, averaged over the year. Some error is introduced into the measure by this procedure. Concentration measures at the 2-digit level are the proportion of product classes, weighted by value of shipments, for which the largest four firms account for 80% or more of total shipments. This is necessarily a different measure of concentration than the one described in the text, used at higher levels of aggregation.
the BARAN–SWEEZY argument, not as to the effectiveness of industrial concentration, but as to the point at which that effectiveness is applied: that it operates not to depress wages, but to increase prices and thus even facilitate the increase of wages.

In reflecting further on the possible dependent variables, we can see that it would be helpful if it were possible to use, as was done in this analysis, a measure of the terms of trade in the particular set of transactions (in this case, the wage contract), rather than the combined terms of trade in all transactions. For example, it would be useful to be able to use prices as wages were used, in examining the sales transaction. But product prices cannot be compared across products, as labor can be compared across occupations.

What is possible for this transaction is to examine prices relative to previous prices, or price changes. This, however, introduces its own complications, because price changes depend on other factors such as variability of demand, elasticity of supply, etc.

The first serious analysis consists of an examination of the effects of concentration of the industry and of suppliers and consumers of the industry on the price-cost margin. More particularly, it is necessary to characterize the suppliers and the consumers according to more than one variable, since the industry in question may sell to a number of consuming industries and buy from a number of supplying industries. The variables used are these:

For the suppliers:

*Concentration*: the 4-firm concentration ratio for supplying industries, averaged over all industries supplying the industry in question, weighted by size of transactions.

*Focus*: the degree to which purchases are focused on one or a few industries (measured by the sum of squared proportions of purchasers from each industry)

*Interaction* between concentration and focus: a measure of the degree to which purchases are from only a few industries and these industries are concentrated.

For the consumers:

*Concentration, focus, and interaction* are similarly defined, but for industries which are consumers of the products of the industry in question.

The equation for the analysis has the following form:

\[ y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + b_6 x_6 + b_7 x_7 + b_8 x_8 \]

where \( y \) = price-cost margin and the \( x_i \)'s are as indicated in Table 1.

**TABLE 1:** Effects of industry concentration, supplier concentration and focus, and consumer concentration and focus on price cost margins (Standard errors in parentheses)

<table>
<thead>
<tr>
<th></th>
<th>Means</th>
<th>Correlations (raw)</th>
<th>Regression coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x_1 ) Capital assets</td>
<td>.456</td>
<td>.167</td>
<td>.024* (.010)</td>
</tr>
<tr>
<td>( x_2 ) Concentration</td>
<td>.395</td>
<td>.276</td>
<td>.103* (.018)</td>
</tr>
<tr>
<td>( x_3 ) Ave. Supplier Concentration</td>
<td>.261</td>
<td>.080</td>
<td>-.070 (.047)</td>
</tr>
<tr>
<td>( x_4 ) Focus on Suppliers</td>
<td>.128</td>
<td>-.396</td>
<td>-.364* (.069)</td>
</tr>
<tr>
<td>( x_5 ) Focus on Concentrated Suppliers (( x_3 * x_4 ))</td>
<td>.032</td>
<td>-.201</td>
<td>.431 (.267)</td>
</tr>
<tr>
<td>( x_6 ) Ave. Consumer Concentration</td>
<td>.200</td>
<td>-.194</td>
<td>-.039 (.047)</td>
</tr>
<tr>
<td>( x_7 ) Focus on Consumers</td>
<td>.310</td>
<td>-.027</td>
<td>.030 (.027)</td>
</tr>
<tr>
<td>( x_8 ) Focus on Concentrated Consumers (( x_6 * x_7 ))</td>
<td>.049</td>
<td>-.230</td>
<td>-.203* (.113)</td>
</tr>
</tbody>
</table>

contin. p. 342

7 This analysis almost directly parallels an analysis carried out by RONALD BURT, reported in BURT (1977). The equations we use differ from BURT’s only in the two interaction terms used in the equation, and in the way corrections of PCM for capital were introduced. We are indebted to BURT for the data preparation which allowed this analysis.
The total effect of the market structure in the customer transactions on the price cost margin of the industry appears to be less than that of the market structure of the supplier transaction. This is indicated by two analyses (not shown) which examine the separate transactions separately, one the supply transactions (using $x_1$, $x_2$, $x_3$, $x_4$, $x_5$), and the other the customer transaction (using $x_1$, $x_2$, $x_6$, $x_7$, $x_8$). In the former, .245 of the variance in price-cost margins is explained; in the latter, only .163 is explained.

With this as preliminary results indicating that extra-market power does have an effect on the terms of market transactions in the economy, we can move toward the central task of the paper. The aim will be this: to consider one set of transactions only, obtaining measures of how market structure affects the price at which that transaction takes place; and then to use these measures, in conjunction with a table of transactions for the economy, and measures of concentration for industries in the economy, to discover where the floating value of the economy accumulates, and thus how it induces inequalities.

In doing this, we will focus upon the supply transactions, where the effect of market structure on the price cost margin (which we will assume to be its effects upon the cost side, that is, the terms of the purchased transaction) is most apparent in the preliminary analyses reported earlier. But to do so, it is important to develop the conceptual structure somewhat more fully. This we will do in the next section.

The flow of value due to market imperfections

Suppose, we obtain, through regressing the ratio of cost to price (which is one minus the price-cost margin, i.e., $1 - (P-C)/P = C/P$) upon concentration of an industry and average concentration of its suppliers, the effects of these two concentrations upon the ratio of cost to price. That is, we obtain $b_2$ and $b_3$ from the following equation:

$$y = a + b_1x_1 + b_2x_2 + b_3x_3$$

where $x_1$ = capital

$x_2$ = concentration of industry
\[ x_3 = \text{concentration of suppliers} \]
\[ y = \text{cost: price ratio (or price-cost margin, which is 1 - cost: price ratio; this would change only the value of a and signs of the b's)} \]

Then we calculate, for purchases from industry i by industry j, what the cost-price ratio would be if the concentration were zero in both industry j itself and suppliers i. This is done by first calculating a modified regression coefficient based on the fact that material costs reflect only a portion of the total materials + labor costs. Thus assuming that concentrated suppliers affect only the materials costs, the effect of supplier concentration upon materials cost is not \( b_3 \) but \( b_3/s \), where s is the proportion of costs that are materials costs. Then with this coefficient, one can calculate the "zero-concentration" price-cost ratio by:

\[ y_{ij}^* = y_j - b_2 x_{2j} - \frac{b_3}{s} x_{3i} \]

where \( y_{ij}^* \) is the price-cost ratio in industry j modified by the effect of reducing concentrations in industry j and its supplier, industry i, to zero.

Then the ratio \( y_{ij}^* : y_j \) is the ratio of costs of industry j (that is, of selling price from industry i to industry j) under the non-concentrated regime to costs under the concentrated regime. Let us call this ratio \( r_{ij} \), for the sales transaction from i to j.

This ratio allows us to calculate what the direct effect of zero industry concentration would have on interindustry transactions. Assume we have a matrix X of interindustry transactions, with \( x_{ij} \) representing the dollar sales from industry i to industry j (and thus dollar transfer from j to i). The last column represents final demand from the "household sector", and the last row represents sale of labor by the household sector to each industry. For each cell of the first n-1 rows of the matrix X, a new quantity \( w_{ij} \) can be created as the product \( r_{ij} x_{ij} \), and this quantity represents the dollar volume of transactions made by industry j purchasing from industry i. These are the first n-1 rows of a new matrix W, representing the "unconcentrated" costs of the same physical flows from sector i to sector j.

For the last row, what is needed is a measure of the effect of labor concentration (unionization) and industry concentration upon labor costs.

This can be calculated in either of two ways: either by calculating directly the effect of industry and labor concentration upon wages, as was reported earlier for the 2-industry level of aggregation. The defect of this, however, lies in controlling for the effect of occupation, a difficult task: if one controls statistically for occupation, then insofar as the occupation's wage is determined by its employment in a given (possibly concentrated) industry and is characterized by a given degree of unionization, a large part of the effect of labor and industry concentration is contained in the occupation's wage. It is difficult if not impossible to separate out the component of the occupation's average wage that is due to its skill and other intrinsic characteristics from the component due to market structure.

The second way to calculate the nonconcentrated payments from industry j to labor (sector n) is to carry out an analysis comparable to that for other suppliers, with cost-price ratio as the dependent variable, and capital, industry, concentration, and labor concentration as independent variables. However, because labor costs are only a fraction of total costs, the labor concentration coefficient must be inflated by the inverse of the fraction of total costs that are labor costs (say I−S) in the average industry.
used for calculating the coefficient\textsuperscript{10}. This inflated coefficient $b_0/(l-s)$, together with the industry concentration coefficient we used to calculate the “unconcentrated” (labor) cost-price ratio, gives

$$y_{ij}^* = y_{ij} - b_2 x_{2j} \cdot \frac{b_9}{l-s} x_{9i}.$$ 

This allows writing the ratio $y_{ij}^* : y_{ij}$, which can be denoted $r_{nj}^*$, for the last row of the transactions table. Thus if $x_{nj}$ is the total sales of labor to industry j, the “unconcentrated sales” would be $r_{nj}^* x_{nj}$.

This, together with the first n-l rows, gives a table W which contains the transactions due to sales from industry i to industry j, as they would be, for the same physical transfers, in an unconcentrated economy.

However, the matrix W does not, in general, any longer balance, so that the dollar inputs to an industry equal the dollar expenditures, as was true with X. In order to see how the change in concentration affects the level of activity in each industry, it is necessary to determine what activity levels at these prices would constitute equilibrium. If the same “recipe” of physical components is necessary to make a unit of a given commodity, as assumed by LEONTIEF in input-output analysis, then the cost of each component in “unconcentrated prices” is given by dividing each entry in W by the column totals. The result can be called C, the cost matrix, with entries $c_{ij}$, the fraction of j’s cost which goes to purchases in industry i. Then if the total level of activity (i.e., the total number of dollars earned and spent) in industry i at equilibrium is labelled $v_i$, $v_i = \Sigma c_{ij} v_j$. This set of n-l independent simultaneous equations can be solved to give the vector V, which is the vector of total inputs to or outputs form each industry at equilibrium. One way of solving this set of equations is to delete the final row of C and to divide each of the $v_j$’s by $v_n$, to give C* and V* and the following equation:

$$V^* = C^* V^* + A$$

where A is the first n-l rows of the last column of C. This is solved by subtracting $C^* V^*$ from both sides and taking the inverse

$$V^* = (I - C^*)^{-1} A.$$ 

The total income in each industry, that is, $v_i$, is given by

$$v_i = \left(\frac{v_i^*}{\Sigma v_j^* + 1}\right) N,$$

where N is the total income in the economy as a whole. Then the total dollar transactions between each pair of industries (assuming no change in the total size of income for the economy as a whole) is obtained as the products $c_{ij} v_j$.

The end result of all this is an economy that differs in two ways from the actual one with non-zero concentration: the prices of various commodities (including labor in various industries) are different, and the level of activity in different industries is as well. This means that not only is there a different distribution of personal income among employees of different industries, but also there is a different mix of goods, both in intermediate markets and in final consumption. In general, the less concentrated the industry, the more inflated its costs and depressed its prices were by concentration, and thus the more money flows into it in the unconcentrated state, and the more physical production that occurs. Thus concentration both reduces the levels of activity of non-concentrated industries, and reduces their wealth.
The estimated effect of supplier concentration on materials cost is complicated by the interaction term, $x_5$. What will be used as the supplier concentration coefficient is $b_3 + x_4 b_5$, that is, the regression coefficient for concentration, plus that for the interaction term multiplied by the mean of the other variable in the interaction term. This is $0.274 + 0.129 (-1.669) = 0.059$. When divided by the proportion of costs due to suppliers, it gives the effect of suppliers concentration on materials cost: 0.114.

Thus the equation for obtaining the ratio of non-concentrated cost to actual cost in the materials supply transaction is:

$$ r_{ij} = \frac{y_{ij}^*}{y_j} = \frac{y_j + 0.61x_{2j} - 0.114x_{3i}}{y_j} $$

and the equation for obtaining the ratio of non-concentrated cost to actual cost in the labor transaction is:

$$ r_{nj} = \frac{y_{nj}^*}{y_{ij}} = \frac{y_j + 0.61x_{2j} - 0.087x_{9j}}{y_{ij}} $$

These estimates indicate that the impact of extreme concentration upon costs is considerable. If a supplier has a concentration ratio of 1.0, and the purchasing industry has a zero concentration, the unconcentrated material costs would only be 0.886 of actual costs. If an unconcentrated industry was completely unionized, the unconcentrated labor costs would only be 0.913 of actual costs. On the other hand, if the concentration imbalance was completely skewed in the other direction, the unconcentrated costs would in both cases be 1.061 of the actual costs.

Unfortunately, it is necessary to leave the analysis at this point. Calculations are not quite completed for coupling the analysis. What remains is to calculate, for the whole economy at the 3-digit level of aggregation, the matrix of unconcentrated prices (the W matrix), then to calculate the unit costs attributable to each industry, for each industry, in the unconcentrated state (the C matrix, or LEONTIEFS technological coefficients), then the vector of total expenditure in each industry, and finally a matrix of transactions for the unconcentrated economy.
From the vector $V$ of total expenditures (or income) for each industry, it is possible to see, by comparison with the actual economy, what industries are the "value sinks" into which wealth goes by virtue of the market structure, what industries are the principal losers, and just what is the amount of distortion of the economy due to this extra-market power.

It is also possible, by comparing the last row of the new total transactions matrix with the last row of the actual one, to show the income distortions for labor in various industries, showing the amount of benefit which some labor achieves by virtue of extra-market power, and the amount of benefit which other labor loses.

Speculations about the structure of power and its effects

Although the analysis is not yet complete, certain general comments are possible concerning who benefits and who loses. A first point is that since final consumers are ordinarily completely unconcentrated (consisting of individual persons as consumers), they end up paying more, rather generally, for goods than they would in an unconcentrated economy. A higher proportion of the total wealth is spent in the more concentrated producer's goods sectors than would be in an unconcentrated economy. But although persons as consumers lose as a result of market structure, some (though not all) persons as employees gain. This again is a result of the greater general concentration on the producer side of transactions in the economy than the consumer side. (The major exception, of course, is agriculture, which one would expect is suffering considerably as a consequence of market structure).

The general asymmetry, with greater concentration on the producer side than the consumer side of transactions, suggests that this structure might also constitute a means for accounting for endemic inflation. For greater concentration on the producer's side implies that the value of dollars is greater at earlier stages of production than at later stages in the actual economy, compared to the unconcentrated one. Thus if the concentrated economy is taken as a baseline, the actual economy will show a decline in the value of the dollar over the period of production. If that period is determined for particular products, then estimates of the decline per unit time in purchasing power of the dollar can be made, by attaching times to the dollars that are input into each industry.

References


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