Chapter 9: *Keiretsu*, Proportional Representation, and Input-Output Theory

Introduction

In view of the modern economic success of Japan, more and more attention is turning to Japanese models of corporate ownership and management. Many of the large, world-famous Japanese corporations are part of ownership groups called *keiretsu*. There is cross ownership between the companies in the group as well as some ownership outside the group that is traded on the stock market. In spite of the partial outside ownership, the *keiretsu* often behave as "self-owning" groups.

What is the meaning of the circular cross-ownership relations? The answer depends on the assumptions made about the companies acting as "transmission belts" (for votes and dividends) between their shares and the shares they hold in other companies. The realistic assumption is that the companies do not act as transmission belts. Then majority cross ownership within a *keiretsu* results in a form of group ownership controlled by the senior managers and bankers in the group. Analysis of this Japanese form of group ownership and comparisons with employee ownership in the West are topics worthy of consideration.

The realistic assumption, however, is often not the one that leads to a mathematically interesting theory (a very common occurrence in mathematical economics). We develop the technically interesting theory that the companies in a cross-owning group serve as vote-and-dividend transmission belts between their shares and the shares they own. Since the ownership pattern is circular, the effects of passing through the votes and dividends lead to an infinite series. The appropriate mathematical framework is input-output theory where the infinite series is the series expansion of the Leontief inverse matrix [see Ellerman 1991]. Even though input-output theory is over forty years old, this application to circular ownership patterns seems to be new.

There is an "unexpected" connection between this analysis of ownership structures and the controversy surrounding proportional representation (PR) in voting systems. This connection allows one to examine PR in a new light and to see why it may not be appropriate in complex political systems.

The Primal Theory of Own and Gross Values

The Cross-Ownership Matrix

There are n firms in the ownership federation or *keiretsu* , and a_{ij} is the proportion of firm j directly owned by firm i.

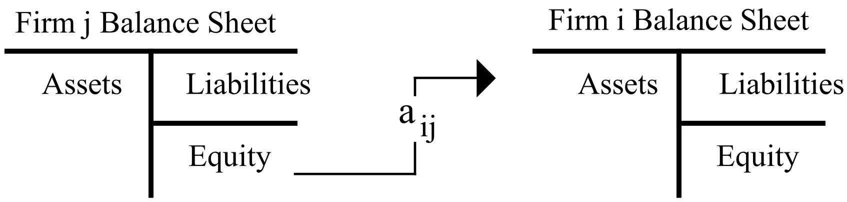

Figure 9.1. Firm i Owns a_{ij} Proportion of Firm j

If $a_{2,1} = .3$, then 30 percent of firm 1 is owned by firm 2. Unissued shares or shares that have been redeemed by a company are "treasury shares" that do not receive a dividend, do not vote, and do not carry a balance sheet value. Hence the diagonal coefficients a_{ii} do not refer to treasury shares. It is assumed that a corporation cannot own its own shares as assets on the balance sheet so $a_{ii}= 0$ (which corresponds to "netting out" the self-transactions of an industry in the usual interindustry analysis).

Let $A = [a_{ij}]$ for i, j = 1,…,n be the (non-negative) *cross-ownership matrix*. Let $\mathbf{1} = (1,\ldots,1)$ be the row vector of n ones so $\mathbf{1}A$ is the row vector of column sums, which is denoted $c = (c_1,\ldots,c_n) = \mathbf{1}A$. The sum c_j of the j^{th} column gives the proportion of the j^{th} company that is owned by the other companies in the group so $1–c_j$ gives the proportion of the j^{th} company that is "external" in the sense of being owned by legal parties other than the remaining n–1 firms in the group. It is assumed that each company has some external ownership so $c_j < 1$. Under that assumption, the Leontief inverse $[I–A]^{–1}$ exists and is non-negative [see Hadley 1961, 118-19].

Own Values and Gross Values

Given a corporation in the ownership federation, we must distinguish between its own shares called "own shares" and the shares it owns in other companies called "owned shares." The direction of causality is different for dividends and votes. The primal input-output theory is concerned with dividends and other income flows that we assume are transmitted by the company from owned shares to own shares. The dual theory is applied to votes that we assume the board of directors passes on from own shares (i.e., the shareholders) to owned shares.

Consider, for example, the flows of dividends. Each company has two types of dividends on its shares: its own dividends (the dividends from its own operations) and the dividends received on owned shares (which we assumed are passed through to the company's own shares). Let $d = (d_1,\ldots,d_n)'$ (the apostrophe indicates transpose) be the column vector of *own dividends* from each company due to its own operations, and let $x = (x_1,\ldots,x_n)'$ be the column vector of *gross or total dividends* declared by the companies. Then Ax is the column vector of dividends received by the companies on the owned shares, and the total dividends are the sum of the *received dividends* (which are passed through by assumption) and the own dividends.

$$x = Ax + d$$

Equation 9.1. Gross Dividends x = Received Dividends Ax + Own Dividends d

The usual Leontief inverse computes the gross dividends from the own dividends: $x = [I – A]^{–1}d$.

The cross-ownership relations do not create any new dividends but they do change the distribution. The dividends $(1–c_j)x_j$ received by the external shareholders of firm j are, in general, different from the own dividends d_j of firm j. But since the dividends received by each firm on its owned shares were simply passed through, the total of the dividends accruing to external shareholders must equal the total of the own dividends **1**d:

$$\sum_{j=1}^{n}\left(1-c_j\right)x_j = \mathbf{1}\left(I-A\right)x = \mathbf{1}d$$

Equation 9.2. Total External Dividends = Total Own Dividends

The application is not unique to dividends. Any corporate stock/flow value that is transmitted by the a_{ij} coefficients can also be used. For instance, let d_j be the stock quantity that is the net asset value (assets minus liabilities) at a point in time of the j^{th} firm without counting the net asset value of the owned shares. Let x_j be the total net asset value of the j^{th} firm. The total net asset values x are given as the net asset values Ax of the owned shares plus the net asset values of the firms independent of their owned shares. The total net asset values $x = [I–A]^{-1}d$ are "inflated" above the "real" values d, but the sum of the net asset value belonging to external shareholders, $\mathbf{1}(I–A)x = (\mathbf{1}–c)x$, equals the sum of the real values **1**d.

It is useful to construct a general interpretation that includes the special cases. Let d_j be a (stock or flow) *own value* held or generated by the jth firm independently of the cross ownership relations. Let x_j be the corresponding *gross value* associated with the j^{th} firm. Gross values are "transmitted" between companies by the a_{ij} coefficients. The *received values* Ax of the owned shares "pass through" each company and add to the own values d to yield the gross values x.

$$x = Ax + d$$

Equation 9.3. Gross Values x = Received Values Ax + Own Values d

The gross value x can be computed as the Leontief inverse times the own values d, that is, $x = [I–A]^{-1}d$. By the representation of the Leontief inverse as the sum of a matrix series,

$$[I–A]^{-1} = I + A + A^2 + \cdots ,$$

Equation 9.4. Leontief Inverse Matrix as an Infinite Series

the gross value x is the direct own values d plus the first stage received values Ad plus the second stage received values A^2d and so forth: $x = d + Ad + A^2d + \cdots$.

Let $B = [b_{ij}] = [I–A]^{-1}$ be the Leontief inverse. The general interpretation of the Leontief inverse is that it gives the "ultimate" direct and indirect cross-ownership relations between the corporations—where each firm is represented as having 100 percent direct self-ownership.

The ij-element b_{ij} of the **Leontief inverse** is the total direct and indirect proportion of the j^{th} firm owned by the i^{th} firm for $i \neq j$,

and
b_{ii} = 1 + total indirect self-ownership of i^{th} firm.

Let I–C be the n x n diagonal matrix with the diagonal entries $1-c_j$ for j = 1,…,n. The matrix D = $(I-C)[I-A]^{-1}$ will be called the *external ownership matrix*.

The D_{ij} element of the **external ownership matrix** D gives the proportion of total (direct and indirect) ownership of j^{th} firm by the external shareholders of i^{th} firm.

The column sums of the non-negative matrix A are less than one since they represent the proportion of each firm directly owned by the other firms. Hence I–C is non-negative and thus D = $(I-C)[I-A]^{-1}$ is also non-negative. Moreover the columns of D sum to one since

$$\mathbf{1}D = \mathbf{1}(I-C)[I-A]^{-1} = (1-c)[I-A]^{-1} = \mathbf{1}[I-A][I-A]^{-1} = \mathbf{1}I = \mathbf{1} = (1,\ldots,1).$$

Let $y = (y_1,\ldots,y_n)' = ((1-c_1)x_1,\ldots,(1-c_n)x_n)'$ be the column vector of *external values* accruing to the external shareholder(s) of the firms. The external values y can be computed directly from the own-values d by the external ownership matrix:

$$y = Dd.$$

Equation 9.5. External Values y = External Ownership D × Own Values d

The i^{th} external value y_i is not necessarily equal to the i^{th} own value d_i, but the sum of the external values, $\mathbf{1}y = \mathbf{1}Dd = \mathbf{1}d$, is equal to the sum of the own values.

The Dual Theory of Ownership and Control

Premature Majoritization versus Proportional Representation

In traditional input-output theory, the direction of determination reverses itself between the primal and dual theories. In the primal theory, the levels of the outputs determine the level of the inputs, while in the dual price theory, the value of the primary inputs determines the value of the outputs. In a corporation, control flows in the opposite direction to value. Value flows from the corporation to the shareholders (in dividends and capital gains) while control and ownership rights go (in theory) from the shareholders to the corporation. Since what we have taken as the primal theory is concerned with the flow of value from corporations to the external shareholders, we will take the dual theory as being concerned with the flow of control and ownership rights in the opposite direction from the external shareholders to the firms.

When there is cross ownership of corporations, control questions are no less subtle and intertwined than valuation questions. To understand the complexities, we must first consider how majority voting outcomes can be manipulated through majoritization at the level of subgroups or districts. Each decision is a yes-or-no question that can be represented by a "1" or a "0." A yes-or-no question put to any company in the group will eventually be put to every other company in the group that is directly or indirectly an owner of the given company. We assume that the boards vote as directed by the shareholders, so the question will ultimately be decided by the external shareholders of the companies in the group.

Given the votes of the shareholders (external and other companies in the group), there are two ways that the board can vote on the owned shares. The board could majoritize and vote all the owned shares as a block according to the majority outcome, or the board could simply pass through the percentages for and against on the owned shares. For instance, if the shareholders vote 60 percent in favor and 40 percent against, the majoritizing board would vote all the owned shares in favor, while the pass-through board would vote 60 percent of the owned shares in favor and 40 percent against.

The pass-through board is the corporate version of proportional representation (PR), while the majoritizing board corresponds to the system of districts with single representatives representing a majority of the voters in the district. It is easy to see how the system of majoritizing districts can lead to violations of majority rule. Suppose there are nine voters with four in favor and five against a proposal.

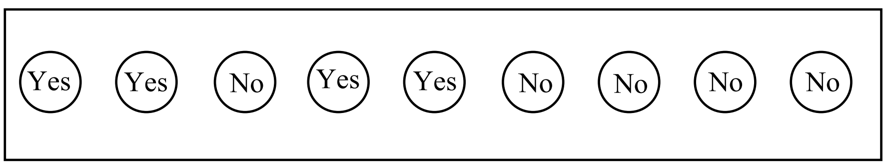

Figure 9.2. Majority Votes No

By majority rule, the proposal would fail. But now suppose the electorate is divided into equal sized districts (as is the goal in the U.S. House of Representatives), and that two of the three districts each have two of the yes votes.

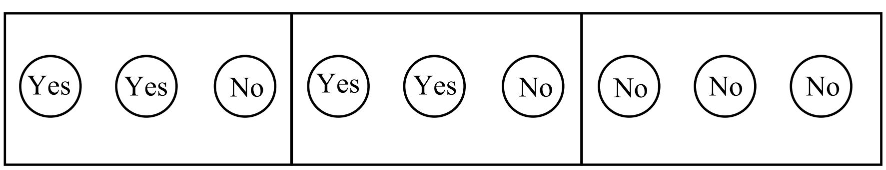

Figure 9.3. Majority of Representatives Vote Yes

Then by majority voting at the district level, two out of the three districts would vote in favor of the proposal so it would pass (in violation of majority rule by the ultimate voters). If the districts did not majoritize but only passed through the proportions for and against the proposal, then the result would be the same as in the direct referendum without districts. Thus the pass-through system gives a correct representation of the electorate, while "premature majoritization" at the district level can allow manipulation of the results. The PR system with large districts and many party representatives for each district to roughly represent the voters' party preferences is an attempt to reproduce the pass-through system in a system of party representatives.

Majoritization in each district and majority voting by districts can thus give a result in opposition to the majority of the primary voters. This has occurred, for example, in the American Electoral College. The unit rule of casting all of a state's electoral votes according to the majority vote in the state resulted in Benjamin Harrison defeating Grover Cleveland in the 1888 presidential election even though Cleveland had 5,540,050 popular votes to Harrison's 5,444,337.

The problems generated by premature majoritization (e.g., with majority-elected single representative districts) are the subject of a large literature in political science on proportional representation (PR) [see the bibliography in Dummett 1984]. John Stuart Mill gave the classic case for PR in his *Considerations on Representative Government* [1861] and Walter Bagehot [1867] gave a classic critique of PR in the context of multiparty systems. In this century, Hoag and Hallett [1969, orig. 1926] reviewed the arguments for PR, while Hermens [1972, orig. 1941] reviewed the case against PR in multiparty politics.

Pyramidal holding company schemes are the corporate versions of the premature majoritization. To adapt the previous example, suppose we have a corporation with $400 paid in by shareholder A and $500 paid in by shareholder B. Clearly B is the majority shareholder.

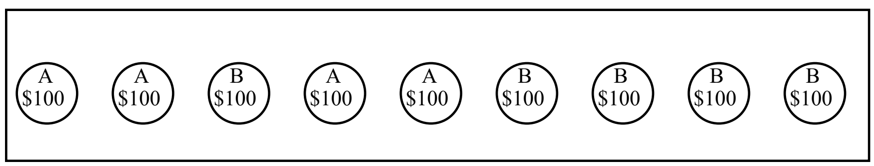

Figure 9.4. Investor B is Majority Shareholder in Company

Now suppose that instead of putting money directly into the company, two other "parent" companies are formed, AABAAB Inc. and BBB Inc. The investors put their money into these parent companies, and then the money is invested into the daughter company in returns for its shares.

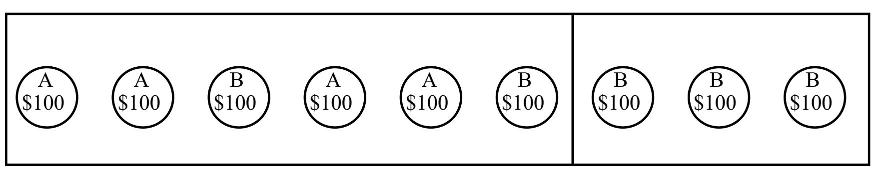

Figure 9.5. Investor A Controls Company Through Pyramidal Holding Company

Investor A owns two-thirds of the AABAAB Inc., which in turn owns two-thirds of the daughter company. Thus if the corporate boards majoritize decisions, then investor A controls AABAAB, and it, in turn, controls the daughter company. Therefore, the holding company structure allows investor A to control the daughter company with only a minority of the ultimate capital. If the corporate boards (e.g., in AABAAB) only pass through the shareholder votes, then investor B would have control of the daughter company as in the structure without the parent companies.

If the daughter company has to make a decision, then it, of course, has to majoritize the votes of its shareholders to a yes-or-no decision. But when that question is put to the AABAAB company as a shareholder in the daughter company, there is no reason for it to vote all its shares as a block ("premature majoritization"). When AABAAB polls its shareholders, suppose that A votes in favor with B against. Then AABAAB Inc. could pass through the votes to its shares in the daughter as two-thirds in favor and one-third against the proposition. Shareholder B's vote would have (1/3)x(2/3) = 2/9 weight through the AABAAB company and 3/9 weight through the BBB company, so its 5/9 weight overall would give B majority control of the daughter company.

The situation is considerably more complicated in the circular ownership federation—particularly with the pass-through voting assumption. Under that assumption, the Leontief inverse is needed to compute the proportions voted by the company boards in terms of the external shareholder votes. We construct an example of an ownership federation with five companies. Using premature majoritization, the external majority shareholder of one of the companies can control the other four companies through a pyramidal structure. But with pass-through voting, that majority shareholder in one firm controls only that firm and the other four firms are controlled by their own direct external shareholders.

Suppose JPM (as in J. P. Morgan) is the 51 percent external owner of Firm 1. Firm 1 owns 51 percent of Firm 2. Firm 1 and Firm 2 each own 25.5 percent of Firm 3 for a total of 51 percent. Firms 1, 2, and 3 each own 17 percent of Firm 4 for a total of 51 percent. And Firms 1, 2, 3, and 4 each own 12.75 percent of Firm 5 for a total of 51 percent. Thus it appears that JPM "controls" (i.e., has 51 percent control of) Firm 1 and through it, Firm 2 as well. But Firm 1 and Firm 2 together control Firm 3 and so forth. Thus JPM seems to control all five firms through the pyramid structure. If we split the other 49 percent of Firm 1 equally between Firms 2 through 5, then that would not appear to change matters since JPM already controls Firms 2 through 5. The following table gives the cross-ownership matrix A (in the bordered area) with the a_{ij} expressed in percentage form, i.e., a_{ij} is the percent of ownership of Firm j by Firm i.

	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5
Firm 1	0.00%	51.00%	25.50%	17.00%	12.75%
Firm 2	12.25%	0.00%	25.50%	17.00%	12.75%
Firm 3	12.25%	0.00%	0.00%	17.00%	12.75%
Firm 4	12.25%	0.00%	0.00%	0.00%	12.75%
Firm 5	12.25%	0.00%	0.00%	0.00%	0.00%
Ext.Control	51.00%	49.00%	49.00%	49.00%	49.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 9.6. Cross-Ownership Matrix A for Pyramidal Holding Structure

Each firm decides a question by majority voting, where "majority" means more than 50 percent of the ownership. In the pyramidal structure, JPM owns 51 percent of Firm 1 so he can always control Firm 1's decisions. The question is about the other firms. JPM is, in effect, using the firms as multilevel districts to inflate the effect of his vote. JPM's actual indirect ownership of Firm 2 is 51 percent of 51 percent or about 26 percent, assuming we ignore the circular feedback effects of each of the other firms' 12.25 percent ownership stakes in Firm 1. Taking the circular effects into account, we will see that JPM's total indirect ownership of Firm 2 is about 31.86 percent. But by using Firm 1 as a district for "premature majoritization," JPM in effect is disenfranchising the 12.25 percent stakes of the other firms and their external shareholders. Thus he gains control of Firm 2, and the process repeats itself for the other firms.

The cure for the manipulation, as noted above, is not to majoritize prematurely. Each "district" vote should be passed along in its true proportions—as is the intent of the various schemes of electoral reform using proportional representation. Since the cross-ownership structure is, in general, circular, adding up the final votes means summing an infinite series, namely the series expansion of the Leontief inverse matrix. With this introductory motivation, we may turn to the theoretical development of the dual theory.

Direct and Indirect Ownership and Control

The external shareholder(s) of each of the n firms votes as a unit to determine the zero-or-one variables $w_1, w_2, \ldots, w_n$. Let $w = (w_1, w_2, \ldots, w_n)$ be the row vector of external shareholder votes. As before, let $c = (c_1,\ldots,c_n) = (1,\ldots,1)A = \mathbf{1}A$ be the column sums of A that represent proportions of the firms owned by the other firms, so $\mathbf{1}\text{-}c = (1–c_1,\ldots,1–c_n)$ is the row vector representing the proportions of the firms owned by the external shareholders. Let I–C be the n x n diagonal matrix with the $1–c_i$ entries on the diagonal. Hence $w(I–C) = (w_1(1–c_1),\ldots,w_n(1–c_n))$ is the row vector of external shareholder votes weighted by their proportion of ownership in the firms.

The final decisions of the n firms are to be determined by majoritizing the n variables $p_1, p_2, \ldots, p_n$ which represent the final sums of the w_i votes tallied using the ownership relations represented by the cross-ownership matrix A. For a variable p with $0 \le p \le 1$, the *majoritization* of p, maj(p), is defined by:

$$\mathrm{maj}(p) = \begin{cases} 0 \text{ if } 0 \le p \le .5 \\ 1 \text{ if } .5 < p \le 1 \end{cases}.$$

Equation 9.6. Majoritization Function

The decision variables p are obtained as the sum of the decisions pA passed on from the other firms plus the external shareholders' decisions w(I–C): p = pA + w(I–C). The variables p to be majoritized to obtain each firm's decision are thus computed as:

$$p = w(I–C)[I–A]^{-1}.$$

Equation 9.7. Firms' Decision Variables p in terms of External Shareholder Votes w

Let $D = (I–C)[I–A]^{-1}$ be the external ownership matrix. The equation p = wD expresses the decision variables p as the "ultimate" (direct and indirect) ownership-weighted sum of the external votes w. Hence each p_j is the weighted sum of the w_i's where the non-negative weights in the j^{th} column of D sum to one. Since each vote w_i is zero or one, $1 \le p_j \le 0$ for all j. Majoritization of the final tally p_j means that Firm j's decision is affirmative if $p_j > .50$ and negative otherwise.

The ultimate ownership of all the n firms is in the hands of the external shareholders who cast the votes $w_1,\ldots,w_n$. But due to the cross ownership relations expressed in the matrix A, the external shareholders have more than just their direct ownership of their companies. The D_{ij} entry in the D matrix gives the proportion of ultimate (direct and indirect) ownership of Firm j by the external shareholders of Firm i.

$$p = wD = w(I–C)[I–A]^{-1} = w(I–C)[I+A+A^2+\cdots]$$

Equation 9.8. Circular Ownership Gives Infinite Summation of Votes

The calculation of the decision variables results from passing the true proportions of the ultimate w_i votes through the "districts" or firms, and summing all the stages in the series expansion of the Leontief inverse.

Consider the previous example of five firms with a "pyramidal" holding company structure with JPM owning 51 percent of Firm 1 as the top of the pyramid. The external ownership matrix D is expressed in percentages in the bordered area of the following table.

	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5
Ext. Shareholders of Firm 1	62.48%	31.86%	24.06%	20.13%	17.66%
Ext. Shareholders of Firm 2	12.17%	55.21%	17.18%	14.38%	12.62%
Ext. Shareholders of Firm 3	9.70%	4.95%	52.74%	11.46%	10.05%
Ext. Shareholders of Firm 4	8.29%	4.23%	3.19%	51.67%	8.59%
Ext. Shareholders of Firm 5	7.35%	3.75%	2.83%	2.37%	51.08%
Column Sums	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 9.7. External Ownership Matrix $D = (I–C)[I–A]^{-1}$ in Pyramidal Example

We see that when the "district" vote manipulations are prevented by passing through the true proportions of the votes, then—far from JPM controlling all five firms—JPM controls only Firm 1. The other diagonal entries are all larger than 50 percent so the other external shareholders would each have control of their companies. They own 49 percent directly, and their indirect ownership through the cross ownership relations puts each over 50 percent.

For instance, the third column of D expresses p_3 as a weighted sum of the w_i votes:

$$p_3 = .2406w_1 + .1718w_2 + .5274w_3 + .0319w_4 + .0283w_5.$$

Since the coefficient of w_3 is greater than .50, the external shareholder of Firm 3 has a controlling interest of 52.74 percent in Firm 3 (in spite of only having 49 percent direct ownership). If w_3 is one, then p_3 majoritizes to one, and if w_3 is zero, then p_3 rounds down to zero. Thus $maj(p_3) = w_3$ regardless of the other w_i votes (recall the w_i's are here taken as zero-or-one variables). Without using the "district" structure to disenfranchise minority shareholders by premature majoritization, JPM only has 24.06 percent of the ultimate ownership of Firm 3 (as shown by the $D_{1,3}$ entry).

The Primal and Dual Theories

The ownership-weights matrix D permits a concise statement of the primal and dual theories (note that it is somewhat arbitrary which theory is called "primal" and which "dual"). Consider the column vector d of own values for the firms and the row vector w of external shareholder votes.

$$y = Dd$$

Equation 9.9. Primal Theory: External Values = External Ownership × Own Values

$$p = wD$$

Equation 9.10. Dual Theory: Firm Votes = External Votes × External Ownership

A more general interpretation can be constructed. A "primal" variable is a value variable where the direction of determination runs from the firms to the shareholders (i.e., the firms give value to the shares, not viceversa). A "dual" variable is a control/ownership variable where the direction of determination runs from the shareholders to the firms.

Given primal values d for the firms prior to considering cross-ownership relations, $y = Dd$ gives the corresponding values for the external shareholders after taking the cross-ownership relations into account.

Given dual values w for the external shareholders prior to considering cross-ownership relations, $p = wD$ gives the corresponding values for the firms after considering the cross-ownership relations.

For another example of a dual variable, let w_i be the proportion of the external shareholding of Firm i that is directly held by a given legal party, say, JPM. Take d to be the column vector of own dividends for the firms. Then the dividends accruing to JPM can be computed in two ways.

$$wy = w(Dd) = (wD)d = pd$$

Equation 9.11. Direct Ownership × External Dividends = Total Ownership × Own Dividends

Since $y = Dd$ gives the dividends accruing to the external shareholders, wy gives the dividends accruing to JPM. Alternatively, $p = wD$ gives the proportions of each firm directly and indirectly owned by JPM so pd is JPM's dividends.

A New Look at Proportional Representation

What new light does this comparison with pyramidal holding structures throw on the debate about PR? First, we have focused on premature majoritization as the crucial difference between PR and non-PR systems. We have seen that the "solution" to the "problem" of premature majoritization is pass-through voting. All the elaborate theories about PR and systems of voting so as not to waste votes in premature majoritization [see Dummett 1984] have been something of a distraction. They can be seen as ways to approximate pass-through voting. Instead of debating the intricacies of the various PR systems, we can thus focus on the basic question: "Is passthrough voting (no matter how obtained) what is desired?"

If the answer is "Yes" then the House of Representatives and the Senate (and the various chambers in other representative systems) are merely anachronisms that can be replaced by direct electronic polling of the citizens (as seems to be advocated by some partisans of "electronic democracy"). Are representatives supposed to exercise intelligence in debating and deciding an issue, or are they simply suppose to "represent" their constituents without any independent decision making?

Some representative systems exist in which the delegates are not supposed to deliberate; they should merely pass through the votes of their constituents. The Electoral College in the American presidential elections is one example. Yet the "unit rule" means that there is premature majoritization at the state level so that the result can end up being elected with a minority of the popular votes cast in a two-way race (as in Harrison's victory over Cleveland in 1888). There seems to be little reason why the Electoral College should not be eliminated. There is no need to replace it with a representative system using pass-through voting since there is no need for representatives at all in collecting the votes of a presidential election. A direct vote count will suffice.

Another situation where pass-through voting may be appropriate are trusts such as the Employee Stock Ownership Plans or ESOPs. Corporate shares owned by the employees of a company are held in a special tax-favored trust. The trustees (unlike the directors of the company) have a rather formal role and are not usually selected for their wisdom or expertise. The trustee might even be the trust department of a bank. When casting votes to elect the board of directors, the trustees can pass through the proportions of the votes of the employee shareholders. There is no need for any elaborate PR voting system. If the ESOP trustees do majoritize, then it is not because the trustees are supposed to be a deliberative body. It is because the majority of the employee-owners in the ESOP want to inflate their voting strength (relative to the non-ESOP shareholders) by using block voting.

We shall assume (without arguing the point here) that the chambers of representative bodies such as the House of Representatives and the Senate are intended to be deliberative bodies. They are not supposed to just count the noses (or telegrams) of their constituents. They are supposed to be the sort of individuals who can bring some wisdom and experience to bear on the questions, who can engage in adversarial debates to sharpen the issues, and who can arrive at the end of the decision-making process at a better and wiser decision than could be obtained by taking a referendum of the undeveloped and uninformed opinions of the constituents. Or the point could be put the other way around. The sort of questions of social decision making that could be best answered after deliberation, research, and debate are the sort of questions that should be put to a deliberative body as opposed to a referendum.

In the past, referenda were quite costly and difficult to administer. But with modern electronics, widespread referenda are now quite feasible. Electronic demagogues, who want social questions put directly to the public in electronic referenda, miss the whole deliberative side of social choice. Social choice theory as represented, for example, in Arrow's Impossibility Theorem also misses that deliberative dimension [see Arrow 1951]. That theory sees social decisions as being based on nose counting, but then worries about what rule to use to convert the nose counts into decisions. For instance, Arrow generalized the parlor paradox of majority voting by showing that any general rule that satisfied a number of seemingly reasonable requirements would lead to similar paradoxes. The subsequent development of "social choice theory" has been a perfect example where rather trite questions dominated the theory because those questions could be treated mathematically, and the substantive questions that were not formally tractable were passed over in silence (e.g., in a world of rather asymmetric information and bounded rationality, should social choice just be a matter of nose counting?).

To conclude, we have noted that some representative bodies are intended as deliberative bodies while others are best seen as "transmission belts" to pass along the votes of the constituents.

When a representative body is properly deliberative, then majoritization at that level of decision making is not "premature." It would seem that many proponents of proportional representation have confused deliberative representation and pass-through representation, and have thus tried to "reform" the legislative bodies of government into better transmission belts of "public opinion."

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