INTERLOCKING DIRECTORATES
IN SWITZERLAND: A NETWORK ANALYSIS*

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Introduction

Corporations are not islands of planned coordination in a sea of market relations (Richardson, 1972), but interdependent organizations. Dependence on the resources of other corporations (purchases, deliveries, credit) can be reduced through joint ventures and strategic alliances, but also through personal interlocking arrangements with major customers, suppliers or competitors (Baker, 1994; Kanter, 1995). Two corporations may be regarded as interlocking when a person holds a seat on the management board or board of directors in both corporations. In the board of directors of larger corporations, persons often come together who hold different positions in a number of enterprises. This gives rise to wide-ranging corporate networks which create economic organizational forms not covered by classical corporate and market concepts (Powell, 1992).

Unlike corporate networks, "big linker" networks, i. e. contacts between persons who hold positions on the board of directors of several corporations, have received relatively little attention. Yet this personal network is of interest in that the big linkers, as "servants of several corporations", no doubt play a decisive role in balancing interests within the network. Moreover, it would appear that it is above all the big linkers who actively promote a beneficial political integration of market relations among the network's members (Granovetter, 1985). Adam Smith already made that point in *The Wealth of Nations* (1776) when he warned that conversations between corporations contain not only the danger of price agreements but also of conspiracies contrary to public interest.[1] Max Weber put forward a similar argument in the unfinished concluding

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1 Original text: "... people of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices." (Smith 1979 [1776], 232)

chapter of *Wirtschaft und Gesellschaft* (Chap. VI: Die Marktvergesellschaftung): "Capitalist interests thus favor the continuous extension of the free market, but only up to the point at which some of them succeed, through the purchase of privileges from the political authority or simply through the power of capital, in obtaining for themselves a monopoly for the sale of their products or the acquisition of their means of production, and in thus closing the market on their own part." (Weber, 1978, p. 638)

Personal corporate networks have been the subject of quantitative analyses since the turn of the century. The pioneering work of Wibaut (1903) in the Netherlands and Jeidels (1905) in Germany already noted the close interlocking arrangements between leading banks and industrial corporations. These findings have not been refuted by recent computer-assisted network studies. It has also appeared that most corporate networks in the West are more or less hermetic and centralized, give leading banks a central role and tend to renew themselves over time (e. g. Stokman et al., 1985; Stokman et al., 1988). Lastly, the few analyses of personal networks show that the big linkers are not "islands" either, but form a tight and politically influential network (Useem, 1984; Perruci and Lewis, 1989).

Until now, there has been only one network analysis of personal corporate links in Switzerland. According to Rusterholz (1985), the network of the 250 biggest corporations was relatively dense and centralized around 1976. The most centralized corporation was the Nationalbank, followed by the Swiss Bank Corporation (SBC), the airline company Swissair, Alusuisse, the Union Bank of Switzerland (UBS), Sulzer, Brown-Boveri (BBC) and the Schweizerische Kreditanstalt (SKA). Also in the centre were Nestlé, Pirelli, Asuag and Ciba-Geigy. These findings are borne out by an analysis of interlocking capital (Höpflinger, 1976), reports of the Swiss Cartel Commission (Schweizerische Kartellkommission, 1979)[2] and Fennema's (1982) study of international networks *between* banks and industry.[3]

In the mid-1970s, the Swiss network was just as dense, centralized and marked by indirectly interlocking general banks as the German and Dutch networks (Stokman et al., 1985). Unlike in the latter two countries, however,

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2   The research findings show that in the 88 corporations considered, the five leading banks had 113 seats on 72 boards of directorates. Together, the five banks controlled 17 finance companies, as well as one holding company which was interlocked with Switzerland's largest corporations. On the other hand, the smaller private banks had only 31 seats in 26 corporations, and the cantonal banks only seven in five.

3   Unlike Stokman et al. (1985), Fennema (1982) focuses on the personal international network among 13 highly industrial countries in the beginning of the 1970s. The four largest industrial firms and two largest banks in the Netherlands and the seven largest industrial firms and the three leading banks in Switzerland were considered.

in Switzerland the insurance sector only played a semi-peripheral role. The Swiss network would appear to differ more strongly from the British and American networks, which are less dense and centralized and feature both commercial banks and insurance companies (Scott, 1991a). These networks are also less dense and centralized in France and Italy; in France there are two sub-centres which are loosely interlocked (Suez, Paribas), whereas in Italy, one sub-centre is controlled by families and the other by the state. The Japanese network is also different; it is controlled by a centralized, highly cohesive and loosely interlocking group of corporations (keiretsus) (Gerlach, 1992).

To date, there has been no analysis of the Swiss network of big linkers. This is all the more surprising given that in Switzerland multiple boards of directors have been shown to have a great potential for exerting political influence (Kriesi, 1980; Tschäni, 1983). This paper will attempt to fill this research gap in two steps. First, it analyzes the *"undirected"*[4] personal links between the 300 largest corporations (interlocking directorates) as of 1995. Then, it considers the network of big linkers, i. e. those persons who are on the board of directors of at least four large corporations. The two assessments will seek to answer the following seven basic questions.

1. How dense, fragmented and centralized is the corporation's network?
2. Which are the central corporations, and what sector are they in?
3. Do the centralized corporations constitute sub-centres or a cohesive network core?
4. To what extent are structural similarities between the central corporations discernible?
5. How dense, fragmented and centralized is the network of big linkers?
6. Who are the big linkers and in which corporations are they based?
7. Do the central big linkers constitute sub-centres or a cohesive network core?

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4   On the other hand, the taking over of a seat on a board of directors by a member of the management board of another corporation is described as a "directed" interlocking arrangement. Unlike in many other European countries, Swiss corporate law does not require joint-stock companies, apart from banks, to have separate functions and personnel for executive and control tasks (cf. Charkham, 1995). It is sufficient to appoint the members of the board of directors, to which both representatives of management (delegates), full-time or part-time board chairmen and representatives of other corporations may belong.

1. Interlocking directorates: Structural conditions and consequences

By far the most common form of large corporation in Switzerland is the joint-stock company (Aktiengesellschaft (AG)). Swiss corporate law requires that a joint-stock company appoint a board of directors which is responsible for the management and sets the company strategy. However, the board of directors may delegate the running of the corporation's affairs to a group of managers. Thus, despite his absence, the owner of a joint-stock company can influence management decisions on the company's business policy thanks to his seat on the board of directors. In the 19th century already, this possibility was used primarily in connection with the inter-generational transfer of property and control rights. According to the *management control model* of Berle and Means (1932), however, the joint-stock companies of the 20th century were hardly controlled any more by their owners, but by their managers. The reasons for the dissociation of ownership and executive power were, firstly, the fact that managers had better knowledge (Burnham, 1941) and, secondly, the deconcentration of capital participation following the splitting up of inheritances, sale by original family owners and the emission of company stocks. It is therefore to be expected that as the number of stockholders increases, the chances decline of mobilizing a majority against management. All that dissatisfied small stockholders can do is to sell their interests.

Whether or not this indicates an irreversible shift from family to management capitalism is a controversial point, however. For Roe (1994) for example, the power of American managers results from the weak legal status of financial institutions (banks, insurance companies). The share capital of large corporations in Europe is also much less dispersed than in the USA (e. g. Windolf, 1996). Moreover, many large corporations in the home of management capitalism are still controlled by families and single individuals (Zeitlin, 1974). Lastly, in recent years, institutional investors (including pension and investment funds) have increasingly purchased large share packages and in so doing are reducing management's freedom of action (Windolf, 1994; Birchler, 1995).

The *resource dependence model* also argues against the management control model. Decisive here for the choice of a personal interlocking arrangement is not management's need for independence, but the corporation's need to control its environment, i. e. to reduce its dependence on the resources of other corporations (Thompson, 1967; Pfeffer and Salancik, 1978). According to this model, corporations send managers to the boards of other corporations and coopt the managers of strategically important corporations with board seats (Schreyögg and Papenheim-Tockhorn, 1995). Three points argue against the resource dependence model. Firstly, meetings of the board of directors are not

suited for coordinating the business policies of interdependent corporations (Poensgen, 1980). Secondly, corporations fill their boards chiefly with persons from reputable firms in order to demonstrate to the banks that they are creditworthy (DiMaggio and Powell, 1983). Thirdly, broken-ties analyses show that only a limited percentage of personal links are renewed after dissolution following resignation or death (Palmer et al., 1986; Stokman et al., 1988).

Both these theoretical models ignore the structure of the network. Whereas the management control model negates structures, the resource dependence model at least acknowledges that interdependence leads to network creation and that non-financial corporations rely on outside capital. On this basis, the *finance or bank control model* (Hilferding, 1920 [1910]; Kotz, 1978) postulates a high centralization of the network, with financial institutions taking central positions. Analogous to this, the centre of the personal network is controlled by financiers and bankers. The centrality and power of control of financial institutions result primarily from the ability to meet the demand for capital, as well as from representation in the board of directors of dependent corporations. As the leading banks want to avoid ruinous competition between their borrowers, it is also thought that there are strong interlocking arrangements within each branch in the industrial sector.

The *bank or financial hegemony model* also postulates the presence of leading banks at the centre of a highly centralized network. According to Mintz and Schwartz (1985, 35 f.), the hegemonial position of the financial sector is based on the universality of capital as a resource, the commodity nature of capital, the permanent danger for non-financial corporations of collapsing without an influx of capital and the fact that the capital needs of non-financial corporations often give rise to banking consortiums. Important instruments which financial institutions have for exerting influence are a) the threat of blocking credit and loans; b) capital participation and the protection of proxy rights; c) representation on the board of directors; and d) investment advantages for their own pension and investment funds. According to Glasberg (1989), big banks are also in a position to define the economic situation and hence the creditworthiness of a corporation.

The hegemony model differs from the control model in three ways. Firstly, it postulates that the insurance companies, at the intersection point between the leading banks and peripheral corporation, exhibit only average centrality. Secondly, according to this model, financial institutions are neither able nor willing to intervene actively in the business policy of non-financial corporations. It is sufficient for them to supervise the course of business and to map out the financial freedom of action. Thus, big banks not only place managers on the boards of large corporations, but also coopt the managers of partner corporations.

Thirdly, it is assumed that stiff competition prevails, at least among the smaller financial institutions, and also that the spheres of influence of the leading banks overlap, which is expressed in many indirect links and structurally similar interlocking models.

Unlike the control and hegemony models, the *inner circle* (influence or power) hypothesis focuses not on the network of corporations but on that of interlocking persons (Bearden and Mintz, 1987). To start with, it is postulated that the holders of several board seats (big linkers) belong to the inner circle and thus constitute a status group as defined by Weber (1978 [1922], 937). This means that its members have a similar style of life, university degrees, social origins, professional prestige etc. – in other words, similar individual resource structures (Bourdieu, 1984), similar political views and considerable political influence (Mills, 1956). It is also thought that the homophilia of big linkers (McPherson and Smith-Lovin, 1987) contributes to the creation of a cohesive social inner circle (Useem, 1984). As the big linkers are committed to the interests of several corporations, the inner circle represents in its dealings with political decision-makers not only the interests of the individual corporations (lobbying), but also those of all entrepreneurs as a group (class hegemony). Lastly, like the hegemony model, the inner circle hypothesis postulates that the network "stars" must have board seats *from* but not *in* big banks.

Hypotheses concerning Switzerland: As in the case of the bank hegemony model, it is postulated that communication in the Swiss *corporation network* is highly centralized and that the Nationalbank and the three leading banks in Switzerland have a central and structurally similar position (Fennema and Schijf, 1979; Stokman et al., 1985; Scott, 1991a). One important reason for this is the historical role of the leading banks as a source of outside capital (Stucki, 1981 [1968]; Scott, 1987). In addition to the leading banks, a number of big export-oriented industrial firms (machines, metal) and insurance companies probably also have central positions in the network. A low regulatory sensitivity to cartels argues in favour of many interlocking arrangements at intra-sectoral and intra-branch levels. In accordance with the inner circle hypothesis, the big linkers should have similar social attributes, should defend the interests of large corporations and should constitute a dense and scarcely fragmented network with a cohesive centre. It is also expected that the central big linkers have seats in financial institutions, and it is assumed, in keeping with the hegemony model and the inner circle hypothesis, that not only bank directors are part of the centre.

2. Network analysis: concepts and choice of corporations

2.1 Basis concepts for network analysis

The structure of interlocking directorates can be seen with the help of a network analysis (Scott, 1991b; Wasserman and Faust, 1994). Unlike the usual *variable-oriented* approaches, network analysis focuses on the *relations* between the actors. The point of departure for the analysis are relational configurations which can be depicted as sociograms (cf. Figure 1) (cf. also Moreno, 1953 [1934]). The statistical approach, on the other hand, calls for a classifying of the relations between the actors in the cells of a quadratic adjacency matrix (e. g. networks i and ii: [A ... I] x [A ... I]). One structural characteristic of the network which is simple to calculate is *density,* i. e. the number of established lines between actors as part of the total of all possible lines, in other words, the number of occupied cells in the adjacency matrix. Relatively controversial is the operationalization of network *centralization* (Freeman, 1979). But most indices concur with the assumption that the star (cf. network i) has the highest degree of centralization, while the ring (network ii without B, G and H) has the lowest.

The most common indicator for the *centrality* of actors is *degree,* i. e. the number of links to the other actors in the network. In network i, B clearly has the most central position. But the degree concept neglects the informational quality of the link. In network ii, for B the link to C is *redundant,* because B can learn about C's situation and opinions from both A and D. *Not redundant,*

Figure 1
Network configurations with nine actors
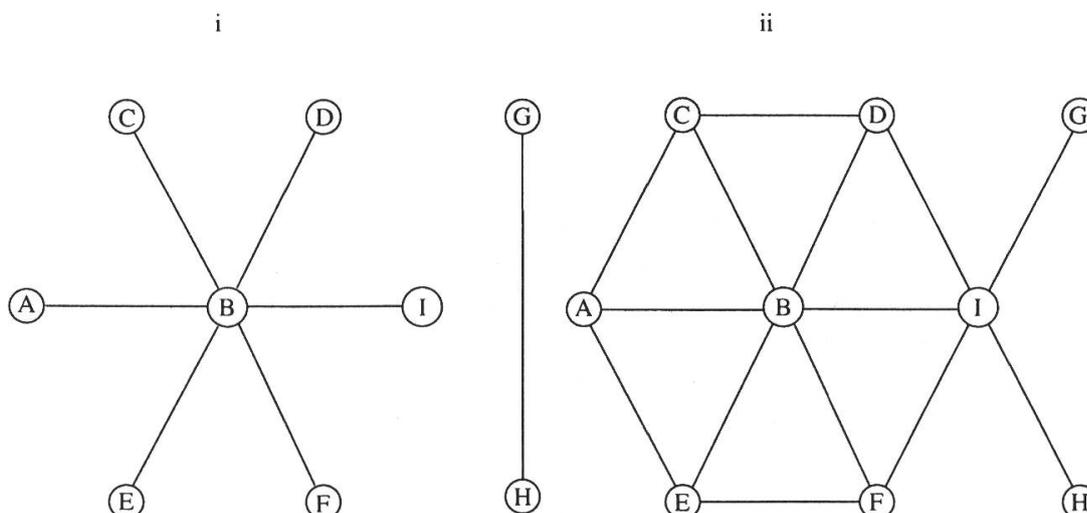
on the other hand, are B's link to C in network i and I's to G and H in network ii. The measure of *betweenness* favours actors with non-redundant contacts, i. e. actors *between* actors who cannot communicate with each other directly. Thus, the degree accords *to* a fictitious actor who would serve as a bridge to connect the two Bs in networks i and ii a higher centrality than *to* the two sub-central Bs.

According to calculations using UCINET (Borgatti et al., 1991), network i in Figure 1 has a centralization of 71.43% (compared to the degrees of the actors), or 53.57% (betweenness) and a density of 0.19. As expected, the density of ii is higher (0.39), whereas the centralization is lower than in i: 46.43% (degree) and 41.74% (betweenness). In network i, actor B clearly dominates, with a degree of 6 and a betweenness of 15. The other 8 actors each only have a degree of 1 and a betweenness of 0. In network ii, the disparities become more pronounced for the two measures of centrality. Regarding degree, B (6) is still in the lead, ahead of I (5). But as B's partners can communicate among themselves, I has the highest measure of betweenness (13.5), ahead of B (10), whereas the "dead ends" G and H have a betweenness of 0.

Sub-group structures are another interesting aspect of networks. All actors who are directly or indirectly linked together form a *component*. Unlike network ii, in which all actors are interlocked with each other, network i contains two components: (A, B, C, D, E, F, I) and (G, H). Components comprise *cliques* and *clans*. 1-cliques are groups of actors that are all directly linked to each other. In network ii, there are six 1-cliques: (A, B, C), (B, C, D), (B, D, I), (B, I, F), (B, E, F) and (A, B, E). 2-cliques are groups of actors that can reach each other via at least two paths (e. g. the star in network i). The n-clique-concept also allows for paths via actors who themselves do not belong to the clique. The *n-clan* concept takes this drawback into account in that in the identification of clans, only paths between clan members are considered.

Clique and clan structures are very vulnerable to the departure of individual actors. Unlike network ii, in network i the six points of the star can only communicate with each other through B. If B leaves the network, the clique will be destroyed and will become six isolated actors. In comparison to this, the component in network ii would remain intact after B's departure. Thus, components are more stable when the actors are interlocked via several paths. To measure stability, it is useful to employ the notion of *block*, which describes groups of actors who, unlike the case of the clique and the clan, are not linked by only one, but by at least two paths. Consequently, blocks are components which do not split up after the departure of one of the actors. In figure 1, A, B, C, D, E, F and I constitute a block in network ii. G and H are not part of the block, because a new component is created with the departure of I (cutpoint).

The cohesion of groups of actors cannot be assessed solely on the basis of the length of the path and the logical consequence of a possible departure of an actor, but also on the basis of the relational density within a given group. The *n-core* concept indicates for groups of actors the minimum number (n) of group members to whom each member is directly linked. For example, network i has only 1-cores and thus does not have a cohesive group, whereas in network ii, the actors A, B, C, D, E, F and I constitute a 3-core, i. e. each of the seven members of the group is directly interlocked with at least three of the other six members.

Actors also differ or resemble one another in respect of their role in relational configurations (Faust, 1988). For example, in network i, B's six relational partners are in a structurally similar, peripheral situation. Two actors are "structurally equivalent" whenever they have the *same* link to the *same* actors. On the other hand, actors are "regularly equivalent" (White and Reitz, 1983; Borgatti and Everett, 1989; Batagelj et al., 1992) as they are in the same relation to actors with *similar roles*. According to this, only the leading banks that are interlocked with the same insurance company in the same way are structurally equivalent, whereas they are regularly equivalent when they are interlocked with structurally similar but different insurance companies. Hence, in network i, A, C, D, E, F and I are structurally equivalent, while G and H have only regularly equivalent positions.

2.2   *Network structure and influence*

Both the control and the hegemony models assume that high network centrality allows the leading banks to influence peripheral corporations. Similarly, the inner circle hypothesis postulates that at meetings of the board of directors, special attention is given to the words of the central big linkers. There are three arguments in support of a correlation between centrality and influence or power. Firstly, it can be assumed that the freedom of action of an actor increases when the degree is higher (Freeman, 1979; Fombrun, 1983). Secondly, the betweenness value takes into account the assumption that a real winner (tertius gaudens), imperialists (divide et impera) (Simmel, 1992, 125 ff.) and actors who mediate between the cohesive actor groups (Granovetter, 1973) bridge structural holes (Burt, 1992), have communication privileges and are thus more influential. Thirdly, empirical studies of the elite show that there is a correlation between network centrality and reputational power (e. g. Kriesi, 1980).

However, two considerations argue against hastily equating centrality and influence. Firstly, sociological role theory indicates that central actors are

exposed to enormous cross pressure. Secondly, it should be borne in mind that a great communication potential produces no effect without a resource base (Emerson, 1962; Etzioni, 1975; Cook et al., 1983). The successful exercise of influence on peripheral actors presupposes that in addition to *secondary* resources, i. e. strategically important exchange links (Boissevain, 1974), the central actor also has primary, economic and informational resources (e. g. capital, specialist knowledge).[5] Thus, it cannot be said from the outset whether for example in network i (Figure 1) B is the boss with many underlings or an underling with many bosses.

Networks consist not only of different central and influential actors, but are also at the same time collective actors who compete with other networks for economic and political influence. According to Hannah Arendt, networks are also invariably potentials for power, which originates in the human ability not only to act or do something, but to join others and act in agreement with them (Arendt, 1970, 45). Charles Tilly (1978, 63) also referred to the fact that organizational ability is promoted by both similar status situations and communicative links. Networked actors of the same social category are thus eminently suited for the creation of a viable, influential *catnet* (*cat*egories + *net*work).

2.3   Selection of corporations and persons

The foundation for the network analysis are the data on the "undirected" personal links among the 300 most important or biggest corporations with headquarters in Switzerland. All persons who according to the *Verzeichnis der Verwaltungs-räte* (1996 edition) are members of at least two of these corporations are classified as interlocking in the adjacency matrix, which is composed of 90'000 cells. On the basis of the 84 persons with at least four seats (big linkers), it is possible to constitute a matrix of persons (7056 cells), a joint seat on the board of directors being entered as an interlocking arrangement.

In most analyses, corporations are arranged according to turnover or, in the case of banks, balance-sheet totals and, for insurance companies, premium income. A set number of classic corporations and financial institutions is then included in the choice.[6] Although this makes it easier to compare corporate

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5   With regard to the influence on the political decision-making process, indices have already been developed which combine network centrality and resource aspects (cf. Kappelhoff, 1993).

6   Stokman et al. (1985) agreed on an ideal sample with the 250 financial institutions with the greatest turnover together with the 50 biggest based on balance-sheet totals and premium income. Rusterholz (1985) considered 127 from the industrial, 74 from the service and 49 from the financial sector (including 15 banks and 15 insurance companies).

networks, it also raises three problems. Firstly, it is not immediately apparent why the criteria chosen are more instructive than, say, the criteria of returns, cash flow or personnel. If corporations are taken to be networks of persons, then from a sociological point of view, turnover is not more important than staff size. Secondly, it is not clear why the number of corporations considered which rely on high turnover should be five times greater than the number of financial institutions. Thirdly, the size of turnover, balance-sheet totals and premium income does not take into account the interlocking function of big holding and affiliated companies.[7] Hence, two essential types of interlocking arrangements are left out right from the start. For one thing, a smaller holding company can manage several large corporations simultaneously (umbrella holdings, such as the CS group). For another, the participation of large corporations in other large corporations can be obtained through subsidiary holdings or interconnected companies.[8]

It therefore seems reasonable to combine a number of criteria relating to size. The manual *Top 2000* of the publication *HandelsZeitung* (1995) serves as a basis for the selection data. It is assumed that staff size is superior to the criteria of turnover, balance-sheet totals and premium income: firstly, this measure allows a direct comparison between turnover-oriented corporations and financial institutions. Secondly, staff size indicates the dimensions of the corporation's internal network of persons. For non-financial corporations, the criteria of turnover and staff size are combined. The 100 biggest non-financial corporations by turnover were considered, and the remaining non-financial corporations were chosen according to the number of employees in Switzerland. That way, 24 corporations from the primary sector and 108 from the secondary sector were chosen, as well as 74 non-financial corporations from the service sector. In addition, 19 corporations (conglomerates, such as Migros and PTT) and 13 holdings and affiliated companies (such as the BZ group) with no particular branch focus are considered. The financial sector is present with 25 banks, 19 insurance companies and 15 finance companies, as well as the fund companies of the three leading banks, CS, UBS and SBC. The finance companies were determined as a function of balance-sheet totals or premium income. In three cases, the criterion of size was departed from: the Neue Aargauer Bank, the biggest regional bank, the Union Bancaire Privée, the biggest investment bank, and the Habib Bank, the foreign bank with the most employees, were also considered. It is worth noting that the Credit Suisse group is represented

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7   Stokman et al. (1985) only consider holding companies in the case of Belgium.

8   Ciba-Geigy, for example, has 100% ownership of the AG für Präzisionsinstrumente, not included in the sample, which in turn has 100% ownership of Mettler-Toledo AG, which does appear in the sample.

in the bank category by the Schweizerische Kreditanstalt (SKA), the Schweizerische Volksbank (SVB), the Bank Leu and the CS holding.[9]

3.   Structural features of the Swiss corporation network

The *component analysis*[10] shows first of all that the biggest component of the corporation network comprises 242 corporations. In other words, more than 80% of the 300 corporations are at least indirectly interlocked. The remaining corporations are divided among six components with at least two corporations and 41 isolated corporations. More than three corporations are in the component of the Schweri family (Rast Holding, Denner and Waro) and one component to which the corporations of the Erb family (Herfina, Unifina, EBC, Volcafé and Uniwood) and Bucherer belong. According to table 1, the data overall contain 1267 interlocking arrangements accounting for a total of 359 persons, including 12 women (3.3%). The density of the entire network amounts to only 2.2%, which is modest when compared with the densities of the networks in figure 1. The number of seats range from 2 to 10. Markus Kündig (former delegate to the Council of States from Zug) and René Ruepp (board chairman of Forbo) head the list with 10 and 9 seats, respectively, followed by 10 persons holding 7 seats. The third column shows that Kündig and Ruepp alone account for 91 interlocking arrangements, or 7.2% of the total.

Table 2 comprises all corporations with degrees that are three times the average of 6.5 (standardized with a view to inter-network comparisons=2.2) or are directly linked with more than 20 other corporations. Unlike density, the degree centralization, at nearly 49%, is very high, higher than in network ii (see figure 1).

The most central corporation is the Swiss Nationalbank, founded in 1907, 37% of whose share capital is in private and 63% in public ownership. Its high centrality is due to an above-average number of board members (40 bank boards) and the policy of representing as broad a spectrum of interests in bank boards as possible.[11] The leading banks, Swissair, machine manufacturers and

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9   Unlike the CS holding, which was created in 1989, the other two leading Swiss banks have headquarters structures. The UBS and the SBC decided against a planned holding structure following a ruling by the Bundesgericht which did not approve the intended risk separation of CS (BGE 116 Ib).

10   Like those in network i and network ii in figure 1, the following calculations are based on the UCINET IV procedure of Borgatti et al. (1991).

11   This assessment is based on a multiple regression analysis according to which, in addition to big bank status (Nationalbank, UBS, SBC, CS holding, SKA, SVB, Bank Leu), the size of the

Table 1

Distribution of persons according
to the number of seats on the board of directors

Number of seats	Number of persons	Interlocking arrangements[13]
10	1	45
9	1	36
8	0	0
7	10	210
6	5	75
5	23	230
4	44	264
3	66	198
2	209	209
Total	359	1267

certain insurance companies also have central positions in the network[12], whereas the Basle chemicals and pharmaceutical corporations only attain modest values (Ciba-Geigy: degree=16 and betweenness=3.5; Hoffmann-La Roche: 9 and 0.4; and Sandoz: 9 and 2.2). Compared to their economic importance, the chemical branch, apart from Clariant and Forbo (interior equipment), the retailers, apart from the Metro holding (COOP: 2 and 0, Migros: 6 and 6.1), the SBB bank (4 and 0.7) and the cantonal banks are relatively peripheral.

Many corporation pairs are not interlocked through one person alone but several (multiple lines) (e. g. CS and SKA).[14] In terms of the absolute number of links, Swissair and SKA have the highest number. Unlike the Metro holding, which has exactly *one* person per link, Swissair and SKA together with Nestlé,

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bank, the size of the board of directors, the equity ratio and cross ownership are the most useful determinants of centrality.

12 The most central branches in the overall network by degree are the banks (degree average=12.1, N=26) or the leading banks (34.6, N=7, cf. footnote 11), the insurance companies (10.7, N=19), machines (10.5, N=17) and metal (10.3, N=3). As for betweenness (norm), the banking sector leads with an average of 6.1 (leading banks: 19.4) ahead of metal (3.1), conglomerates (2.9, N=17), machines (2.8) and insurance companies (2.6).

13 The number of interlocking arrangements is calculated using the following formula: Number of persons*((Number of seats*(Number of seats−1))/2).

14 According to Schaub (1992, 194), the CS originally intended to underscore the independence of the SKA board of directors by disengaging the two boards by 1995 at the latest.

Table 2

Corporation centrality by degree (over 20) and betweenness (N=300)

Rank		Degree D	(norm)	Links		Betweenness (norm)
1	Nationalbank (B)	45	15.05	54	Nationalbank (B)	45.49
2	SKA (B)	42	14.05	68	UBS (B)	20.85
3	UBS (B)	42	14.05	53	Swissair (T)	19.98
4	Swissair (T)	38	12.71	70	SBC (B)	19.14
5	CS-Holding (B)	37	12.37	47	SKA (B)	16.97
6	SBC (B)	36	12.04	50	Mobiliar (I)	13.79
7	Nestlé (F)	27	9.03	50	CS-Holding (B)	13.62
8	Clariant (C)	26	8.70	43	Georg Fischer (Mc)	11.37
9	Zürich (I)	25	8.36	34	SVB (B)	10.57
10	Mobiliar (I)	24	8.03	24	Crossair (T)	9.83
11	Sulzer (Mc)	23	7.69	31	Bank Leu (B)	8.91
12	BBC (Mc)	22	7.36	36	Schindler (Mc)	8.75
13	Alu-Lonza (Mt/C)	22	7.36	25	Siemens-Albis (El)	8.15
14	SIKA (Bm)	22	7.36	23	Südelektra (K)	7.55
15	Elektrowatt (En)	22	7.36	23	Elektrowatt (En)	7.47
16	Oerlikon-Bührle(K)	21	7.02	30	Forbo (C*)	7.43
17	Landis & Gyr(Mc)	21	7.02	27	Alu-Lonza (Mt/C)	7.28
18	SVB (B)	21	7.02	25	NZZ (Md)	7.27
19	Schindler (Mc)	20	6.69	25	Danzas (T)	7.10
20	Forbo (C*)	20	6.69	23	Metro (R*)	6.85
21	Georg Fischer(Mc)	20	6.69	22	Bâloise (I)	6.74
22	Metro (R*)	20	6.69	20	Vaudoise Ass. (I)	6.69
	Average	6.6	2.2			1.74
	Centralization	48.95%				11.61%

Branch codes: B=Bank, Bm=Building materials, C=Chemicals, El=Electrical engineering, En=Energy, F=Foodstuffs, I=Insurance, K=Conglomerate, Md=Media, Ms=Machines, Mt=Metal, R=Retail trade, T=Transport, *=inter alia

Zürich and Brown Boveri Corporation (BBC), the Swiss 50% owner of ASEA Brown Boveri (ABB), are the most intensively linked in terms of the links/ degree quotient.

Although degree and logarithmic betweenness values (norm) correlate closely (r=0.87), there are a number of prominent exceptions. For example, Nestlé, Zürich-Insurance, Clariant, Sulzer and BBC do not appear on the list of the

most central corporations according to degree of betweenness and thus apparently have many redundant links, whereas Crossair, Bank Leu, the Neue Zürcher Zeitung publishing house (NZZ) and also the Nationalbank have noticeably higher betweenness values and therefore have relatively few redundant links.

The matrix of interlocking relations listed by economic sector and branch (not shown here) without multiple lines (982 links) exhibits some 488 (49.7%) intra-sectoral and 87 (8.6%) intra-branch links. Within the banking branch there are only 12 links. However, banks are involved in 277 (31%) of the 895 inter-branch interlockings. The most frequent links are between banks and insurance companies (37) and between banks and conglomerates (33).

These values depart only marginally from the findings of Rusterholz (1985). The leading banks have slightly increased their centrality, whereas Alu-Lonza no longer attains the centrality of Alusuisse, and the Basle pharmaceutical manufacturers have a propensity to international networking (Hagedoorn and Schakenraad, 1990). Hence, the network structure has changed little over two decades. Apart from the relatively insignificant branch linkage, the findings largely support the bank hegemony model. For example, Switzerland has a comprehensive, highly centralized corporation network in which the leading banks and the Nationalbank have central positions, but not the insurance companies.

4. Cohesion and structural similarities in the network centre

Although all central corporations belong to the biggest component, the central corporations in general and the leading banks in particular each build sub-centres which are linked solely by single mediating corporations (cutpoints) and long paths with other sub-centres. Under the hegemony model, the spheres of interest of the central financial institutions overlap, which ought to be reflected in a short distance between the leading banks and insurance companies and high structural similarity.

4.1 Cohesion in the centre

The *clique analysis* identifies no less than 266 1-cliques (each member is directly linked with each other member) with at least three actors. One of these 1-cliques is made up of six corporations with a degree value of over 20: CS, SKA, Zürich, Nestlé, Swissair and BBC. This "star clique" is relatively resistant to disintegration tendencies. Only two of the 15 lines are made up of

one person (Zürich-Swissair, BBC-Nestlé). Inversely, in addition to the CS-SKA line (12 persons), three lines of five persons are linked (CS-Zürich, SKA-Zürich, Nestlé-Zürich). In 1996, the CS group decided, in view of the cooperation between SBC and Zürich, to do without seats on the board of the Zürich firm. That ought to have reduced the clique to five corporations, but this break-up has had only a minor impact on the overall structure, because CS-SKA and Zürich continue to be indirectly interlocked through Swissair, BBC and Nestlé. There are five corporations with a degree of more than 20 in another 1-clique: SVB, Swissair, BBC, Elektrowatt and CS. The fact that CS and SKA are jointly represented in 21 1-cliques, Nestlé and Swissair in 17 and the four above-mentioned corporations with the Nationalbank, Zürich and BBC in 14 argues in favour of close interlocking arrangements in the finance sector.

As no 1-clique has more than one leading bank, direct links between the leading banks must be excluded. By identifying the 2-cliques and 2-clans in the data, it is possible to examine how often the leading banks are linked by a *sole* corporation (path length 2). Since a clique, unlike a clan, does not presuppose that the mediating corporations are themselves part of the clique, there are noticeably fewer clans than cliques. All told, the data contain 26'494 2-cliques and 324 2-clans, the Nationalbank and Swissair together belonging to 221 clans. These two corporations are together with CS, BBC, Clariant, SKA, UBS, NZZ and Nestlé in a total of 187 2-clans and with SBC in 139 2-clans. In other words, there are contacts in another corporation between the board members of the three leading banks in 139 sub-groups.

The block procedure also shows that the leading banks are not only linked through individual third corporations. In the case under consideration, there is a core block within the biggest component containing the following 26 corporations: UBS, SKA, SBC, SVB, Banque Cantonale Vaudoise, Bank Leu, Bank in Liechtenstein, Bâloise, Helvetia, La Genevoise, La Suisse (Leben und Unfall), Mobiliar, Patria, Rentenanstalt, Rück, SUVA, Union, Vaudoise Assurances, Winterthur, Zürich, Nestlé, Metro, ABB, and Ciba-Geigy and Sandoz. Banks and insurance companies are heavily represented in the core block, whereas the principal machine producers, the Nationalbank, the CS and Swissair are missing. The strong presence of the insurance companies in the block points to their modest betweenness values (cf. footnote 12) and suggests that individual bank-insurance company disengagements do not result in a fragmentation of the network structure.

The data also contain a 9-core with the following 42 corporations: UBS, SBC, SKA, Bank Leu, CS, Nationalbank, PTT, Swissair, Mobiliar, Rück, Suva, Zürich, Metro, Nestlé, ABB, BBC, Ascom, Alu-Lonza, Dätwyler, Elektrowatt, Forbo, Georg Fischer, Landis & Gyr, Oerlikon-Bührle, Bally, Motor Columbus,

Rieter, Schindler, Siemens-Albis, Sulzer, Metallwaren und Verzinkerei Zug, Ciba-Geigy, Merck, Clariant, Atel, NZZ, Hesta, Hiag, SIKA, Anova and Unotec. The only large corporations missing (Table 2) are Crossair, Bâloise, Vaudoise Assurance, Südelektra and Danzas. In other words, each of the 42 corporations is directly interlocked with at least *nine* of the other 41 corporations.

The sub-group analysis largely supports the assumption of the hegemony model, according to which the spheres of interest of the leading banks overlap. The CS group, UBS and SBC are not directly, but in many ways indirectly linked, including via insurance companies. Regardless of which cohesion concept is considered, the leading banks are not sub-centres, but constitute, together with other central corporations, a cohesive network core.

4.2   Regular equivalence in the centre

That the spheres of interest of the leading banks overlap should be reflected in a high structural similarity between them. The degree of regular equivalence (cf. section 2.1), calculated with the REGE algorithm for binary data (categories), has been chosen as the criterion of similarity. Table 3 shows the similarity of the 13 corporations which according to table 2 are among the 22 most central corporations from the point of view of both degree and betweenness. The analysis contains a total of five levels of similarity (0 to 4: regularly equivalent). As only corporations of the biggest component are considered [15], no fully dissimilar pairs (0) can be identified. [16] As expected, it is mainly the structural positions of the CS holding, SKA and UBS, as well as the Nationalbank, Swissair and Mobiliar (3), that are similar. An exception is Basle's SBC, whose contacts with the chemicals and pharmaceuticals branch are more heavily weighted and which has only a moderate similarity to SVB (2). All the other central non-financial corporations exhibit only modest similarities (2 or 1).

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15 UCINET's REGE procedure enables a maximum of 250 actors to be processed.

16 The pairs Jowa-Micarna, Coop-Bell, Steinbeck Holding-Glencore, Skandifinanz-Siber-Hegner, Lonza-Crédit Lyonnais, Sibra-Feldschlösschen, Metallwaren Zug-Verzinkerei Zug, ABM-Globus, UTC-Basler Handelsgesellschaft, the urban transport operators of Basle and Zurich, André & Cie-Kantonalbank Luzern, Stillhalter-BZGruppe, La Suisse (Leben und Unfall) are regularly equivalent (4).

Table 3

Regular equivalence of the 13 most central corporations (N=242)

	Rank	1	2	3	4	5	6	7	8	9	10	11	12
Nationalbank	1												
UBS	2	3											
Swissair	3	3	3										
SKA	4	3	3	3									
SBC	5	1	1	1	1								
CS	6	3	3	3	3	3							
Mobiliar	7	3	3	3	3	1	3						
SVB	8	1	1	1	1	2	1	1					
G. Fischer	9	1	1	1	1	2	1	1	2				
Schindler	10	1	1	1	1	2	1	1	2	2			
Alu-Lonza	11	2	2	2	2	1	2	1	1	2	1		
Forbo	12	2	2	2	2	1	2	1	1	2	1	2	
Metro	13	1	1	1	1	2	1	1	2	2	2	1	1

5. The network of the big linkers

5.1   Structural features and cohesion in the centre

According to table 1, 84 of the 357 persons with at least four seats (big linkers), or 23.5% of all linkers, account for 860, or 68%, of all interlocking arrangements. The inner circle hypothesis postulates that the big linkers are at least indirectly linked, have similar social attributes and actively defend the political interests of large corporations. In addition, the central links would be expected to constitute cohesive network cores.

In all, 726 interlocking arrangements can be identified between the big linkers. Without multiple lines this network amounts to a density of 16.1%. The data comprise two components, a large one with 81 actors and a smaller one with three members of the Erb family. In other words, more than 96% of all big linkers are, as expected, at least indirectly linked to each other. The number of big linkers per corporation also correlates with corporation centrality. For example, there are 14 big linkers on the board of directors of CS and SKA, 10 on those of the Nationalbank and Nestlé, 9 on those of SBC and UBS and 8 on that of Swissair.

According to table 4, every big linker meets an average of 13 other big linkers in the framework of his board activities. The "stars" in the Swiss network are Hans-Ulrich Doerig, who probably knows at least 30 other big linkers personally, and Walter Frehner, followed by Adolf Gugler and Gianfranco Cotti. Helmut Maucher and Vreni Spoerry (both Nestlé board members) have, analogous to the foodstuffs concern in the corporation network, relatively many redundant contacts (betweenness of Maucher and Spoerry=1.45 and 0.96, respectively). Conversely, Markus Kündig, René Ruepp (degree=21) and Georg Stucky (18), in keeping with their noticeably higher betweenness centrality, have many non-redundant contacts. As the central persons tend to have seats in central corporations and there is a correlation between corporation centrality (degree) and average board remuneration (r=+0.42, N=62) (source: Speck 1995), they are also among the highest earners in the board of directors system.[17]

A limited number of attributes for big linkers can be identified with the help of the current issue of *Who's who in Switzerland?* (1996), the CD-ROM of the *Neue Zürcher Zeitung* 1994–1996 and the chapter "Men of the month" in the issues of *Bilanz* between November 1977 and July 1997.[18] An analysis of the data yields the following results: There is only one woman in the network (Spoerry). The average year of birth of the big linkers is 1935 (standard deviation: 7.5 years) (N=65). A total of 71 are of German, 6 of western Swiss and 5 of Ticino origin (N=84, 2 foreigners). Four persons are from the upper class, 10 from the middle class and as many as 7 from the lower class (N=21).[19] The list for education completed (N=64) is headed by law (16 persons), followed by economics (14), graduate engineer (11), high-school diploma / vocational school (10), professors (8), business schools (3) and law school (2). At least 20 persons are officers and three have stated that they are members of a service club. In addition, 10 persons belong to the conservative Freisinnig Demokratische Partei (FDP) and 3 to the Christlichdemokratische Volkspartei (CVP) (N=15). It may be assumed on the basis of the findings that the typical big linker is a man from the German Swiss middle class who has an academic degree in law or economics and sympathizes with the FDP.

Three facts argue in favour of the assumption that big linkers actively defend not only the interests of their corporations but also the political interests of corporations as a whole. Firstly, a total of 13 big linkers have been, or still

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17 For example, Rainer Gut and David de Pury were paid 572'900 and 571'000 Swiss francs, respectively, for each of four seats (Nestlé, Rück, Ciba-Geigy and SKA; Nestlé, Ciba-Geigy, Zürich and BBC).

18 The data situation improves with increasing centrality. Of the central big linkers (cf. table 4), data are missing only for Truls Berg, Hans-Ulrich Doerig and Urs Rinderknecht.

19 This classification is on the basis of the Hollenstein class model (1987, 45).

are, active members of the Swiss Federal Assembly.[20] Secondly, as many as eight big linkers signed the neoliberal manifesto "Mut zum Aufbruch. Eine wirtschaftspolitische Agenda für die Schweiz" (Courage for change: an economic and political agenda for Switzerland).[21] Thirdly, in 1997 ten big linkers are members of the head boards of the main interest organization of big companies (Schweizerischer Handels- und Industrieverein – Vorort).[22]

Analogous with the corporation network are the strong links of the central actors in the network of individuals. In all, 124 1-cliques with a minimum size of 3 can be identified, the big linkers of CS and SKA accounting for the two biggest cliques (14 persons). Spoerry, Maucher and David de Pury are most often together in 1-cliques (21 times). Thomas Schmidheiny (17 times), Jean-Daniel Cornaz (13), Stephan Schmidheiny and Rainer Gut (12), Rolf Gerber (11), Robert Jeker and Thomas Bechtler (10), as well as Kündig and Doerig (7), are often in 1-cliques with Spoerry, Maucher and de Pury. Niklaus Senn (board chairman of UBS) and Peter Spälti are together in 10 1-cliques, and Frehner, Gugler and Cotti in 6 1-cliques. All these persons are together in 5 1-cliques.

This finding is also borne out by the path length of 2. Owing to the high number of 1547 2-cliques, we shall confine ourselves to the make-up of the 67 2-clans. Kündig, Urs Rinderknecht and Stucky are together in 62 clans. Doerig is together with this trio in 61 clans. Stephan Schmidheiny and Maucher are likewise together in 61 clans. All these persons belong to 59 clans together. Senn and Spälti are together in 60 clans. All the eight persons mentioned are present together in 58 2-clans.

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20 Former members are Ulrich Bremi (FDP), Gianfranco Cotti (CVP), Gilbert Coutau (Liberale Partei), Ulrich Gadient (Schweizerische Volkspartei), Ricardo Jagmetti (FDP), Markus Kündig (CVP), Jakob Schönenberger (CVP), Peter Spälti (FDP) and Paul Zbinden (CVP). Active members are Adriano Cavadini (FDP), Vreni Spoerry (FDP), Franz Steinegger (FDP) and Georg Stucky (FDP).

21 Josef Ackermann, Ulrich Bremi, Kaspar Cassani, Helmut Maucher, David de Pury, Stephan and Thomas Schmidheiny, and Robert Studer.

22 Truls Berg, Pierre Borgeaud, Marc C. Cappis, Gilbert Coutau, Hannes Goetz, Gustave Grisard, Robert Jeker, Gaudenz Staehelin, Rolf Schweizer, Thomas Schmidheiny.

Table 4

Centrality of the big linkers by
degree (minimum 22) and betweenness (N=84)

Name (role, corp.)	Degree D	(norm)		Betweenness (norm)
1 Doerig (vbd SKA)	30	36.2	Kündig (ex cs ZG, UBS)	6.9
2 Frehner (cbd SBC)	29	34.9	Gugler (cbd Elektrowatt)	6.1
3 Maucher (cbd Nestlé)	29	34.9	Frehner (cbd SBC)	5.6
4 Kündig (ex cs ZG, UBS)	28	33.7	Doerig (vbd SKA)	5.6
5 Gugler (cbd Elektrowatt)	28	33.7	Ruepp (cbd Forbo)	4.4
6 Spoerry (cs ZH, bd CS, SKA)	27	32.5	Stucky (cs ZG)	3.6
7 Schmidheiny, St. (vbd L. & Gyr)	27	32.5	Cotti (ex nc TI, cbd SVB)	3.4
8 Cornaz, J. D. (bd CS, SKA)	27	32.5	Rinderknecht (mb UBS)	3.2
9 Cotti (ex nc TI, cbd SVB)	26	31.3	Schmidheiny, St. (vbd L. & Gyr)	3.2
10 Schmidheiny, Th. (vbd Swissair)	24	28.9	Cornaz, J. D. (bd CS, SKA)	2.7
11 Spälti (mb/cbd Winterthur)	24	28.9	Grisard (vbd Ringier, SHIV)	2.7
12 de Pury (cbd BBC)	23	27.7	Spälti (mb/cbd Winterthur)	2.7
13 Gut (cbd CS)	23	27.7	Berg (cbd Attisholz)	2.4
14 Rinderknecht (mb UBS)	23	27.7	Grosjean (vbd Ciment Portland)	2.4
15 Bechtler (cbd Zellweger Luwa)	22	26.5	Schiltknecht (div. bd BZ-Grup.)	2.3
16 Loepfe (cbd Crossair)	22	26.5	Goetz (cbd Swissair	2.0
			Schmidheiny, Th. (vbd Swissair)	2.0
average	13.5	16.3		1.3
centralization	20.33%			5.76%

Note: cbd=chairman of board of directors; vbd=vice-chairman of board of directors; bd=member of board of directors; mb=management board; cs=Swiss Council of States; nc=Swiss National Council; first names: see text

As a result of the high density, the identified block with 79 persons is relatively large and includes all persons listed in table 4. The only persons not in the block are François Carrard, Martin Ebner and – as to be expected because of the component analysis – the three members of the Erb family. The network of persons also has a 13-core made up of 18 persons: Bechtler, Ulrich Bremi, Kaspar Cassani, Cornaz, Cotti, de Pury, Doerig, Gerber, Gugler, Gut, Heinrich Lippuner, Maucher, Thomas Schmidheiny, Spoerry, Gaudenz Staehelin, Loepfe, Klaus Jacobi and Henry Bodmer. There is also a 12-core composed of Josef Ackermann, Markus Cappis, Frehner, Claudio Generali, Hannes Goetz, Kündig, Rinderknecht, Stephan Schmidheiny, Senn, Spälti and Robert Studer.

The *inner circle* hypothesis is entirely borne out by these findings. Apart from three exceptions, all the big linkers are at least indirectly linked to each other. They probably also have similar social features and defend the political interests of large corporations. Lastly, the central network members do not constitute separate or widely dispersed sub-centres, but a cohesive network core. The only central persons who are weakly integrated in the inner circle are Carlos Grosjean and Gustave Grisard, the vice-chairman of the Swiss Chamber of Commerce, and the former member of the Nationalbank board, Kurt Schiltknecht, who as Nationalbank advisor has a mediating role between the leading banks and Ebner's BZ group.

5.2   Board seats of big linkers in financial corporations

Both the financial control and the bank hegemony model postulate that most big linkers have seats from banks and insurance companies. A breakdown of the seats of big linkers by financial and non-financial corporations supports this assumption. According to figure 2, only 18% (15) of all big linkers have no seat in any of the financial corporations under consideration; as many as 51% (43) have one seat on the board of directors; and 31% (26) have one management board seat, with 20 big linkers holding seats on board of directors of banks and/or insurance companies in addition to being management board members. It is worth noting that the chairmanship and vice-chairmanship in boards of directors are regarded as operative functions, and persons holding these posts are thus categorized also as management board members. Three big linkers (Hugo von der Crone, Frehner and Gut) have management board seats in a bank and an insurance company.

The financial control and bank hegemony models and the inner circle hypothesis give different replies to the question of the extent to which the central financial corporations influence the network of persons. The financial control model postulates a concentration of bank and insurance company managers in the network core, whereas the hegemony model and the inner circle hypothesis acknowledge that industry representatives can also have central positions in the network. An analysis of the seats of big linkers contradicts the financial control model. The two central persons in the big linkers network (Doerig and Frehner) have positions on the boards of leading banks, but in all, less than one third of the most important positions in the network core (managers, board chairmen and vice-chairmen) are from financial corporations. The presence of board chairmen from industry and transport corporations, eight professors, four current and nine former members of the Federal Assembly and four "family owners" (St. and Th. Schmidheiny, Bechtler and Grisard), who according to

Figure 2

Seats on management boards (mb) and boards of
directors (bd) held by big linkers in banks and insurance companies
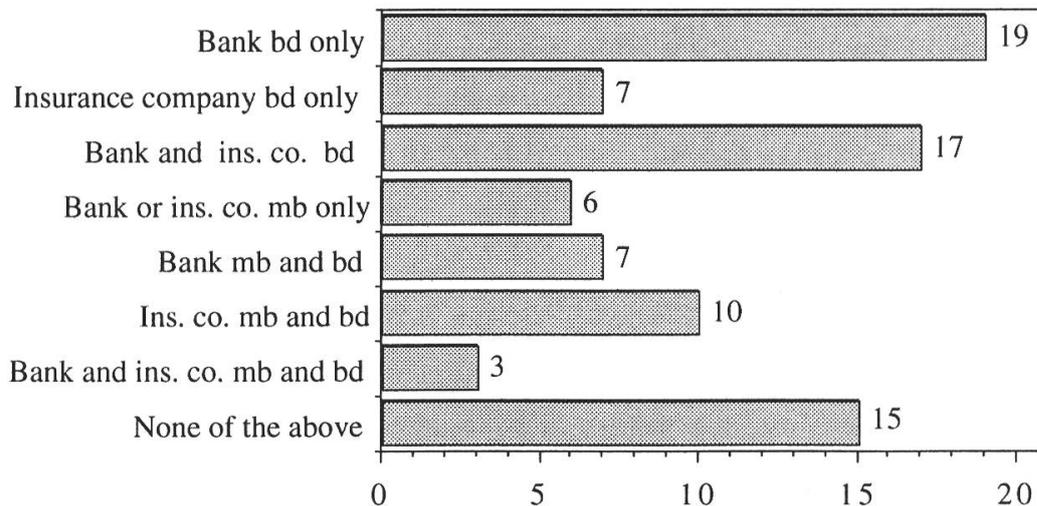
Bilanz are in the group of the 200 most wealthy Swiss, also argues against a one-sided control by the financial sector. The fact that the board chairman of UBS, Niklaus Senn, with a degree of 21 and a betweenness value of 1.6, does not belong to the central group and that the board chairman of CS and SKA (Gut) has a modest betweenness level (=1) and relatively redundant links likewise argues against the control model.

Conclusion

These findings clearly show that big Swiss corporations are no "islands", but constitute an inter-organizational network. The network created by multiple boards of directors includes about 80% of the corporations considered. However, from the point of view of the absolute numbers of interlocking arrangements (degree), the communication chances of corporations are very unequally distributed. The central actors in the highly centralized network are, as is to be expected, the Nationalbank, the leading banks, Swissair and a number of machine manufacturers, whereas the internationally linked pharmaceutical producers in Basle have only semi-peripheral positions. The fact that the insurance companies have above-average centrality values but are only weakly represented in the network centre argues in favour of the bank hegemony model and against the financial control model. Furthermore, it can be seen that there is a correlation

between centrality and financial power. Accordingly, unlike the rather peripheral regional banks, the leading banks should certainly be in a position to influence the general financial conditions of corporations with which they are interlocked. The sub-group analysis also bears out the hegemony model. Irrespective of the choice of the cohesion concept, the central corporations do not constitute isolated sub-centres. Moreover, the leading banks are indirectly interlocked with each other in a variety of ways. The differences are obvious, notwithstanding the short path distance between the leading banks. We can say, first of all, that there is a close network of links between the CS group (CS holding, SKA, SVB and Bank Leu), the Nationalbank, Swissair, Nestlé, BBC, Elektrowatt and – at any rate this was still the case in 1995 – Zürich-Versicherung, whereas UBS and, in particular, SBC are at a somewhat greater distance. It should also be observed that the Nationalbank, the CS holding, SKA and UBS, on the one hand, and SBC and the CS affiliate SVB on the other exhibit similar interlocking structures.

In comparison to the corporation network, the network of big linkers is not centralized, but is all the denser. Three facts argue in favour of the inner circle hypothesis. Firstly, 81 of the 84 big linkers (96%) are indirectly interlocked, and all big linkers must meet at least 13 other big linkers yearly. Secondly, like the central corporations, the central persons constitute a cohesive network core. Thirdly, the big linkers probably have similar social features and thus, according to Tilly (1978), have ideal prerequisites for a *catnet*, i. e. a high potential for exercising political influence. The centrality of the banks in the corporation network can also be seen in the fact that there is an above-average presence of big linkers on the boards of the leading banks. The circumstance that just under 80% of all big linkers (67) have seats on the boards of directors of banks or insurance companies but that at the same time there are relatively few bank directors in the network argues in favour of the hegemony model and against the control model. Thus, the leading banks owe their central position in the corporation network less to the presence in other boards (control) than to the coopting of managers of non-financial corporations, individual big owners and politicians.

While these findings refute both the management control and the financial control models, the question remains as to the empirical content of the resource dependence hypothesis. Consequently, it would need to be ascertained whether, in the final analysis, the big linkers network is based more on old-boy connections than on resource dependence. On the one hand, indications for the dependence hypothesis are certainly the personal disengagement and new interlocking arrangements of the leading banks and insurance companies in connection with the creation of all-encompassing financial alliances. On the other hand,

the current financial reports of the leading banks show that the ties broken with non-insurance companies in 1996 were only partially repaired. It remains to be seen to what extent the efforts to achieve such all-encompassing financial alliances are reflected in the network structure. As the leading banks and the insurance companies are interlocked through a multitude of paths, the move to disengagement and new interlocking arrangements will probably cause fine fissures to appear here and there in the network, but will also result in new solidification. Thus, the linkage distance between the leading banks will increase slightly, but at the same time, the linkage distance between the banks and the insurance companies will probably decline.[23] This ought to decentralize the network slightly as a whole, but the leading banks will probably retain and, in the event of a continuing concentration in the financial sector, even extend their central position. It is also unlikely that the stricter rules under the revised company law governing the liability of boards of directors (Art. 716a) will have much of an impact. The average number of seats held by linkers will probably decline, but at the same time, the big linkers will increasingly get rid of the seats of medium-sized corporations and just keep a few lucrative mandates with large corporations.

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23 For example, Peter Spälti (Winterthur) left the board of directors of UBS in 1996 and was replaced by Manfred Zobl (Rentenanstalt-Swiss Life).

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