

Organizational cohesion: An empirical study of corporate group structure in 16 developed economies

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Motivation

Though it is widely recognized that the stylized image of the firm as a discrete organizational actor is at odds with the global reality, there has been relatively little progress toward assembling the type of systematic evidence necessary to describe the multifaceted nature of inter-firm linkages. We take a step toward filling this gap by combining insights from multiple theoretical perspectives to construct a novel set of measures of the internal cohesion of corporate groups (aka “business groups”), confederations of legally independent firms linked by multiplex economic and social ties. Using novel algorithms and techniques, we calculate the cohesion measures for a comprehensive data set including ownership and accounting information for approximately eight million European and 14 million American publicly-traded and closely-held companies. To identify structural archetypes in the data, we employ clustering analysis and a series of cross-country regression analyses. We find that corporate groups exhibit varied sources of cohesion in different institutional settings, providing support for systems views emphasizing fit between organizational structures and the national institutional environments in which they are embedded.

Cohesion: Data and Measures

We performed the empirical analysis on a comprehensive dataset of ownership and accounting information for approximately eight million European and 14 million American publicly-traded and closely-held companies. The data are drawn respectively from the Amadeus and Icarus databases and are mostly for fiscal year 2007. In the relatively small number of cases for which 2007 accounting data are unavailable, we used data from fiscal 2005 or 2006.

The difficulty of defining what constitutes a group for purposes of embarking on generalizable, cross-nationally valid research can be vexing. We define a group simply as two or more legally independent firms sharing an ownership tie, either directly, meaning that one firm holds a direct equity stake in another; or indirectly, meaning that one firm holds an equity stake in another through one or more intermediate firms.

To be sure, even this simple criterion embodies the important assumption that ownership ties are economically or organizationally meaningful. Given the control rights associated with equity ownership in legal systems permitting private property, together with the frequent identification of ownership ties as an important source of “cohesion” in much existing research on corporate groups (La Porta et al., 1999; Granovetter, 2005), we judge this definition to be the most parsimonious possible. To further bolster our confidence that the ownership ties we use to define groups are organizationally meaningful, we excluded all ties where a superordinate firm (or individual) holds less than 50 percent of the voting rights in the case of a closely-held subsidiary, and less than 20 percent of the voting rights in the case of a publicly-traded subsidiary (though all reported results are robust to

different plausible specifications of these thresholds). We further restricted the sample by excluding economically insignificant groups with less than \$10 million dollars in annual sales. We did not, however, exclude individual affiliates for which little or no economic activity is reported, because such firms may be organizationally significant holding companies. Using these criteria, we identified roughly one million controlling ownership ties. We inferred group structures from these ties by using a recursive algorithm (Belenzon and Berkovitz, 2010) to construct corporate ownership chains, and then grouping together all firms controlled by the same ultimate shareholder (either a family, a financial firm, or a non-financial firm). The final sample includes 61,180 groups comprising 445,825 affiliate firms. These firms represent roughly 70 percent of all firms in the initial sample, an incidence consistent with the growing consensus that hybrid structures are widespread in developed as well as emerging-market countries.¹

To construct the cohesion measures, we drew on multiple theoretical perspectives to identify linkages or attributes that suggest closer coordination than among the atomistic firms in the stylized market-based model. Table 1 provides summary definitions for the measures, on which we elaborate below.

Name Similarity. The first cohesion measure reflects the degree of name similarity among group affiliates. Names are a central source of organizational identity, creating solidarity (Glynn and Abzug, 2002) and serving as a carrier of reputation to external actors (Rao, 1994; Ingram, 1996; Ingram and Baum, 1997). Greater name similarity among a group's affiliate firms thus suggests greater cohesion.

To construct the measure of name similarity, we used a fuzzy string-matching algorithm to identify the most common name or name variant among a group's affiliates. We then calculated the ratio of sales by these affiliates to total group sales. We also explored the robustness of the results to alternative measures of name similarity (e.g., the extent to which the name of the largest affiliate was shared with other affiliates in the same group). With the exception of Ingram's (1996) study of U.S. hotel chains, we are unaware of prior studies that have sought to measure the degree of name similarity among an organization's subunits.

Board Interlocks. The second cohesion measure reflects the extent of board interlocks between a group's apex firm and affiliate firms. Board interlocks serve as another source of solidarity among affiliates, engendering trust and enhancing monitoring by facilitating information exchange (Davis, 1991; Gulati and Westphal, 1999). More extensive board interlocks suggest greater cohesion among affiliates.

To construct the measure of board interlocks, we used a similar approach to that employed in several prior studies (Palmer et al., 1993; Palmer et al., 1995; Haunschild and Beckman, 1998). First, we matched the names of the individual board members of each affiliate in a given group to those of the apex firm's board members. When we found at least one match, we regarded the affiliate as having a board interlock. We calculated the group-level interlock measure as the ratio of total sales by affiliates with interlocks to total group sales. To check the robustness of the measure, we tried alternative measures incorporating interlocks among the affiliates themselves as well as weights based on interlocked affiliates' share of total group sales.

¹ Two data limitations warrant mention. First, though we take the boundaries of affiliate firms as fixed, the location of these boundaries is itself a choice that may be affected by some of the same factors influencing a group's level of cohesion. Second, when comparing American groups to those from the 15 Western European countries represented in the data, it is important to recognize that the U.S. taxes inter-corporate dividends (i.e., dividends paid by a subsidiary to a parent company), but the E.U. Commission's Parent Subsidiary Directives expressly prohibits member states from taxing such dividends. It is therefore almost certainly the case that, ceteris paribus, a wider range of economic activity in the U.S. is organized among corporate divisions than among affiliated firms operating in a group structure (Khanna and Yafeh, 2007). In the econometric analysis, we make no causal inferences that could be confounded by these factors.

Family Ownership. The third cohesion measure reflects family ownership. Familial bonds represent the strongest type of kinship tie (Steers et al., 1989; Bertrand and Scholar, 2006), fostering mutual trust, shared identity, and solidarity (Encarnation, 1989). Business groups whose controlling shareholders are family members (or a single individual) should operate more cohesively than those owned by other entities.

Following prior research in economics and finance (Shleifer and Vishny, 1986; La Porta et al., 1999; Claessens et al., 2000; Faccio and Lang, 2002; Anderson and Reeb, 2003; Villalonga and Amit, 2006, 2010), we measured family ownership using a dummy variable that takes a value of one for groups where the controlling shareholder of the apex firm was a family or individual, and zero otherwise. To be classified as controlling, a shareholder had to own at least 20 percent of the equity of the apex firm. For robustness, we also calculated measures using a 10 percent threshold and a 50 percent threshold.

Several studies of family firms during the past several years have employed more fine-grained metrics that distinguish between founding and non-founding owners (Villalonga and Amit, 2010; Anderson et al., 2012), and that also reflect family management. We consider family management using a distinct measure, discussed below.

Family Management. The fourth cohesion measure reflects family management, which may also promote mutual trust, common identity, and solidarity. The presence of a familial bond should also mitigate potential owner-manager agency conflicts.

We constructed the family management measure by collecting data on affiliate firms' top managers (i.e., individuals with titles such as Chief Executive Officer, Managing Director, General Manager, and Manager). On average, there were 1.7 such managers per affiliate. Next, we generated a list for each affiliate of dominant shareholders holding at least a 5% sales-weighted equity stake in the group, either directly or through a stake in the apex firm. This methodology allowed us to identify familial links---and thus possible channels of influence---between an apex firm's dominant shareholders and managers of affiliates in which these shareholders have no, or very low, equity stake. We characterized any affiliate with at least one match between its top manager and dominant shareholder lists as being family-managed. The group-level family management measure represents the ratio of sales by family-managed affiliates to total group sales. To demonstrate robustness, we also report results using a measure that classifying affiliates as family-managed only if the top managers all belong to the same family.

Minority Shareholders. The fifth cohesion measure reflects whether a group's affiliates are wholly-owned or, alternatively, have minority shareholders. As discussed above, agency-theoretic accounts portray business groups as vehicles for the expropriation of minority shareholders. Additionally, the Property Rights view of the firm holds that shared ownership impairs unilateral investment incentives, an argument that would also apply to business group affiliates. Under this logic, business groups whose affiliates have a lower level of minority ownership should operate in a more cohesive fashion than those with relatively diffuse ownership.

We constructed the minority ownership variable by first calculating the share of group sales by affiliate firms with minority shareholders. Consider, for example, a group with three affiliates generating \$1 million in annual sales each, and suppose that affiliate A (the apex firm) owns 50% of the equity of affiliate B, and affiliate B owns 50% of the equity of affiliate C. In this case, one third of the sales generated by the group are made by affiliates with minority shareholders. Note that this fractional measure does not reflect whether the apex firm has minority shareholders, because it is variation in a group's internal structure that is of interest.

The minority ownership variable used in the econometric analysis is a dummy variable that takes a value of one for groups for which the fractional measure described above exceeds zero. We used a

binary indicator variable rather than a continuous fractional measure because the latter has a bimodal distribution, resulting from the fact that 60 percent of the groups in the sample had a unified ownership structure (i.e., no sales by affiliates with minority owners), while the remaining 40 percent made 16 percent of their sales through affiliates with minority owners. To demonstrate robustness, we report separate results for groups in which the apex firm has a dominant shareholder and those in which the apex firm is widely held.

Pyramidal Index. The sixth cohesion measure is a pyramidal index that reflects the extent to which the organization of affiliate firms more closely resembles one of two extremes: a "tall" structure, in which the apex firm holds a direct controlling stake in a single affiliate firm, which in turn holds a stake in a subordinate affiliate firm, and so on; versus a "flat" structure, in which all affiliates firms occupy a single horizontal layer immediately beneath the apex firm.

Taller structures could indicate more or less cohesion. The expropriation perspective on business groups suggests that the ability of an apex firm's dominant owners to control subordinate affiliates in which they hold no direct, controlling stake grows with the number of ownership levels separating an affiliate firm from the apex firm (Morck et al., 2005). Research on organizational design, however, suggests that hierarchical structures in which decision-making responsibility over non-routine tasks (e.g., acquisitions) is delegated to local managers result in better decisions (Aghion and Tirole, 1997).

To characterize a group's pyramidal structure, we developed a Pyramidal Index (PI) that measures the distribution of affiliates by ownership layers. Because a pyramidal structure increases the apex firm's span of ownership, we regard a group as taller if the share of affiliates located close to the apex firm is low. We calculated the pyramidal index as:

$$PI = \frac{2 \left(\sum_{i=1}^{NLevel} i \times Share_i - 1 \right)}{Affiliates - 1}$$

where NLevel is the maximum number of levels in the group, Affiliates is the number of affiliates in the group, and Share_i is the ratio of the number of group affiliates that are located at level i to the total number of affiliates in the group. PI takes a value from zero to one, with higher values implying that the group structure is more vertical.

Figure 1 illustrates the properties of PI for a hypothetical business group with three affiliates. The upper-left corner shows a completely horizontal group structure (i.e., a single level). PI takes a value of zero ($= 2 \times (1 \times (3/3) - 1) \times (1/2)$) because the numerator in this case is zero. The upper-right corner illustrates a more vertical structure because company C is subordinate to company B. PI now takes a value of $(1/3)$ ($= 2 \times (1 \times (2/3) + 2 \times (1/3) - 1) \times (1/2)$). The lower right corner shows a completely vertical group: firm B appears beneath firm A, and firm C appears beneath firm B. In this case PI takes the highest possible value of 1 ($= 2 \times (1 \times (1/3) + 2 \times (1/3) + 3 \times (1/3) - 1) \times (1/2)$).

Importantly, as the number of firms in a group increases, the range of values PI can take increases. For example, PI for groups with only two affiliates must be either zero (the ultimate owner directly holds shares of both companies), or one (the ultimate owner directly holds shares of one firm, which holds the second firm as a subsidiary). In the econometric analysis, we control for a group's number of affiliates. We also check the robustness of the results by separately examining groups with a similar number of affiliates.²

² In theory, the relationship between PI and the number of group affiliates is ambiguous. On the one hand, a greater number of affiliates tends to be associated with a greater number of levels, increasing the numerator. On the other hand, a greater number of affiliates also increases the denominator because the index is normalized by

PI is, to our knowledge, the first variable to measure the internal structure of business groups. Empirical tests of the expropriation hypothesis typically compare groups or group affiliates in which controlling shareholders have different ownership stakes (e.g., Claessens et al. 1999, Claessens et al. 2000, Bertrand et al., 2002). A limitation of these studies is that they do not consider to what extent the separation between ownership and control is achieved through pyramids or other instruments (e.g., dual class equity structures) (Khanna and Yafeh, 2007). Our newly-developed PI can in principle be used to explore this issue.

Diversification. The final cohesion measure reflects the level of business line diversification among a group's affiliates. As discussed above, financial economists and strategic management scholars typically espouse "focus" and take a dim view of unrelated diversification. Accordingly, a lower level of business line diversification among affiliates reflects greater cohesion.

Most prior diversification research has taken the firm as the unit of analysis, and measured diversification using the number of business segments in which a firm operate (e.g., Lang and Stulz, 1994; Villalonga 2004; Campa and Kedia, 2002). Analogously, we took the group as the unit of analysis, and based the diversification measure on the number of industries to which different group members belong. In principle, one could also measure diversification within each affiliate, but we lack data to do. We discuss this issue further below.

The final diversification measure used in the analysis is a dummy variable that takes a value of one if a group's affiliates operate in at least two distinct two-digit SIC code industries. Close to 80 percent of the groups in the sample are diversified according to this measure. The results reported below are also robust to the use of a Herfindahl-Hirschman (HHI) measure of affiliate sales concentration by three-digit SIC (reported in the descriptive statistics).

Summary Statistics and Patterns

Table 3 presents summary statistics at the country level. American groups account for 23% of the sample, followed by British and French groups at 15% each, German groups at 14%, Spanish groups at 9%, and Italian groups at 6%. Average group size varies substantially across countries, from a low of \$155 million for Greek groups to a high of \$16 billion for American groups.³

The summary statistics reveal several notable differences in group structure. First, name sharing varies considerably by country, ranging from respective values of 0.17 and 0.19 in Italy and Spain, to 0.42 in Great Britain. The family management measure also varies greatly, ranging from respective values of 0.01 and 0.02 for Finland and Great Britain, to respective values of 0.51 and 0.54 for Ireland and Belgium. Ownership patterns differ by country as well. Only 7% of American groups have affiliates with minority owners, versus 72.7% of French groups and 75.3% of Greek groups. The

a group's total number of affiliates. In the data, the correlation between PI and the number of group affiliates is -0.31, and that between the asset-weighted PI measure and the number of group affiliates is -0.10, meaning that groups with more affiliates tend to be more horizontal than groups with fewer affiliates. Because the number of affiliates is also correlated with a groups' diversification level, we take extra care when comparing groups of different sizes to control for number of affiliates as well as total group assets.

³ The average group in the data has \$4.7 billion in annual sales, \$1.3 billion in assets, and 7.3 affiliates. On average, 28% of affiliates share the same name within a group, 53% share at least one director in common with the group's apex firm, 17% have family-related managers, 35% have outside owners, and 61% operate in at least two different 2-digit SIC code industries. Most groups in the sample operate in only one country (81%), with an average country sales concentration index of 0.95. Table A2 presents summary statistics on the main variables used in our analysis.

variable measuring the share of sales "owned" by minority owners (Column 5) exhibits a similar pattern. Further, only 2.5% of American groups and 3.5% of British groups are owned by families or individuals, versus 56.4% of German groups. Among the subsample of widely-owned groups, ultimate ownership by financial institutions is relatively common in Great Britain and France, at 42.7% and 67.9% of groups, respectively, whereas 82.8% of American groups and almost 95% of Dutch groups and Finnish groups are ultimately owned by a non-financial corporation.⁴

Cluster analysis

We performed the empirical analysis in two stages. First, we performed a cluster analysis to explore the extent to which our group measures co-appear with each other as well as with a set of country dummies reflecting the national origin of a group's apex firm. Second, we further investigated whether the groups represented in the data exhibited distinct national or regional archetypes by separately regressing each group-level cohesion measure on the set of country dummies. This regression analysis allowed us to identify a richer variation in group structures across countries than the one obtained from the coarser cluster grouping.

The cluster analysis categorized groups on cohesion variables into two clusters using non-hierarchical clustering process (k-means) (MacQueen, 1967; Judson, 1998). This clustering algorithm combined observations with most similar attributes (closest in cohesion measure values, in our case) using an iterative process that minimizes the distance between the mean of the cluster and each observation. The process started with random centroids (average coordinates for all the points) for each cluster, and the algorithm assigned observations into the clusters based on the minimized sum of squares of distances between data and the corresponding cluster centroids. After each assignment, new centroids were calculated with new additions to the cluster, and the algorithm repeated until cluster centroids no longer changed. As cluster dimensions we used the seven group cohesion variables that are described above. We removed group size effects prior to clustering to improve precision of the clustering by regressing each variable against group's total assets (natural log) and taking the residuals as values for clustering. In addition to the cohesion variables we also included dummies for the nationality of the group ultimate owners to learn about how the likelihood of belonging to the different groups varies by country.

Table 6 presents the results. The clustering process results separated corporate groups into groups with minority shareholders and wholly-owned groups: clusters A and B, respectively. Greater share of the groups in the cluster with minority shareholders were under family control, less pyramidal, and more diversified than groups in cluster B. Groups in the cluster B (wholly-owned groups) were more pyramidal, displayed greater name similarity and lower degree of board independence.⁵

⁴ Figure A2 plots the distribution of the cohesion measures across and within countries by two-digit SIC code. With the exception of the industry diversification and PI variables, the cohesion measures vary considerably across countries, and all measures vary considerably by industry. Though these patterns raise the possibility that cross-national variation in group cohesion might be driven by differences in industry specialization, the inclusion of group and industry characteristics among the independent variables in the regressions mitigates this concern.

⁵ We also utilized hierarchical clustering (average linkages) to examine the consistency of these patterns (Johnson, 1967). This method determined patterns without relying on pre-determined number of clusters. This clustering algorithm used a sequential process to assign cases into sub-clusters starting with the most similar cases in terms of the distance between their means. The process started with all observations as belonging to their own sub-cluster, and then the algorithm calculated the Euclidean distance between all the pairs of these sub-clusters and combined those with the smallest distance into new larger sub-clusters. Once new sub-clusters were formed, the process repeated to pool closest sub-clusters until all observations were grouped into one large cluster. We found a clear separation of observations into two distinct clusters as the number of sub-clusters consolidated. The patterns we obtained from the hierarchical clustering process were identical to the one from

The likelihood of belonging to clusters A or B varies considerably by the nationality of the group ultimate owner. Corporate groups from Great Britain, Ireland, Finland, Netherlands, Nordic and Switzerland were much more likely to belong to cluster B (wholly-owned groups) than to cluster A, whereas groups from France, Greece, Italy and Spain were much more likely to belong to group A (partly-owned groups). For Germanic and Belgium groups we did not find a substantial tendency to belong to either cluster. For American groups, because the reported cluster analysis included information on family management and board interlocks which were mostly missing for American firms, we did not find a tendency to belong to either cluster. However, when repeating the cluster analysis without the family management and board interlocks dimensions, our results showed that American groups were substantially more likely to belong cluster B (wholly-owned groups).

Regression analysis

Method

To investigate whether the groups represented in the data exhibit distinct national or regional archetypes, we regressed each group-level cohesion measure on a set of dummy variables reflecting the national origin of a group's apex firm. In most cases, the national origin dummy variable represents a single country, either France, Greece, Italy, Spain, Switzerland, or the United States. For statistical and expositional reasons, we also grouped several countries together, including the United Kingdom and the Republic of Ireland in the "Anglo " group; Germany and Austria in the "Germanic " group; and Sweden, Denmark, Norway, and Finland in the "Nordic " group. The Anglo group is the base category in the regressions and all results are interpreted accordingly. To account for industry- and firm-level heterogeneity, the regressions also include a set of variables reflecting a group's share of sales in each of 97 different industries (at the two-digit SIC code level), as well as variables reflecting group sales, number of group affiliates, average age of group affiliates, and the apex firm's share of group sales.

Results

Table 5 contains results for the baseline regressions. Column 1 presents results for the name similarity measure. Consistent with the descriptive statistics discussed above, within-group name similarity varies significantly across countries. Anglo groups exhibit the second-highest level of name similarity after Switzerland, as indicated by the negative coefficient estimates for all other countries. Groups from France, Italy, Spain, and Greece exhibit a relatively low level of name similarity, while American, Germanic and Nordic groups lie somewhere in between.

One concern in this regard is that the incentives to share names within a group may vary across industries. For example, because reputation is very important to financial firms, these firm's incentives to share names may also be especially large. As a result, the cross-national variation in name similarity discussed above might reflect cross-national variation in industry composition. We investigate this possibility in unreported regressions by distinguishing among different name categories (financial, consumer products or services, and business products or services). The general pattern of results holds. Details on the name classification methodology and the full set of results are available from the authors upon request.

the non-hierarchical clustering analysis: the two clusters resulting from the hierarchical analysis split the sample into the same groupings as the non-hierarchical clustering method. This consistency provides important robustness to the patterns we observed.

Column 2 presents the results for board interlocks. Board interlocks are far more common in Anglo groups than in the rest of Europe. French, Italian, Dutch and Swiss groups have the lowest level of board interlocks, while Anglo, Nordic, and American groups had the highest interlock values. Belgium, Germanic, Greek and Spanish groups lie in between

Column 3 presents the results for family ownership, estimated using a linear probability model. They reveal a much higher probability of family ownership among groups in continental Europe than among those in the Anglo group, the Nordic group, and the United States. Germanic groups, for example, are 54 percentage points more likely to have a family or individual as a controlling shareholder than Anglo groups are---a striking difference given that the sample-wide proportion of family-held groups is 18%. Similar patterns hold for French, Greek, Italian, Swiss, and Spanish groups.

Column 4 presents results for the family management measure. As with family ownership, family managers are much more prevalent in Continental Europe than elsewhere, with the highest levels in Belgium, Italy, Spain and Switzerland, and a somewhat lower level in Germanic groups. The major exception to this pattern is French groups, which---despite their high probability of being family-owned---are as unlikely to be family managed as the Anglo and American groups.

Column 5 presents results for the minority ownership dummy variable, estimated using a linear probability model. Striking differences are evident between the Anglo and American groups, on the one hand, and those from Continental Europe, with the exception of Netherlands, on the other. Twenty four percent of American groups and 35% of Anglo groups are estimated to have minority shareholders. In contrast, over 95% of Greek groups and 90% of French groups are estimated to have minority shareholders, with Italian groups just slightly behind. The same pattern of results holds when a continuous measure reflecting the share of group sales by partly-owned affiliates is used.

Column 6 presents the results for the pyramidal index, which higher values indicating a more vertical structure. The coefficient estimates reported in the table all have a negative sign, indicating that Anglo groups have the most vertical structure. Cross-national differences are not particularly large, however. Swiss groups have the most horizontal structures, with an estimated pyramidal index value of 0.627, compared to a value of 0.678 for Anglo groups.

Column 7 presents the results for the diversification dummy variable, estimated using a linear probability model. The dummy variable takes a value of one of one for groups that operate in at least two two-digit SIC codes. The results indicate that Anglo groups are the least diversified in the sample, followed by Swiss, American, Dutch, and Belgian groups. Groups in the remaining countries exhibit substantially higher level of diversification.

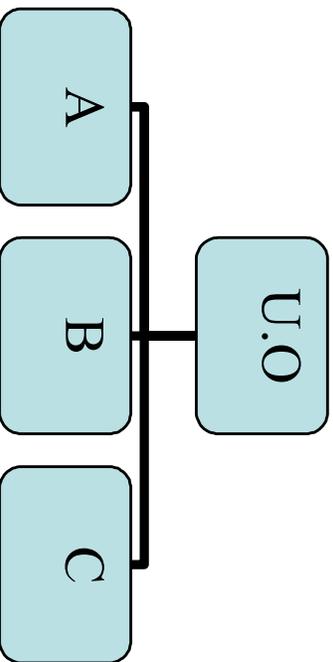
Detailed robustness checks for the above patterns are available on request. The robustness checks consider group size, domestic vs. multinationals, diversified vs. specialized, widely-held vs. closely-held, and acquisition intensity.

Figure 1: Pyramidal Index (PI)

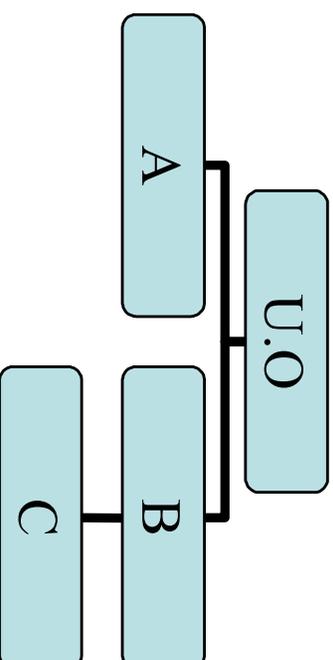
$$PI = \frac{2 \times \left(\sum_{i=1}^{N_{level}} i \times share_i - 1 \right)}{\# Aff - 1}$$

Examples:

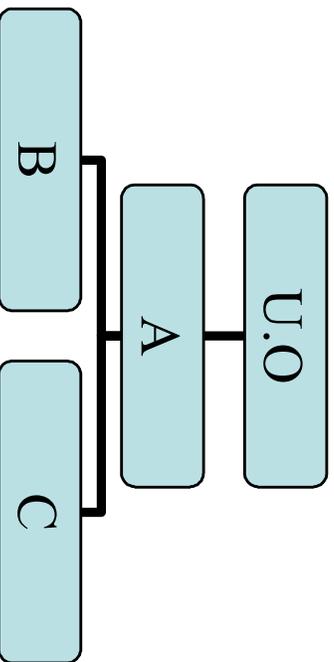
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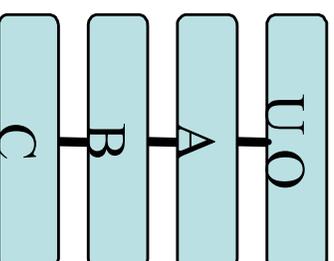
$PI=1/3$



$PI=2/3$



$PI=1$



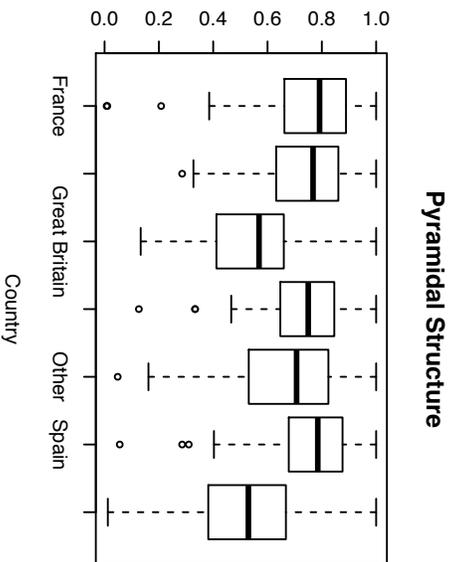
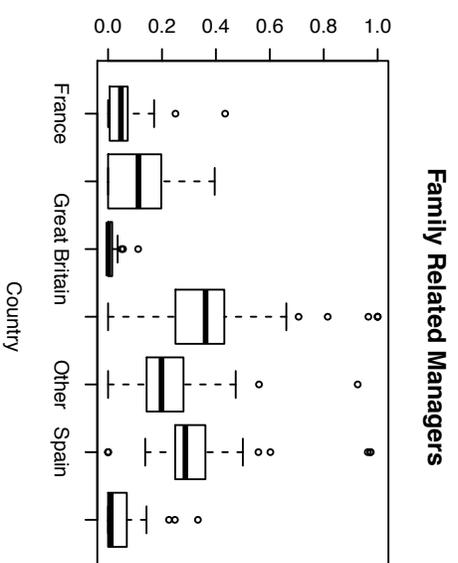
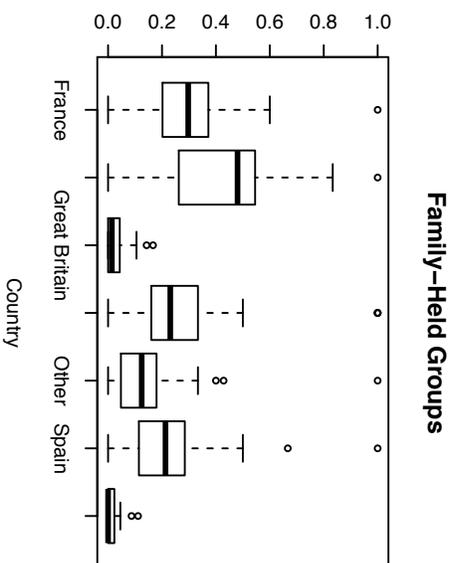
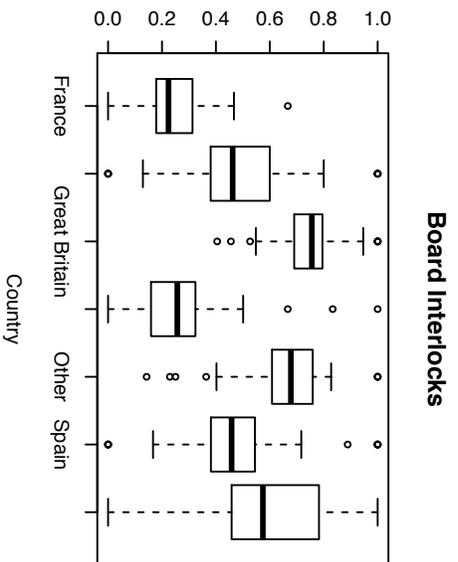
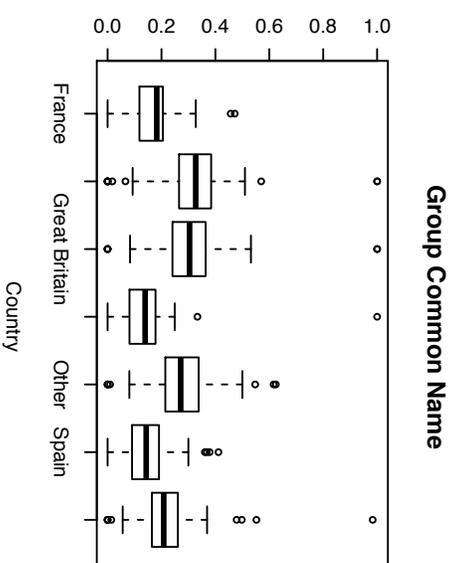
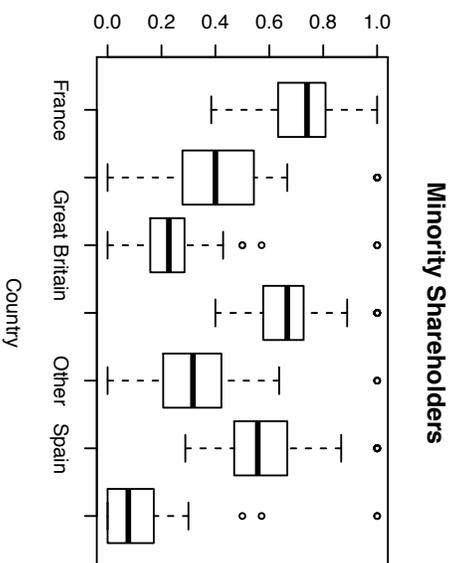
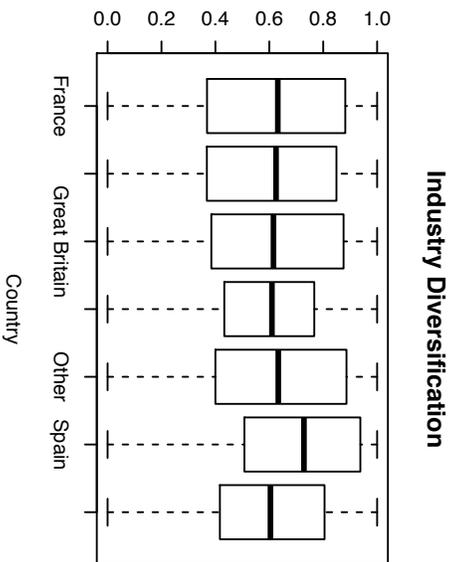


Figure 2

TABLE 1. Main Variable Definitions

Variable	Explanation
<i>Business Group</i>	Two or more legally independent firms tied by a controlling equity stake. For privately-owned firms, a controlling stake is defined as an ownership share of 50% or more. For publicly-traded firms, a controlling stake is defined as an ownership share of 20% or more.
<i>Name similarity</i>	The sales-weighted ratio of (1) the number of affiliates whose name includes the most common name in a group, to (2) the total number of affiliates in the group.
<i>Board interlocks</i>	The sales-weighted ratio of (1) affiliates that share at least one director with a group's apex firm, to (2) the total number of affiliates in the group.
<i>Family ownership</i>	A dummy variable that takes a value of one for groups where the ultimate owner is a family or individual, and zero otherwise (i.e., for publicly-traded groups).
<i>Family management</i>	The sales-weighted ratio of (1) affiliates that have a family-related manager, and (2) the total number of affiliates in the group.
<i>Dummy for minority owners</i>	A dummy variable that takes a value of one for groups that have outside owners, and zero for groups in which all affiliates are wholly owned.
<i>Share of partly-owned affiliates</i>	The sales-weighted ratio of (1) affiliates with minority owners, to (2) total number of group affiliates.
<i>Pyramidal index</i>	A measure of the vertical structure of a business group. A higher index value implies that a larger fraction of group affiliates are located further away from the apex firm.
<i>Industry diversification</i>	A dummy variable that receives the value of one for groups with affiliates that operate in at least two different two-digit SIC code industries, and zero for groups where all affiliates operate in the same two-digit SIC code industry.
<i>Industry concentration index</i>	Ratio of (1) the HHI sales concentration index, to (2) the number of different three-digit industry SIC industries in which group affiliates operate.
<i>Dummy for domestic groups</i>	A dummy variable that takes a value of one for groups that operate in a single country, and zero for groups whose affiliates operate in at least two countries.
<i>Country concentration index</i>	Ratio of (1) the HHI sales concentration index, to (2) the number of different countries in which group affiliates operate.
<i>Group sales</i>	Total affiliate sales within a group.
<i>Number of affiliates</i>	Total number of affiliates that belong to a group.
<i>Average affiliates age</i>	Average age of group affiliates in 2007.
<i>Apex firm's sales share</i>	The ratio between sales by apex firms and total group sales.

TABLE 2. Summary Statistics

Variable	# Groups	Mean	Std. Dev.	Distribution		
				10 th	50 th	90 th
<i>Name similarity</i>	61,180	0.283	0.373	0	0	1
<i>Board interlocks</i>	36,142	0.526	0.394	0	0.5	1
<i>Dummy for family ownership</i>	61,180	0.180	0.384	0	0	1
<i>Family management</i>	44,449	0.174	0.347	0	0	0.976
<i>Dummy for minority owners</i>	61,180	0.354	0.478	0	0	1
<i>Share of partly-owned affiliates</i>	61,180	0.061	0.137	0	0	0.263
<i>Pyramidal index</i>	61,180	0.678	0.317	0.217	0.667	1
<i>Dummy for industry diversification</i>	61,180	0.609	0.488	0	1	1
<i>Industry concentration index (HHI)</i>	61,180	0.768	0.239	0.430	0.865	1
<i>Dummy for domestic groups</i>	61,180	0.812	0.390	0	1	1
<i>Country concentration index (HHI)</i>	61,180	0.949	0.140	0.792	0.865	1
<i>Average affiliate age</i>	61,180	22	16.9	6	17	42
<i>Share sales by apex firm</i>	61,180	0.464	0.356	0	0.500	0.979
<i>Group sales (millions, \$)</i>	61,180	4,694	140,054	19	39	577
<i>Group assets (millions, \$)</i>	61,180	1,252	34,951	0	19	384
<i>Number of affiliates per group</i>	61,180	7.3	25.5	2	3	11

TABLE 3. Group Characteristics by Country of Ownership

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
							Ultimate Owner type (%)		
National origin	Number of groups	Average group sales (mm, \$)	Name similarity	Family management	% with minority owners	% sales by partly-owned affiliates	Family	Financial institution	Industrial corporation
Austria	241	973	0.39	0.16	50.2	6.9	32.0	2.3	65.8
Belgium	1,961	423	0.23	0.54	45.9	4.5	2.1	46.0	51.8
Denmark	945	598	0.41	0.06	25.5	3.4	19.8	17.4	62.8
Finland	742	1,032	0.32	0.01	38.9	2.7	1.6	4.1	94.3
France	8,990	1,751	0.19	0.05	72.7	17.8	26.6	67.9	5.5
Germany	8,388	1,473	0.27	0.19	36.1	5.5	56.4	14.5	29.2
Great Britain	9,303	1,454	0.42	0.02	25.1	5.3	3.5	42.7	53.7
Greece	451	155	0.15	0.10	75.2	9.2	53.7	7.7	38.6
Ireland	166	546	0.32	0.51	20.6	3.1	32.5	2.4	65.1
Italy	3,768	568	0.17	0.34	62.8	7.6	25.7	30.7	43.7
Netherlands	1,561	2,381	0.33	0.12	19.1	2.3	2.4	4.3	93.3
Norway	1,096	4,719	0.24	0.14	44.3	7.3	25.2	1.7	73.1
Spain	5,451	544	0.19	0.29	50.9	6.5	22.4	24.4	53.2
Sweden	3,195	1,042	0.32	0.33	22.5	2.1	0.9	27.3	71.8
Switzerland	776	3,323	0.46	0.33	25.1	2.7	11.7	0.9	87.3
United States	14,146	15,770	0.31	0.06	7.2	0.9	2.5	14.7	82.8
All Countries	61,180	4,694	0.28	0.17	35.4	6.1	0.18	0.18	0.73

TABLE 4. Correlation Matrix for Group Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>Name similarity</i>	<i>Board interlocks</i>	<i>Family managem ent</i>	<i>Minority owners</i>	<i>Pyramid al index</i>	<i>Industry concentrati on index (HHI)</i>	<i>Number of affiliates</i>	<i>Group sales</i>
<i>Name similarity</i>	1							
<i>Board interlocks</i>	0.099	1						
<i>Family management</i>	-0.084	-0.005	1					
<i>Minority owners</i>	-0.048	-0.043	-0.038	1				
<i>Pyramidal index</i>	-0.289	-0.119	0.122	-0.010	1			
<i>Industry concentration index (HHI)</i>	-0.162	-0.096	0.020	-0.011	0.435	1		
<i>Number of affiliates</i>	0.162	0.003	-0.056	-0.024	-0.331	-0.170	1	
<i>Group sales</i>	0.021	-0.004	-0.006	-0.008	-0.043	-0.035	0.388	1

TABLE 5. Cohesion Measures by Country

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable:	<i>Name similarity</i>	<i>Board interlocks</i>	<i>Family ownership</i>	<i>Family management</i>	<i>Minority owners</i>	<i>Pyramidal index</i>	<i>Dummy for diversification</i>
<i>Dummy for Belgium</i>	-0.093** (0.006)	-0.235** (0.017)	0.004 (0.015)	0.490** (0.009)	0.286** (0.019)	-0.028 (0.013)	0.097** (0.022)
<i>Dummy for France</i>	-0.142** (0.006)	-0.440** (0.013)	0.255** (0.015)	0.011 (0.008)	0.549** (0.017)	-0.030* (0.012)	0.164** (0.023)
<i>Dummy for Germanic</i>	-0.056** (0.007)	-0.219** (0.016)	0.543** (0.012)	0.148** (0.007)	0.206** (0.022)	-0.019 (0.016)	0.160** (0.018)
<i>Dummy for Greece</i>	-0.169** (0.005)	-0.195** (0.010)	0.483** (0.004)	0.074** (0.009)	0.608** (0.024)	-0.022 (0.016)	0.230** (0.009)
<i>Dummy for Italy</i>	-0.162** (0.004)	-0.433** (0.013)	0.226** (0.006)	0.296** (0.007)	0.463** (0.021)	-0.036* (0.014)	0.177** (0.011)
<i>Dummy for Netherlands</i>	-0.017 (0.008)	-0.498** (0.019)	0.041 (0.027)	0.090** (0.003)	0.016 (0.020)	-0.029 (0.014)	0.079** (0.023)
<i>Dummy for Nordic</i>	-0.042** (0.005)	-0.039** (0.013)	0.070** (0.012)	0.181** (0.004)	0.095** (0.013)	-0.025* (0.009)	0.171** (0.016)
<i>Dummy for Spain</i>	-0.135** (0.009)	-0.251** (0.017)	0.209** (0.013)	0.249** (0.006)	0.352** (0.019)	-0.009 (0.014)	0.217** (0.020)
<i>Dummy for Switzerland</i>	0.074** (0.008)	-0.380** (0.020)	0.093** (0.007)	0.275** (0.010)	0.042** (0.016)	-0.051** (0.009)	0.037 (0.021)
<i>Dummy for United States</i>	-0.068** (0.005)	-0.055* (0.021)	-0.007 (0.013)	0.049** (0.012)	-0.111** (0.016)	-0.034* (0.013)	0.060* (0.021)
<i>Constant</i>	0.122** (0.029)	0.965** (0.104)	0.096 (0.092)	-0.030 (0.059)	0.056 (0.037)	0.933** (0.049)	0.784** (0.130)
<i>ln(Group Sales)</i>	0.010* (0.004)	-0.019* (0.009)	-0.015 (0.011)	-0.005 (0.005)	-0.008 (0.006)	0.023** (0.005)	-0.048** (0.015)
<i>ln(No. of Affiliates)</i>	0.118** (0.013)	0.020 (0.025)	0.043* (0.020)	-0.004 (0.003)	0.142** (0.030)	-0.373** (0.023)	0.286** (0.031)
<i>ln(Average Affiliates Age)</i>	-0.021** (0.006)	0.015 (0.008)	-0.007 (0.007)	0.042* (0.015)	0.007 (0.006)	0.005* (0.002)	0.017 (0.013)
<i>Apex Firm's Sales Share</i>	0.014 (0.016)	-0.174** (0.042)	0.144* (0.065)	0.025 (0.014)	-0.012 (0.014)	-0.006 (0.006)	0.014 (0.065)
Sample average value of cohesion measure:	0.283	0.526	0.180	0.174	0.354	0.678	0.609
R^2	0.139	0.234	0.249	0.158	0.269	0.785	0.191
<i>Observations</i>	61,180	36,142	61,180	44,449	61,180	61,180	61,180

Notes: This table presents OLS estimates of the effect of the group ultimate owner nationality on measures of group cohesion. Dummy for Anglo (Great Britain and Ireland) is the base. All regressions include a set of industry sales share variables for the share of group sales in 97 two-digit SIC code industries. Standard errors (in brackets) are robust to arbitrary heteroskedasticity. ** significant at 1%; * significant at 5%.

TABLE 6 Non-Hierarchical Cluster Analysis (k-means)

Variables:	%Δ: A - B		Cluster A		Cluster B		
	Mean	N	Mean	Std. Dev.	N	Mean	Std. Dev.
<u>Group cohesion variable:</u>							
<i>Name similarity</i>	-13.2	13,375	0.287	0.347	17,095	0.325	0.386
<i>Board interlocks</i>	-18.0	13,375	0.479	0.385	17,095	0.565	0.389
<i>Dummy for family ownership</i>	58.5	13,375	0.258	0.438	17,095	0.107	0.309
<i>Family management</i>	12.4	13,375	0.194	0.353	17,095	0.170	0.349
<i>Dummy for minority owners</i>	100.0	13,375	1	0	17,095	0	0
<i>Pyramidal index</i>	-18.9	13,375	0.556	0.322	17,095	0.661	0.313
<i>Dummy for industry diversification</i>	16.9	13,375	0.763	0.425	17,095	0.634	0.482
<u>Country dummies:</u>							
<i>Dummy for Great Britain and Ireland</i>	-121.6	13,375	0.153	0.360	17,095	0.339	0.473
<i>Dummy for Germanic</i>	-3.2	13,375	0.095	0.293	17,095	0.098	0.298
<i>Dummy for Belgium</i>	5.6	13,375	0.054	0.226	17,095	0.051	0.221
<i>Dummy for Finland</i>	-19.0	13,375	0.021	0.144	17,095	0.025	0.156
<i>Dummy for France</i>	77.6	13,375	0.237	0.425	17,095	0.053	0.224
<i>Dummy for Greece</i>	100.0	13,375	0.001	0.027	17,095	0.000	0.011
<i>Dummy for Italy</i>	54.3	13,375	0.140	0.347	17,095	0.064	0.245
<i>Dummy for Netherlands</i>	-54.5	13,375	0.011	0.104	17,095	0.017	0.131
<i>Dummy for Nordic</i>	-104.0	13,375	0.101	0.301	17,095	0.206	0.405
<i>Dummy for Spain</i>	27.0	13,375	0.152	0.360	17,095	0.111	0.314
<i>Dummy for Switzerland</i>	-44.4	13,375	0.009	0.096	17,095	0.013	0.116
<i>Dummy for United States</i>	19.2	13,375	0.026	0.159	17,095	0.021	0.144

Notes: This table presents sample averages for cohesion variables and country dummies in clusters obtained from non-hierarchical cluster analysis (k-means).

TABLE 7 Summary of Main Results

National origin	Name similarity	Board interlocks	Family ownership	Family management		Minority owners	Pyramidal index	Dummy for diversification	
				management	management			diversification	diversification
Anglo-American	High	High	Low	Low	Low	Low	High	Low	Low
French	Low	Low	High	Low	High	High	Low	High	High
Germanic	Medium	Medium	High	Medium	Medium	Medium	Medium	Medium	Medium
Northern Europe	Medium	Low	Low	Medium	Medium	Medium	Medium	Medium	Medium
Switzerland	High	Low	Medium	Medium	Low	Low	Low	Low	Low
Southern Europe	Low	Low	High	High	High	High	Low	High	High

Note: Anglo-American includes British, Irish, and American groups; Northern Europe includes Belgium, Netherlands, Switzerland, and the Nordic countries; and Southern Europe includes Spain, Italy, and Greece.