

Business Groups and Industrial Districts in Emilia Romagna - New evidence

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While it has long been recognized that in Italy the business group structure is the organisational form typical of the large corporation, it is only recently that the literature has started to investigate corporate groupings among small and medium size firms. Focusing on the Emilia Romagna region (Italy), one of the most comprehensive of these studies has revealed the rather surprising strong presence and importance of business groups within industrial districts. Continuing this line of research, this paper presents the results of an econometric investigation on the determinants of the probability that a firm belongs to a business group. Using a large data set referring to the end of 1998 and comprising more than 35,000 firms, our study shows that this probability is strongly affected by firm size, industry and belonging to an industrial district.

Key words: Business groups, industrial districts, Emilia Romagna.

Jel codes: L22, C21.

1. Introduction

Business groups¹ and industrial districts² are among the most significant peculiarities of the Italian manufacturing industry. While it has long been recognized that in Italy the business group structure is the organisational form typical of large corporations, it is only recently that the literature has confirmed that the group form is almost as widespread amongst small and medium sized firms³ (Barca *et al.*, 1994). Over the last few years, the literature

¹ A business group can be defined as a set of firms connected through equity linkages and controlled – directly or indirectly, through one or more control chains – by a single shareholder (or a coalition of shareholders) (Goto, 1982, Brioschi *et al.*, 1989).

² An industrial district can be defined as “a socio-territorial entity which is characterized by the active presence of both a community of people and a population of firms in one naturally and historically bounded area” (Becattini, 1990, pp. 38-39).

³ The reasons for the adoption of this organisational structure differ between large and small enterprises. While large companies organise themselves in groups mainly as a means of separating ownership from control, smaller sized firms typically aggregate in groups composed of small firms, in order to by-pass labour and tax constraints and to replicate the organisational model of the small enterprise.

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on the extent of corporate grouping has been enriched by a number of industrial and regional studies that have pointed to the importance of business groups within industrial districts (Banco Ambrosiano Veneto, 1994; Dei Ottati, 1996; Balloni and Iacobucci, 1997; Bianchi *et al.*, 1999; Brioschi and Cainelli, 2001; Brioschi *et al.*, 2002; Cainelli *et al.*, 2006; Cainelli and Iacobucci, 2007). In particular, one of the more comprehensive of these studies – focusing on Emilia Romagna (Italy) – has produced the surprising finding that the phenomenon of corporate grouping within industrial districts is very extensive (Brioschi and Cainelli, 2001). Following this line of research, this paper presents the results of an empirical investigation aimed at identifying the determinants of the probability that a firm belongs to a business group. Using a large data set referring to the end of 1998 and comprising more than 35,000 firms from the Emilia Romagna region, this paper tests the hypothesis that this probability is affected, among other things, by a firm being located within an industrial district.

The relevance of these findings stems from the fact that the phenomenon of corporate grouping within industrial districts has significant implications for the nature, structure and industrial organisation of these districts. In this regard, it has been shown that the widespread presence of business groups, which implies more hierarchical relationships amongst firms, does indeed affect the governance structure of the district (Whitford, 2001). In addition, it has been shown that business grouping in industrial districts often takes the form of ‘district groups’, that is, groups composed mostly of firms located within the district. This organisational architecture fosters the competitiveness of district firms’, combining the flexibility of the small legal firm size – one of the unquestioned strengths of Italian districts and of Italian local capitalism in general – with larger scale operations and central handling of such functions as production, distribution, marketing and finance (Brioschi and Cainelli, 2001). In other words, though essentially empirical in nature, the works in this strand of research raise an issue of considerable importance, from a theoretical perspective: that is, the need to reconsider the concept of industrial district and the methods of inquiry generally employed by the traditional literature on industrial districts.

The rest of the paper is organised as follows. Section 2 briefly reviews the two strands of literature on which our paper is based: that on the extent of corporate grouping in industrial districts, and that on the determinants and implications of a firm belonging to a business group. Section 3 describes the data sets and the algorithm employed to partition the sample of Emilia Romagna’ firms into group members and autonomous firms. Section 4 presents the results of our econometric analysis and Section 5 draws some conclusions.

2. Business groups and industrial districts

Our paper draws on two contiguous strands of literature: the work on the extent of corporate grouping within industrial districts (Dei Ottati, 1996; Bianchi *et al.*, 1999; Brioschi *et al.*, 2002; Cainelli *et al.*, 2006) and the econometric work on the determinants and effects of a firm belonging to a business group (Barbetta *et al.*, 1996). Research in the first strand documents the exceptionally high incidence of the group structure among district firms, signaling the need to reconsider industrial districts as models of local capitalism where hierarchical relations among firms play an important role and where the 'actual' firm size is larger than is revealed by the official statistics. In particular, in an analysis of the main Tuscan industrial districts, Dei Ottati (1996) shows that district firms tend to organise themselves in groups. This tendency dates back to the early 1970s, though she finds that it was only in the subsequent decade that district firms essentially began to grow through the creation of new units and acquisition of new companies. Bianchi *et al.* (1999) document that "at least for some industries, the phenomenon of industrial districts can be traced back not only to the sort of informal links among firms largely highlighted in the literature but also to the presence of formal, equity arrangements" (Bianchi *et al.*, 1999, p. 281, our translation). In a large-spectrum survey on business groups in Emilia Romagna, Brioschi and Cainelli (2001) show that the extent of corporate grouping in the 13 Emilian districts is even greater than at regional level. Compared to a regional average of 23.4 per cent of firms belonging to a business group, the extent of corporate grouping within industrial districts reaches an average of 30.5 per cent of firms. The detailed results are given in Table 1.

Table 1. Corporate grouping among Emilia Romagna's industrial district firms

Industrial district	All	Firms with known ownership ^b		
	Firms ^a	All firms	Of which: in group	
	No.	No.	No.	%
1 Motor-cycles (Bologna)	42	26	9	34.6
2 Wood processing machinery (Carpi)	43	27	9	33.3
3 Stuffed furniture (Forli)	458	61	10	16.4
4 Biomedical products (Mirandola)	326	51	11	21.6
5 Ceramic tiles (Sassuolo-Castellarano)	441	261	136	52.1
6 Machine tools (Piacenza)	101	36	14	38.9
7 Food processing (Parma)	1,552	259	67	25.9
8 Footwear (Fusignano)	193	30	4	13.3
9 Wood processing machinery (Rimini)	41	17	5	29.4
10 Textiles-clothing (Carpi)	2,779	449	77	17.1
11 Farm machinery (Modena-Reggio Emilia)	337	124	40	32.2
12 Packaging machinery (Bologna)	296	112	48	42.8

13	Footwear (San Mauro Pascoli)				137	16	2	12.5
	Total	6,419	1,415	432	30.5			

^a Extracted from ASTER's Impero archive.

^b Emilia Romagna's shareholder database was employed to identify up to 1,415 of the overall 6,419 firms extracted from Impero.

In the second strand of the literature on which our paper draws, Barbetta *et al.* (1996) present the results of an empirical analysis of the extent of corporate grouping among the 4,000 Italian manufacturing firms of the Mediocredito Centrale archive. The first part of the paper reports a number of descriptive statistics documenting that a firm's size, economic sector and territorial location strongly affect its likelihood of joining a group. In particular, they show that the propensity for firms to organise themselves as a group grows with firm size, and that the majority of firms in group are located in the North-West and in the scale-intensive and science-based sectors. Secondly, they conduct a thorough econometric investigation with the aim of verifying the impact of the group form on a number of performance variables net of the above size, geographic and sectoral effects. The main results of the analysis are that the three control variables are always strongly significant and that group membership reduces firms' profitability but enhances firms' export intensity and borrowing capacity.

3. The data, the group-identification algorithm and the sample

To identify business groups in Emilia Romagna we combined two statistical sources: the Emilia Romagna *archivio Soci* (i.e., the shareholder database) of Infocamere and the *Impero* database of the regional agency for technological development (Agenzia per lo Sviluppo Tecnologico dell'Emilia Romagna, ASTER). The Emilia Romagna shareholder database covers all regional firms required to register their ownership structure with the Chamber of Commerce, i.e. to report the names of their owners – individuals or legal entities – and their ownership stakes. The Impero data bank provides information on location, economic sector and number of employees of all firms with legal head-quarter in Emilia Romagna. Moreover, Impero includes a number of extra-regional firms with connections (usually via an ownership linkage) to the regional firms in the database. The reference data used for both data sets in this paper is the end of 1998.⁴

⁴ Unfortunately, both data sets have gaps which affect the analysis of the extent of corporate grouping: e.g., the shareholder database contains firms for which the full ownership structure is not available, and a number of firms in the Impero data bank do not report their number of employees.

From the shareholder database we extracted 48,132 regional firms with a known ownership structure.⁵ Their shares are held by 115,020 individuals and 15,112 companies. Of the latter, 6,643 in turn are among the set of the 48,132 firms extracted; the other 8,469 are firms whose ownership is unknown but on which, thanks to Impero, we have a fair amount of other information, such as location, economic sector and size (in terms of number of employees). To avoid losing some ownership links and precious information on the characteristics of the business groups, in the effort of reconstructing the groups we used both the 48,132 firms with a known ownership structure and the 8,469 outside firms. This gives a set of 56,601 firms (Figure 1)⁶. To identify business groups, we applied the algorithm described below.

Figure 1. Composition of the set of firms to which the group-identification algorithm was applied

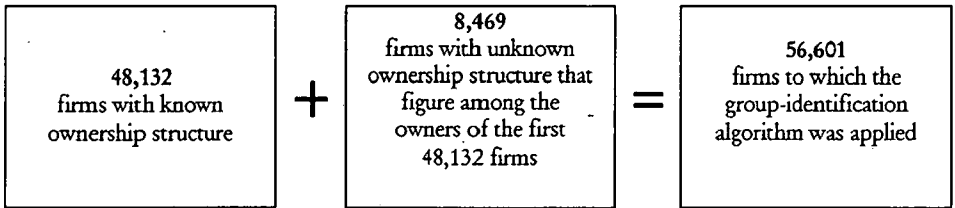
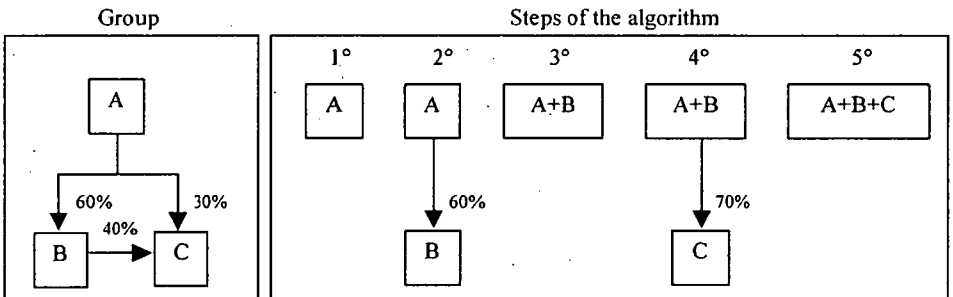


Figure 2. The group-identification algorithm



⁵ Although they constitute only 12% of Emilia Romagna-based firms (which numbered 400,689 at the end of 1998), the firms in the shareholder database are the most important ones, representing all the incorporated companies with headquarters in the region, demonstrated by the fact that they account for more than half of all Emilia Romagna firms' employees, and that the regional firms not included the database average less than 2 employees each.

⁶ Of which 7,954 are headquartered outside of Emilia Romagna.

The algorithm follows an extremely simple iterative procedure. The first step uses a selection criterion that identifies potential 'group controllers', which can be either companies or individuals: the companies selected are those for which it is not possible to find a controlling owner in the database; the individuals are those who hold absolute majority stakes in one or more firms. In each subsequent step, the algorithm applies a procedure to search for all the firms controlled with an absolute majority stake⁷ by the group controllers and by all the firms associated with the group controllers up to the previous step. The algorithm ends when no more of the still unassigned firms are controlled by any of the existing groups. At the end of the iterative procedure, the algorithm has identified groups composed of firms linked by absolute majority shareholdings, groups composed of firms bound together under the control of the same individual, and isolated firms. To illustrate the mechanism, Figure 2 traces the reconstruction of a group consisting of three companies in which firm A is the parent company. In the first step the algorithm identifies firm A as the group controller; in the next two steps it identifies firm B and associates it to the parent company; in the fourth step it observes that group A+B holds a 70 per cent stake in firm C; and in the fifth step it links firm C with the group that controls it.

At the end of the group-reconstruction process outlined above, the 7,954 non-regional firms employed in the algorithm⁸ has been eliminated, together with another 13,368 firms with headquarters in Emilia Romagna for which the Impero database does not include number of employees, and a further 160 firms for which Impero does not provide the economic sector. This gave us a new set of 35,119 firms with legal headquarters in Emilia Romagna, known number of employees and known economic sector. This is the reference sample for the econometric investigation that follows. Interestingly, despite the number of firms that were dropped the degree of representativeness of the sample is very good: the total number of employees of the 35,119 sample firms is 517,138, which is about 40% of all employees of firms located in Emilia Romagna.

The structure of the sample is provided in Tables 2 and 3, which report the breakdown of the sample by economic sector and province (Table 2) and by size class (Table 3). The tables show that more than 75% of the sample firms belongs to sectors D (manufacturing), G (sales and distribution) and K (real estate), and that 86% of the sample firms have less than 20 employees.

⁷ The algorithm groups firms only if connected through absolute majority ownership linkages, i.e. shareholdings of more than 50%.

⁸ As already mentioned, the extra-regional firms were used in the group-identification process because they represented the link between otherwise apparently disjoint regional firms.

Table 2. The sample by economic sector and province

Sector	Bologna	Ferrara	Forlì	Modena	Piacenz a	Parma	Ravenn a	Reggio Emilia	Rimini	Total
A	91	60	75	85	26	40	68	53	9	507
B	4	5	0	1	1	0	4	1	11	27
C	24	6	10	29	21	19	7	25	7	148
D	2,482	405	562	2,644	451	1,096	468	1,482	374	9,964
E	10	5	6	11	6	4	5	1	6	54
F	717	159	230	589	154	506	161	360	146	3,022
G	2,432	333	543	1,495	443	879	562	875	558	8,120
H	294	49	74	154	42	95	123	86	178	1,095
I	242	50	97	158	93	120	193	77	75	1,105
J	377	29	37	252	27	96	67	100	40	1,025
K	2,960	367	498	1,676	476	869	491	864	566	8,767
M	59	4	7	22	6	9	7	11	6	131
N	93	10	24	53	13	40	30	30	27	320
O	262	41	53	119	34	59	68	76	122	834
Total	10,047	1,523	2,216	7,288	1,793	3,832	2,254	4,041	2,125	35,119

A: Agriculture; B: Fishing; C: Mining; D: Manufacturing; E: Public Utilities; F: Construction; G: Sales and Distribution; H: Hotels and Restaurants; I: Transportation and Communications; J: Banking and Insurance; K: Real Estate and Leasing; M: Education; N: Public Health; O: Other Public Services.

Table 3. The sample by size class

Size class (No. of employees)	Number of Firms		Number of Employees		Employees/Firm
	No.	%	No.	%	Average No.
1-19	30,255	86.15%	135,616	26.22%	4.5
20-49	3,203	9.12%	89,332	17.27%	27.9
50-99	897	2.55%	59,723	11.55%	66.6
100-299	508	1.45%	75,292	14.56%	148.2
300-499	164	0.47%	54,666	10.57%	333.3
500-999	57	0.16%	38,040	7.36%	667.4
>999	35	0.10%	64,469	12.47%	1,842.0
Total	35,119	100.00%	517,138	100.00%	14.7

4. Econometric results

Table 4 presents the econometric results. The estimation method is a Probit model in which a 'robust' estimator is used to correct for heteroscedasticity. The exercise reported below is aimed at identifying the variables affecting the probability that a firm belong to a business group. The analysis is performed in three steps with three different samples: (i) the first sample comprises all the 35,119 Emilia Romagna's firms identified in Section 3; (ii) the second sample is a subset of the first sample that includes only manufacturing firms; (iii) the third sample is a subset of the first sample that includes only firms belonging to district sectors of specialization.

For the first sample, the first step in our analysis consists of regressing the probability that a firm belongs to a group against Barbetta *et al.*'s (1996) three structural variables, i.e., firm size, economic sector and territorial location. Firm size is captured by the class (or number) of employees, economic sector by the section of the Ateco 1991 code, and territorial location – meant to account for the differences in institutional set-ups – by the province in which the firm is located. The results are shown in the first two equations of Table 4, where, in order to measure firm size Equation [1] uses the employee class and Equation [2] uses the (log of the) number of employees. As expected, our data confirm that all three structural variables significantly affect the probability that a firm belongs to a business group. In particular, our results show that this probability increases with firm size, and that of the three largest economic sectors (D, G and K) – K is the only one to have a positive impact on the probability of group membership. This finding is readily explained if we recall that real estate companies are often used by entrepreneurs as both holding companies for their business group and as a legal device to separate personal wealth (flowing into the real estate company) from industrial activity (placed under an operating company), thereby creating a business group.

Going into more detail, the next two steps in our analysis are aimed at assessing whether being part of an industrial district affects the probability that a firm belongs to a business group. Using only the manufacturing firms, Equations [3] to [6] replace the sector and the province explanatory variables with a dichotomous variable used to capture membership of a firm in an industrial district⁹. In Equations [3] and [4] (which differ only in the definition of firm size) the dummy variable is called 'district', and takes the value 1 if the firm generically belongs to one of the 13 industrial districts of Emilia Romagna and 0 otherwise. The results indicate that the variable 'district' has a positive impact on the probability of group membership. To provide more detailed evidence, Equations [5] and [6] replace the non-specific dummy 'district' with 13 dummies ('district 1', 'district 2', etc.) each representing an Emilian industrial district.¹⁰ This model shows that the probability of group membership is significantly affected by four district-related dummies, namely 'district 5' (identifying ceramic tiles in Sassuolo and Castellarano), 'district 8' (footwear in Fusignano), 'district 12' (packaging machinery in Bologna) and 'district 13' (footwear in San Mauro Pascoli). These findings confirm

⁹ A district being an 'intersection set' between an economic sector and a geographical area (however precisely defined).

¹⁰ See Table 1 for the district numbering employed in the econometric analysis.

the results of Brioschi and Cainelli (2001), Cainelli *et al.*, (2006) and Cainelli and Iacobucci (2007) who found that corporate grouping is more frequent in mechanical districts, while district firms operating in traditional sectors such as footwear show a smaller propensity for the group form.

Beyond confirming the important role of firm size in explaining the probability of group membership, the analysis performed on the sub-sample, only composed of firms active in sectors of districts specialisation yields similar results.

Table 4. Probit estimation

	I		II			III	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Constant	0.658**	-0.650**	0.668**	-0.871**	0.676**	-0.859**	0.367
D1_9	-1.231**	...	-1.341**	...	-1.341**	...	-0.974**
D10_19	-1.067**	...	-1.242**	...	-1.244**	...	-0.767**
D20_49	-0.884**	...	-1.058**	...	-1.063**	...	-0.687**
D50_99	-0.547**	...	-0.670**	...	-0.675**	...	-0.502*
D100_199	-0.374**	...	-0.443**	...	-0.437**	...	-0.395
D500	0.498**	...	0.536**	...	0.505**	...	0.723
Ln(Add)	...	0.111**		0.163**	..	0.161**	
Sector A	0.292**	0.307 **					
Sector C	0.305**	0.295**					
Sector D	-0.175**	-0.151**					
Sector F	-0.096**	-0.086**					
Sector G	-0.185**	-0.195 **					
Sector H	-0.189**	-0.206**					
Sector J	0.339**	0.387**					
Sector K	0.114**	0.140**					
Sector M	-0.334**	-0.337**					
Sector N	-0.249**	-0.176**					
Bologna	0.116**	0.116**					
Modena	0.074**	0.073**					
Reggio Emilia	0.058**	0.064**					
Ravenna	0.089**	0.094**					
District			0.776**	0.093**			
District 5					0.240**	0.315**	0.236**
District 8					-0.488*	-0.375	-0.942**
District 12					0.303**	0.298**	...
District 13					-1.000**	-0.813**	...
N. of Observations	35,119	35,119	9,964	9,964	9,964	9,964	1,437
Pseudo R ²	0.027	0.018	0.039	0.024	0.041	0.026	0.042
Log likelihood	-21306.18	-21524.63	-5957.69	-6048.84	-5947.56	-6038.60	-885.23

**significant at 5%; *significant at 10%.

5. Conclusions

While it has long been known that in Italy the business group structure is the organisational form typical of large corporations, the literature has only recently started to investigate corporate grouping among small and medium sized firms. One of the most comprehensive of these studies, which focuses on Emilia Romagna, reveals the strong presence and the importance of business groups within industrial districts. Continuing this line of research, our paper has presented the results of an econometric investigation on the determinants of the probability that a firm belongs to a business group. Based on a large data set of Emilia Romagna firms, our study shows that this probability is strongly affected by firm size, industry and the socio-economic contexts such as membership of an industrial district.

The relevance of this econometric exercise stems from the fact that the phenomenon of corporate grouping within an industrial district has at least two significant implications: first, the need to revise the concept of industrial district; second, the possible influence on policy. With regard to the former, it is well known that the traditional district literature pioneered by Becattini (1979, 1989, 1990) and Brusco (1982) shapes industrial districts as production arrangements characterised by a high degree of co-ordination and little (if any) ownership integration. The emergence of organisational forms based on ownership linkages, providing greater concentration of ownership and control, is altering these traditional arrangements, and gradually replacing the old mechanisms of competition and co-operation with others based on more formal and stable relations. The challenge that academics now face is to understand the nature of these more formal and stable relations, that is, whether this process of ownership concentration tends to alter the internal organisation of the district.

In terms of the implications for policy, it is useful to recall that Emilian policy makers generally design industrial policy based on the industrial district or the local systems of small and medium sized firms as the reference organisational model.¹¹ Our findings show that the small juridical size of the individual firms making up these local systems is only one of the variables that should be considered in the designing of industrial policy programmes. The extent of corporate grouping certainly suggests that firm ownership is concentrated in a lower number of controlling owners. The fragmentation of organically unified enterprises into a large number of legally distinct firms may result in a concentration of the benefits of policy measures on a lower

¹¹ E.g. the Ervet system centres, conceived from the outset as centres to support small businesses with the provision of real services (Bellini *et al.*, 1990; Mazzonis, 1996).

number of actual beneficiaries. In addition, as juridical size is often an essential factor in determining who is eligible for a given benefit, the 'district groupification' may permit circumvention of the size ceiling. That is, the existence of groups could distort the allocation of public resources within a district to the disadvantage of small autonomous firms.

This paper is one of the few attempts to analyse the determinants of corporate grouping using large data sets rather than company or industry case studies. As such, it has some limitations, mainly related to the availability of the data. The most important of these is the use of cross section data. The econometric technique used in this paper allows us to study statistical associations between variables but one should be cautious about interpreting them as casual relationships. Despite these limitations we think that the methodology and the empirical results provide an interesting contribution to our understanding of the empirical determinants of corporate grouping, and represent a valuable premise for further refinement.

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