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CORE BUSINESS NETWORK IN THE EUROZONE

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Abstract

Surprisingly, available elite studies on the EMU have mainly focused on the strategy of political elites in favor of uniting (Fligstein & Mara-Drita 1996 ; Jabko 2006), and Fligstein (2008) recently claimed there is still no real transnational business cohesive circle in Europe. This echoes a long-standing debate on the existence of a transnational capitalist class or transnational business community (Robinson & Harris 2000; Sklair 2001; Morgan 2001; Carroll & Fennema 2002; Carroll & Carson 2003; Kentor & Jang 2004; Carrol & Fennema 2004; Nollert 2005; Kentor & Jang 2006; Carroll & Fennema 2006). In this paper, we seek to clarify the debate for Europe on the basis of an interlocking directorates study. We present a new theoretical framework for the study of transnational interlocking, a new context of reference (stock exchange indices rather than magazine rankings or international business organizations), and an original data-setting method (board composition at the end of the year for 2006 and 2007). From this perspective, three main observations emerge. First, unsurprisingly, national scores of centrality remain much higher than transnational ones—proof of the persistence of the national anchorage of core business elites. Second, the emerging transnational power based on transnational interlocks is based on the strength of weak ties, particularly around financial companies. Third, though the absolute density of transnational interlocks remains the higher on the Franco-German axis, our partial Chi2 test indicates that it is less important than what could be expected, contrarily to Franco-Dutch interlocks, which call for deeper investigations about economic restructuring in the Netherlands.

Key words

Board interlocks, corporate networks, elite networks, Eurozone, stock exchange indices, transnational interlocking, transnational business.

INTRODUCTION

While comparative studies of European elites have been a matter of interest for years (Stockman & al. 1985; Suleiman & Mendras 1995; Bauer & Bertin-Mourot 1996; Windolf 2002; Georgakakis 2002; Genyieis 2008), it seems that there is still a lack of transnational studies of the Eurozone business elites. This topic is not entirely new; a few years after the creation of the EEC, Meynaud & Sidjanski (1967) suggested that business groups based on transnational arrangements were beginning to act in the new European community. Though a few investigations were conducted afterwards (Nollert 2005; Guieu & Meschi 2008), one would have expected a dramatic increase of such studies in the context of the achievement of the EMU. Surprisingly, available studies have kept focusing on the strategy of political elites in favor of the EMU (Fligstein & Mara-Drita 1996; Jabko 2006). The dominant perception of the EU introduces a kind of clash between proactive European elites and national public opinions concerned with welfare and social stakes (Hooghe 2003; Fligstein 2008). In this context, transnational initiatives in Europe remain a better insight for scholars who study sources of social contest (Tarrow 2000; Imig & Tarrow 2001). In the business context, Fligstein (2008) even argued for the absence of a strong transnational milieu in Europe.

In this paper, we seek to face this question through a more specific methodology based on the study of interlocking directorate in European firms. This is the only field in which the existence of a transnational community of business elites has been questioned, sometimes harshly. We are aware of the fact that such studies should be complemented by more qualitative studies about business galaxies (Dudouet & al. 2009), European manager interest groups, clubs and think-tanks (Cowles 1995; Coen 1998; Van Appledoorn 2000; Greenwood 2002; Chartier 2003; Mac Gann & Johnson 2005; Rabier 2007), or the daily firms' activism in lobbying European institutions (Mazey & Richardson 1993; Grossman& Saurugger 2003; Michel 2005). But we think that this interlocking directorate method is still underexploited in this field, and should not be ignored. This method has inspired a growing number of studies in social and organizational science (Mizruchi 1996), but transnational studies still represent a minority of them, which we discuss in this paper as a priority.

Interlocking directorate studies : a definition

Interlocking directorate studies search for individuals belonging to multiple governance structures. According to Kentor & Jang (2004), there are two main types of interlocks : 'concomitant interlocks' and 'serial interlocks'. The first occur when a single individual is a member of two or more boards at the same time. This method has been widely used by US institutions to control the right implementation of anti-trust legislations. It has recently been renewed and supported by the increasing sophistication of network study methodologies. The second is a way to learn more from individual trajectories through public and private structures of governance, such as company boards, cabinets, agencies, and so on, which reveal much on the discrete ties between small worlds of business and politics.

Most edited published studies have been based on concomitant interlocks. In this field, Windolf (2002) distinguishes between the study of corporate networks and elite networks. Any kind of work with a focus on firm strategies is related to the first type, while the second corresponds to a group of studies that are more concerned with the social structure of elites. Yet, the two kinds of networks can be obtained from the same data set, offering interesting perspectives when switching from one to another. In both cases, national case studies and international comparisons dominate the field. In the perspective of corporate networks, scholars have stressed the dependence of companies on key resources (Pfeffer & Salancik 1978; Eisenhard & Schoonhoven 1996 ; Uzzi 1996; Hallen, 2008), the control and coordination assumed by banks (Mizruchi 1982; 1992; 2004; Windolf 2005; Schnyder & al. 2005) or families (Coles & Hesterly 2000; Anderson & Reeb 2003; 2004), cartel strategies (Loderer & Peyer 2002) or the financial hegemony of some big companies (Davis & Mizruchi 1999). In the perspective of elite networks, the first concern has been a quest for a capitalist class, whether it was enthusiastically inferred from marks of hegemonic positions in national affairs (Scott 1995; 1997; Windolf 2002), or more cautiously deducted from the density of an 'inner circle' characterized by strong social and ideological cohesion, as well as a high degree of common interests (Useem 1984).

This approach has been progressively taken over by a more managerial conceptualization of elites, according to which autonomous elites mobilize resources or social capitals to increase their environmental scan and prestige (Davis & Greve 1997; Watts 1999; Chung & al. 2000; Kogut & Walker, 2001; Broschak 2004; Dudouet & Grémont, 2007). In this paper, we will switch between corporate and elite networks in order to overcome the tough question of managers' nationalities. First, we were not able to collect them systematically. Second, the nationality of a manager is precious when one studies the circulation of elites, but it is less relevant when one measures business relations. For example, British Lindsay Owen Jones was, for a long time, Chairman and CEO of French L'Oréal but he did not holdt mandates in UK firms except in L'Oréal's parent companies. So the nationality of a manager is not a sufficient criterium to measure transnational interlocks. Measuring transnational interlocks requests to study firms first[1], and then go back to the individuals who link them together. If we focus on the main European stock exchange indices, it is also because being part of them constitutes the highest consecration for managers. As a result, this leads us to pay greater attention to manager portfolios of social links than, for instance, the ways of protecting family patrimony. Moreover, this procedure is less contradictory with the interlocking directorate method, which gives no access to firm capital (Kentor & Jang, 2004). We are much more interested in managerial capacities, that is, the ability to influence strategic choices and interfirm arrangements. From this perspective, one of the contributions of our study is the exploiting of original, self-made, and recent data (see the methodological section) and to test the hypothesis of the transnationalization of such managerial capacities in Europe. We are thus taking part in ongoing debates on transnational interlocking.

Studying elite networks trough transnational interlocking: an emerging field

Comparative studies which deal with interlocking directorate in Europe and the United States insist on the higher density of national interlocks in continental Europe,

[1] The nationality of firms is another kind of problem we deal with in the following section.

especially in France and Germany, than in the US and UK (Stokman & al.1985; Windolf 2002). The study of transnational interlocking was first inspired by the hypothesis of exit strategies US managers would follow in order to consolidate their hegemony from bank and insurance core business networks (Fennema 1982; Carroll & Fennema 2002).

Next, Carroll & Carson (2003) as well as Kentor & Jang (2004), tried to replace such interlocking directorate studies within the scope of the constitution of a transnational capitalist class or Atlantic ruling class. Indeed, Hymer (1979), followed by a few Gramscian scholars (Cox 1987; Overbeek & Van der Pijl 1993; Van der Pijl 1998), had for years claimed the emergence of such a class in the context of the restructuration and stabilization of transnational capitals controlled by banks, industries and trade companies promoting neo-liberal hegemony all over the world. Robinson & Harris (2000) then insisted on their capacity to emancipate from States, while Sklair (2001) insisted on the variety of ideological vectors by adding consumerism to neo-liberalism. Kentor & Jang (2004) undoubtedly strengthened the methodological tools of this research stream. This led them to criticize the tight panel exploited by Carroll & Fennema (2002) and to promote their study of the 500 biggest companies compiled by Fortune. From 2004 to 2006, *International Sociology* edited this controversy. Though we suscribe to the methodological critiques against Fortune as a relevant source for sharp data-setting of interlocks (Carroll & Fennema 2004; 2006), we think the final word (Carroll & Fennema, 2006) might have been written a bit too quickly, as all available studies still suffer from heavy methodological problems. We expected much from Nollert (2005) to explore the European transnational interlocks, but his restrictive choice of firms connected to members of the European Round Table, thus excluding some of the financial ones, as well as other methodological limits, offers limited advances in the field. In this paper, we propose a new framework for data setting and interpreting transnational interlocks. But let's first precise what we really mean by transnational in our study.

What does transnational mean in our study?

Before pointing out all the methodological problems we identify in this emerging field, we must note that this debate on a transnational capitalist class or a transnational business community is not very clear on what the authors mean by 'transnational'. Keohane & Nye's seminal definition of transnational relations (Keohane & Nye 1972) as relations between actors among which one at least would not be a State or related to a State is sometimes not even discussed in most of the papers. This definition has become problematic as far as it is directly linked to formal State control. As Tilly (1992) pointed out, contemporary sociologists and political scientists are somehow 'prisonniers de l'Etat', which means they have many difficulties to build analyses and comparisons without referring directly to States. Indeed, the debate about the transnational capitalist class is much based on the hypothesis of an emancipation of business elites from States (for example Robinson & Harris 2000). Leaving the State behind incites to focus much more, according to a Weberian approach, on the probability that collective action is still or no more oriented by motives of national belonging and anchorage.

From this perspective, assumptions about transnational links presuppose a relation with national circles or boundaries directorate would path through or articulate with. Selecting stock exchange indices partially solves the problem, because it underlines big companies are much more embedded in business relations within stock exchanges than in the countries they are supposed to be located in[2]. The high mobility of capitals, registered offices or even governance directorship, as well as the quick relocation of turnover, assets and results makes it harder to postulate self-relevant nationalities. Stock exchange indices give better indications of the contexts of affairs in which firms more willingly operate and constitute the main part of their financial and social links. Of course, some of them still opt for their quoting in numerous stock exchange indices, but the greatest part of them are most of the time registered in one only. Otherwise, it is still possible to solve the multi-quotation dilemma by crossing indices with the structure of the capital and the dominant nationality of executive managers, in order to select the more relevant index of reference.

Here we have to discuss the relation between location and transnational flows. Some scholars insisted on the multiplication of transnational flows in the contemporary world, and the fact that some of them escape from States' control (Badie & Smouts, 1995). No doubt that the financial globalization accelerated financial transnational flows. What is interesting here is to search for the relevant circles and contexts from which these flows are harnessed, and to wonder if they are still organized on a national basis or not. Somehow, we try to know whether hubs are still embedded in small national business worlds linked to particular stock exchange places, or they are conglomerated through transnational networks from which a kind of core European corporate circle would emerge.

The main survey on transnational network actors edited by Risse (2002) goes beyond the definition originally proposed by Keohane & Nye (1972). Risse points out that such transnational network actors may be more or less directly linked to structures of intergovernmental cooperation, as EADS would be in our case study for example. Moreover, he generally distinguishes between networks which are embedded in formal device and those characterized by a higher degree of informal relations. Our study investigates formal device, because boards are publicly registered, framed by the law, and controlled by financial authorities. We do not deal here with all the informal links through which individuals access foreign boards or maintain their social capital; as far as such investigations require qualitative methodologies we do not apply here. On another side, Risse (2002) introduces the distinction between advocacy logics and more instrumental ones. This distinction is quite important because we think that interlocking directorate methodologies give a broader access to the second kind of logics than to the first one.

[2] For example, Fortune 500 (2007) registers EADS as a Dutch firm, what is rather far from the reality of its Franco German control and main activity in stock exchange.

TRANSNATIONAL INTERLOCKING IN THE EUROZONE: CHALLENGES AND NEW HYPOTHESES

Investigating transnational interlocking in the Eurozone is methodologically and theoretically demanding. Available studies bring out trends but new data and new hypotheses are needed, especially as far as we select stock exchange indices.

Methodological problems of available studies on transnational interlocking directorate

Transnational interlocking directorate studies suffer from heavy methodological problems. First, the composition of the data set is very heterogeneous, because of conceptual options but also of opportunities to access and collect them. Carroll & Fennema (2002) selected 176 companies Fennema (1982) initially studied, but the methodological and conceptual reasons for such a choice are not very clear. Kentor & Jang (2004) claimed that their data were less representative than the 500 biggest companies they carried out from the Fortune's ranking. Yet, we agree with Carroll et Fennema (2004) when they point out that exploiting such rankings requires to take a lot of precautions. Indeed, financial companies with more restricted sale volumes but sometimes more crucial influence (Scott 1995) are never taken into account in them. But the main objection is that focusing on volumes leads to ignore the essential dimension interlocks give access to, which is the structuration of social links between firms. Carroll & Carson (2003) partially treated the Fortune's data set and added other companies they identified as peripheral, and above all five global policy groups like the World Economic Forum or the International Chamber of Commerce. On the same way, Nollert (2005) selected the ERT. What is interesting here is the search for institutions, which mark circles. This is what we try to do methodologically. We agree with the idea that business and managers' institutions give access to the self-consciousness of what is managing a big company for a group of reference, and to the social circles in which it is consensually shared. As far as one only exploits the Fortune's data set, they find among French big companies Auchan, the SNCF and La Poste. All indeed are big or even giant companies, but they are social dwarfs: Auchan is a family group, which is not quoted and withdrawed into itself, the two other ones are public companies that private groups constantly despise. Moreover, as far as one looks for a transnationalization of interlocks, constructing a panel on the basis of Fortune's data means over representing firms whose patrimony was highly valued in the past twelve months. This is somehow dangerous because this leads to take for granted a kind of virtual social hierarchy rather than a true ability to influence strategies, structure cliques and harness financial flows to distribute them: the hub capacity.

The hypothesis that hubs could now be organized on a transnational basis may require to investigate systematically national and international institutions and clubs (Morgan 2001, Langley 2004, Nollert 2005). But stock exchange indices might be a very useful gateway to the social structure of national core business elites. Such indices provide distinctive competing images, and shape so directly social identities and hierarchies that all the leading organizations pay the highest attention to their strategy of affiliation (Rao & al. 2000). Moreover, belonging to such an index means being part of the managers' circle that counts in terms of economic and mediatic influence, revenue, and so on. There might of course be exceptions. Some financial companies (for example Lazard) did not belong to stock exchange indices. But social arrangements and financial opportunities which arise in stock exchanges seem to us much more important that the simple volume of sales that Fortune's rankings take into account. Furthermore, let's remember that European companies, which were privatized during the 1980s-90s, have massively moved on stock exchange markets. Access to interlocks through the main European indices somehow corresponds to a sharp focus on what Useem (1984) defined as an Inner Circle or Carroll & Fennema (2004) called core business. Methodologically, this seems to us more adjusted to the contemporary realities of financial globalization.

From this perspective, the specificity of the Eurozone is a matter of interest. Has the achievement of the EMU impacted the social structure of the European core business elites? Do we know whether their national anchorage is still vivid (structural effect of national stock exchange indices) or their europeanization is in progress (structural effect of easier accounts and cash availability, open competition and disintermediation in financial services)? This is all the more interesting since a few reports on the European financial regulation insisted on the limited capacity of cooperation between national financial agencies at the third level of the Lamfalussy process. Transnational interlocks in this context of weak horizontal control could be a resource for self-regulated business arrangements. Such a transnational power would be very formal and very instrumental, according to Risse's typology (2002), and could be the basis of various strategies, from harsh preemption, peaceful merging, self-interested intercorporate portfolio management, or intersectorial agreements, to more sophisticated bank-industry transnational arrangements or emerging multinational conglomerates. Contrarily to some political scientists, we do not think interlocking directorate studies should be used in a predictive way.

Have interlocks recently europeanized ?

Let's now have a look on the main results of available studies on transnational interlocking in Europe. As we said, two main studies (Nollert 2005; Guieu & Meschi 2008) give us a few indications of what has happened in Europe in the last two decades.

Guieu & Meschi (2008) insist on the fact that national and transnational networks are on various forms, and articulated through different ways. Therefore, the main result is the predominance of national network compared to transnational ones.

Nollert (2005) repairs an inner circle around firms whose managers belong to the ERT. His results are interesting when one compares them to Guieu & Meschi's study (2008), as they bring out a few firms which remain central from 1994 to 2003 in transnational intercorporate networks. Among them, we find Deutsche Bank, Bayer, Suez and Siemens. The lack of financial elites in Nollert's panel is a true handicap here, because it brings out parts of the inner circle. Both studies recognize European ties beyond big firms but in small scale.

Which kind is the core network of European core business elites ?

Our method consists of a study of companies quoted in the main index of four Eurozone countries: France, Germany, Italy and Netherlands. Our hypotheses are the following ones:

Hypothesis 1. National scores of centrality may remain much higher than transnational ones, which would mean the persistence of the national anchorage of core business elites, then resilience of national capitalism (Hall & Soskice 2001).

Hypothesis 2. We suppose that the stronger transnational interlocks are Franco German ones. This means that the centrality of this axis remains strong in Europe, which is a very common hypothesis, shared by common sense and more sophisticated neo-institutionalist studies. Guieu & Meschi's results indeed confirm a framework Risse-Kappen (1995) elaborated when he insisted on the fact that intergovernmental structures of cooperation favour the stabilization of transnational relations. From this perspective, the Franco German axis is well known as a dense network.

Hypothesis 3. Transnational interlocks might constitute a structure of weak ties, which could vary from one year to another, which would indicate a kind of plasticity of such a structure. If this hypothesis is verified, Fligstein's assumption about the absence of a well-structured European business world is right.

Hypothesis 4. Most of the studies in national and internal levels concluded these last years about weakness of finance's firms in interlocking schemes. On another side, financial management scholars insisted on changes in the move towards and the implementation of the single currency, with the consolidation of the bank sector, characterized by a substantial decrease of firms, higher concentration (Staikouras & al. 2006), as well as the growing competition and internationalization in the merger and acquisition market (Ekkayokkayo & al. 2009). But does the institutionalization of the Eurozone as well as progresses in financial liberalization favor the renewal of financial institution in Euro zone business networks?

METHODOLOGY

Selecting relevant interlocks is a classical problem (Mizruchi 1996; Carroll & Fenema 2004). Some scholars are only interested in boards' members (Guieu & Meschi 2008), while others take into account executive managers who are non-members of boards in order to compile supervisory boards and managing boards when needed (particularly in the case of North European companies). However, the main problem lays in the heterogeneity of sources scholars exploit to establish the composition of corporate directorship.

Data collection

We agree with Carroll & Fennema (2004) when they claim that annual reports provide the most reliable information. Unfortunately, many studies make sharp measurement of whales on the shore without knowing how magazines or institutions equipped their fishing. As we directly collect our data from annual reports, we get the control of their quality and their comparability throughout years.

Moreover, as far as boards are cautiously reconstituted, another problem is to take time into account on a right manner. In many cases, the sharp dating of the data is neglected. If this is not done, interlocks are measured for the whole year, despite the fact that some managers who began or ended a mandate in the course of the year may have never met each other at board meetings. This may lead to establish wrong links or redundancy. The sharpness of our original data based on the composition every 31st of December allows us to avoid this kind of redundancy, and to build future longitudinal network analysis. This is of particular importance for the study of transnational ties, whose weakness may induce big variations in the measurement. From our corpus, we made a comparative test of the two ways to do, by counting on one side all managers registered throughout the full year of 2007 and all managers registered on December the 31st 2007 (Table 1).

Table 1. Comparison of (binary) links for a full year 2007 and December 31st 2007

	Full year 2007	31.12.2007	Variation
Total	1094	902	21%
Internal links	872	756	15%
External links	222	146	52%

Total links in a full year exceed of 21% the whole set calculated on December 31. Whenever scholars could chose to take upon their selves to measure domestic links with a constant 15 % margin of error, would they go up to 52% when measuring transnational links? Implementing such a measurement need specific databases schema, that we have with own.

This is the second point about the temporalization of data. Interlocking directorate studies, particularly transnational ones still suffer from a lack of cross-time comparisons. When this is done, like in Carroll & Fennema (2002), the gap is so important that it generates an illusion of linearity, while nothing indicates the two selected points are not an aberration in a longer series. Even if we do not dismiss the idea of an increase of transnational links through the last decades, we plead for equipped longitudinal analyses, which would allow bringing out reliable results on the main historical trends. This is what we have done for the CAC 40 since 2002, and what we have begun to do with other European stock exchange indices since 2006. Of course, by now, we are still short with a comparison based on two following years, and we readily address our critics back to ourselves as well. But we think it is useful to establish first partial results and to invite comments at the beginning of the process, in order to improve future investigation.

Data set

Our data is based on the set of companies, which composed four stock exchange indices of the Eurozone on 2006 and 2007, December 31st (see table 2). These four indices are the AEX 25 (Netherlands), the CAC 40 (France), the DAX 30 (Germany) and the S&P/MIB 40 (Italy). All belong to the Eurozone and have been part of the founders of the EC. We are aware of the fact that the BEL 20 should be added to our corpus: work is in progress. Globally, 138 companies have been analyzed after we have taken into account merging initiatives (which were particularly numerous in the Italian bank in 2007) and common 'natural' entrance and exit activity within these indices[3]. The AEX index does not represent the whole list on December 31st, either in 2006 (24 companies) or 2007 (23 companies). In order to prevent redundancy, we have also been obliged to select an index of reference for companies, which are registered in two indices. We thus affiliated Unibail-Rodamco to the CAC 40 and STMicroelectronics to the S&P/MIB 40, according to the nationality of the CEO and to the localization of the index. We also subtracted one company – ArcelorMittal – because of the quasi-impossibility to affiliate it[4].

Table 2. Number of companies by index in the data set

	31.12.2006	31.12.2007
AEX 25	24	21
CAC 40	38	38
DAX 30	30	30
MIB 40	40	40
Total	132	129

The managers we retained are all members of the boards, including censors, representatives of employees and States, and observers, but not honorary presidents and secretaries. We added to them some executive managers who are not members of the board of directors or supervisory board such as members of Board of Management, Chief executive officer (CEO) and deputy CEO. Globally, 1788 individuals were retained for 2006 and 1792 for 2007 (each time on Dec. 31st). The global numbers of individuals who interlock boards are respectively 273 and 267. Annual reports and press releases were compiled to check all the data.

Measurement

The measurements presented here are essentially descriptive, in order to furnish a first cartography of the whole set of main stock exchange indices of the Euro zone. Contrary to most of the dominant literature about interorganizational networks based on Uzzi (1996), we don't analyze dyads, like Guieu & Meschi (2008) did for Europe, because this method seemed to us too restrictive to make appear the whole set of trans-indices' ties. It is not so rare that single individuals link boards without redundancy. In this case, measuring dyads would mean erasing the strength of weak ties (Granovetter 1971) transnational relations are characterized by.

[3] By 'natural', we mean initiatives, which are not linked to merging or purchase.
[4] ArcelorMittal is a company ruled by the Luxembourgian law, quoted in Amsterdam, Brussels, Luxembourg, Madrid, New-York and Paris while most of the capital is Indian, such as the President and Chief Executive Manager. It was present on the CAC 40 in 2006 (as Mittal Steel) and 2007, and on the AEX in 2007. We could have added it to the CAC, due to the purchase of Arcelor, but we will not be comfortable with that until we have treated the whole BEL 20 to which we could have affiliated it as well. Somehow, Arcelor Mittal can be consider as a transnational board.

We thus essentially examine links between firms and their density. However, we also made a big effort to bring out actors who embody these weak ties in the Euro zone by interlocking foreign boards. We here agree with Windolf (2002) when he claims that elite networks only partially match up corporate networks. In order to restore the link between the two, we applied the following geometric series:

We denote by n the number of mandates held by one director, and R_n, the number or relations created between firms. R_n is calculated as follow:

$$R_n = \frac{n(n-1)}{2}$$

If we have k indices and n_i the number of mandates of one director in each index

$$i \in \{1, \ldots, k\}$$

we can bring out the total number of mandates for one director from

$$N = \sum_{i=1}^{k} n_i$$

and N_r the global number of relations created from:

$$\frac{N(N-1)}{2}$$

So N_i the number of relations created in each index is calculated as follow:

$$i \in \{1, \ldots, k\}$$

and

$$\frac{n_i(n_i-1)}{2}$$

When one applies this measurement to strict transnational relations, they must calculate the total of the intercorporate links the actors constitutes by holding their mandates and to subtract all those, which are properly, related to inner indices subsets.

$$N_r - \sum_{i=1}^{k} N_i$$

So

$$\frac{N(N-1)}{2} - \sum_{i=1}^{k} \frac{n_i(n_i-1)}{2}$$

To conclude, we present a framework of the Euro zone's Core Corporate Network, calculated from relations managed by firms holding at least three relations on at least two indices.

RESULTS

A first measurement of all the links (table 3) structured among the whole set of company shows a clear domination of domestic interlocks. External links exist but are considerably less numerous than the inner stock exchange indices ones. Moreover these external links decrease on a higher degree from 2006 to 2007.

Comparison of inner and extra stock exchange links

Table 3. Corporate links (absolute value)

	31.12.2006		31.12.2007		Evolution on one year	
	n=132		n=129			
	Val	Bin	Val	Bin	Val	Bin
Total	1226	958	1138	902	-7,2%	-5,85%
Inner Index links	1016	762	982	756	-3,3%	-0,79%
Extra Index links	210	196	156	146	-25,7%	-25,51%

Val = valuated links i.e. taking into account redundancy
Bin = binary links i.e. counted once.

In order to have a better idea of this evolution, the variation of the number of companies must be neutralized by the measurement of the average in the two periods considered. Here it appears that the trend is far less noticeable for the totality of the links and becomes even positive for binary domestic links. These links therefore benefit from the general decrease, and particularly of the external links. Yet, valued links, which express power relations, continue to release more quickly from one year to another, and there again for extra stock exchange links.

Table 4. Corporate links (average)

	31.12.2006		31.12.2007		Evolution on one year	
	n=136		n=131			
	Val	Bin	Val	Bin	Val	Bin
Total	9,29	7,26	8,82	6,99	-5,0%	-3,66%
Inner Index links	7,70	5,77	7,61	5,86	-1,1%	1,52%
Extra Index links	1,59	1,48	1,21	1,13	-24,0%	-23,78%

Density measurement (table 5) shows highly density into indices than in the whole network. DAX and CAC lead also AEX and MIB present weakness density. One have to careful about MIB considering high numerous of homonymous. This indicates probable strong family networks.

Table 5. Density (binary)

	31.12.2006	31.12.2007
AEX 25	0,26	0,29
CAC 40	0,36	0,39
DAX 30	0,6	0,56
MIB 40	0,2	0,2
All	0,11	0,11

Structure of intercorporate relations between stock exchange indices

Table 6. Distribution of links by index (valued average)

31.12.2006				
	CAC	DAX	MIB	AEX
CAC (n=38)	8,53	1,11	0,58	0,45
DAX (n=30)	1,40	12,53	0,47	0,13
MIB (n=40)	0,55	0,35	5,70	0,15
AEX (n=24)	0,71	0,17	0,25	3,67

31.12.2007				
	CAC	DAX	MIB	AEX
CAC (n=38)	9,05	0,66	0,50	0,39
DAX (n=30)	0,83	11,20	0,40	0,17
MIB (n=40)	0,48	0,30	5,70	0,05
AEX (n=21)	0,71	0,24	0,10	3,52

This result reinforces the first observations. Transnational relations exist, and for the four indices, but are very clearly underrepresented. The DAX and the CAC show out a valued average between 8 and 12 for inner stock exchange links, and only averages of 0.13 and 1.40 for extra stock exchange links. The AEX and the MIB get a lower average for inner stock exchange links, but neatly superior to the extra ones. Generally, extra stock exchange links are not numerous, less than one by company excepted for the Franco-German relation, with 1,40 for DAX-CAC and 1,11 for CAC-DAX in 2006.

Pearson's Chi2 Test applied to absolute value of links ($p<0.001$; ddl=9; chi2=2120.83 for 2006 and chi2=2170,58 for 2007) confirms that the distribution is not independent from indices (See the Appendix).

In order to get a sharper idea of the nature of the distribution, we did a partial Chi2 test, (Chi2 partial/Chi2 total). Each Value is determined by the cell (in percent) in the total Chi2. Signs mean positive or negative gap from independence. In blue the most important variation from independence, in orange the smallest one.

Table 7. Partial Chi2 Test

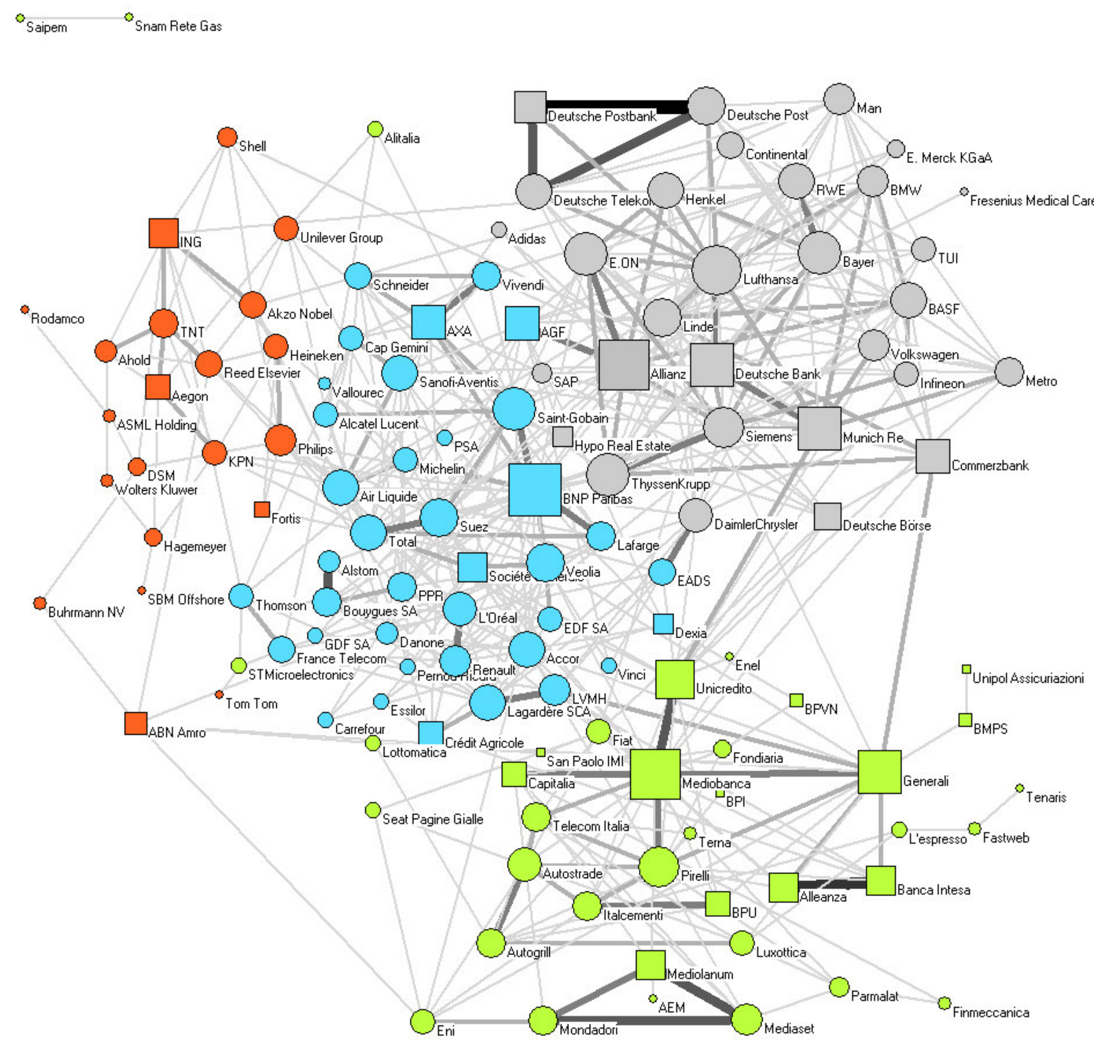
	31.12.2006							31.12.2007				
	CAC	DAX	MIB	AEX	SUM			CAC	DAX	MIB	AEX	SUM
CAC	+12,75	-3,41	-2,39	-0,55	404,92		CAC	+13,08	-4,08	-2,69	-0,49	441,37
DAX	-3,41	+14,85	-3,30	-1,57	490,47		DAX	-4,08	+16,25	-2,96	-1,04	528,27
MIB	-2,39	-3,30	+22,52	-0,70	613,13		MIB	-2,69	-2,96	+21,76	-0,84	613,17
AEX	-0,55	-1,57	-0,70	+26,06	612,31		AEX	-0,49	-1,04	-0,84	+24,71	587,77
SUM	404,92	490,47	613,13	612,31	2120,83		SUM	441,37	528,27	613,17	587,77	2170,58

Let's first notice that all inter-indices interlocks are underrepresented, while all intra-indices links are overrepresented, which confirms the previous Chi2 test. From this test, AEX and the MIB show out as the most positive results. This means that, despite a huge quantity of interlocks in both the CAC and the DAX, firms quoted in the AEX and the MIB, as far as they establish relations, prefer to do it with firms from their own index. From this perspective, we can already consider that Dutch and Italian firms lead a kind of "defensive" strategy against transnational interlocks. Yet, the AEX extra-indices links are the closest to independence (expected values), especially with firms quoted in the CAC and the MIB. This means that Dutch firms have a higher degree of transnational interlocks than other firms between other indices. So we may consider, at least as an hypothesis, a strong correlation between this kind of "defensive" strategy and transnational openness. Let us underline an apparent trend of strengthening relations between the CAC and the AEX, which are the closest to independence for both years. This means an amazing Franco-Dutch connection, which unexpectedly appears as relatively stronger than the Franco-German one. As we can see in the Table 6 and the Appendix, the CAC and the DAX have the most numerous transnational interlocks, but the related partial Chi2 score presents the most negative gaps from independence. So the apparent strength of Franco-German relations is actually inferior to their expected value. Furthermore, the DAX is characterized by the most negative gaps for extra-indices interlocks. So the German index is proportionally more isolated than other indices.

So it gets clear that a transnational network of interlocks exists, but is far weaker than inner index interlocks, which leads us to be very cautious towards every theory that would defend the idea of a dilution of national links in a transnational field (see for example Robinson & Harris 2000). On the contrary, partial Chi2 test shows that the most open index (AEX) is also this, where the preference for internal links is the most developed.

As far as we take a look at the four indices, we see how they are interconnected (Graphs 1 and 2). Weak ties between stock exchange boards represent 17% of the whole set of links in 2006 and 14% in 2007.

Graph 1: Corporate Network at 31.12.2006 (valued)

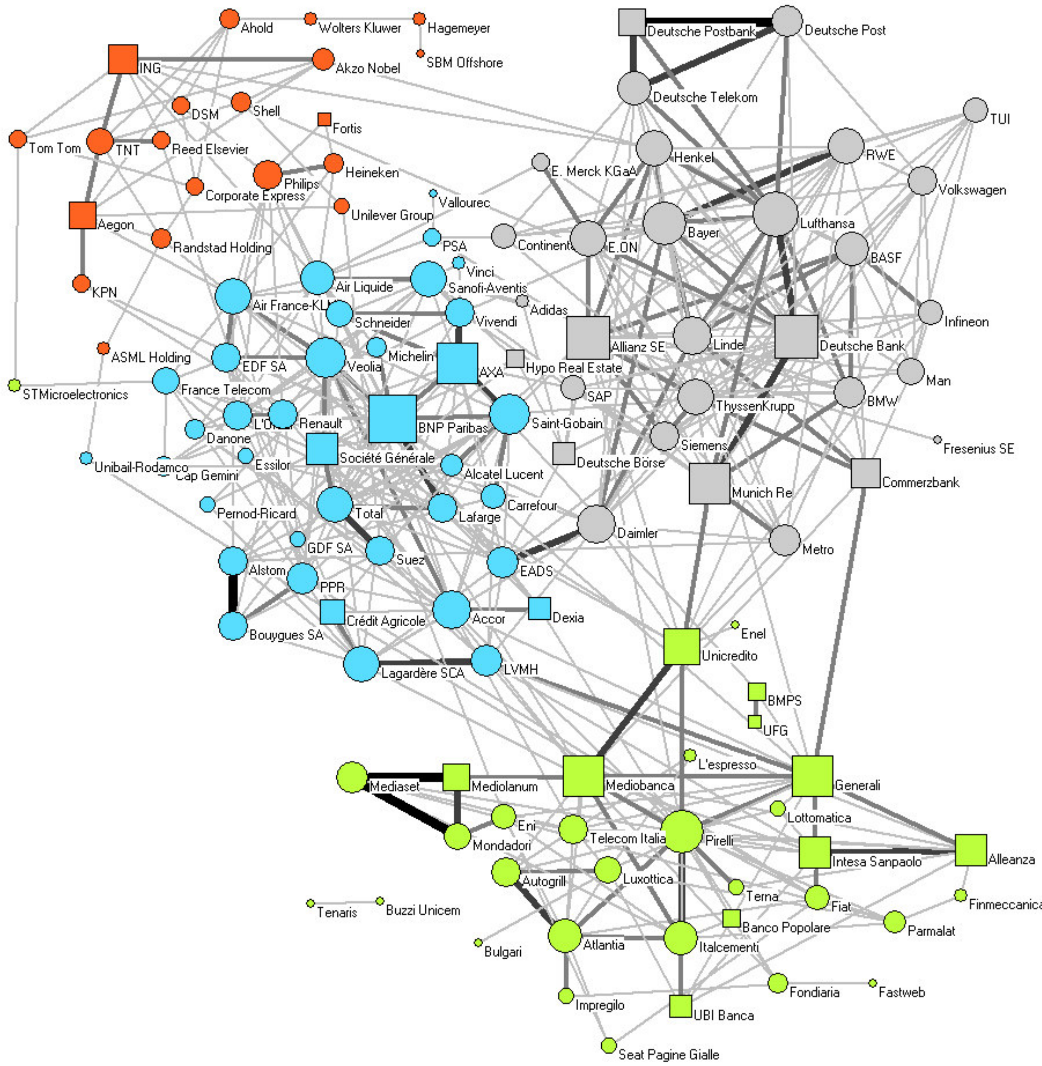


Weight : degree centrality

Box : Financial firms (bank-assurance) Circle : any other kind of firms

Blue: CAC 40; Gray: DAX 30; Green: MIB 40; Orange: AEX 25.

Graph 2: Corporate Network at 31.12.2007 (valued)



Weight : degree centrality
Box : Financial firms (bank-assurance) Circle : any other kind of firms
Blue: CAC 40; Gray: DAX 30; Green: MIB 40; Orange: AEX 25.

Eurozone's business elites[5]

Only a few actors structure weak ties between inner index networks of interlocks: they are 45 out of 273 in 2006 and 44 out of 267 in 2007 (see table 5). Due to their strategic position, they constitute the core network of the core business elites in Europe. A first measurement indicates that the density of the elites transnational

[5] Following measurements are valuated.

network is up to 0.30 for 2006 and up to 0.24 for 2007, which means a higher score than the global elites network (0.06 et 0.05). If we only retain actors who hold more than three mandates in two stock exchanges at least, they are now 24 for 2006 et 21 for 2007, but the density score for this close elite network reaches 0.50 and 0.43.

The low number of key actors and the concentration of mandates explain great variations from one year to another. As the table 8 indicates, a single exit may have a huge impact. This is the case for Gerhard Cromme, who left four of his eight mandates in 2007, which deleted 22 interlocks among which 12 were transnational. Let's notice that seven actors do the essentials of the moves from 2006 to 2007, which means 51% of the decrease and 56% of the increase.

Table 8. Transnational interlockers in the Euro zone from 2006 to 2007

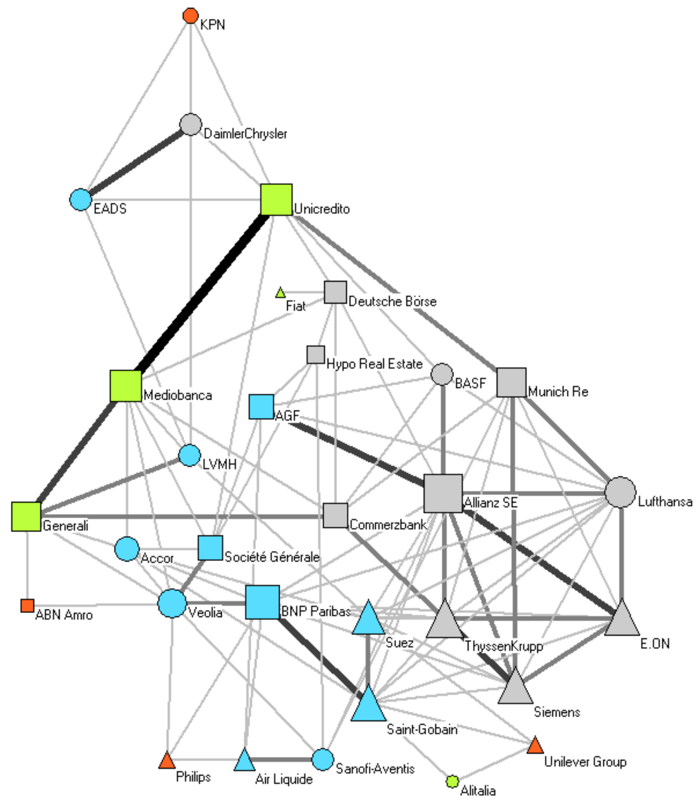
Actor	**# mandatory**			**Extra-index links**			
	2006	2007	Variation	2006	2007	Variation	% of variation (+/-)
Cromme	8	4	-4	15	3	-12	**-29%**
Spinetta	4	3	-1	5	_	-5	**-12%**
Diekmann	5	4	-1	4	_	-4	**-10%**
Bischoff M.	4	3	-1	6	3	-3	-7%
Scaroni	4	3	-1	5	2	-3	-7%
Profumo	3	1	-2	2	_	-2	-5%
Bolloré	2	_	-2	1	_	-1	-2%
Bourdais de Charbonnière	3	2	-1	2	1	-1	-2%
Breipohl	2	1	-1	1	_	-1	-2%
Faber J.	2	1	-1	1	_	-1	-2%
Jeancourt-Galignani	4	3	-1	3	2	-1	-2%
Landau I.	3	2	-1	2	1	-1	-2%
Lippens	2	1	-1	1	_	-1	-2%
Lombard D.	3	2	-1	2	1	-1	-2%
Passera	2	1	-1	1	_	-1	-2%
Ruys	2	1	-1	1	_	-1	-2%
Studer	2	1	-1	1	_	-1	-2%
Thierry	3	2	-1	2	1	-1	-2%
Mangold	1	2	+1	_	1	+1	7%
Mussari	1	2	+1	_	1	+1	7%
Polet	1	2	+1	_	1	+1	7%
Uebber	1	2	+1	_	1	+1	7%
Vuursteen	3	4	+1	2	3	+1	7%
Westerburgen	2	2	_	_	1	+1	7%
Carron	3	3	_	_	2	+2	**14%**
Cucchiani	1	3	+2	_	2	+2	**14%**
Streiff	2	3	+1	_	2	+2	**14%**
van Wijk L.	1	3	+2	_	2	+2	**14%**
Apotheker	2	2	_	1	1	_	_
Azéma J.	3	3	_	2	2	_	_
Balbinot	2	2	_	1	1	_	_
Bernheim	5	5	_	4	4	_	_
Bomhard	2	2	_	1	1	_	_
Cordero di Montezemolo	2	2	_	1	1	_	_
Della Valle	2	2	_	1	1	_	_
Dunn	2	2	_	1	1	_	_
Galateri di Genola	4	4	_	3	3	_	_
Grube R.	2	2	_	1	1	_	_

Highbury	2	2	_	1	1	_	_
Innocenzi	2	2	_	1	1	_	_
Job	2	2	_	1	1	_	_
Kley M. D.	3	3	_	2	2	_	_
Krebs	2	2	_	1	1	_	_
Lagardère A.	5	5	_	4	4	_	_
Lamberti	3	3	_	2	2	_	_
Markl	3	3	_	2	2	_	_
Müller K.-P.	3	3	_	2	2	_	_
Pohle	2	2	_	1	1	_	_
Schinzler	3	3	_	2	2	_	_
Schweitzer L.	6	6	_	5	5	_	_
Strutz	2	2	_	1	1	_	_
van Lede	5	4	-1	4	4	_	_
van Miert	3	3	_	2	2	_	_
Wyand	2	2	_	1	1	_	_
Total	**148**	**134**	**-14**	**105**	**78**	**-27**	_

Euro zone's Intercoporate Core

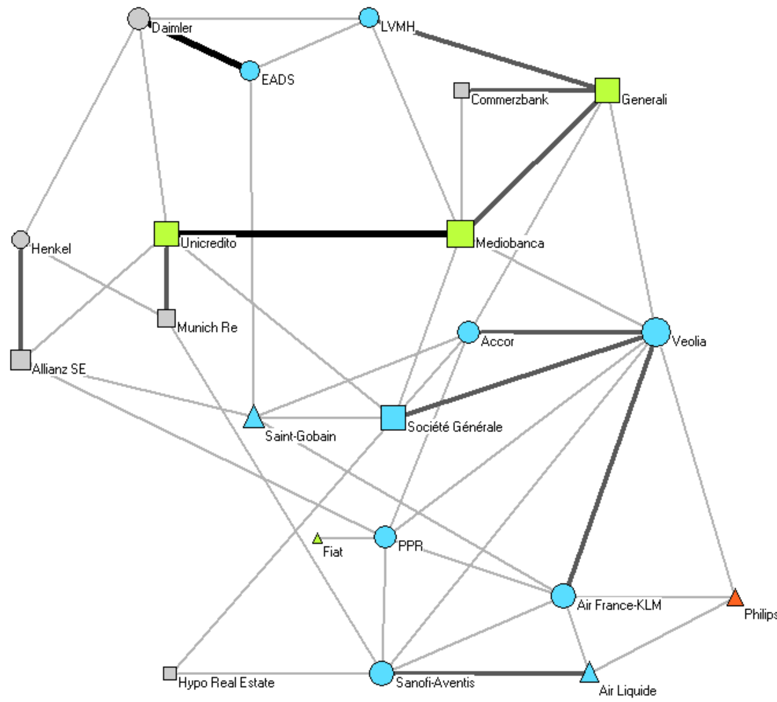
Now we can take a look at the Euro zone core corporate network. We take into account here firms that have at least three transnational links and we measure the whole set of relations they maintain, including inner stock exchange ones. We then have 31 companies and 254 links for 2006, 21 companies and 116 links for 2007, with density of 0.53 both.

Graph 3. Euro zone Core Corporate Network 31.12.2006



Colors: Blue = CAC; Gray = DAX; Green = MIB; Orange = AEX. Symbols: square = financial firm; triangle = ERT; circle = industries out of the ERT. The size of nodes is related to the number of relations.

Graph 4. Euro zone Core Corporate Network 31.12.2007



Colors: Blue = CAC; Gray = DAX; Green = MIB; Orange = AEX. Symbols: square = financial firm; triangle = ERT; circle = industries out of the ERT. The size of nodes is related to the number of relations.

The dramatic decrease of networks from 2006 to 2007 reveals the low stability of the Euro zone core corporate network. According to our criteria, we here move from 31 interlinked companies in 2006 to only 21 in 2007. But we see very well here that the main result of this measurement is the central position of financial companies' boards. This means that the bank insurance sector must be taken into account as far as one looks for a leading small world of transnational business in the Euro zone.

DISCUSSION AND CONCLUSION

Our tests confirm our first hypothesis: stock exchange internal networks are made of much stronger ties than the global transnational network, which was also pointed out by Guieu & Meschi (2008) for the period from 2000 to 2003. As Granovetter (1971) showed, the density of a network is correlated to its withdrawal into itself, which indicates that the national anchorage of core business elites is still vivid. White (1992) added that strong density within subsets would also signify a self-perception of their social identity by their members. Even if we did not implement such measurements, Rao & al. (2000) have demonstrated this in their case studies of the NASDAQ and the NYSE. Due to this self-perception, all stock exchange internal relationships may at least be considered as latent. Yet, we have in our corpus five companies in 2006 and seven in 2007, all in the MIB and the AEX, that were not interlocked. In our stock exchange indices, we also find companies which seem less integrated in national core business cliques: Alitalia, ST Microelectronics for the MIB, Rodamco for the AEX, Vallourec for the CAC 40, Fresenius Medical care for the DAX—the two latter highly dependant on PSA and Bayer, respectively. Our tests show that business relations remain mainly incorporated in national interlocks and that the stock exchange may play a structural role among other institutions. If there are still varieties of capitalism in Europe, as Hall & Soskice (2001) or Fligstein (2008) claim, we invite neo-institutionalism scholars to place more attention on the structuring capacities of European stock exchange main indices. The strong density of the CAC and DAX internal links show that the so-called capitalism of the Rhine is not dead. Some cliques, such as the one which structures the intercorporate links between Deutsche Postbank, Deutsche Post and Deutsche Telekom, are so incorporated that they constitute real national fortresses. Yet, beyond such vestiges of State monopolies, this model of capitalism is above all reconstructed around powerful financial companies whose managers are very active in blue chip boards.

Thus, we did not find a highly integrated and structured transnational European business network. Our study rather suggests that weak ties interlink strong national poles. Let us notice, however, the particularity of the AEX, where neat preference for domestic interlocks contrasts with the weaker integration of the Dutch business network. This paradox may indicate, as we will see, a kind of dilution of Dutch capitalism in the globalization of business.

Regarding our second hypothesis on bilateral relations, cautious comments should be given. Unsurprisingly, the majority of transnational interlocks are structured between the CAC and he DAX companies. However, the high variation of interpersonal and intercorporate networks shows that there is no real process of transnational incorporation, but entrepreneurs' strategies that invest structural holes. Most of the existing relations are led by single actors who manage a good insertion in the different worlds, embody collaborations and impose themselves temporarily as real go-betweens in project management initiatives they are able to exit with. Yet, Franco-German relations are proportionally less developed than other bilateral relations (Partial Chi2 test). So, relations between big firms in France and Germany are not as strong as expected. Our results for 2006 and 2007 must still be related to the shadingoff process in Franco-German affairs of the last few years. An example of this is the failure of the connection between Euronext and Deutsche Börse in 2006, which led to the NYSE-Euronext alliance, industrial disputes and mainly the governance crisis of EADS. Another example of this is the end of the strategic partnership between Areva and Siemens in nuclear production. All these tensions are the backdrop of our observations of the decline of Franco-German interlocks between 2006 and 2007. We would not be that surprised if the 2007-2008 continued to release these Franco-German relations. In that case, a deeper trend of restructuration should not be excluded, but it is still too soon to make this claim.

Our results on the transnational links between French and Dutch boards are more striking. We find here another axis, which has of course a lower intensity, but may challenge the Franco-German axis if the increasing trend persists. One explanation is what we could call, inside the European core business, a process of absorption of the periphery by its centre. Indeed, for years now, the Dutch blue chips have been engaged in big reorganization, with increasing purchase from foreign companies (see table 9).

Table 9. AEX quoted companies purchased by foreign groups since 2000

Year	Dutch Firms on AEX	Foreign Firms	Country
2000	Baan	Invensys	UK
2002	CMG	Logica	UK
2004	KLM	Air-France	France
2005	P&O Nedlloyd	Möller-Maersk	Denmark
	Versatel	Tele2	Sweden
2007	Rodamco	Unibail	France
	ABN Amro	Barclays- RBS -Santander	UK-Espagne
	Numico	Danone	France
2008	Hagemeyer	Rexel	France
	Corporate Express	Staples	USA

With four of the ten main purchase initiatives, French companies have gained good positions in what looks like the carving of Dutch capitalism. For KLM and Rodamco, the rapprochement was made by a kind of merging with quasi-equal boards. In 2007, Air-France KLM is linked with ten companies of the CAC 40 and four of the AEX, while Unibail-Rodamco, is linked with the Crédit Agricole (CAC 40) and the ASML Holding (AEX). There is without doubt a tight relation between these new connections and the increasing number of interlocks between the companies of the two stock exchanges. The merging of these stock exchanges in the Euronext in the early 2000s might also have favoured these dynamics.

However, the fact that strong internal relations within stock exchanges are concomitant with weak transnational ties, more or less personified and opportunistic, signifies the absence of highly incorporated transnational networks that would constitute a Eurozone integrated capitalist class or even business community. If the networks we drew indicate a transnational business area, the latter remains deeply anchored in national core business networks. Moreover, the negative evolution of the whole set of ties invites us to be all the more cautious of comparisons within short periods. The decrease we observe between 2006 and 2007 may be an accident in a global series of increasing interlocking, but could also be an indicator of a recent turn. The relations between the four stock exchange blue chips are based on weak ties whose evolution may always substantially modify the whole structure. Transnational connections within the global network are the work of key actors of significantly different composition and portfolios, though their whole number remains rather stable. This means, and even we intend to prove this, on the basis on longitudinal analysis, that the transnational network is always very connective, but we first have to notice that it is very unstable. For Fligstein (2008), the European economic integration has not yet been accompanied by a comparable integration of European elites. Moreover, a similar study which would take into account interlocks with the American companies might indicate a stronger competition between the Euro zone transnational ties and the transatlantic ties than the one observed in the 1980s and 1990s.

However, our first quick look at the transnational embeddedness of the Euro zone stock exchange through board interlocks shows a rather different physiognomy of the core intercorporate network. Here, the financial companies are the most significant bridges in the Euro zone, which would tend to confirm the hypothesis of integrating effects of the EMU, with financial reorganization that 2008 and 2009 could dramatically accelerate in the context of the financial crisis.

It is very clear now that bank and insurance companies have the most central position in national networks, though it is hard to say if this is new due to the heterogeneity of previous datasets. But let's see that all national areas are highly structured around a couple or a tryptic of bank-insurance companies: AXA-BNP Paribas for the CAC, Allianz-Deutsche Bank-Munich Re for the DAX, Generali-Mediobanca-Unicredito for the MIB, and, in a lower proportion, Aegon-ING for the AEX. More interesting is the high presence of the financial companies in what we called the Eurozone Corporate Core Networks. This observation is very different from what Nollert found when he claimed the absence of such firms in the European Inner Circle. It must be said in his defence that his data did not go beyond 1994, missing the main restructuring of bank and insurance in Europe. Allianz, AXA, Generali emerged as European giant between 1996 and 1998. As for banks, processes of merging and purchase are even more recent and have not yet concentrated the sector to the same extent, now at stake in the context of uneasy salvaging by States. We do not exclude that the EMU process of financial integration had strong effects on the distribution of board portfolios and favoured the birth of giants in the field of bank and insurance. In this domain, studying the Eurozone for itself, as we do, would be meaningful. Longitudinal and enriched data will give us more reliable information in the future, and will provide better insight on the strength of this trend.

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Appendix

Chi-2 Test (Pearson)

H(o): Are interlocks between Euro zone's firms independent from indexes?

Observed Value

31.12.2006					
	CAC	DAX	MIB	AEX	SUM
CAC	324	42	22	17	405
DAX	42	376	14	4	436
MIB	22	14	228	6	270
AEX	17	4	6	88	115
SUM	405	436	270	115	1126

31.12.2007					
	CAC	DAX	MIB	AEX	SUM
CAC	344	25	19	15	403
DAX	25	336	12	5	378
MIB	19	12	228	2	261
AEX	15	5	2	74	96
SUM	403	378	261	96	1138

Expected Value

31.12.2006					
	CAC	DAX	MIB	AEX	SUM
CAC	133,79	144,03	89,19	37,99	405
DAX	144,03	155,05	96,02	40,90	436
MIB	89,19	96,02	59,46	25,33	270
AEX	37,99	40,90	25,33	10,79	115
SUM	405	436	270	115	1226

31.12.2007					
	CAC	DAX	MIB	AEX	SUM
CAC	142,71	133,86	92,43	34,00	403
DAX	133,86	125,56	86,69	31,89	378
MIB	92,43	86,69	59,86	22,02	261
AEX	34,00	31,89	22,02	8,10	96
SUM	403	378	261	96	1138

Chi-2

31.12.2006				
	CAC	DAX	MIB	AEX
CAC	270,43	72,28	50,62	11,60
DAX	72,28	314,84	70,06	33,29
MIB	50,62	70,06	477,71	14,75
AEX	11,60	33,29	14,75	552,68

$p<0.001$; Chi-2=2120.83; ddl=9

31.12.2007				
	CAC	DAX	MIB	AEX
CAC	283,89	88,53	58,33	10,61
DAX	88,53	352,72	64,36	22,67
MIB	58,33	64,36	472,28	18,20
AEX	10,61	22,67	18,20	536,28

$p<0.001$; Chi-2=2170.58; ddl=9

Both Chi-2 shows a high significance, so we reject H(o).