ove Office of Evaluation and Oversight

Evaluation of the Results of the Realignment

Organizational Change and Collaboration Dynamics: A Social Network Analysis of the IDB

Background Paper

IDB

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ABSTRACT

This paper analyzes the effects of the Realignment process of the Inter-American Development Bank (IDB) on internal collaboration outcomes. Network analysis methods are used to depict social networks and to measure the degree of collaboration between IDB employees at different points in time. Drawing on a before-and-after comparison, we conclude that the Realignment successfully dismantled the institution's regional segmentation and location silos. However, collaboration within and between sectors does not appear to have increased.

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I. INTRODUCTION

1.1 The Inter-American Development Bank (IDB, or the Bank) is the largest source of development financing for Latin America and the Caribbean (LAC). It lends to national, provincial, state, and municipal governments, as well as to private and autonomous public institutions in 26 countries of the Region. The Bank provides loans, credits, technical assistance, and grants to clients, and carries out knowledge generation activities, including research and evaluation. The IDB has grown substantially as an organization since its foundation in 1959. From a modest start, it now employs more than 2000 individuals, who are organized in multiple departments, offices and sectors.[1]

1.2 In 2007, the IDB underwent a major institutional overhaul. The "Realignment" was implemented by the Bank's administration to improve the overall functioning of the organization. Among other things, the revamp involves introducing a matrix structure, decentralizing personnel, and streamlining processes. Through these actions, the Realignment intended to reduce the fragmentation of the Bank's technical expertise in order to boost its presence in, and relevance for, LAC.

1.3 The IDB Board of Executive Directors recently requested the Office of Evaluation and Oversight (OVE) to evaluate the Realignment. For the evaluation OVE is examining the reforms that were carried out and assessing the Realignment's intermediate outcomes in terms of increased country focus, stronger sectoral knowledge, and improved institutional efficiency.

1.4 This paper, one of several informing OVE's evaluation, seeks to analyze the Realignment's effects on reducing the fragmentation of technical expertise by studying collaboration among Bank employees. Here, *collaboration* is defined as common participation in the design of loan operations. The specific objectives of this paper are to assess whether (i) the overall level of collaboration among Bank employees changed with the Realignment; (ii) the Realignment affected the segmentation between personnel at headquarters and those in country offices; (iii) the Realignment affected the fragmentation of personnel by client regions; and (iv) collaboration within and between sectors changed with the Realignment.

1.5 This paper uses social network analysis (SNA) to describe the social dynamics of the organization and to quantify the level of formal collaboration among employees.[2] We rely on two sources of data to determine employees' participation in the design stage of loan operations: IDB's Time and Labor System and the Bank's official Personnel Roster for 2004-2012. The application of SNA to these data allowed the computation of various yearly collaboration indexes and the

[1] A more detailed description of the Bank, its governance structure, and activities can be found at`http://www.IDB.org`.

[2] Social network analysis (SNA) is an interdisciplinary methodology in which observable social relations across individuals are depicted and measured, using a extensive list of indicators.

identification of changes in trends that likely resulted from the Realignment reforms.

1.6 All our conclusions are drawn from comparisons between the pre-Realignment and post-Realignment IDB, using the year 2007 as the threshold between the two periods. Although before-and-after comparisons are rarely good approaches for assessing impacts, we consider them appropriate in this case for several reasons. First, the Realignment was a comprehensive reorganization that was intended to bring profound changes to the inner workings of the Bank; thus, the achievement of its objectives should be reflected in large changes that should eclipse all other, relatively minor, shocks that may have occurred concurrently. Second, as the Bank is a nearly unique institution, most other impact evaluation methods are inapplicable, as no valid forms of obtaining a trustworthy counterfactual are available. Third, the social networks constructed represent the Bank holistically, without making any assumptions about how individuals or departments work together. And finally, this approach takes advantage of existing data that cover the periods before and after the implementation of the reforms.

1.7 The results suggest that the Realignment process successfully dismantled the institution's regional. It also seems to have succeeded in breaking location silos and fostering greater collaboration between operational staff in headquarters and country offices. However, it does not appear to have fostered greater collaboration among operational staff, both at the aggregate and sector level, at least in the design stage of the project cycle.

1.8 This paper is organized as follows. Section 2 lays out the specific evaluation questions addressed in the paper, taking into account the stated objectives and implemented reforms of the IDB's Realignment. Section 3 discusses the methodology, including the theoretical foundations of SNA and some key formal definitions. Finally, Section 4 presents the main results, and Section 5 summarizes the key findings.

II. EVALUATIVE QUESTIONS

2.1 In 2006, in response to the Bank's perceived loss of relevance and presence in Latin America and the Caribbean, the IDB's Board of Governors authorized a Realignment that had two main objectives: (i) to increase the development effectiveness of Bank activities, and (ii) to increase the Bank's organizational efficiency. [3] The Realignment involved a number of reforms: the introduction of a

[3] According to the Realignment proposal, the IDB was struggling in a context of (i) LAC's countries' greater access to alternative sources of financing; (ii) the appearance of new actors, such as subnational governments that were responsible for investment decisions; (iii) heterogeneous nature of the countries of the region, and (iv) pressures to obtain results more quickly. The Bank was perceived as slow and bureaucratic, with complicated and undifferentiated processes, products that were not very innovative or flexible, and lagging technical capacity and know-how. Decreasing presence and relevance in the region was affecting the Bank's ability to influence the economic and social development.

new organizational structure (a matrix organization); the selection and development of areas of sector specialization and new processes for strategy preparation and programming; the implementation of new processes for project design, execution, and for the management of knowledge products; the renewal of human resource skills and decentralization of personnel; and the concentration of specialists in a single Vice-Presidency.

2.2 The introduction of these reforms, and particularly the establishment of the new organizational structure, sought to generate conditions for improved internal collaboration among employees. The Bank's report outlining the Realignment recognized that the Bank's technical expertise was deeply fragmented, "with sector staff distributed into small groups in SDS, INT, the different sector divisions in the regions, and the Country offices. This situation is compounded in the Regional Operations Departments, because they operate as silos and hence cannot achieve economies of scale, flexibility in resource allocation, or the advantages that could be derived from sharing lessons learned among the different regions".[4] Moreover, according to the diagnosis, this fragmentation took many shapes: "(i) project design/execution; (ii) knowledge/operations; (iii) HQ/HQ; (iv) HQ/COF; (v) private/public; and (vi) private/private, weakening the Bank's responsiveness and multiplying coordination problems".[5]

2.3 This paper focuses on the issue of formal collaboration among Bank employees, seeking to address whether the Realignment succeeded in reducing some of this technical fragmentation. In particular, it intends to provide answers for the following evaluative questions:

- To what extent has the Realignment triggered increased collaboration between the operational staff?
- To what extent has the Realignment succeeded in breaking the headquarters/country office fragmentation?
- To what extent has the Realignment succeed in breaking the regional silos?
- To what extent has the Realignment triggered greater intersectoral collaboration?
- To what extent has the Realignment triggered greater intrasectoral collaboration?

III. DATA AND METHODOLOGY

3.1 In this paper we use the tools of SNA to map work interactions between IDB employees during the design stage of loan operations. We use data collected

[4] Realignment of the Bank to take on its strategic challenges, par. 5.8 (GA-232), November 7, 2006.

[5] Idem.

continuously by the Bank's administration to identify common participation in operations inside the IDB over a nine-year period. This allows us to quantify the degree of formal collaboration in the institution, identify changes over time, analyze work relations between and within sectors, and study the persistence of regional and location silos.[6]

3.2 We base our analysis on common team membership, the most explicit form of collaboration between Bank employees. Our networks consider teams working on the design of sovereign-guaranteed and non-sovereign guaranteed loans, IDB's core business.[7] Data on the individuals working on these activities were obtained from the Bank's Time and Labor System, in which employees report the distribution of their working hours by product; and their affiliation and location in the Bank were obtained from the official Personnel Roster. To distinguish main team members from marginal participants, our analysis considers only employees who reported having contributed at least 10% or more of the total time spent in the design of a project.[8]

3.3 The use of information from the Bank's Time and Labor system is convenient, as the data contained there are collected continuously and cover the entire universe of projects. It also makes the replication of this exercise easy. Unfortunately, it also has drawbacks: information is limited to full-time employees, so it is impossible to asses the role of consultants; and it does not record informal assistance among staff members.

3.4 Using this information we constructed eight yearly networks, for the periods 2004-2006 and 2008-2012, based on loans approved. We omitted information from 2007, the year when the core Realignment reforms were implemented. All networks are composed of nodes, each representing an IDB employee, and ties, linking nodes together according to common participation in project teams. Figure 1 depicts the network for 2005. The small islands with one to five fully interconnected nodes

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6 The use of network analysis to study the social dynamics of groups of individuals is not new, although it has rarely been used only to evaluate the effects of organizational reforms. Initially advanced by sociologists and researchers in social psychology in the 1960s and 1970s, SNA rapidly expanded into other areas as management, economics, marketing and industrial engineering (Coulon 2005). As such Borgatti and Foster (2003) note the volume of publications using network techniques has increased exponentially in recent years. Among other things, SNA has been used to describe the consolidation of the political and economic power of the Medici in early 15th century Florence (Padgett and Ansell 1993), to characterize world trade (Benedectis and Tajoli 2009) and to estimate the diffusion effects of social interventions (Fafchamps and Vicente 2010). More recently, the use of these methods has gone beyond the area of pure research topics, reaching big corporations that have used this tool to improve performance and boost innovation (Cross and Thomas 2009). For a complete review of social network methods and some of the applications, see Hanneman and Riddle (2005).

7 The design period considered corresponds to the 12 months preceding the approval date.

8 Unfortunately, the IDB lacks an historical record of project team members for the pre-Realignment period; therefore, the Time a Labor System was used to identify project teams at the design stage. The 10% threshold is intended to distinguish between actual team members and other employees who still reported time because of their involvement in reviews (e.g., QRRs). Administrative, financial, and legal personnel, although in the original dataset, were also excluded as they are not in the core of the operational work.

correspond to teams that worked exclusively together during that year. Larger conglomerates of nodes appear as employees participate simultaneously in two or more teams. Each independent set of nodes is called a *component*.

Figure 1. IDB Collaboration Network for 2005

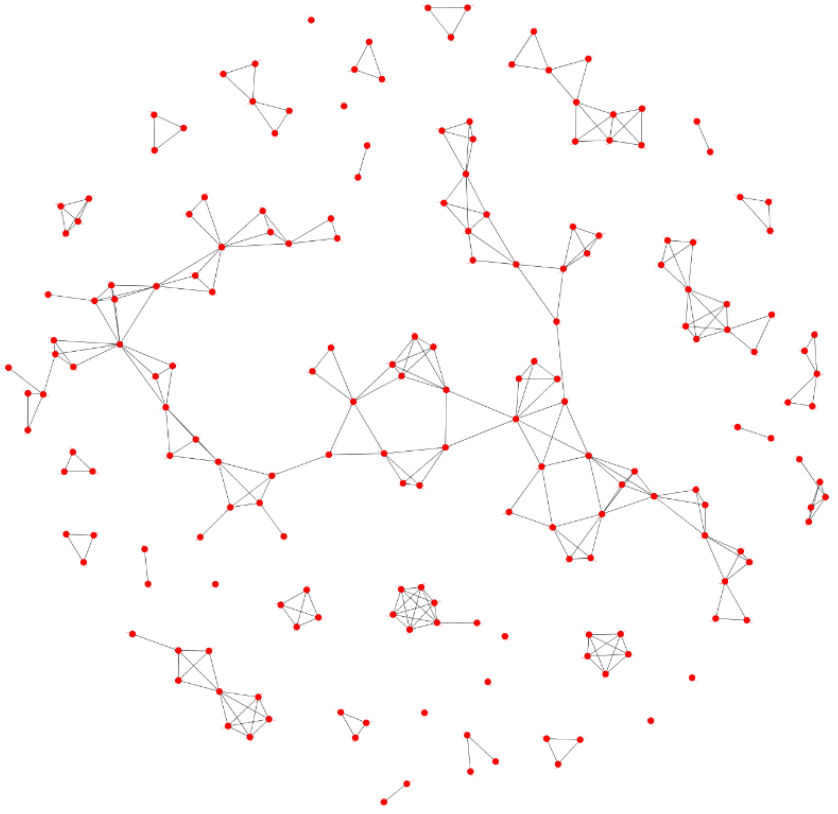
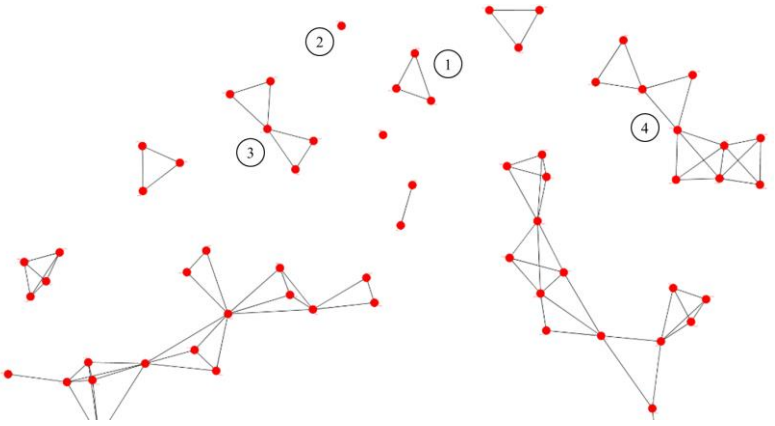


Figure 2. Sections of the IDB Collaboration Network



3.5 Figure 2 presents some sections of the upper part of Figure 1. A team composed of three individuals can be observed in (1). As these employees did not participate in other teams, this group appears separated from all other nodes. Isolated points (such as the one marked by number 2) represent employees who did not share connections at all with other employees.[9] An individual working in two teams can be observed at the center of (3). In general, components become larger as more individuals participate in several teams simultaneously. A component with four teams can be observed in (4), where two project teams share two members.

3.6 Formally, each network is defined as:

$$N^t=(V^t,L^t,W^t,P^t) \quad (1)$$

3.7 Where N^t denotes the network of year t; $V^t=\{1,2,...,n^t\}$ refers to the set of nodes and L^t to the set of links associated with it;[10] and L^t can be understood as a matrix containing binary values, with $L_{ij}^t \in \{1,0\}$ denoting respectively the presence (or absence) of a link between nodes i and j.

3.8 In the definition of a network, the *link value function* W^t corresponds to a vector of observable characteristics of links (for example, project names). This information is useful to differentiate distinct links in order to analyze specific forms of fragmentation. Equivalently, the *node value function* P^t gathers identification characteristics associated with nodes (e.g., the association of each individual to a particular sector).

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[9] Given our definition of collaboration, other employees may have participated marginally in this project, but each devoted less than 10% of the total time required for its design.

[10] In this paper, we use *nodes* and *vertexes* interchangeably to refer to individuals in the network. Similarly, we use *links* and *ties* to refer to connections between nodes. We follow the notation used by Benedectis et al. (2009) in all our mathematical formulas.

3.9 Graphical representations of the network, like the one presented in Figures 1 and 2, can be formally defined as $G^t=(V^t,L^t)$. There are infinite ways to draw the same network by altering the spatial position of the nodes. To obtain a graph that is comprehensive and aesthetically pleasing, the standard approach is to use a force-directed algorithm that finds a particular arrangement where all links are drawn with approximately the same length, and the number of crossings between them is minimized.[11]

3.10 As the network graphs share this random aspect, we do not analyze their year-by-year evolution directly. Instead, we rely on standardized indexes to perform all comparisons. In conjunction, these indexes provide a consistent representation of the network being analyzed. The statistics used here to describe the networks are as follows:

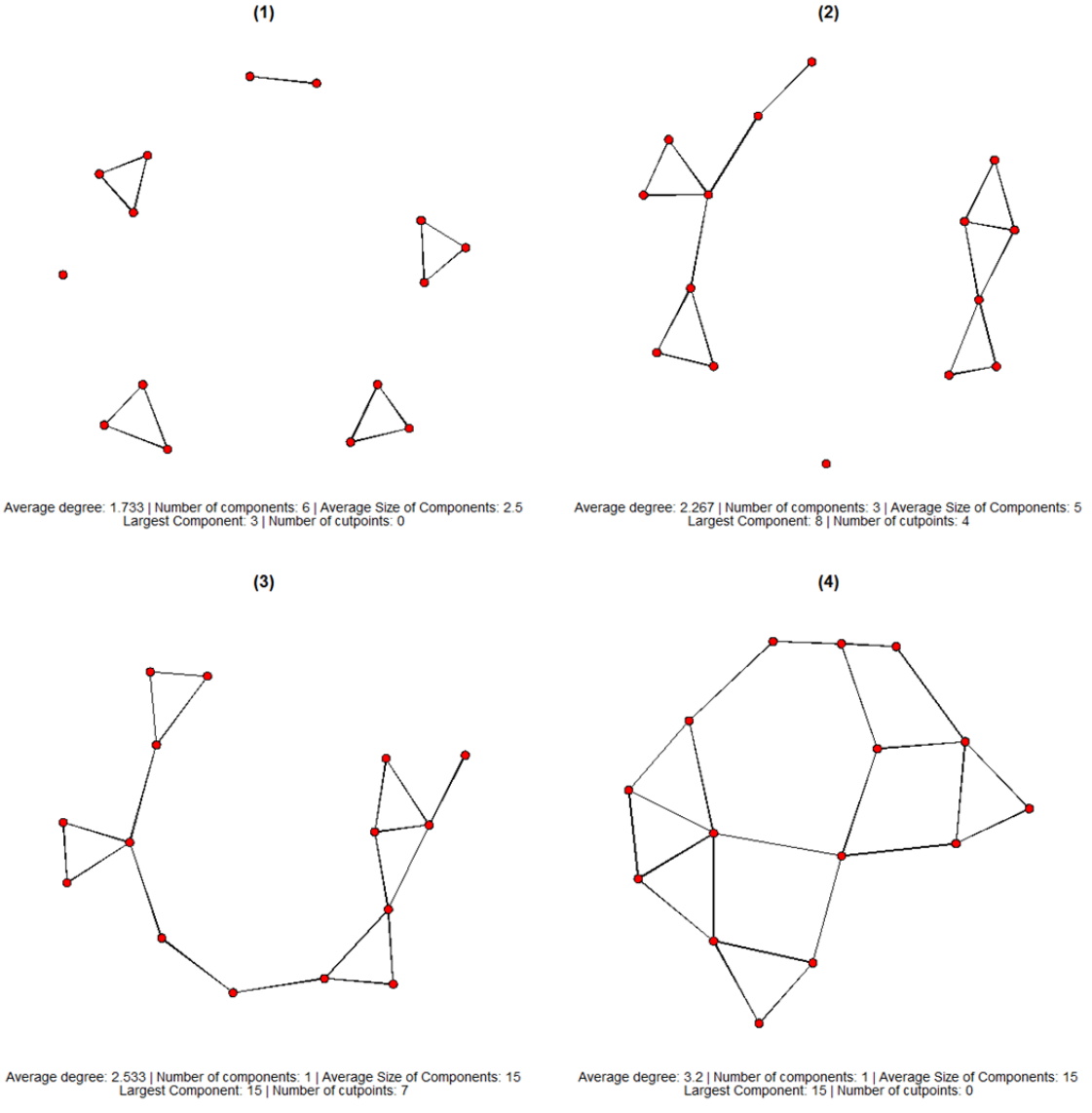
- *Number of nodes* (n) - Total number of nodes (employees) in the network.
- *Number of links* (m) - Total number of links (connections) in the network.
- *Density* (γ) - Number of links in the network, expressed as a proportion of the maximum possible number of links in a network with the same number of nodes. Formally, $\gamma=m/(n(n-1)/2)$.
- *Average degree* (D) - Average number of links associated with each node of the network. Formally, $\frac{\sum_{i}^{n} d_i}{n}$, with d_i indicating the links of node i. In the case of a completely unconnected network, $D=0$; and in a complete network (i.e., a network where all nodes are interconnected), $D=n-1$.
- *Number of components* - Total number of components in the network.
- *Average size of components* - Average number of nodes in components.
- *Size of largest component* - Number of nodes in the largest component.
- *Diameter of largest component* - Geodesic distance[12] between the two nodes that are farthest from each other in the largest component.
- *Number of cutpoints* - Total number of cutpoints in the network, with a cutpoint being defined as a node whose deletion would increase the number of components in the network.

[11] We use the algorithm proposed by Fruchterman and Reingold (1991).

[12] The Geodesic distance is defined as the number of links that separates two nodes, through the shortest path

3.11 These indicators can be used to assess the degree of collaboration occurring inside a network structure. As nodes have more direct connections, networks become increasingly integrated. This is reflected in higher number of links and larger average degrees. Accordingly, the number of components decreases as each starts to include a larger proportion of nodes. Finally, the number of cutpoints decreases because nodes become connected indirectly through multiple paths.

Figure 3. Networks with increasing degree of collaboration



3.12 Figure 3 shows four simulated networks of the same size, organized by increasing degree of collaboration. Network (1) represents a deeply fragmented social network, in which nodes are hardy interconnected. Network (2) has a less fragmented structure, with fewer components of bigger size and a higher average degree. Cutpoints are present, as some individuals are only loosely connected in components. In Network (3) a single component indirectly brings all individuals together; however, the existence of cutpoints implies that the removal of key nodes would increase the number of components substantially. Finally, Network (4) represents a strongly collaborative network, with all nodes in a single component and no cutpoints. These are just four cases in a continuum of possibilities.

3.13 To analyze collaboration dynamics within and between sectors, we define subnetworks based on common characteristics of nodes. A subnetwork N_s^t will contain a subset of the original nodes from network N^t, and the links connecting these nodes together. The specific group of nodes to be included in these networks is determined by common characteristics contained in *W*.

3.14 For our analysis we construct several subnetworks:

- First, *location-specific subnetworks* in which the collaboration dynamics of nodes in headquarters and country offices are represented separately.

- Second, an *operational core subnetwork* obtained by using only those nodes that pertain to the main operational sectors: Finance and Infrastructure (FIN-INF), Environment and Natural Resources (ENV-NR), Social, and State-Civil for 2004-2006; and Infrastructure and Environment (INE), Institutions for Development (IFD), Social (SCL) and Integration (INT) for 2008-2012.

- Finally, a set of *sector-specific subnetworks*, each of which include only personnel from one of those sectors.

IV. RESULTS

4.1 In this section we analyze the dynamics of formal collaboration in the design stage of the project cycle, based on the eight IDB networks we constructed (see Annex). This analysis allows us to assess the extent to which the Realignment succeeded in achieving three of its goals: attaining greater collaboration between the Bank's operational staff, ending the headquarters/country offices fragmentation, and breaking the regional silos. Additionally, we dissected these networks into various subnetworks to analyze connectivity patterns within and between sectors. Through this exercise we addressed to what extent the Realignment triggered greater intrasectoral and intersectoral collaboration.

A. Collaboration Dynamics between Operational Staff

4.2 The Realignment does not appear to have fostered higher collaboration among overall operational staff, at least in the design stage of the project cycle. In fact, high levels of fragmentation and fragility persist. However, under the new matrix structure employees in country offices became more important in terms of connectivity.

4.3 The IDB networks grew over time, in terms of both number of nodes and number of links.[13] This growth is associated with an increase in the number of loan operations approved each year, from 92 in 2004 to 153 in 2012.[14]

4.4 Despite the expansion of the networks and the increasing number of loans approved per year, three pieces of evidence suggest that the Realignment did not increase collaboration among operational staff during project:

- First, the networks remained divided into a similar number of components (Table 1), each hosting a very small fraction of all the nodes in the system (less than 3% both before and after the Realignment). The 2004-2006 networks had an average of 37 components, while the 2008-2012 networks were split, on average, into 39 components.[15]

- Second, only a third of all operational employees are directly or indirectly connected throughout the whole period under analysis. This can be observed in the largest components, which sheltered an average of 27% and 32% of all nodes before and after the Realignment, respectively. This means that the large majority of IDB employees involved in project design remained disconnected.

- Third, the operational personnel are not engaging directly with more peers under the new organizational structure. This is evidenced by the fact that the number of direct connections per operational employee (average degree) also remained unchanged between 2004-2006 and 2008-2012. The relatively constant average degree coupled with the increase in the number of nodes resulted in a decrease in the network's density (that is, in the proportion of all possible direct links observed within the network).

[13] Networks contained an average of 187 nodes between 2004 and 2006, and 277 nodes between 2008 and 2012, reaching a peak of 301 in 2010. A steady increase in the number of operational staff can be tracked at least to 2005, which suggests that the Realignment did not trigger the expansion of the operational network.

[14] The average size of the design varied between three and four members from 2004 to 2012. In addition, employees kept participating in the design of a similar number of projects. Our calculations show that most employees worked in the design of one or two projects per year, both before and after the Realignment.

[15] Since the number of employees designing projects went up, the post-Realignment components are bigger, but they do not house a larger proportion of nodes.

Table I. Descriptive Statistcs - IDB Network

	Pre			Post					Average Pre	Average Post
	2004	2005	2006	2008	2009	2010	2011	2012		
Total Nodes (#)	159	193	208	220	276	301	299	288	187	277
Total Edges (#)	428	579	672	745	913	1071	965	905	560	920
Average Degree (#)	2.59	3.24	3.38	3.41	3.38	3.71	3.41	3.29	3.1	3
Density (%)	3%	3%	3%	3%	2%	2%	2%	2%	3%	2%
Average Path Length (#)	1.84	6.57	3.66	5.04	5.48	5.92	5.91	2.43	4.0	5
Components (#)	39	33	40	30	39	32	41	52	37.3	39
Average Components Size (# of Nodes)	4.1	5.8	5.2	7.3	7.1	9.4	7.3	5.5	5.0	7
Average Components Size (% of Nodes)	3%	3%	3%	3%	3%	3%	2%	2%	3%	3%
Largest Comp. (# of Nodes)	16	84	58	64	105	137	104	33	53	89
Largest Comp. (% of Nodes)	10%	44%	28%	29%	38%	46%	35%	11%	27%	32%
Diameter of Largest Component (#)	6	17	10	14	15	14	17	7	11	13
Cutpoints (# of Nodes)	27	34	29	50	60	46	53	38	30	49
Cutpoints (% of Nodes)	17%	18%	14%	23%	22%	15%	18%	13%	16%	18%

4.5 In addition, the Realignment did not alter the network's fragility. *Fragility* is defined as the propensity of a network to increase its fragmentation as the result of the removal of key nodes or cutpoints. Our evidence suggests that the average share of cutpoints remained around 17% before and after the Realignment. Importantly, the large majority of the cutpoints are still located at headquarters but the gap between the proportions located in the field and headquarters has been significantly reduced since the Realignment (see Annex, Table 1). This implies that the likelihood that an employee working in a country office is pivotal for keeping the IDB network together is much higher under the new structure. Grade also seems to count: the large majority of the cutpoints were grades 3 and 4 between 2004 and 2012, which suggests that more experienced specialists are more likely to be involved in several teams simultaneously (see Annex, Table A2). In contrast, cutpoints are not clustered in a particular sector, either before or after the introduction of the matrix (see Annex, Table A3).

B. Headquarters / Country Office Fragmentation

4.6 The Realignment seems to have succeeded in breaking location silos and fostering greater collaboration between headquarters and country offices personnel, at least in the design stage of the project cycle. This is related to the decentralization process initiated in 2007, which sharply increased the share of operational staff located in the field.

4.7 The Realignment was intended to strengthen country offices and increase sector expertise across the Region. Among other actions, there was a major effort to deconcentrate operational staff from headquarters to country offices, and a complementary workforce of operational analysts was deployed to the field to

support project management. This decentralization process was further reinforced by the Ninth Capital Replenishment of the IDB, which established that 40% of the Bank's professional staff had to be located in country offices by 2015.[16]

4.8 To analyze changes in collaboration between headquarters and country offices, we obtained the geographical location of each Bank employee from the Human Resources Department, which provided the Bank's Personnel Roster for 2004, 2006, 2008, 2010, and 2012.[17]. We then colored nodes in all networks according to their location. Additionally, we constructed subnetworks for each location-year pair to obtain statistics at the location level.

4.9 The average share of team members located in the field during the project design stage doubled after the Realignment. Whereas only 2 in every 10 employees who participated in the design of a project were located in the field between 2004 and 2006, the average share reached 4 in 10 in the post-Realignment period (Table 2). This higher participation of employees located in country offices is also reflected at the project level. The proportion of projects with no members in the field in the design stage dropped from 59% to 22% between 2004 and 2012, while the share of projects with one member in the field increased from 40% to 56% in that period. The largest increase can be observed in the percentage of projects with two or more members in the field, which went up from 1% to 22%.

4.10 This finding has two corollaries:

- First, larger participation by personnel located in the field implies an increased collaboration between country offices and headquarters in the design of projects. In the network analysis this is reflected by the increase in the proportion of components with nodes from different locations (Figure 4). While before the Realignment half of the components had nodes in both country offices and headquarters, the average share reached 63% after the Realignment. This structure should facilitate interaction and knowledge circulation between headquarters and country offices.

- Second, larger participation by employees located in the field implies that it became more common for people in country offices to work together in the design of projects. In the network analysis this is reflected by the fact that the average proportion of isolates in the country office subnetwork[18] shrank by 40 percentage points between the pre- and post-Realignment periods (88% *vis-a-vis* 49%). In fact, this tendency seems to have started before 2007, which might suggest that the Realignment reinforced an already existing trend.

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16 For further details on the decentralization of specialists, please refer to OVE's IDB-9 Evaluation and Human Resources Processes Background Paper (AB-2909 and RE-439-3).

17 Less than 5% of the observations lacked location data both before and after the Realignment. These nodes were marked as NA, and they are reported separately.

18 An isolate in these subnetworks reflects an employee working exclusively with people in other locations.

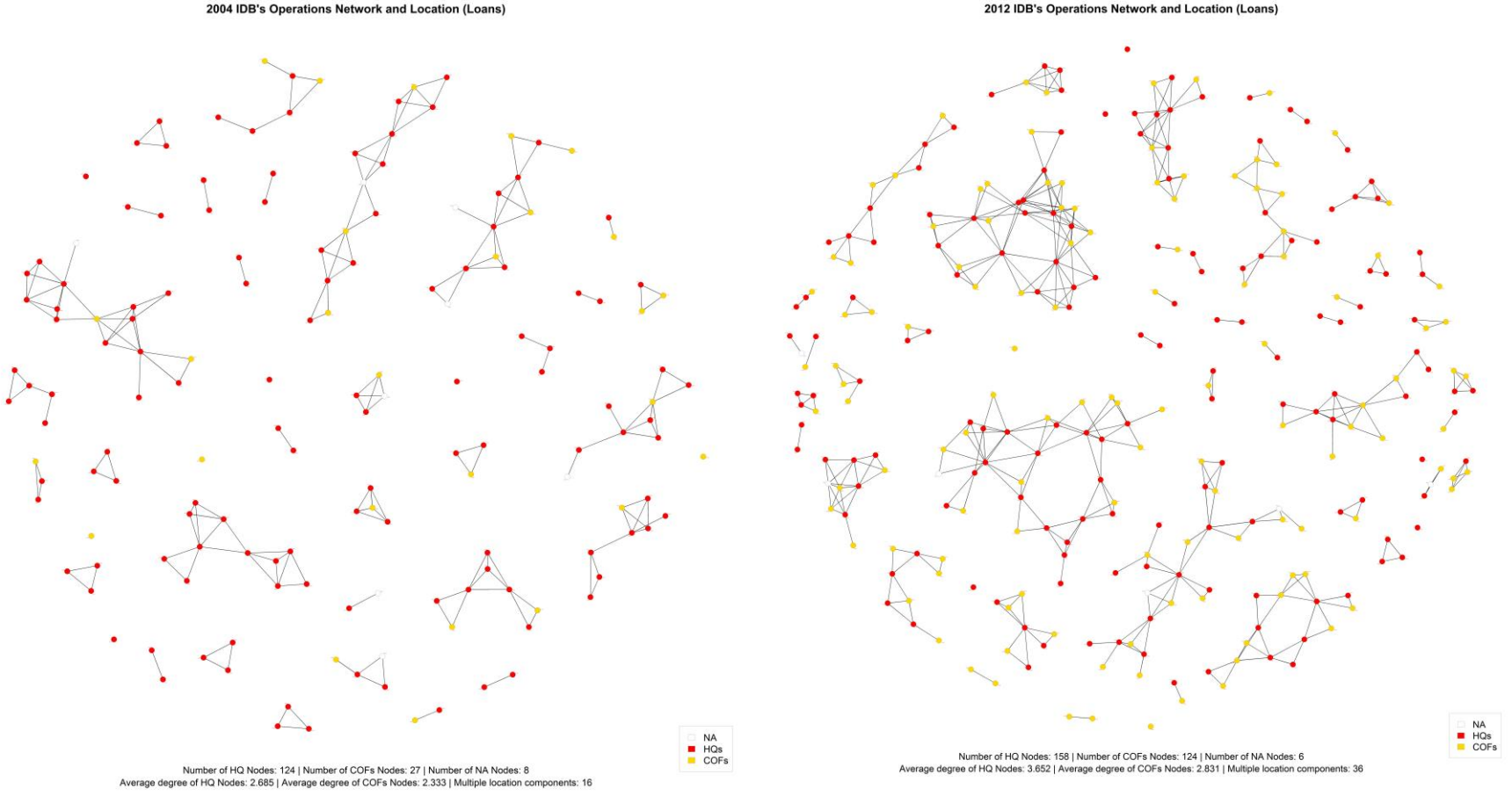
Table 2: Headquarters / Country Office Fragmentation Statistics - IDB Network

	Pre		Post		
	2004	**2006**	**2008**	**2010**	**2012**
Total Nodes (#)	159	208	220	301	288
Projects with 0 nodes in COF (%)	59%	55%	39%	34%	22%
Projects with 1 nodes in COF (%)	40%	42%	50%	41%	56%
Projects with 2+ nodes in COF (%)	1%	3%	11%	25%	22%
Total Components (#)	39	40	30	32	52
Multi-location conponents (#)	16	21	17	20	36
Multi-location conponents (%)	41%	53%	57%	63%	69%
HQ Nodes (#)	124	148	124	163	158
HQ Nodes (%)	78%	71%	41%	57%	55%
Isolates* in HQ (#)	9	7	12	23	29
Isolates* in HQ (%)	7%	5%	10%	14%	18%
Average degree of HQ Nodes (#)	2.68	3.79	3.74	4.13	3.65
COFs Nodes (#)	27	50	79	123	124
COFs Nodes (%)	17%	24%	36%	41%	43%
Isolates* in COF (#)	25	42	47	45	64
Isolates* in COF (%)	93%	84%	59%	37%	52%
Average degree of COFs Nodes (#)	2.33	2.28	2.72	3.15	2.83
NA Nodes (#)	8	10	17	15	6
NA Nodes (%)	5%	5%	8%	5%	2%
Isolates* in NA (#)	8	10	8	13	6
Isolates* in NA (%)	100%	100%	47%	87%	100%

**Isolates* refers to individuals working exclusively with people in other locations
Note: COF= Country Office, HQ= headquarters

4.11 All being, the core of the design process remains in headquarters, where most of the connectivity in the Bank is concentrated. This is evidenced by the fact that the average degree of operational personnel in headquarters is persistently higher than that of their colleagues in the field. On the positive side, the average degree of the personnel in country offices grew at a faster rate than that of their colleagues in headquarters.

Figure 4: Color-Coded Nodes by Location – 2004 and 2012



A. Fragmentation by Regional Distribution of Clients

4.12 By dismantling the Regional Operations Departments, the Realignment successfully broke the regional silos so that employees increasingly work in projects that benefit countries in different regions. The new structure allows for greater interaction between teams working in projects across LAC.

4.13 Before the Realignment, the IDB was divided into three regional departments.[19] Each contained sector-specific units in which specialists designed operations for that region. This meant that specialists with the same expertise were scattered among the regional departments, not working together on the same projects.

4.14 The Realignment organized the Bank under a new structure: all specialists at headquarters are grouped in sector-specific departments under the Vice Presidency of Sectors,[20] while specialists in the field report simultaneously to the Vice Presidency of Sectors and the Vice Presidency of Countries. The unification of personnel under the same department opened the door for economies of scale, as specialists in the same sector are now able to work together without any regional constraints.

4.15 The graphical representation of the networks suggests that this organizational overhaul was successful in breaking regional silos. To analyze changes in this type of fragmentation, we identified the geographical location of each loan operation. By coloring the links according to each project's region, it was possible to visualize the frequency of, and interaction between, employees working in multiple regions (Figure 5). The 2004 regional network shows that the large majority of the components housed links of the same color, indicating that there were hardly any nodes working on projects in different regions. In addition, fragmentation within regions was high, as is shown by the fact that projects in the same region are scattered in many components. For example, there were 12 isolated components for Region 2 in 2004 (yellow links). This fragmented structure is not observed in 2012: the graphical representation of the regional networks exhibits tiles of interconnected colors, suggesting that the regional silos were strongly reduced, at least in the design stage of loan operations.

4.16 Two pieces of statistical evidence illustrate the dissolution of regional silos after the Realignment. First, the percentage of operational staff that worked in projects in different regions sharply increased between 2004 and 2012, with a clear discontinuity after 2007: whereas fewer than 1.5% of the nodes worked in projects in different regions in 2006, in 2008 the share rose to 16% (Table 3). Second, and related to the previous point, the portion of components that groups projects in multiple regions increased substantially after the Realignment. From an average of 7.1% between 2004 and 2006, it rose to 26% between 2008 and 2012.

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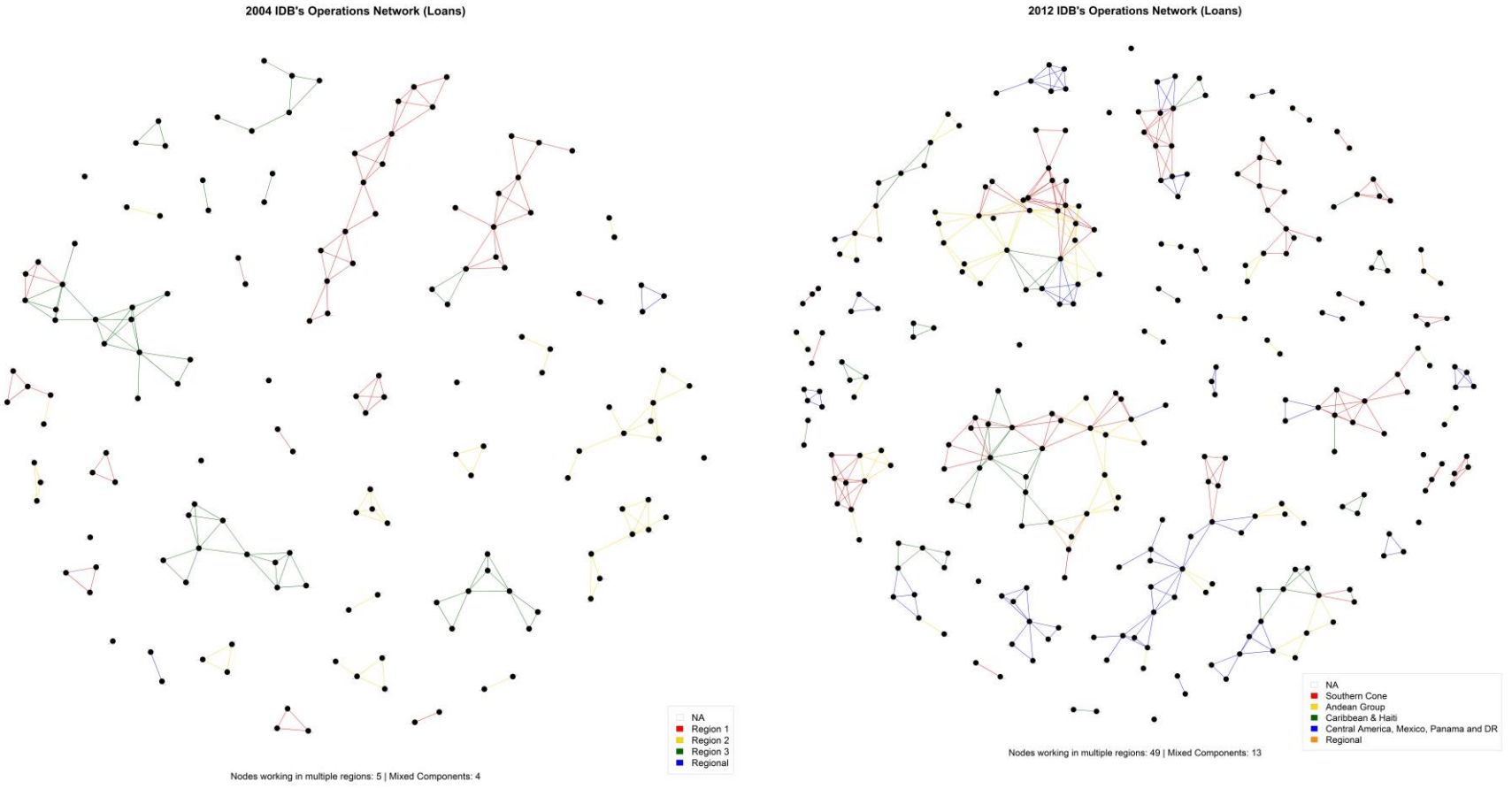
19 Region 1 - Southern Cone; Region 2- Central America and Spanish Speaking Caribbean; and Region 3 - Andean Countries and English Speaking Caribbean

20 Infrastructure and Environment; Social; Institutions for Development and Integration and Trade.

Table 3. Regional Fragmentation Statistics - IDB Network

	Pre			Post				
	2004	**2005**	**2006**	**2008**	**2009**	**2010**	**2011**	**2012**
Total nodes (#)	159	193	208	220	276	301	299	288
Total edges (#)	428	579	672	745	913	1071	965	905
Total components (#)	39	33	40	30	39	32	41	53
Nodes working in multiple regions (#)	5	3	3	36	50	73	57	49
Nodes working in multiple regions (%)	3%	2%	1%	16%	18%	24%	19%	17%
Components with projects in multiple regions (#)	4	2	2	9	9	8	11	13
Components with projects in multiple regions (%)	10%	6%	5%	30%	23%	25%	27%	25%

Figure 5: Color-Coded Links by Region of the Projects – 2004 and 2012



A. Intrasectoral Collaboration

4.17 Despite the expansion in the number of operational personnel involved in project design, there is no clear evidence of increased connectivity within each of the sectors. This is possibly related to the lack of incentives to develop multisectoral projects that involve specialists from different divisions.

4.18 To analyze connectivity patterns within sectors, we color-coded each node according to its membership in a particular sector of the Bank (Figure **Error! Reference source not found.**) and then dissected the IDB network into various sectoral subnetworks. This analysis focuses on the main operational sectors: Finance and Infrastructure (FIN-INF), Environment and Natural Resources (ENV-NR), Social, and State-Civil for 2004-2006; and Infrastructure and Environment (INE), Institutions for Development (IFD), and Social (SCL) for 2008-2012. Even though the organizational changes introduced in 2007 make it hard to draw one-to-one comparisons between pairs of sectors, a descriptive analysis of changes in collaboration within sectors is still informative.

4.19 Each sectoral subnetwork expanded after the Realignment, as the rise in the number of nodes and total links shows (Table 4). However, this expansion was not accompanied by a clear change in the connectivity patterns within sectors, a fact that is reflected in the network by three indicators:

- First, the operational staff of IFD and SCL are not directly connected with a larger proportion of colleagues within their sectors; the average degree hardly changed after the Realignment. INE displays a different pattern but the results should be viewed with caution because under the new organization structure, INE houses two different sectors that existed in the pre-Realignment period: ENV-NR and FIN-INF.

- Second, the number of components within each sector did not decrease with the Realignment, and it even grew in INE and IFD. This suggests that the sectors remained similarly fragmented after the introduction of the matrix structure. On the positive side, the increase in the number of components within the sectoral subnetworks could be an indicator of higher collaboration between sectors. Basically, if the number of links between members of different sectors increased over time, when those links are removed, the number of components within sectors rises. We will come back to this point later in the paper.

- Finally, there is no evidence of the emergence of a stable and bigger principal component. The averages for the pre- and post-Realignment periods indicate that the largest components of INE and SCL increased in size, but the time trend reveals that they have been very volatile from year to year, and no clear pattern can be identified.

Figure 6: Color-Coded Nodes by Sector Division – 2004 and 2012

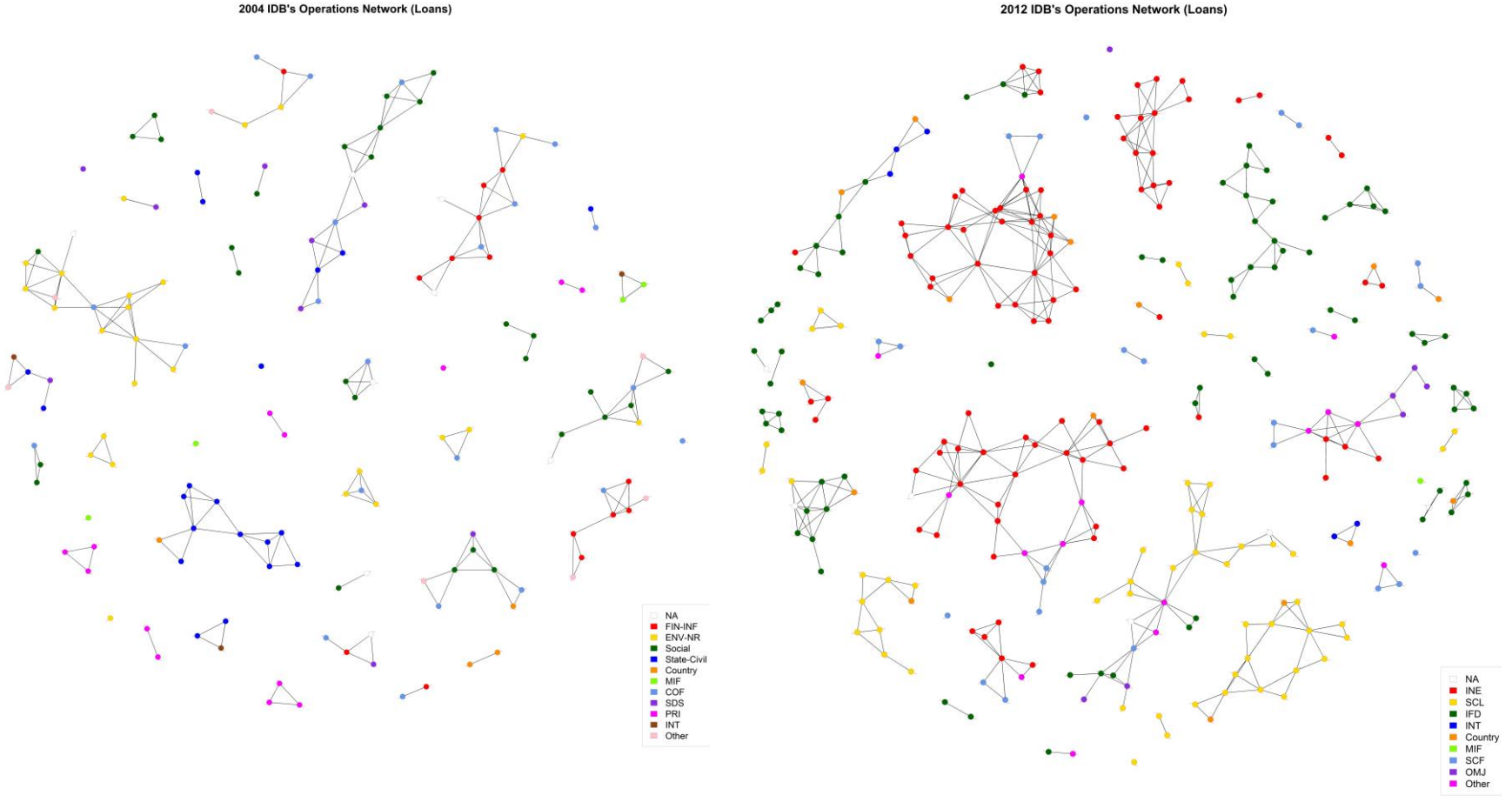


Table 4. Degree of Collaboration Between Sectors

Connectedness of ENV-NR - INE Specialists							
	Pre		Post			Average Pre	Average Post
	2004	2006	2008	2010	2012		
Total Nodes	25	33	66	91	88	29	82
Number of Edges	64	95	208	342	325	80	292
Average Degree (internal)	2.08	2.67	2.79	3.67	3.96	2.38	3.47
Number of Components	10	7	17	9	15	9	14
Average Size of Components	3	5	4	10	6	3.6	7
Nodes in Largest Component	7	13	22	59	26	10	36
Share of Nodes in Largest Component	28%	39%	33%	65%	30%	34%	43%

Connectedness of FIN/INF - INE Specialists							
	Pre		Post			Average Pre	Average Post
	2004	2006	2008	2010	2012		
Total Nodes	14	31	66	91	88	23	82
Number of Edges	39	94	208	342	325	67	292
Average Degree (internal)	1.857	2.32	2.79	3.67	3.96	2.09	3.47
Number of Components	5	12	17	9	15	9	14
Average Size of Components	3	3	4	10	6	3	7
Nodes in Largest Component	6	6	22	59	26	6	36
Share of Nodes in Largest Component	43%	19%	33%	65%	30%	31%	43%

Connectedness of Social Sector Specialists							
	Pre		Post			Average Pre	Average Post
	2004	2006	2008	2010	2012		
Total Nodes	29	25	22	51	52	27	42
Number of Edges	68	71	49	151	129	70	110
Average Degree (internal)	1.655	2.48	1.91	2.94	2.23	2.07	2.36
Number of Components	12	8	6	7	14	10	9
Average Size of Components	2	3	4	7	4	3	5
Nodes in Largest Component	6	9	15	34	14	7.5	21
Share of Nodes in Largest Component	21%	36%	68%	67%	27%	28%	54%

Connectedness of State/Civil - IFD Specialists							
	Pre		Post			Average Pre	Average Post
	2004	2006	2008	2010	2012		
Total Nodes	20	23	61	63	74	22	66
Number of Edges	50	89	214	187	189	70	197
Average Degree (internal)	2.2	3.13	3.23	2.57	2.27	2.67	2.69
Number of Components	8	7	10	16	22	8	16
Average Size of Components	3	3	6	4	3	3	4
Nodes in Largest Component	10	8	17	24	14	9	18
Share of Nodes in Largest Component	50%	35%	28%	38%	19%	42%	28%

A. Intersectoral Collaboration

4.20 There is no clear evidence of changes in connectivity between the main operational sectors since the Realignment, and high levels of fragmentation between them persists. IFD seems to contribute the most to intersectoral collaboration.

4.21 To analyze connectivity patterns between sectors, we restricted the analysis to a subnetwork containing all nodes from Finance and Infrastructure (FIN-INF), Environment and Natural Resources (ENV-NR), Social, and State-Civil for 2004-2006; and Infrastructure and Environment (INE), Institutions for Development (IFD), and Social (SCL) for 2008-2012. This is equivalent to the analysis presented in the previous section, but it includes the relationships between personnel across sectors.

4.22 Connectivity between the operational sectors did not follow a clear trend over time. Although the average degree increased slightly, there is no evidence of the emergence of a stable and bigger principal component or of a change in the composition of the components, which would have been expected if the connectivity had strongly increased. Additionally, the number of components hosting nodes from multiple sectors exhibits high yearly variation, without following a clear trend. Finally, the share of nodes in multiple sector components also displays high year-to-year variation and no clear trend (Table 5). These results are consistent with many interviewees' perception that the Bank is fostering not integral and integrated projects but rather sectoral projects.

Table 5: Degree of Collaboration Between and Within Main Operational Sectors

	Pre		**Post**		
	2004	**2006**	**2008**	**2010**	**2012**
Total nodes	88	112	151	207	219
Share of total nodes	55%	54%	69%	69%	76%
Number of edges	228	357	488	694	665
Average degree	2.091	2.768	3.02	3.227	3.032
Number of components	31	30	28	29	48
Nodes in largest component	10	22	22	59	26
Share of nodes in largest component	11%	20%	15%	29%	12%
Components with nodes from different sectors	4	4	5	4	4
Share of components with nodes from different sectors	13%	13%	18%	14%	8%

V. CONCLUSIONS

5.1 In this paper we study the effects of the Realignment on collaboration among Bank employees. We focus on formal collaboration, defined as common participation in the design of loan operations. Other forms of formal and informal collaboration, although important, are not addressed in this paper. However, we believe that because the design of loan operations is the main activity of the IDB, team composition (as reconstructed by the self-reported time allocated to each operation) is probably the most relevant form of collaboration and knowledge-sharing within the Bank.

5.2 Drawing on Time and Labor and Personnel Roster data for 2004-2012, we use social network analysis to describe changes in connectivity dynamics within the IDB after the Realignment. Our results show that, consistent with the decentralization process initiated in 2007, collaboration between headquarters and country office personnel increased strongly after the Realignment, as did the collaboration between staff in the field. By dismantling the Regional Operations Departments, the Realignment also allowed specialists to work on projects in different regions within LAC, which arguably has positive consequences in terms of knowledge-sharing and dissemination of good practices across the Bank's clients. Therefore, the reforms introduced in 2007 succeeded in breaking both location and regional silos.

5.3 Despite those positive achievements, our results also suggest that the Realignment did not foster greater collaboration between specialists. High levels of fragmentation within and across sectors persist, affecting the overall cohesion and strength of the Bank's working system. It seems that the IDB still lacks a set of proper incentives to develop multisectoral projects that involve specialists from different units. Double-booking is an attempt to move in that direction, but its implementation is still too recent to evaluate its impact.

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ANNEX

Figure A1. IDB Network - 2004

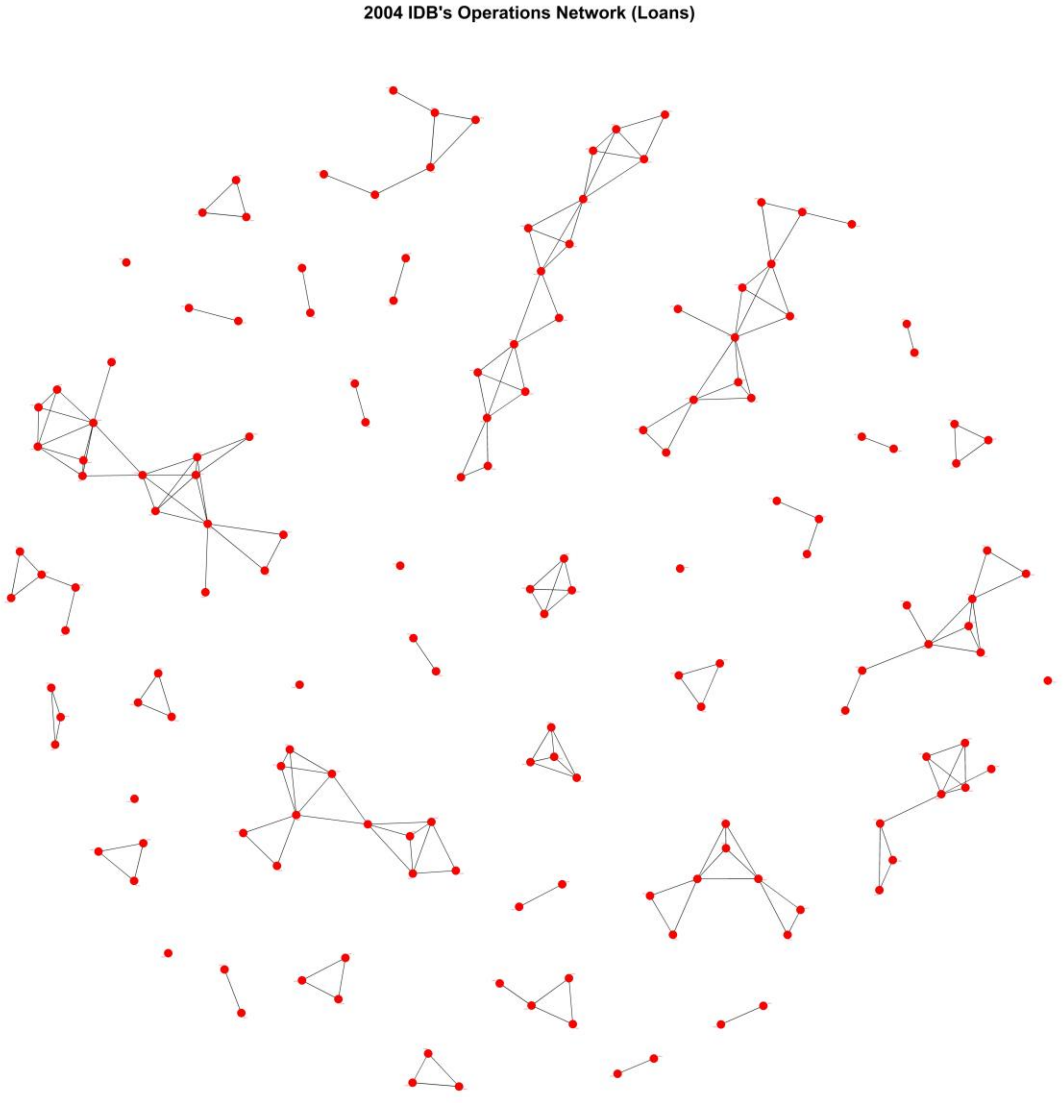

Figure A2. IDB Network - 2005

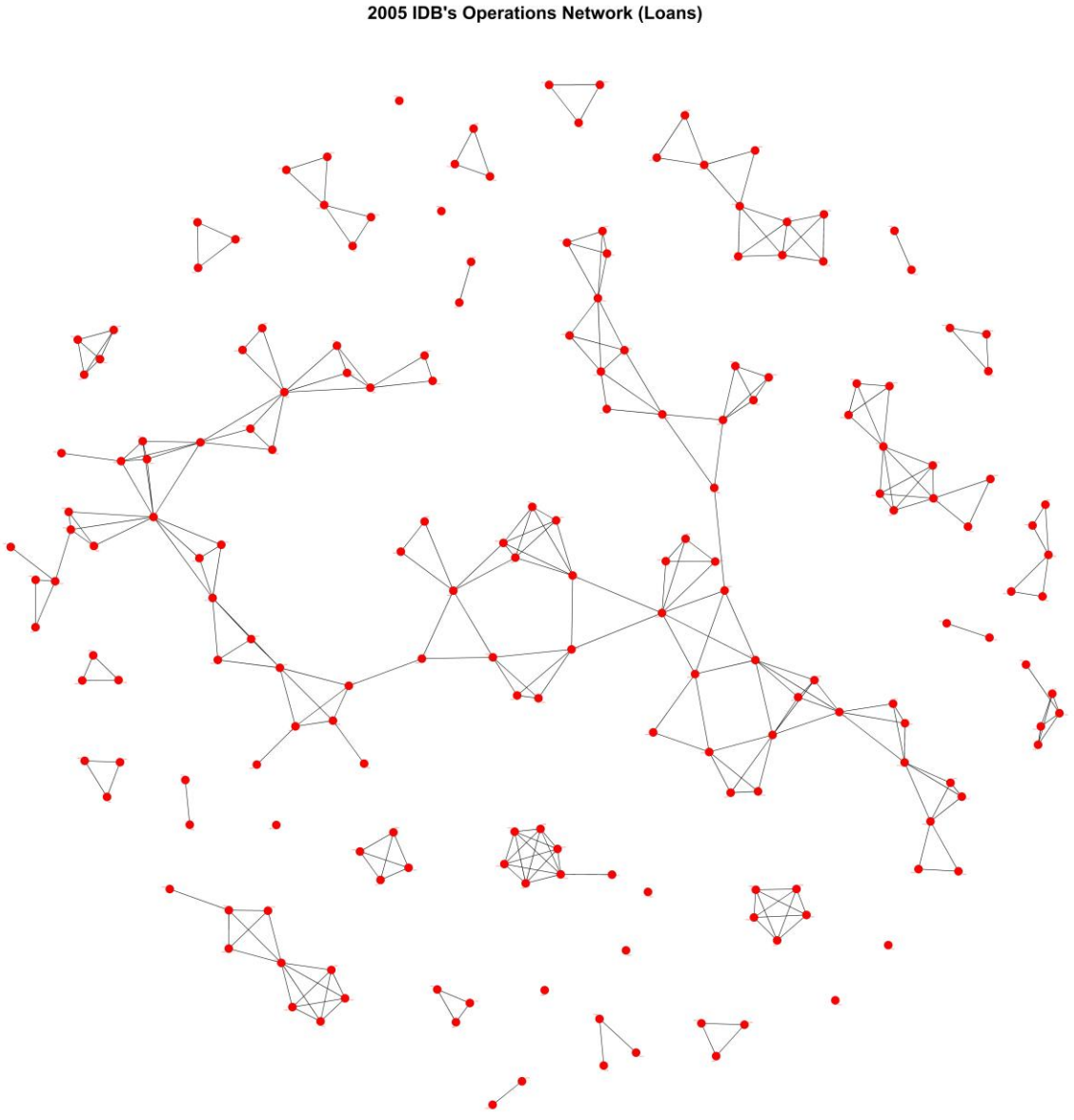

Figure A3. IDB Network - 2006

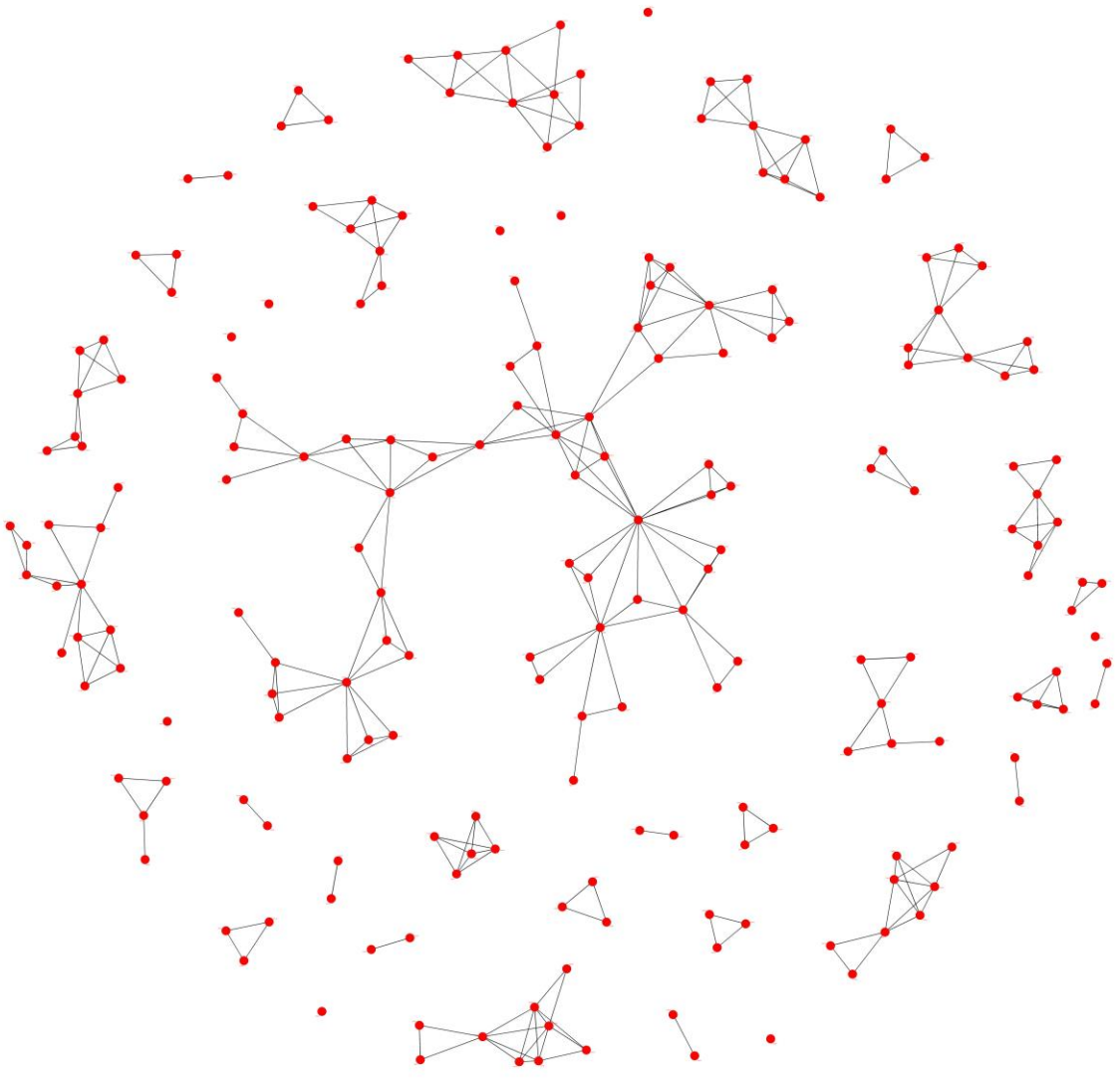

Figure A4. IDB Network - 2008

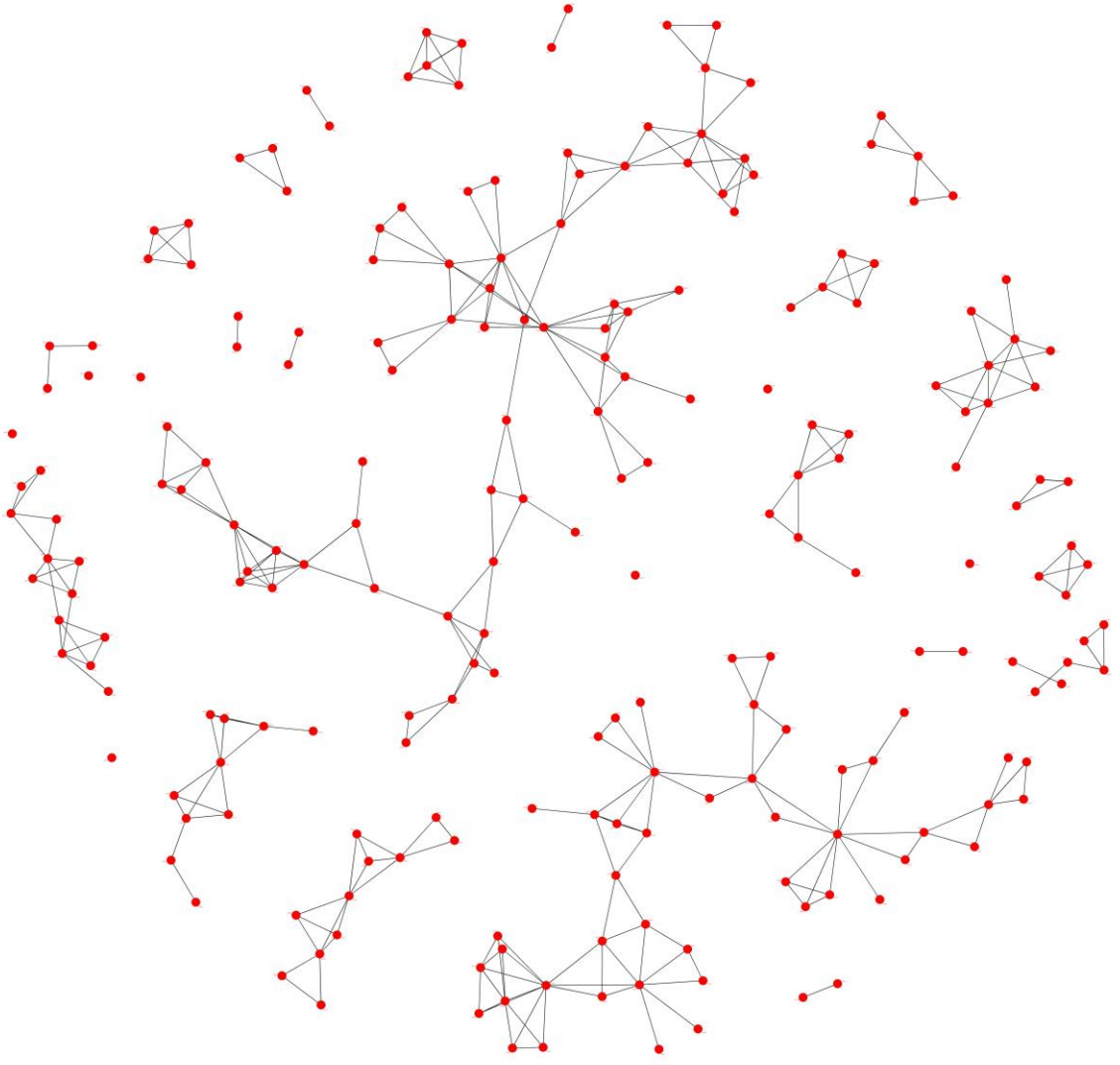

Figure A5. IDB Network - 2009

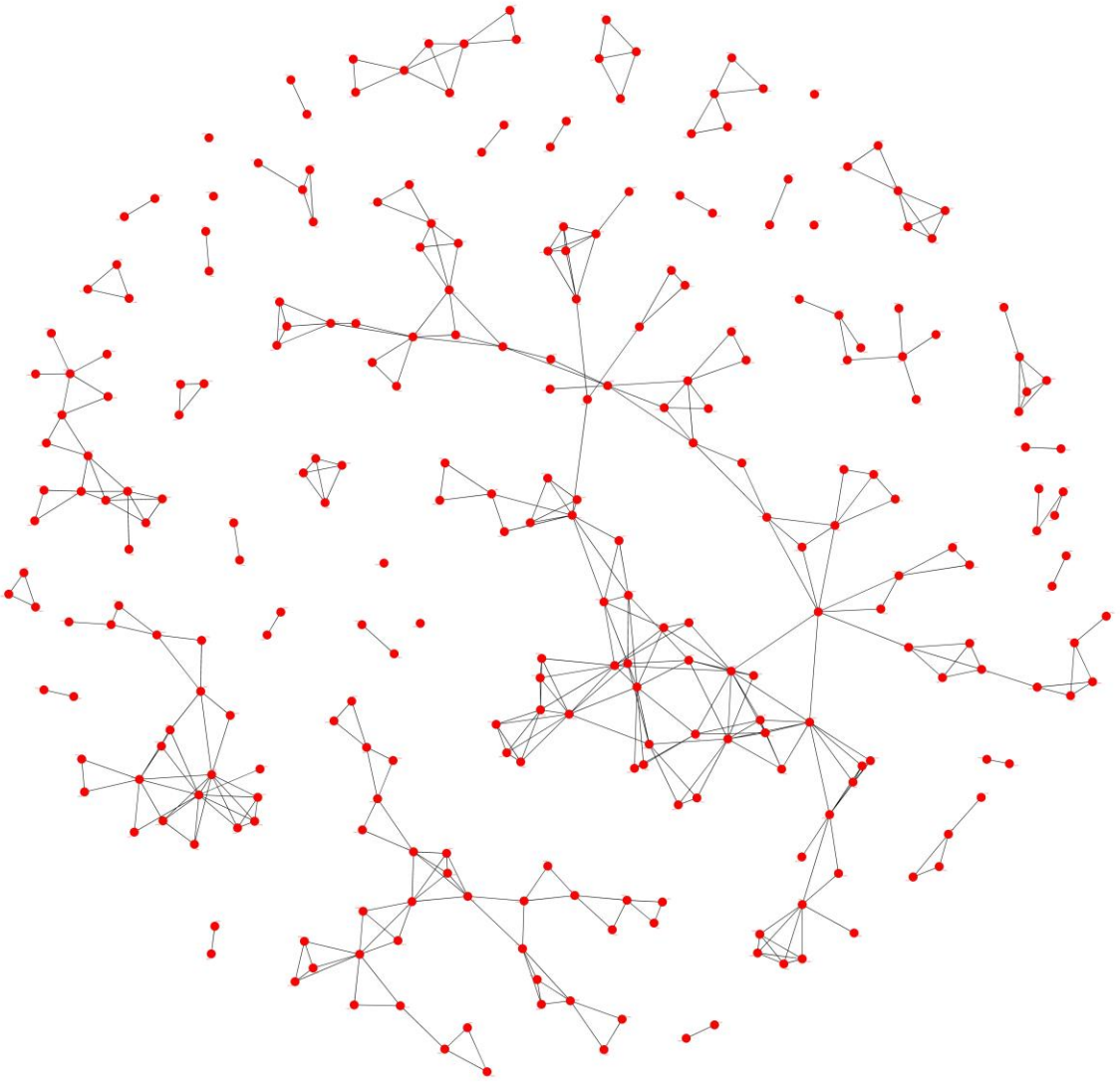

Figure A6. IDB Network - 2010

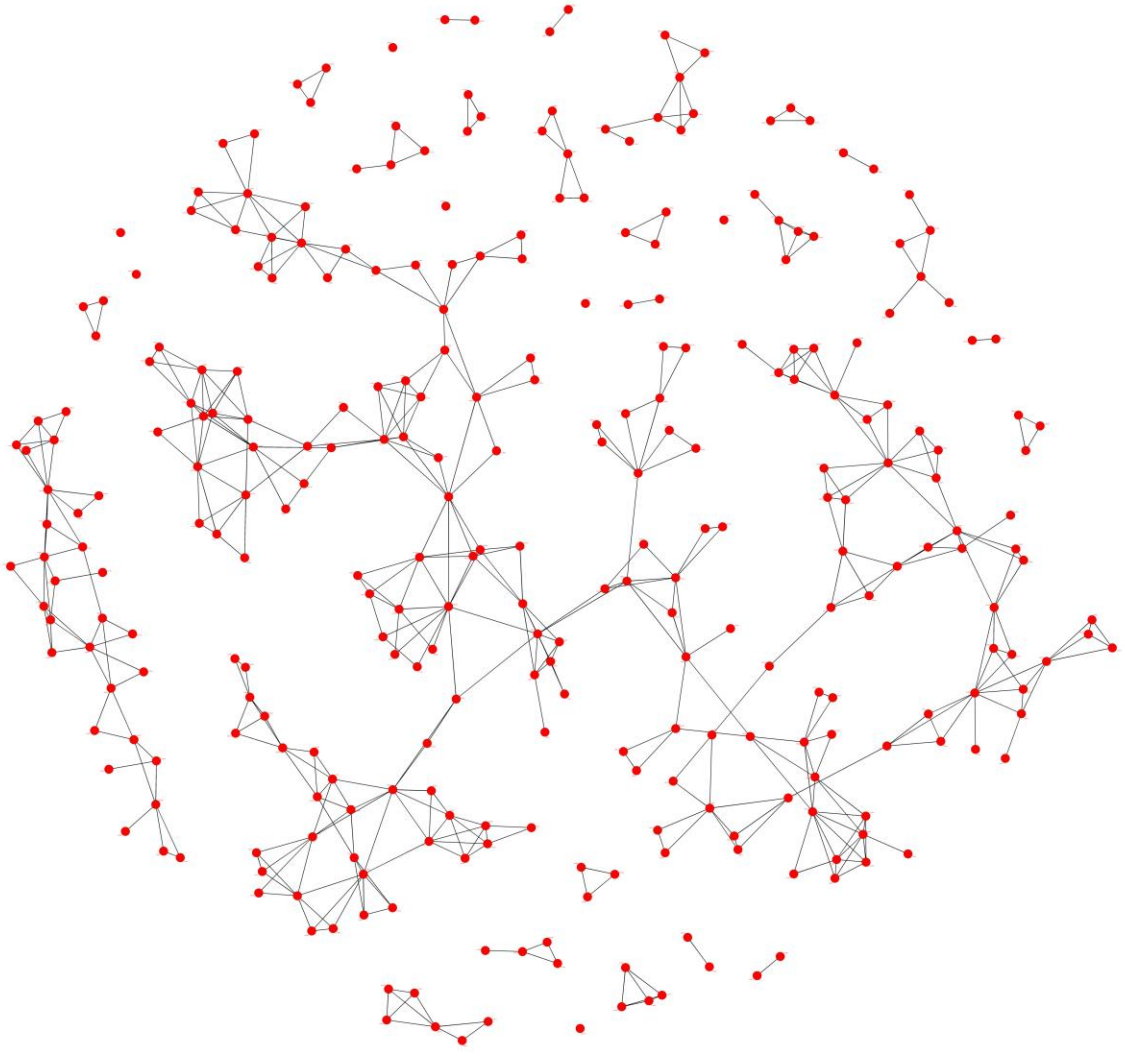

Figure A7. IDB Network - 2011

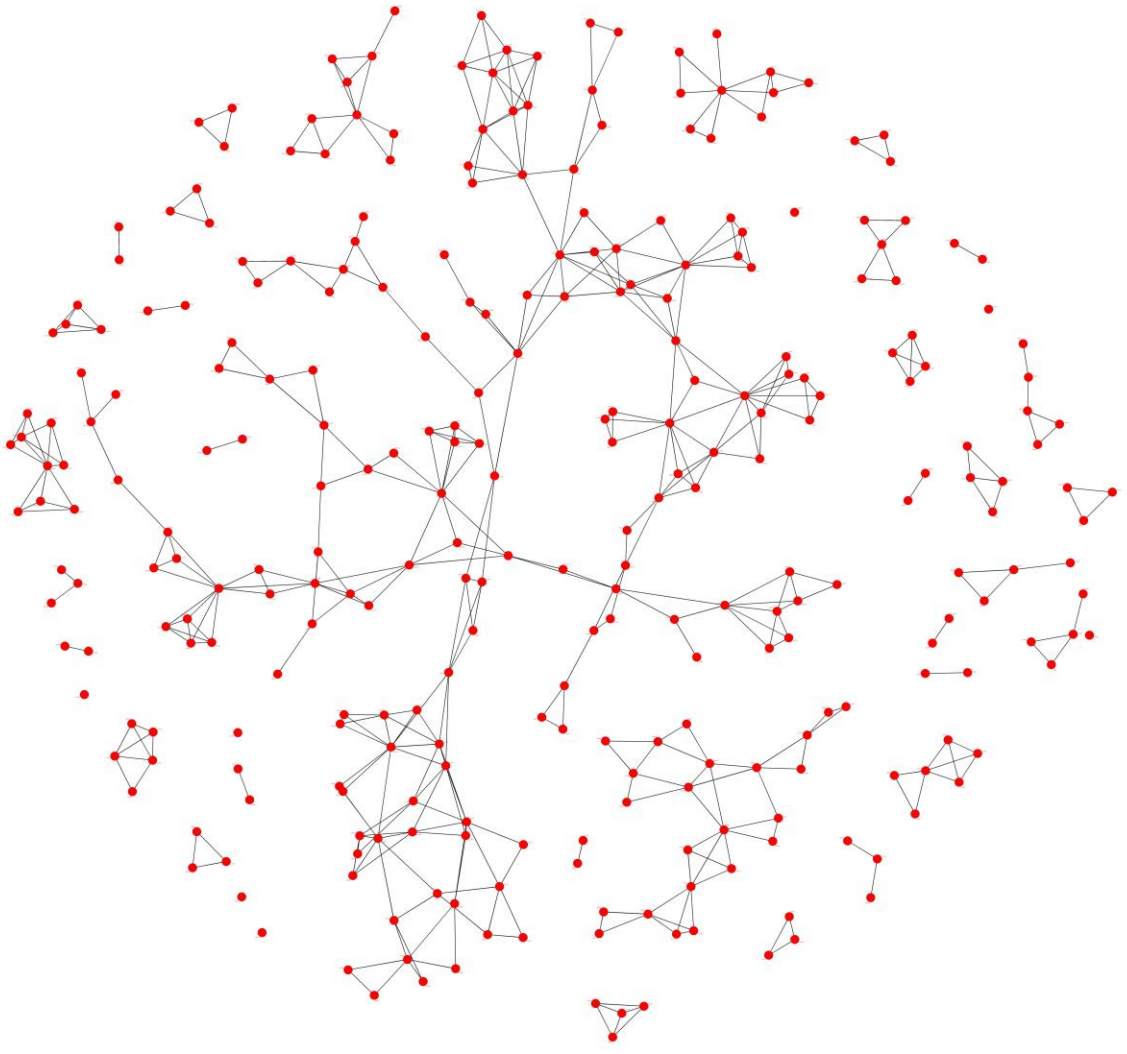

Figure A8: IDB Network - 2012

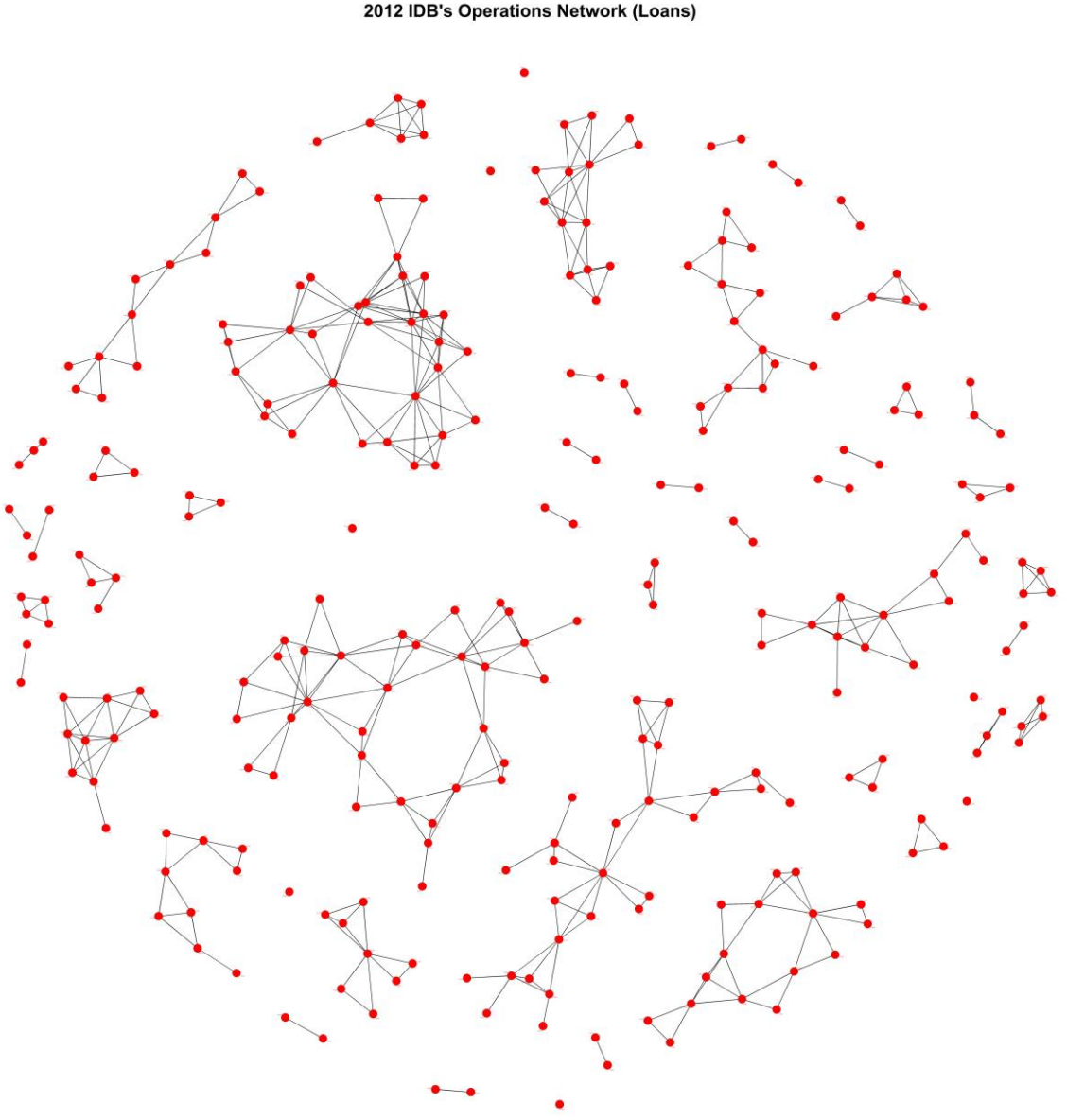

Table 1. Distribution of Cutpoints by Location

	Pre-Realignment		Post Realignment		
	2004	**2006**	**2008**	**2010**	**2012**
HQ	94%	96%	68%	57%	73%
COFs	0%	0%	26%	37%	24%
NA	6%	4%	6%	6%	3%

Note: Proportions should be taken with caution since the number (n) of obs. is small (2004 n=16; 2006 n=28; 2008 n=50; 2010=46; and 2012 n=38).

Table 2. Distribution of Cutpoints by Grade

	Pre-Realignment		Post Realignment		
	2004	**2006**	**2008**	**2010**	**2012**
1				5%	
2	13%	19%	7%	7%	8%
3	27%	41%	36%	19%	30%
4	33%	19%	19%	30%	15%
5	20%	15%	15%	19%	14%
6			4%	5%	11%
7		3%	2%	2%	3%
8				2%	3%
9	7%	3%	9%	2%	8%
10			6%	7%	5%
11			2%	2%	3%

Note: Proportions should be taken with caution since the number (n) of obs. is small (2004 n=16; 2006 n=28; 2008 n=50; 2010=46; and 2012 n=38).

Table 3. Sectoral Distribution of Cutpoints

	Pre-Realignment			Post Realignment		
	2004	**2006**		**2008**	**2010**	**2012**
FIN-INF	25%	25%	INE	22%	28%	13%
ENV-NR	19%	32%	SCL	12%	15%	21%
Social	25%	18%	IFD	44%	24%	32%
State-Civil	6%	11%	INT		2%	3%
SDS	13%	7%	Country	2%	4%	
PRI	6%	4%	SCF	12%	4%	8%
NA	6%	3%	OMJ		2%	8%
			Other	2%	13%	13%
			NA	6%	7%	3%

Note: Proportions should be taken with caution since the number (n) of obs. is small (2004 n=16; 2006 n=28; 2008 n=50; 2010=46; and 2012 n=38).