An investment social network beside the Banco de Barcelona, an unusual case?¹

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Abstract

The extension of banking activities during the XIX century was mainly leaded by certain social groups related to commerce, which took profit from their experience and knowledge to spread their influence among the credit world. In the Spanish historiography, there are some works specifically focused on these people, but very few of them make a classification of the economic groups who led the financial modernization of Spain along the mid 19th century.

The main objective of our work is the analysis of the social group which constituted the Banco de Barcelona between 1844 and 1854. This institution was as important for the financial and banking history of Spain as a pioneer in their credit an issue activity; moreover its experience served as a base for the constitution of the modern Spanish financial system.

In a society like the Catalan in mid 19th century, the confidence is an important factor to explain the investment. The appearance of new companies and its investment requirements transformed the previous guidelines. How was the behaviour of the potential investments? Did a powerful investing group grow around the bank and ascended economically throughout the central years of the 19th century? The result shows how de members of the board administration of the Banco de Barcelona, were concentré in some of the groups of the whole of the Catalan economy.

Keywords: Social networks, banking formation, Barcelona. JEL Codes: N23, G21

Resum

L’extensió de les activitats bancàries al segle XIX va ser liderat per alguns grups socials connectats amb el comerç, que van treure profit de la seva experiència i coneixement per estendre la seva influència al voltant del món del crèdit. A la historiografia espanyola, hi ha un conjunt de treballs que s’han centrat en aquesta gent, però en molts pocs casos s’ha fet una classificació que permeti detectar el conjunt de grups econòmics que han liderat el procés de modernització financera de l’Espanya de mitjans del segle XIX.

El principal objectiu del treball és l’anàlisi dels grups socials que van formar el Banco de Barcelona entre 1844 i 1854. Aquesta institució va ser important per a la història financera i bancària d’Espanya per ser pionera en la seva activitat creditícia i d’emissió: a més, la seva experiència va servir com a base en la constituïció d’un sistema financer modern a Espanya.

En una societat com la catalana de mitjans del segle XIX, la confiança era un factor important per explicar la decisió d’invertir. L’aparició de noves companyies i les seves necessitats d’inversió van transformar el comportaments previs. Quin va ser el comportament dels inversors potencials? Va ser el grup que hi havia al voltant del banc el que va ascendir econòmicament en els anys centrals del segle XIX? La resposta és prou clara, els membres del consell d’administració del Banc de Barcelona formaven un grup apart dins dels grups que sorgeixen a l’economia catalana en el seu conjunt.

Paraules clau: Xarxes socials, formació bancària, Barcelona. Codis JEL: N23, G21
Introduction

The new possibilities opened by the industrialization, the development of the capital markets and their internationalization, incentivated the appearance and diffusion of the banks and the extension of the financial instruments. The investment, one of the central factors to stimulate and to consolidate the economic growth, turned out to be boosted. One of the elements that stimulated the investment was the adoption of the principle of limited responsibility. It favoured a broad participation of the investors in the constitution of firms, besides facilitating the accumulation of capital and limiting the risks. Before that, in Spain, the constitution of corporations was strongly restricted during the first half of the 19th century, being liberalized gradually from 1850. This is the framework of this paper.

The social, economical and political conditions of the 19th century, with a given level of information and communication technologies, made the investment choice to be ruled through confidence relations among investors. The economic players obtained the information through the existing social networks. Naomi Lamoreaux in her study on the impact of bank activities over industrial development, highlighted the importance of links between bank boards to explain the diffusion of the credit and the capital accumulation. These endogenous practices of insider lending, seem to play an important role in the extension of the investment and in the development of business entrepreneur shipment in New England at mid 19th century\(^1\). Thus, these networks of economic and personal relations are indeed a key element to explain the development of the economy.

A social network is a social structure composed by nodes, corresponding to organizations or individuals, which are linked through different proximity variables that cover a broadly range of familiarity or economics connections.

\(^1\) Lamoreaux (1994).
Alternatively, social networks can be understood as networks of information flows circulating through different organizations, institutions and informal spaces, which are especially significant in highly uncertain contexts facilitating the decrease of information costs\(^2\).

The formation of investment networks during a period when the Spanish economy was making a huge modernization effort is very relevant. The development of the different kinds of corporations in mid 19\textsuperscript{th} century had an important ally in those networks, which also had a huge influence on the characteristics of the business weaving.

Our objective is to analyse the investment social network around the members of the administration board of the \textit{Banco de Barcelona} between 1844 and 1854 (\textit{BB net}, from now on)\(^3\), and observe their role within the investment network resulting from the links of the most important investors in Catalonia during the first half of the 19\textsuperscript{th} century (\textit{G net}, from now on). We believe that the \textit{BB net} was important in a double sense. It reduced the cost of information in the investment choice and made easy the control and the monitoring of their client’s operations. We also think that \textit{BB net} was a compact network and it was participated by the most important investment groups of the Catalan’s economic society. In that direction, Blasco et al. (2007) had studied how the members of the \textit{Banco de Barcelona} oriented their investment through non-industrial sectors, hypothesis corroborated by other authors\(^4\).

\begin{itemize}
  \item \textsuperscript{2} Granovetter (1973), Wasserman and Faust (1994), Molina and Marsal (2002), Bogartti and Foster (2003)
  \item \textsuperscript{3} We stop in 1854 because of a huge modification of the analysis framework due to important legal changes. More concretely, the laws on railroads (1855), and issue banks and credit societies (1856), pushed up the investment. Making difficult any kind of comparison with previous years.
  \item \textsuperscript{4} Carles Sudrià, gathering the thesis about the role placed of the banks in the industrialization, pointed out the weakness of the banking system in Catalonia (Sudrià, 1982). New research on it uncovers that the huge industry funding were, actually, auto-funding. The bank system played a secondary role as Jordi Nadal and Enric Ribas have been said. Nadal y Ribas (1992), Soler (2000) y Prat (2006).
\end{itemize}
The use of joint investment made by two players as a criterion to draw a
link among them, in the configuration of a social network is not new\(^5\). Certainly,
this assumption on investments in public limited companies could be considered
weak because the economic responsibility is limited, and the owners changed
quickly. In the Catalan economy of mid 19\(^{th}\) century, investment choices were
conditioned by the reputation firms’ managers and directors of the directives of
the firms. Social control and confidence relations were strong to impede the
investment choice as an individual act. The methodology used is similar to that
one applied on the studies of the links between firms among the members of
board meetings (Interlocking Directorates)\(^6\) that, in some cases, also study the
role played by banks\(^7\). In fact, the study of the businesses networks formed
among their board meetings, and the related power relations, have been reported
in the literature on analysis of social networks for several decades, \(^8\).

Our main sources are the original documentation of the Banco de
Barcelona (Actas de las Juntas de Accionistas, Dirección y Gobierno), the
printed Memorias of the institution and other sources of those years (basically
newspapers). To identify the investments of the members of the boardroom of
the bank we have used the Base de Dades Empreses i Empresaris a la
Catalunya del segle XIX del Departament d’Història i Institucions Econòmiques
(Universitat de Barcelona) (BDDHiIE-UB as follows). It is built from the
collection of notary’s documentation of those years. We know the number of
shares which were paid by the shareholders when the societies were inscribed at
the notary. The notary districts of Barcelona, Girona and Tarragona between
1815 and 1866 were analysed to identify the shareholders who registered the

\(^5\) Similar example of linkage criteria can be found in Kramarz and Thesmar (2006), who use
the Grand Ecole membership of the boardroom of the most important french firms, and
Casson (2005) who considers market relations between firms.


\(^7\) Mariolis (1975); Gogel y Koenig (1981).

\(^8\) Allen (1974); Burt (1978); Koenig y Gogel (1981).
society and their initial investment. The resulting database includes the name of the society, the name of the first shareholders, the capital of the society and their distribution among the participants. This source has been refined many times. The result allows us to identify the same firm along the years, estimate the investment, and the new shareholders. The persons and firms went to the notary for two reasons. First when the firm was funded and, later on, every time they made changes in the capital or in the social name. Thought the authors of the database built up an investment series of annual data, we have utilised a sample in two different years (1844 – 1854). By this research, we also know who were the main investors between 1815 and 1866. To our purpose, we have selected individuals whose investments were larger than 500,000 pesetas. They were seventy-five people and investment societies (societies which invest in other societies). To build the BB net from investment links, we have considered all the firms where the members selected had invested, including public limited societies. Thought this criteria could be weak nowadays, we should consider that the formation of the public limited societies in the 19th century needed the promotion of renowned persons with they own investment networks.

The paper is organized as follows. In the first part, we defined the social network, its construction and its analysis. The second part presents and compares the two networks that we want to analyse (G net and BB net). Finally, we list with the main conclusions.

Social Network Analysis

Networks obtained from this sort of data are normally called bipartite networks. These kinds of networks are composed by two types of elements: Individuals and projects or organizations they belong to (or where they meet at).

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9 A broadly description about the construction of the Base de Dades Empreses i Empresaris a la Catalunya del segle XIX can be found in Soler (2003).
10 Sudrià, Pascual, Castañeda (1992); Sudrià, Pascual (1999).
In our particular case, these types of elements correspond to the members of Bank directorates and the companies they decided to invest in. The most common procedure to manage with these sorts of networks is to separate them into two new networks (one for each kind of element). Consequently, we obtain two networks from our data, one of investors and another of companies. Since our goal in this work is to study the social networks between investors, we have focused on the first network.

All networks are formed by vertices (or nodes) and links (or edges). In our particular case, nodes correspond to investors, and a link between two nodes means that the connected individuals has decided to invest in the same company, at least, once. Such definitions of the edges correspond to the trust links existing between investors referred above in the introduction of the paper. Note that these trust links reveal not only a certain level of confidence, but also uncover possible information flows between investors.

Once we have built up the networks of investors corresponding to the different historical moments described above, we have analyzed them by means of methodologies borrowed from Social Network Analysis. More concretely, we have represented both networks graphically and have calculated different kinds of nodes centrality.

Graphical representations have been made using Pajek, a computational utility which is able to draw complete graphs from a list of edges between vertices. In order to reach more intuitive representations of the networks, we have drawn the links in such a way that their width indicates the intensity of the relationship between nodes (the thicker the link between two investors, the more companies they have invested in jointly). Moreover, we have used an option of Pajek which represents the less connected vertices at the periphery of the network, leaving the most connected ones in the core.

Regarding node centrality measurements, we have applied the three ones described by Freeman in (1978) namely: degree, closeness and betweenness
centralities. Although all three of them give information about the importance of vertices' position in the network, each one of them provides particular information that is worth to mention here.

First, degree centrality of a vertex is calculated by counting how many 'neighbours' does it have, that is, the number of vertices it is connected to. Looking to our networks of investors, an individual with a high degree centrality (a 'popular' investment partner) could have a privileged global vision of the economical scenario, because of his connections to very different people.

Second, to calculate betweenness centrality, we first have to obtain the shortest paths between all pairs of vertices of the network. By the shortest path we mean the shortest list of intermediaries needed to connect two nodes. For instance, if two nodes are directly connected, their shortest path has no intermediaries at all. Once all shortest paths are defined, betweenness centrality of a certain node is calculated as the ratio of critical paths he belongs to over the total critical paths existing in the network. In our case, investors with a high betweenness centrality occupied an strategically position in relation to information flows management, because their intermediate location gave them the opportunity to notice (and, probably, control) which information had arrived to whom, how and when.

Third, the closeness centrality measures the 'physical' centrality of each node in the network. The node with the highest closeness centrality is the one with the shortest (in average) paths to all other nodes in the network. In a network where linkage is strongly related to trust, like our network of investors, closeness centrality can be associated to individual social capital (seen as those potentialities of each individual due to his relationships). An individual with a high closeness centrality is 'close' to other individuals, he can easily reach them (to obtain information, ask them for a favour or propose a business, for example) involving a little number of intermediaries in the operation.
One characteristically feature of social networks is that they present a community structure, i.e. they are composed by groups or communities of individuals that are more densely connected among them than with the rest of the population. The community structure of a social network can provide useful information, not only at a strictly structural level (who are the members of each one of the communities) but also about the relation between structure and dynamics (for instance, who are the ‘gatekeepers’ of a certain community, that is, the individuals that control the interactions of the community with the rest of the network). From the large variety of methods to determine the community structure of networks such as social ones (Danon et al., 2005), in the present work we have used an algorithm proposed by Duch and Arenas in (2005).

Finally, we have also compared two networks in terms of their density. In order to do that, we have calculated two different indicators of density: Link density (Number of links divided by the total possible number of links) and clustering coefficient, which measures the density of triangles in the network (the number of neighbour that are also neighbours of a common third individual).

The investment network composed by the main actors of the Barcelona's economic society, at mid 19th century

In this part we focus in the network resulting of the main investors. We want to analyse the investment network resulting by the investment links of a random choice of persons with important investment capabilities and, in that case, study the characteristics of the network. This could allow us to see the investment behaviour of the main players of the Catalan economy, and detect
the possible existence of compact groups. The results of this exercise will be
cmpared with the characteristics of the BB net studied before\textsuperscript{11}.

The selected group is formed by the main investors in firms of the mid
19\textsuperscript{th} century\textsuperscript{12} (we do not consider the not unipersonal firms as Girona Hermanos, Catalana General de Crédito, Crédito Mobiliario Barcelonés o Prosperidad Catalana\textsuperscript{13}). The coincidence in an inversion in a firm by one or more persons is the criteria used to build the social network\textsuperscript{14}.

The $G$ net of the highest investors of the Catalan economy shows a usual
structure in this kind of analysis (see Illustration 1). A densely nucleus with the
main actors of the system. An outer ring formed by others members connected
with the main actors with less densely links. A third group of persons, with weak
connections, which maintains some links with the net. And, the last group,
formed by the persons with no connections.

The observation of the network also emphasizes the low number of
personages that do not share any investment (only a 13\% of the total), that
enlarges to the 33\% if we are stricter and we only consider the links among
individuals that share two or more investments (Illustration 2), revealing a large
quantity of weak links (which only has a common investment).

\textsuperscript{11} A detailed study of the investment network around the members of the board administration of the Banco de Barcelona see Blasco, Y.; Lozano, S. y Badia-Miró, M. (2007).
\textsuperscript{12} Notice that the most important investor could not mean the richest one.
\textsuperscript{13} In this case we assign the investments of these firms to their shareholders.
\textsuperscript{14} Though Casson (2005) focused their analysis in the social networks around the markets, he
thinks that the confidence among different persons could be nexus which link the parts of the
network.
We observe the existence of various groups with different degree of dependence. First of all, cut off from the network we find the joint investments of the Batllo Barrera brothers’ (Felió, Jacinto and Juan). Secondly, other groups which are linked to the main net through a simple connection. Those are the groups formed by Juan Oliveras and Joaquín Gurri connected to the net through Juan Güell Ferrer; Ramon Ribas Boix and Miguel Cantallops Barnola linked through Juan Lleó Torroja. And finally, those that only have a simple link as Manuel Carbonell Sans connected through Manuel Girona Agrafel; Pablo Soler Morell through José Ferrer Vidal; Juan Capmany Carreras through Coma, Ciuró y Clavell\(^\text{15}\); and Ignacio Herrero Buj through José Jover Sans. Though we do not have a broadly information of all this persons, we believe that exists a non

\[^{15}\text{We have maintained in the analysis this firm, firstly because is not a public limited society, and secondly because only one of the main investors was in the first seventy five, which is the criteria for our analysis. Coma, Ciuró y Clavell was a big commercial firm in Barcelona, which the main business was the purchase and the sale of weaves along Spain. See Solà (1996).}\]
random explanation of all this relations. For example, Pablo Soler Morell was born in Vilanova i la Geltrú, not far from Barcelona, as José Ferrer Vidal, and the investment coincidence were in the firms participated by Ferrer’s (a cotton and a water public service company). The Jover and the Herreros Buj were commercial partners in a company which sold weaves in Castilia (Moreno, 2003).

Table 1 - Index of degree, closeness and betweenness

<table>
<thead>
<tr>
<th>Degree</th>
<th>Closeness</th>
<th>Betweenness</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIDAL RIBAS, JOSE</td>
<td>0,522</td>
<td>0,583</td>
</tr>
<tr>
<td>TINTORER</td>
<td>PASTOR, PABLO</td>
<td>MARIA</td>
</tr>
<tr>
<td>TINTORER</td>
<td>PASTOR, PABLO</td>
<td>MARIA</td>
</tr>
<tr>
<td>PASTOR, PABLO, MARIA</td>
<td>0,507</td>
<td>0,562</td>
</tr>
<tr>
<td>FABRA ILLAS, GIL</td>
<td>0,478</td>
<td>0,556</td>
</tr>
<tr>
<td>BUENAVENTURA, GIRONA</td>
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<td>0,543</td>
</tr>
<tr>
<td>AGRAFEL, IGNACIO</td>
<td>0,435</td>
<td>0,537</td>
</tr>
<tr>
<td>JOVER SANS, JOSE</td>
<td>0,435</td>
<td>0,531</td>
</tr>
<tr>
<td>GIRONA</td>
<td>0,420</td>
<td>0,531</td>
</tr>
<tr>
<td>AGRAFEL, CASIMIRO</td>
<td>0,435</td>
<td>0,531</td>
</tr>
<tr>
<td>SIRVENT</td>
<td>AGRAFEL, MARIANO</td>
<td>JOVER SANS,</td>
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<tr>
<td>AGRAFEL, MARIANO</td>
<td>0,420</td>
<td>0,531</td>
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<tr>
<td>SERRA, JOSE, MARIA</td>
<td>0,435</td>
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<tr>
<td>SIRVENT</td>
<td>AGRAFEL, MARIANO</td>
<td>JOVER SANS,</td>
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<tr>
<td>URGELLES, MARIANO</td>
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<tr>
<td>FERRER VIDAL, JOSE</td>
<td>0,435</td>
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<tr>
<td>GIRONA</td>
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<td>SERRA, JOSE, MARIA</td>
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<td>URGELLES, MARIANO</td>
<td>0,420</td>
<td>0,531</td>
</tr>
</tbody>
</table>
SERRA, JOSE MARIA 0,420
JOVER SANS, JOSE 0,525
VIDAL RIBAS, JOSE 0,030
ASCACIBAR DE VILLOTA, CELEDONIO 0,519
CLAVE ESPAÑA, MIGUEL 0,406
GIRONA AGRAFEL, IGNACIO 0,029
FABRA ILLAS, GIL 0,377
CLAVE ESPAÑA, MIGUEL 0,513
SERRA, JOSE MARIA 0,028
TORENS 0,377
SALER HUGUET, JOSE 0,502
MIRALDA, CARLOS 0,497
COMA, CIURO Y CLAVELL 0,026
GIRONA 0,333
SAFONT LLUCH, JAIME 0,492
AGRAFEL, CASIMIRO 0,023
ASCACIBAR DE VILLOTA, CELEDONIO 0,021

Source: Own elaboration from the analysis of social network. In black we consider the members of the boardroom of the Banco de Barcelona which, also are in the list of the main investors of the economic society at mid 19th century. Notice that Juan Güell Ferrer had low indexes in the first columns.

Though the visual study of the network permits us to have a first idea of the social connections in the network, is necessary the construction of some type of numerical indicator that facilitate the identification of the main personages inside it, that is to say, the indices of centrality presented further up.

Table 1 shows the fifteenth persons with higher indexes of centrality in this investment network. Is not strange that we find similar names in the three columns (grade, centrality and betweenness) because all this indexes indicate the
central persons of the sample, but the differences in the ranks are so interesting for the different nuance that this mean. Specially, the most important persons in the third column are in secondary places in the first and the second column. This is due to the specific role played for some persons who link different investment groups among them.

José Vidal Ribas, Pablo Maria Tintorer Pastor, Gil Buenaventura Fabra Illas, Ignacio Girona Agrafel and Manuel Girona Agrafel lead the centrality list (as an indicator of the number of neighbours of every node), that is to say, those are the persons which share a higher number of investors. We also find, in an important place, the other Girona Agrafel brother, Casimiro, and other members of the board administration of the Banco de Barcelona as José Maria Serra and Celedonio Ascacibar de Villota (as well as Manuel Girona Agrafel). Juan Güell Ferrer, an other member is placed in a lower rank (in the first ring of the system). Those persons were important in the Catalan economy of mid 19th century. With no doubt, the most important were the Girona brothers’, a family of merchants who evolve to financial and banking activities, though they participate in a lot of different type of business as the Herrera Barcelones, the Ferrocarril de Barcelona a Zaragoza or the Canal de Urgell. Juan Güell Ferrer, had amassed his fortune in Cuba and then went to Barcelona, at mid 30s in 19th century where he became an cotton businessman. Gil Buenaventura Fabra Illas was a Barcelona’s merchant who worked in the waves sector. His nephew was the founder of an important weaves firm, Fabra & Coats. Pablo Maria Tintorer, José Maria Serra and Celedonio Ascacibar are not as recognised as the others but their centrality shows their importance. Jose Maria Serra and Jose Vidal Ribas, for their importance in the network and for the amount of their investment we believe that he needs a broader research of their biography16.

The column of the closeness index shows a similar ranking with the important persons in the higher places (this index is an indicator of them who were placed in the best position of the network). The differences are in the order of the ranking. Pablo Maria Tintorer Pastor and José Vidal Ribas exchanged their places, as well as Ignacio Girona Agrafel and Gil Buenaventura Fabra Illas. Manuel Girona Agrafel is in the same position but José Maria Serra and Celedonio Ascacibar de Vellota raise some positions, lost by José Jové Sans and Casimiro Girona Agrafel.

The betweenness index, used as an index of connections between the persons, who do not share investments, show more differences in the ranking. The two most important persons are also important in the previous indicators: Pablo Maria Tintorer Pastor and Mariano Sirvent Urgelles. In the third position we find the first surprise, Juan Güell Ferrer, member of the board administration of the bank up to 1948, but a secondary person in the $G_{net}$. The explanation is that he allows that Juan Oliveras and Joaquín Gurri were connected to the network. A similar case is José Ferrer Vidal, who is also in an important place in the ranking. We have to point out that this is the indicator where the members of the boarding administration of the bank had better positions.

If we filter the initial network considering that two people will be connected only if they have two or more joint investments, the results obtained are quite significant. With this approximation we want to analyze a representative network of more intense linkages among their members (see Illustration 2).
Illustration 2 - G net, formed by the main 75 contributors of Catalonia (with two or more joint investments)

In this case, the number of persons with no links is higher. It also appears two groups with no connections with the main network but with some links among them. The first one is the group formed by Antonio López López and José Samá Mota. The second one includes José Ferrer Vidal and Fernando Puig Gibert. The second group is so interesting because puts José Ferrer Vidal in a secondary place and out of the main network. This result stress the importance in study the global network and the weakness of it. This result could be explained because they were in an early stage in their personal course. Antonio López had arrived to Barcelona in 1855, few years later were a member of the higher bourgeoisie of Barcelona and his daughter was married with Joan Güell’s son. José Samà, was the manager of a firm in La Habana at the end of 1850. José Ferrer Vidal was working in Vilanova i La Geltrú between 1844 and 1854, and he finally established in Barcelona at mid 50s. The connection between López and Samà could be explained for their coincidence in the colonial trade\textsuperscript{17}.

In this new network appeared other secondary persons as Sebastián Aballí Prats who is linked through Salvador Bonaplata, Bartolomé Vidal Nadal linked through Pedro Juan Garriga Soler and Juan Lleó Torroja through Mariano Sirvent Urgelles.

<table>
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</table>

Source: Own elaboration from the analysis of social network. In black we consider the members of the boardroom of the Banco de Barcelona which, also are in the list of the main investors of the economic society at mid 19th century. Notice that Juan Güell Ferrer had low indexes in the first columns.
But the most interesting result in this new network is the greater role played by Jose Maria Serra. We should remember that he was a member of the board administration of the bank and, at the same time, a central member in that network.

The next step is to look the structure of the network and test the existence of some compact communities inside it, to see their characteristics (see Illustration 3). To perform the analysis and to have more reliable results, we work on the network of two or more links (the outcome of this network is stronger than in the whole network). We have been able to unbundled 70 characters into seven groups (six groups with the persons of the network, and one with the rest). The six groups are quite different between them in terms of number of members. The largest was composed of 16 members six of whom were also central members of the $G$ net (José Jover Sans, Juan Lleó Torroja, Jose Seller Huguet, Mariano Sirvent Urgelles, Maria Tintorer Pablo Maria Tintorer Pastor Shepherd, Carlos Torrents Miralda and Jose Vidal Ribas).

The second group, also in terms of number of members, was composed by 10 members and would include three of the four members of the Banco de Barcelona. We have already talked about Celedonio Ascacibar de Villota, Juan Güell Ferrer and Jose Maria Serra. The third group was formed by the Girona’s brothers, their father (Ignacio Girona Targa), and other four persons (eight persons in total). The fourth group, much less extensive, is formed by four members where the main ones were Bonaplata Salvador and Jose Colomer. Finally, we find two couples which were no connected with the main network. On the one hand, the couple formed by Antonio Lopez López and Jose Samà Mota, and on the other hand, the coupled formed by Jose Ferrer Vidal and Fernando Puig Gibert.
Illustration 3 - Communities analysis of the G net (two or more joint investments)

Source: Own elaboration from the BDDHiIE-UB through Pajek.

A further step in the study of the communities’ composition in the network is the analysis of the G net with the incorporation of the investment of the members of the board of directors of the Bank of Barcelona. Our objective is to test if the members of the bank were randomly distributed in the G net or their presence is concentrated in certain groups (see Illustration 4). As in the previous exercise, we filtered the network by two or more joint investments\textsuperscript{18}. We must be cautious with the result obtained because the strong compaction of this network could make a bias in the communities’ analysis due to the fact that this new observations had a common investment which is the Banco de Barcelona. To fix this we have not considered it. Nevertheless, the further communities’ analysis of this new network put together four members of the bank in the group leded by Jose Bonaplata and Jose Colomer, and also in the group of ten members, which were formed by Jose Maria Serra, Juan Güell and Celedonio

\textsuperscript{18} The Banco de Barcelona network only considers two or more shared investments because we do not consider the inversion in that bank.
Ascacibar. The new group is composed of 24 members, 15 of whom were members of the board of Banco de Barcelona (three already in the network of the major contributors and twelve were new). This result shows the significant investment group that was generated around the Bank.

Another relevant data is that the group of the previous network with members of the Bank maintained his isolation, despite the inclusion of new characters. None of them seemed to have joint investments with the new members. In this case, the number of members of the group remains but there are some movements of characters. Juan Lleó Torroja, Mariano Sirvent Urgelles and Carlos Miralda Torrents had moved toward the group of Girona’s brothers and Gil Buenaventura Fabra Illas, Miguel Martorell Peña and Joaquin Prats Roquer had come from the group of Güell, Ascacibar and Serra.

In the other three communities, we want to stress that Girona’s brothers were still forming a compact group where the three characters came from the larger one, plus two other members of the network of the Banco de Barcelona, Juan Plandolit and José Montagut. The other group, which contain the remaining members of the Banco de Barcelona (Jose Amell, Jaime Badia, Manuel Compte, Jose Parlads and Ignacio Villavecchia), is composed of eight members, of whom more than half belongs of the new network. It is remarkable that the two of the three members of the network of the largest investors, came from the group of Serra, Güell and Ascacibar, and the third one was not part of the main network. This reinforces the important role of these three group members as an umbrella for the other ones.

At the end, we can see the couple formed by Antonio López López and José Samá Mota had not got connections with the other members of the net. Otherwise, the other couple who was alone has changed and now it is part of the group of Serra, Güell y Ascacibar (we are talking about José Ferrer Vidal and Fernando Puig Gibert).
Illustration 4 - Community analysis to the network formed by the $G \text{ net}$ and the members of the administration board of the Banco de Barcelona (only links with two or more joint investments)

Based on the foregoing, we can say that the members of the Banco de Barcelona are not distributed randomly among the different groups emerging from the network formed by the 70 largest investors. They are grouped into two groups arising from whole network. On the other hand, there is a group formed by central figures in the overall network as Jose Vidal Ribas, Jose Jover Sans or Pablo Maria Tintorer Sans, which do not maintain joint investment with the people's Bank of Barcelona. There we also found Carlos Miralda Torrens, which sought the establishment of a financial institution after the crisis of 1848 which affected the Banco of Barcelona, but it ended in a bankruptcy\(^19\).

\(^{19}\) Arxiu Històric de la Biblioteca de Catalunya, Fons Junta de Comerç, JC XCIII 923-948.
The Banco de Barcelona and its investment network

In Barcelona, prior to the authorization obtained by the Banco de Barcelona, only three public limited companies had been formed: Sociedad de Navegación e Industria, established in 1841, which came from a company called Compañía Catalana de Buques de Vapor, formed in 1833; the Compañía Barcelonesa de Seguros Marítimos which was established in April of 1838 and the Sociedad Catalana del Alumbrado por Gas in 1843. None of them had more than 10 million pesetas of social capital, at the beginnings. The starting authorization to the Banco the Barcelona in 1844 marked a significant change in the scenario described above. The first evidence of this change was the magnitude of capital of the bank, which was formed by 20 million pesetas divided into 5,000 shares which enabled almost half a hundred shareholders to participate in the establishment of a bank. Its directors opted for a consensus strategy on their constitution, and to engage in its board administration at least two industrialists. Its statutes required that any shareholder would have on his property more than 100 actions, and the vote on the Boards of Shareholders was per person and not by amount of shares. This package ensured, apparently, the participation of a significant segment of the population in the constitution and operation of the Bank.

The Bank's organizational design was defined by three boards: Shareholders, the government and Management. In the first one all the Bank's shareholders voted but if they owned up of five shares. This Board elected the members of the Governing Board, which is responsible for the Bank's activity and decide its evolution. The Board of Directors elected three directors, responsible for executive tasks of the entity.

The hard core of the Bank was composed of his Presidency, 15 members elected at the General Meeting. In this first period this group was fairly compact, and also remained in the time: in 10 years 10 councillors were changed by the death, resignation or no re-election by shareholders. The significant initial
participation of shareholders, made clear that the elected persons had good reputation in the city and they enjoyed the confidence of approximately 70 to 80 shareholders who came to vote.

Tabla 1 – Members of the administration board of the Banco de Barcelona, 1845 – 1856

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<th>Name</th>
<th></th>
<th>Name</th>
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<td>PEYRA MACH, AGUSTIN</td>
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<td>PLANDOLIT, JOSE</td>
</tr>
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<td>FLAQUER PADRINES, MARIANO</td>
<td>19</td>
<td>RICART GUITART, JAIME</td>
</tr>
<tr>
<td>7</td>
<td>GATELL, ESTEBAN</td>
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<td>ROIG ROM, MIGUEL</td>
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<td>GIRONA AGRAFEL, MANUEL</td>
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<td>GONZALVEZ DE FARIA, SERAFIN</td>
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<td>13</td>
<td>MARTÍ CODOLAR, JOAQUÍN</td>
<td></td>
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</table>

Source: Banco de Barcelona. Actas Juntas de Accionistas del Banco de Barcelona. Arxiu Històric Nacional de Catalunya. We have included all the persons who were members of the Junta de Gobierno of the Banco, though some of them were it only for some months, as Montagut.

In this paper we built a representation of the social network, from the information related to the investment participation of these people, and we have studied it through their analysis techniques. We have established that a link between two persons appears when they have made, at least, a joint investment in a single company (different from the Banco de Barcelona which is not
considered because it could bias the exercises). As the first exercises, this is a first step and we should study other kind of relations among the members of the economic society and filter by other characteristics as the different types of existing business, or other relationships of trust such as the sharing of the boards of administration in other companies.

To build the network investment, we considered all the persons who had been members of the Board of the Bank and the investments that performed together on the same criteria that followed in the construction of the earlier network.

**Illustration 5 – Investment network of the members of the Board Administration of the Banco de Barcelona, 1854**

In Illustration 5 we can see the network emerged for joint investments by members of the Board of Directors of the Bank. From Blasco et al (2007) we can see the evolution of the network and compaction of their investments. They detect the importance and centrality of some persons, sometimes forgotten as Jose Maria Serra (also a member of the network of the largest investors), Miguel Roig i Rom and Manuel de Lerena. We also find, at preferential places,
Celedonio Ascacibar, while Juan Güell and Manuel Girona are placed in secondary positions.

**Tabla 2 – Indexes of the members of the Board Administration of the Banco de Barcelona**

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<td>0,790</td>
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<td>0,800</td>
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<tr>
<td>0,750</td>
<td>0,042</td>
<td>0,770</td>
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<td>Badia, Jaime Villavecchia, Ignacio</td>
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<td>0,750</td>
<td>0,038</td>
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<td>0,710</td>
<td>0,020</td>
<td>0,750</td>
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<td>0,710</td>
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These results stress the importance of José Maria Serra in the overall Catalan Economy at the time, also as an investor in the network that was formed around the Banco de Barcelona.
Similarities and differences between the two investment networks

The analysis of the two investment systems highlights a relevant fact. The network of Banco de Barcelona is significantly more compact than the network built among major investors in the Catalonia in the mid-nineteenth century (see Table 5). This is a stronger proof of the importance of the BB net as a special case.

**Tabla 3 – Indexes among networks.**

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<th>Link density¹⁰</th>
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<td>CAT (up to one joint investment)</td>
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<td>CAT (up to two joint investment)</td>
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The two indices of Table 5 shows as the values for the Banco de Barcelona are higher, even considering the Catalan network without restrictions, that is, considering the network up to a common investment. The links density shows higher values in the Banco de Barcelona network (approximately 1.8 times higher). The differences in the clustering coefficient are lower but remained the stronger compaction of the BB net (1.3 times). As expected, in the network filtered by two or more links, the differences in the rates of compaction between the two networks are even lower (4.6 times and 2.1 times the density for clustering coefficient).

This fact confirms what we have already found in a qualitative sense. The members of the Board Administration of the Bank were grouped as a

¹⁰ Number of existing linkages (without considering the number of joint firms)/all of possible links (without considering the number of joint firms).
community of investors and their investment network were compact. For next studies we have to analyze the characteristics that define each group, those who are part of the network of the Bank, and those who are outside and detect possible common features among them.

Conclusions

During the early stages of the globalization and given the level of economic, social and information technologies, we would expect that the capital market would operate around social networks that minimize information costs. The existence of certain groups with reputation and financial capabilities, which maintained trade, proximity or familiar relations with those who had economic capacity, should encourage the movement of capital towards the investment in the industry, the trade or the transport sectors. The emergence of modern financial institutions affected, of course, this situation. However, it did not always influence as one would expect from economic theory: attracting private capital to reinvest it later. The Banco de Barcelona and the Catalan banking system of the 19th century are an example of how financial institutions do not always go hand in hand with the industrial development and with the economic development in general. In that sense we have to ask ourselves about their role. To do that we have compared the persons who were part of the Board Administration of the Banco de Barcelona and the group formed by the largest investors in corporations in the 19th century Catalan economy, using the quantitative methodology of the social network analysis commonly used in other areas.

One of the main results of our analysis has a direct impact on the role played by the Bank in the overall economy. It seems clear, as the literature has established so far, that this financial institution had no direct impact on the industrial and the commercial investment. After the establishment of the Bank,
businesses continued to fund their fixed assets through reinvestment of profits while they had to finance the capital requirements, they use to turn to their own shareholder’s credit. Even in the short-term credit market, the Bank had a fairly relative weight. Instead of, the bank was important as an issuing institution, although this is not relevant here. Thought the fact that the bank accepted the share of the commercial and industrial firms, as a guarantee of a loan, push up the development of the public limited companies.

Our analysis shows that the social network formed around this institution helped to link several isolated networks that were either scattered or in process of formation. This argument is reinforced by the analysis of the structure of the investment network. The group with no members of the bank was formed by people who had a stake in other financial institutions\(^{21}\). Thus, José Jover was linked to the family Herrero who had a trade’s house, and since the 1850s their financial activities were dominant over the strictly commercial activities. On the other hand, Carlos Torrents Miralda was the representative of the English engineer established in Belgium, John Cockerill, and we know that he had his own adventure in the financial world before the foundation of the Banco de Barcelona. To end the checking of this group, Pablo Maria Tintorer attended in the Caja Catalana Industrial y Mercantil.

Beyond the BB net, the analysis of the network and its structure allows us to show how, in the context of a dynamical economy, as was the Catalan economy between the period over the end of the Napoleonic Wars and the crisis of the cotton hunger, a social network was structured and became the hard core of the Barcelona bourgeoisie until the Civil War of 1936-39.

So, after the demonstration of the existence of several investment networks we have analyzed their structure. We have deduced the existence of several groups of different typologies. On the one hand, there is a group of

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\(^{21}\) Anes and Otazu (1987)
investors who had their roots in the trade and manufacturing sector of mid 18th century, had born at the end of this century and towards 1840 were mature. This was the case of Salvador Bonaplata and Josep Colomer, partners in the adventure of *El Vapor*, the first firm of yarn and cotton with a steam engine. 

Secondly, we would be faced with that group who would be coming into full maturity, but they had not got relationship with the traditional bourgeoisie of the 18th century. That includes José Jover, Juan Lleo, José Seller, Mariano Sirvent, Pablo Maria Tintorer, Carlos Torrents and José Vidal which were born out of Barcelona and their first business steps in the trade sector. The last group, called the "new investors", it is formed for persons who had born after 1800 and we can found persons as the Girona’s brothers, leaded by Manuel, and the "Indians" as Celedonio Ascacíbar, Juan Güell and José María Serra. In this group of "new investors" we must consider those who joined the Barcelona’s bourgeoisie after the founding of the bank. We are talking about Antonio Lopez, Juan Samà, José Vidal Ferrer and Fernando Puig, which had been born in mid 1810s as Manuel Girona, and were linked with the “Indians” through familiarity relations, who had landed or were landed in Barcelona after 1830. We have already mentioned the case of Ascacíbar, Güell and Serra. Antonio Lopez and Juan Samà also had come back to Barcelona after a stay of several years in La Havana. Jose Ferrer Vidal came from a village with great tradition of emigration to America and ended up marrying with a woman born in La Havana (Soler, 2006). Manuel Girona, also married with an "Indian’s" daughter (Carolina

\[\text{Nadal (1983)}\]
\[\text{José Jover (Copons), Juan Lleo (Reus), José Seller (Maó), Mariano Sirvent (La Havana), Pablo Maria Tintorer (Tarragona), Carlos Torrents (Manresa) and José Vidal (Sant Feliu de Llobregat).}\]
\[\text{Celedonio Ascacíbar was born in Santiago de Chile. Juan Güell was born in Torredembarra (near to Tarragona), he had gone to Veracruz and, before he came back, he went to La Habana (Rodrigo, 2006).}\]
Quadras) born in Venezuela and member of one of the most important families in the economy of mid 19th century in Barcelona. Only Fernando Puig could not be classified in this typology.

To sum up, the analysis of the investment networks shows that, in the fast growing economy of Barcelona in mid 19th, there were several networks that helped to channel funds into inversion. We have also detected a group, called "new investors", which would be consolidated and became the dominant elite of the Catalan economy until the outbreak of the Civil War in 1936. It was in this network, where the Banco de Barcelona played a key role in the consolidation and compacting of the groups who were formed around it.

Bibliography


Annex 1

Table 4 - 70 main investors of Catalonia.

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<td></td>
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<td></td>
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<td>BALTA, JOAQUIN</td>
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6 BATLLO BARRERA, FELIO
7 BATLLO BARRERA, JACINTO
8 BATLLO BARRERA, JUAN
9 BOADA VILOMARA, MIGUEL
10 BOFILL PINTO, JUAN MANUEL
11 BONAPLATA, SALVADOR
12 BOSCH LABRUS, PEDRO
13 BUÑEDE ACREUT, MIGUEL CANTALLOPS BARNOLA,
14 MIGUEL
15 CAPMANY CARRERAS, JUAN
16 CARBONELL SANS, MANUEL
17 CERIOLA CASTELLA, JAIME
18 CLAVE ESPAÑA, MIGUEL
19 CLAVE VIDAL, JUAN BTA.
20 COLOMER, JOSE
21 COLOMER, JUAN
22 COMA, CIURO Y CLAVELL
23 ESPARO, VALENTIN
24 FABRA FONTANILLS, CAMILO FABRA ILLAS, GIL
25 BUENAVENTURA
26 FERRER VIDAL, JOSE
27 GARRIGA SOLER, PEDRO JUAN
28 GIRONA AGRAFEL, CASIMIRO
29 GIRONA AGRAFEL, IGNACIO
30 GIRONA AGRAFEL, MANUEL
31 GIRONA TARGA, IGNACIO
32 GRIMALDI, JUAN DE
33 GUELL FERRER, JUAN
34 MARTORELL PEÑA, MIGUEL
35 MASRIERA VIDAL, JOSE
36 MASRIERA VIDAL, JUAN
37 MASRIERA VIDAL, JUAN
38 MIRALLES GIL, JORGE MUNTADAS CAÑELLAS,
39 BERNARDO
40 NADAL Y RIBO
41 ODENA PUJOL, JOSE
42 OLIVERAS, JUAN
43 PAUL PIMONT, EDUARDO PLANAS COMPTE, JOSE
44 MANUEL
45 PRATS ROQUER, JOAQUIN
46 PUIG GIBERT, FERNANDO
47 PUIGMARTI MATAS, RAMON
48 RIBAS BOIX, RAMON
49 ROMA, JOAQUIN DE
50 SAFONT LLUCH, JAIME
51 SALA BRUGUES, RAMON
52 SAMA MOTA, JOSE
53 SANTALO VIÑALS, RUPERTO
54 SELLER HUGUET, JOSE
55 SERRA FRANCH, JOAQUIN
56 SERRA, JOSE MARIA
57 SIRVENT URGELLES, MARIANO
58 SOLER MORELL, PABLO TINTORER PASTOR, PABLO
59 MIRALPEIX, NICOLAS
60 TOUS SOLER, FCO.
34 GURRI, JOAQUIN
35 HERRERO BUI, IGNACIO
69 VIDAL NADAL, BARTOLOME
70 VIDAL RIBAS, JOSE