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Reassessing the bank industry relationship in Italy, 1913-1936: a counterfactual analysis

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Abstract:	<p>Until the banking reform in 1936, banks and industrial companies in Italy were strongly intertwined (both in terms of ownership and interlocking directorates). Using Imita.db - a large dataset containing data on over 300,000 directors of Italian joint stock companies - this paper analyses what would have happened to the Italian corporate network in the years 1913, 1921, 1927 and 1936 if the German type universal banks and their directors would have not been there. Our test shows that new centers of the system would have emerged (financial, electricity and phone companies), confirming the interconnected nature of the Italian capitalism. We also analyze two industries (textiles and iron and steel) characterized by different labor-to-capital intensities to check for sectoral differences. Contrary to conventional wisdom, we find that local banks were important in funding both industries.</p>

COMMENTS TO THE AUTHOR:

Reviewer 1:

I still like the basic idea of the paper. The authors have added some new citations to recent work, however, they still do not seem to have the bigger picture of the historiography and the idea that there has already been a well-accepted revision of the standard (Gerschenkron and followers) view. Moreover, they do not really address anything about the consequences of these governance networks for corporate performance, shareholder well being, industrial development or economic growth. To present this study as a "test" of Gerschenkron's hypothesis is a huge stretch. And trying to do so seems to under-appreciate the significant works that already have offered rigorous reexamination (and mostly undermining) of Gerschenkron's claims. To be sure, most of this revisionist work has concerned the German and UK financial systems and a few others. But some work has also reshaped thinking about the Italian system. The authors do give some credit to Confalonieri (a huge, multi-volume work!) and to Fohlin and Battilossi and others. But they need to acknowledge previous works more directly and point out their relationship to specific points they are making.

Dear Referee,

thank you for your further comments which have contributed to further improve our paper. Accordingly, we have now profoundly rewritten the Introduction and have revised the Conclusions to fix this point. We point out the relationship between our findings and the wider historiography also at various other points throughout the paper.

For example, in the introduction, the authors state the following: "Despite the relevance of the relationships between banks and industry in Italian economic historiography, only very few studies have analyzed the sharing of board members between banks and industrial companies in the period prior to WWII." They then cite a couple of papers by Baccini and Vasta and footnote two others from the 20s. Why not refer to the Confalonieri and Fohlin works again here, since they specifically address this issue?

Now we meet the referee's point by referring again to Confalonieri's and Fohlin's works in the Introduction.

And then in the conclusion, a glaring omission of granting credit where due appears in the opening paragraph, which states the following:

"The main results of this paper support in part the criticism of recent historiography towards Gerschenkron's view about the centrality of German-style universal banks in fostering Italian industrialization, especially in capital-intensive industries"

Here is where they should highlight the scholars who have actually done this in-depth analysis, often extremely pain-staking-to make these points. All this statement does is draw the attention back to Gerschenkron and whether he was "right" about German-style banks. Why keep giving credit to the work that is mostly wrong, rather than to the more recent work that is right?

As recommended, now we give credit to the more recent historiography by referring directly to Confalonieri's and Fohlin's works in the Conclusions. As to Gerschenkron, our point is twofold. On the one hand, our evidence supports Gerschenkron's insight that Italy's German-style universal banks were linked by a dense web of interlocks principally to larger firms. On the other hand, we criticize him by showing that he failed to grasp that the creation of interlocking directorates was not limited to a few large banks, but was a widespread practice in Italian capitalism which involved many small local banks which in turn developed a dense web of ties with industrial firms. Only a

minority of such local banks were linked to larger universal bank, whereas most of them were part of systems of interlocks that existed in parallel to the one centered on the larger universal banks.

2nd point: The authors still have done little to tie their work on Italy to the larger body of research on other countries and to comparative studies. For this paper to grab the interest of general readership and have the credibility you want for the journal, it needs to incorporate this single country analysis into the bigger and comparative picture. Germany is the obvious case—both because it is the core case for Gerschenkron and because it has the most thorough and rigorous quantitative historical work, but there have been studies of bank/industry networks in the US, Belgium, Sweden, Japan, France, the UK—plus others.

Now we have reframed the paper to address this point. As said, the Introduction has been largely rewritten to incorporate the Italian case in a larger comparative perspective, especially with Germany. Comparison with Germany is also developed in various other parts of the paper. Moreover, comparative analysis of corporate network structure has been extended, thanks to some recent research, to include not only Germany, the USA and the Netherlands, but also France and the UK (see footnote 11).

3rd point: Again, to raise the "law and finance" strand of research opens up a whole range of (uncited) studies that have mostly debunked the original studies, based as they were on scant evidence. The authors cite the 2005 NBER volume in passing, but they stopped there.

Following the referee's suggestion, now we have dropped all the parts of the paper that referred to the "law and finance" strand of research.

Here's another example: "At the same time, we have shown that Italian capitalism seems to be structured to a remarkable extent on a sizeable and stable system of corporate interlocks which existed in parallel to that centered on the universal banks." This is very similar to Germany, and much has been written about the extent of interlocking directorates among non-financial corporations in the pre-war era (and much more regarding the post-war era). They should draw the comparison, rather than highlight their results as a novelty.

According to the referee's recommendation, now we highlight the similarity of this result to that of Germany, where also there was a dense web of interlocks amongst non-financial corporations.

4th point: This raises another issue that I think I did not underscore enough the first time: what these authors measure is the extent of corporate governance relationships. They do not, and cannot, say much at all about whether these relationships had any impact on the companies with banking relationships. And that is one of the key points of much historical work—some of which they have cited, but a good bit they have not. As extensive as bank governance relationships were, they really stemmed from other activities and did not in many cases have any growth enhancing effects. Again, this is a key point of the newer history of corporate governance and banking.

So, in summary, I think the paper has technical merit, but the authors really have to address the key issues in order to make the paper publishable in a top field journal:

1. Make a point of what they have added past their own previous work published elsewhere. Ie, the data and basic network analysis is already published in previous journal articles.

This point allows us to better clarify the effort we have made in this research. First of all, data of the counterfactual networks for all four benchmark years are new and have never been published elsewhere. Data of the actual networks for the benchmark years 1913 and 1921 are also totally new and have never been published elsewhere. Data of the actual networks for the benchmark years 1927 and 1936 are instead a refined version of the dataset used in Vasta and Baccini (1997). As for the methodology, all the network analysis indexes provided in this paper have never been published elsewhere. Indeed, Vasta and Baccini (1997) report the Density, the Interlock Position Ratio, and the Concentration First Four indexes that are not used in this paper also because they are sensitive to the sample size. Moreover, data of the textiles and iron and steel sub-networks - both actual and counterfactual - are new and have never been published elsewhere. The same applies for all the network analysis provided on these sub-samples.

2. Give proper credit on specific points of other authors

Now we have done it, particularly in the Introduction that, as said, we have largely rewritten, but also in several other parts of the paper.

3. Either drop the law and finance connection or engage it more thoroughly

We have dropped the law and finance connection.

4. Look more deeply into the newer research on other cases, at the very least Germany, which is the dominant universal banking country with the most work done on analyzing corporate governance relationships.

Now we have reframed the paper to address your point. In the Introduction, we have incorporated the Italian case in a bigger comparative perspective, especially with Germany. Comparison with Germany is also developed in other parts of the paper. Moreover, comparative analysis of corporate network structure has been extended to include not only Germany, the USA and the Netherlands, but also France and the UK (see footnote 11).

5. Make the point that extent of networks don't necessarily indicate anything about results and impact. Ultimately, we want to know whether these institutional differences had any effect on industrial and economic development.

Now, we have made this caveat at p. 4 in the Introduction.

Reassessing the bank industry relationship in Italy, 1913-1936: a counterfactual analysis

1. Introduction

Financial institutions arise to intermediate between savers in excess of funds and entrepreneurs seeking credit for productive investment. Different economies may face varying problems for capital mobilisation, so that financial systems may assume a wide range of forms. Thus, countries such as the UK and the USA developed specialized financial systems in which commercial and investment banking are spread into separate sets of institutions, and stock markets play a paramount role in allocating funds. Conversely, in continental Europe financial systems often hinged on large joint-stock universal banks that provide both commercial banking functions (short-term credit, deposit taking, payments clearing, bill discounting) and investment banking services (underwriting and trading in securities) (Cameron 1967; Fohlin 2012).

Universal banks emerged in a number of continental European countries in the mid-19th century. Germany became the archetype of universal banking, having used this institution to mobilize extensive capital to finance its economy (Fohlin 2007). In the mid-1890s, a consortium of German banks transplanted German-style universal banking in Italy by establishing two joint-stock banks – the *Banca Commerciale Italiana* and the *Credito Italiano* – that soon became the two largest credit banks in the country (Cohen 1967).

Gerschenkron (1962) singled out the main universal banks as the major drivers of Germany's and Italy's industrial spurts in the pre-World War One years. In his view, in both countries these banks functioned as a “substitutive factor” for otherwise missing prerequisites of industrialization, i.e., substantial capital accumulation and a willingness to invest it in industry. According to Gerschenkron, universal banks exerted a considerable influence and control over industrial companies through three major channels: capital participation, sharing of board members and monitoring over day-to-day financial affairs. Benefits of a financial system based on a close relationship between banks and industry included the provision of qualified managerial advice to industrial firms and the alleviation of moral hazard associated with asymmetric information. However, the role of universal banks has been reconsidered by a more recent “revisionist” historiography. In particular, Fohlin (1998, 1999) found evidence that in both Germany and Italy these banks had a limited impact on capital mobilization, industrial investment, and economic growth. In both countries, firms connected to universal banks

performed similarly – as regards growth of financial capital, fixed assets and revenues – to “unattached” firms.

In-depth research by Fohlin (2007) provides new insights about the structure of the German financial system. Her results show that key characteristics of universal banking emerged late in the industrialization process and its influence came from something other than the formalized control relationship over firms. The importance of universality – the combination of investment and commercial banking – appears mostly in the support that universal banks gave to the development of active securities markets, not in the domination of industry nor in the dramatic alteration of firm behaviour or performance.¹

Another major contribution to the revision of the Gerschenkronian paradigm came from Confalonieri’s multi-volume work on the history of the Italian banking system (Confalonieri 1974-76, 1982, 1992, 1997). This author stressed the continuity between the German-type universal banks and their French-style antecedents as the former hired most of the staff and followed the practices of the latter. Confalonieri argued that the Italian universal banks were more concerned with standard banking activities, i.e. they lent money on a project by project basis, than with planning an overall industrial strategy. Last but not the least, Confalonieri maintained that the universal banks avoided permanent ownership of industrial companies and accepted shares only as a guarantee for loans. This strategy collapsed when the post-First World War crisis made impossible for many companies to repay their debts to banks. Thus, the banks unwillingly became the real owners of much of the “military-industrial complex” and of several important firms in other industries. When the Great Depression struck, the entire system collapsed and both the banks and their industrial clients were thus bailed out by the State.

In recent years, a new strand of literature has studied the relationship between banks and industry in Italy by focusing on corporate governance. Battilossi (2009) argued that unsound practices by the universal banks in the interwar years were permitted and to some extent enhanced by the systematic failure of public and private governance institutions to act as disciplinary devices for banks’ risk-taking. In particular, he points out that, in order to reject hostile takeover attempts, the *Banca Commerciale Italiana* and the *Credito Italiano* assigned their own equities to *ad hoc* holding companies. These were owned by the banks themselves and by their “allied groups”, i.e., large industrial concerns that were amongst their largest

¹ Indeed, a bank cannot become “universal” without investment banking operations to perform. As investment banking requires the use and intermediation of securitized financial instruments, universal banks generally worked with, rather than against, active securities markets (Fohlin 2015).

borrowers. Thus, universal banks entered into close and long-run relationships with financed firms that insulated managers from external controls, favored the elimination of prudential constraints, and increased the potential for conflicts of interest as borrowing industrialists were co-opted among their controlling owners. This degeneration of relationship was epitomized by a pathological escalation of equity stakes, possibly further encouraged by expectations that liquidity mismanagement would have been fixed once again by lack of supervision and unconditional bail-outs by monetary authorities when macroeconomic conditions eventually improved. In the same perspective, Brambilla (2012) stresses that poor corporate governance limited information disclosure by borrowing firms. This led to higher grades of opacity as for investment projects quality and industrial undertaking performances, and to higher degrees of risk connected with capital investment by universal banks.²

Despite the relevance of the relationships between banks and industry in Italian economic historiography, only a few studies have analyzed the sharing of board members – that is the system of interlocks – between banks and industrial companies in the period prior to the Second World War. The pioneering works by Zorzini (1925) and Luzzatto Fegiz (1928) found in the mid-1920s a high presence of directors of the two largest universal banks – *Banca Commerciale Italiana* and *Credito Italiano* – on the boards of electric power companies. More generally, they found a high concentration of the whole corporate system, in which two per cent of directors controlled more than one-third of the total share capital of Italian joint-stock companies.

Cohen (1967) and Confalonieri (1974-76, 1982, 1992, 1997) stressed that as soon as they began operations, the two largest universal banks formed two networks that involved Italy's two largest railway companies – *Strade Ferrate Meridionali* and *Strade Ferrate del Mediterraneo* that after the nationalization of the Italian railways in 1905 turned into holding companies – and firms operating in modern capital-intensive sectors such as electric power, chemicals, iron and steel and shipyards.

A study by Vasta and Baccini (1997) – using a large sample of more than 4,000 Italian joint-stock companies and formalised network analysis techniques – held that the Italian corporate network does not seem to have been characterized by a strong centrality of banks as it was commonly believed. The location of banks at the center of the network could be detected in 1911 and even more in 1927, but this was no longer the case in 1936, after the collapse of

² More generally, on the history of corporate governance in Italy, see Aganin and Volpin (2005). For a history of corporate governance in a wide range of countries, see the essays contained in Morck (2005).

the universal banks. By that time, insurance companies and utility companies had replaced banks at the center of the system (Baccini and Vasta 1995). These authors also find that a highly stable system of interlocks existed in parallel to that centered on the banking system, and remained substantially unchanged over the years. This result is very similar to what has been shown by Fohlin (2007) for Germany, where in the pre-First World War years there was also a dense web of interlocks amongst non-financial corporations.

An in-depth analysis of the system of interlocks centered on Italy's largest universal bank, the *Banca Commerciale Italiana*, is provided by Fohlin (1999). This author shows that 18 per cent of all Italian joint-stock companies with at least one million lire of share capital in 1911 were affiliated to this bank but accounted for 40 per cent of total share capital. This bias towards larger firms pervaded the bank's relationships across industries but was more pronounced in some sectors such as transportation, mining, chemicals, food and beverage, and entertainment services.

This article investigates the links between the Italian universal banks and the corporate economy by focusing on cross-memberships in boards of directors of joint-stock companies (interlocking directorates). This approach, which has its origin in modern sociology, gained, in the last decades, significant spaces in all social sciences, including economics and, with a certain delay, economic and business history.³ The use of the interlocking directorates technique can play a dual role by complementing, on the one hand, the traditional case-study method and, on the other hand, by allowing broad overviews of the corporate systems under investigation, which also helps the verification of different theoretical perspectives. The interlocking directorates technique is a powerful tool for the analysis of the governance structures of the corporate system. Nonetheless, a causal relationship between the structure of corporate interlocks and the performance or the patterns of investment of the firms involved as well as the growth of the economy overall is difficult to establish and is beyond the scope of this work.

This paper first analyzes the structure of the Italian corporate network in four benchmark years: 1913, 1921, 1927 and 1936. Then it presents a counterfactual experiment, by showing what would happen to the network if the universal banks and all their directors had been eliminated. In order to check for sectoral differences, the analysis is replicated for two industries

³ The necessity to introduce new methodologies and the opportunity to integrate much more economic, business and social history has been recently maintained by Jones, van Leeuwen and Broadberry (2013).

– textiles and iron and steel – characterized by different labor-to-capital intensities. We find that a new center of the system would have emerged, confirming the interconnected nature of the Italian capitalism. Moreover, it emerges that local banks were important, particularly in the North of the country, in funding textiles and iron and steel firms.

The paper is organized as follows: after this Introduction, Section 2 describes the data and the sources. Section 3 sets out the methodology utilized for this study. Section 4 presents the results of our counterfactual tests, while Section 5 focuses on actor centrality. Section 6 replicates the counterfactual exercise for textiles and iron and steel industries. Lastly, Section 7 concludes.

2. Data and sources

The source we used for this work is *Notizie statistiche sulle principali società italiane per azioni*, edited and published by Credito Italiano, from 1906 to 1925, and since 1928, by the Associazione fra le Società Italiane per Azioni. The *Imita.db* database is an electronic version of this source.⁴ This dataset contains information regarding companies, boards of directors, and balance sheets of a large sample of Italian joint-stock companies for several benchmark years. The source includes all the joint-stock companies listed on one of the Italian stock exchanges, together with those companies located in Italy whose share capital at the closure of the last balance was higher than a set threshold, which was set at 1 million Italian lire, with the sole exception of 1913, when it amounted to 500,000 lire. Overall, the dataset contains data on more than 38,000 companies, almost 300,000 directors, and more than 100,000 balance sheets. Representativeness, in terms of capital, is very high as the sample covers over 90 percent of the total universe of Italian joint-stock companies. As for the directors, we used only data for members of a board of directors in the strict sense, leaving out the members of *Collegi sindacali*.⁵ We have carefully standardized the names of the directors to make them as

⁴ Imita.db is one of the worldwide largest datasets on joint-stock companies in historical perspective. For details, see: Vasta (2006). The database is available on line: <http://imitadb.unisi.it>

⁵ During the period investigated in this paper, the 1882 Commercial Code regulated corporate governance in Italy. This had designed a two-board system of corporate administration in which the assembly of the shareholders had the legal authority for appointing the two following boards: 1) the board of directors (*Consiglio di amministrazione*), which was the executive body of the assembly of the shareholders. This usually included both inside and outside directors; 2) the board of syndics (*Collegio sindacale*), which consisted of three or five regular syndics (*sindaci effettivi*) and two alternate syndics (*sindaci supplenti*). Their duty was to exercise control and supervision over the management of the company, to monitor the decision taken by the board of directors (Teti 1999). The board of syndics was fundamentally an auditing board and its function did not coincide with those of the supervisory board in the German system. Thus, similarly to what was done in the two major international

homogeneous as possible. However, we estimate that the information on boards of directors contained in *Imita.db* has a margin of error of about 1 per cent, as is the case with other similar databases (Mintz and Schwartz 1985). These errors are mainly due to cases of homonymy, misprints, or shortcomings in the source.

3. Methodology

Starting from the actual networks, we analyze and test – for each benchmark year – some counterfactual hypotheses about the network structure. We study an initial two way matrix related to the network, and then we analyze a second matrix related to the counterfactual effects. The effects of the change could be distinguished between global and local. Global effects can be referred to the structure of the entire network, whereas local effects are related to the position of a single node in the network. The global effects of the network counterfactuals are related to network stability and network connectedness, whereas the local effects are associated to the stability and robustness to change of the communication channels into the network. In particular, it is possible to analyze how the role of each node changes by passing from the actual to the counterfactual network (Borgatti 2003, 2005, 2006).

Analytically, we start from an adjacency matrix A_s , of binary elements $A_s(i, j) = 1$, in which we can observe a connection between the firms i and j , and $A_s(i, j) = 0$, in which the two firms are not connected. This matrix refers to the baseline adjacency matrix and is the matrix to which every counterfactual experiment is compared. For this matrix we compute all the different network measures representing the baseline network indexes to compare with the counterfactuals experiments, which are obtained through a perturbation of the original network. A single perturbation could be considered as an elimination of a single node or an elimination of a single vertex. We recomputed all the network measures for each counterfactual experiment and then we compare the results obtained for the two networks.

The structure of the Italian corporate network at various times in the 20th century has already been explored in Vasta and Baccini (1997) and Rinaldi and Vasta (2005, 2012, 2014) by using network analysis techniques. This paper adds to the previous studies a counterfactual experiment for each of the benchmark years considered. Our procedure works as follows: firstly, we compute statistics for the actual networks in all the benchmark years; secondly, we

research projects on corporate networks in comparative perspective (Stokman, Ziegler and Scott 1985; David and Westerhuis 2014a) for our analysis we have selected only members of the board of directors.

remove the universal banks – *Banca Commerciale Italiana*, *Credito Italiano*, *Banco di Roma*, *Banca Nazionale di Credito* and *Società Bancaria Italiana*⁶ – and all the board positions of the directors who sit in at least one universal bank. In this way, if a given director sits in the boards of directors of a universal bank and two industrial companies, we cut the links between the universal bank and each of the two companies as well as the link between the two industrial companies.⁷

In addition to the analysis of the whole networks, we also compare interlocking directorates between banks and industry in textiles and in iron and steel. We expect that banks are considerably more connected with the iron and steel sector because it requires more capital for investment. Sharing board members enhances the ability of the banks to monitor the performance of the companies and therefore the possibility of getting their money back. For both sectors we performed the counterfactual described above for each benchmark year.

4. The structure of the network

Table 1 reports a number of statistics for the actual networks in the four benchmark years and the relevant counterfactuals. The number of vertices (in our case, companies) is related with the number of nodes in the network. This number increases from 1913 to 1921, reaches a peak in 1927 and then decreases in 1936, as a consequence of the reduction in the number of firms included in our sample due to the Great Depression. The number of isolates follows the same pattern, however it also increases in 1936, possibly because of the bankruptcy of some connecting companies during the Depression. The increase in the number of isolates is higher than the increase in the number of firms, moving from 12 to 21 per cent. The number of

⁶ Bankruptcies and mergers changed over time the landscape of universal banks in Italy: *Banco di Roma* was founded in 1880, *Banca Commerciale Italiana* in 1894 and *Credito Italiano* in 1895. *Società Bancaria Italiana* was established in 1904 and, because of the crisis of the iron and steel industry in 1911, it merged in 1914 with *Società Italiana di Credito Provinciale*, establishing the *Banca Italiana di Sconto*, which bankrupted in 1921. What remained of the *Banca Italiana di Sconto* gave rise to the *Banca Nazionale di Credito*, which in 1930 merged with *Credito Italiano*.

⁷ Actually, this procedure defines the upper limits of the universal banks' influence in the network. For example, if there is an executive director (for instance the president) of a large Italian steel company who has 10 positions in the network, he creates $(10 \cdot 9)/2 = 45$ ties in the network. Indeed, he is executive director of the steel company, has been co-opted in the board of a universal bank, and has board position in other eight industrial firms (non-executive director). The sub-network created by this individual is centered on the steel company and is more an indicator of the influence of this company rather than of the universal bank. Thus, in the WP version of this article (Drago, Ricciuti, Rinaldi and Vasta 2012), we performed also a less demanding counterfactual experiment in which we eliminated only the universal banks, but retained the board positions that their directors held in any other companies. This allows to define the lower limits of the universal banks' influence in the network. The difference between the actual network and the counterfactual obtained in this way was very small so we eventually decided to drop it.

components (which is a subgraph in which any two vertices are connected to each other by paths, and which is not connected to any additional vertices in the supergraph) steadily increases over the years. The largest component in a network is usually very large, in our case its relative size with respect to the number of vertices is 85 and 88 per cent in the first two benchmark years, then falls to 81 and 71 per cent in the last two years. The diameter of largest connected component measures the distance between the two most distant nodes: the increase we observe between 1913 and 1921 is sizeable, and given the increase in the number of firms, this means that the network becomes denser in structure. Notably, in 1927 the diameter reduced with respect to 1921, but in 1936 it returned to its 1921 level. Instead, the total adjacency index⁸ – which measures the number of edges (interlocks between companies) in the network – increased constantly from 1913 to 1927, but in 1936 it declined. More generally, the structure of the network became more complex from 1913 to 1927, but in 1936 complexity decreased. In fact, the average degree⁹ – a normalized index unbiased by a change in sample size – also increases from 1913 to 1927 and decreases in 1936. A similar trend is shown by a standardized sample of Italy’s top 250 companies by total assets. Here the density – the basic index of the network’s connectedness, defined as the ratio between the actual number of interlocks and the number of possible interlocks¹⁰ – rises from 4.77 per cent in 1913 to a maximum of 8.61 per cent in 1927 and then drops to 5.44 per cent in 1936 (Rinaldi and Vasta 2014).¹¹

<<Table 1 around here>>

In all benchmark years, we find that firms that were linked to the universal banks were in almost all cases the largest firms in their respective sector. The bias of universal bank’s

⁸ This index is calculated starting from the matrix that contains all ties.

⁹ The degree of a node is the number of edges connected to it.

¹⁰ In the case of a standardized sample, density is an unbiased indicator because comparison concerns samples of the same size.

¹¹ Comparing to other countries, Italy seems to have followed much the same trend as Germany, even if at lower values. Indeed, the density of the network of Germany’s top 250 firms rose from 7.34 per cent in 1914 to 16.19 percent in 1928 and then fell to 10.47 per cent in 1938. The US followed the same trend, even if at values much lower than both Germany and Italy (Windolf 2009, 2014). The decline of the density in these countries in the 1930s was the result of the banking laws that prohibited or regulated the financial participation of banks in industries (David and Westerhuis 2014b). A similar trend was observed also in the Netherlands, another bank-centered corporate system. However, here it was not banking laws that put limits on the functioning of banks, but the banks themselves that chose new strategies: after the crisis, Dutch banks returned to trade financing and became reluctant to provide long-term credit to firms (Westerhuis 2014). By contrast, in some other countries, such as France and the UK, the density of the network of the top 250 firms grew steadily from the pre-First World War years to the late 1930s. In the former from 4.90 per cent in 1911 to 6.30 per cent in 1937 (François and Lemerrier 2014); in the latter from 0.98 per cent in 1904 to 1.98 per cent in 1938 (Schnyder and Wilson 2014).

relationship towards largest firms was more pronounced in some sectors than others, especially in capital-intensive industries such as electricity, chemicals, iron and steel, and in the other financial intermediation (finance companies). Conversely, affiliation to large universal banks is lower – both as a proportion of firms and share capital – in some labor-intensive industries such as food, textiles, leather, wood and furniture.¹²

The counterfactual exercise changes the network structure to different extents across benchmark years. The number of isolates is slightly higher than in the actual networks, but their percentage is basically the same. In addition, the percentage of multiple ties is very similar through the benchmark years. The number of components is strongly reduced, but not the size of the largest component. The diameter of the largest connected component is also similar, if anything slightly higher in two years. The dynamics of the indices is quite similar to the one of the actual networks, with an increase in the first three benchmark years and a reduction in the last one. Moreover, their values are quite smaller than in the actual networks. For instance, the average degree sees a 21 per cent reduction in 1913, then the gap slightly declines to 17 per cent in 1921, reaches a 25 per cent peak in 1927 (from 16.8 in the actual network to 12.5 in the counterfactual). Finally, it drops dramatically to a 10 per cent minimum in 1936 (from 11.0 to 9.9). The average degree in the counterfactuals has rather high values in absolute terms in all benchmarks year, ranging from 9.9 in 1936 to 12.8 in 1921, and is much more stable than that in the actual networks.

These data show that the weight of the large universal banks in the Italian corporate network varied remarkably over time. It was substantial prior to the Great Depression and especially in the late 1920s, but then it declined dramatically. At the same time, a stable and resilient system of interlocks seems to have existed in parallel to the system centered on the larger universal banks, as claimed by Vasta and Baccini (1997). Remarkably, this result is similar to Germany, where not only the larger Berlin-based universal banks, but also the smaller provincial universal banks were linked by a dense system of interlocks to industrial companies and a web of interlocks also existed among non-financial firms (Fohlin 2007).

¹² Details on the number and total share capital of all Italian joint-stock companies with at least one million lire of share capital in the four benchmark years and on the number and proportion of firms with affiliation with at least one of the big universal banks are reported in Tables A1 to A4 in the Appendix.

5. Actor centrality

In network analysis it is assumed that actors that are central have better access to information, better opportunities to spread information and somehow a “power” to coordinate the whole network. We use *nBetweenness* as the measure to calculate the centrality of firms. This measure is based on the idea that a firm is more central if it is more important as an intermediary in the communication network. So it calculates for each actor (company) the number of shortest paths between any pairs of actors in the network that pass through this actor (De Nooy, Mrvar and Batagelj 2011).

Table 2 shows the mean for the deciles of *nBetweenness*, across actual and counterfactual networks. Within each benchmark year the mean of *nBetweenness* in each decile is quite similar, which can be expected in very large networks as the ones we are analyzing. In all benchmark years, the mean of the three lowest deciles is zero. Such a result is due to the high proportion of isolated firms (i.e., firms that are not interlocked to any other firms) which is not surprising in such large samples. The mean is zero for the four lowest deciles in 1927 and for the five lowest deciles in 1936, in both cases for both the real and counterfactual network. Across benchmark years, the mean of the two highest deciles becomes smaller moving from 1913 to 1936. In particular, we find that the counterfactual network differs from the actual one in the mean of *nBetweenness* in the three highest deciles, where it is higher in all benchmark years but 1913. Thus, removing universal bank-industry interlockers seems actually to increase centrality of other subjects, making them even more connected than those that were removed.

<<Table 2 around here>>

Tables 3 to 6 show the *nBetweenness* of the twenty most central companies and the relevant counterfactual in the four benchmark years. The actual networks’ statistics show the prominent position occupied by the universal banks, some iron and steel producers, electricity companies, and railway companies.

<<Tables 3-6 around here>>

Looking over time at the real networks, the universal banks strengthen their central position in the ranking. In 1913 we find three of these banks (1st, 5th and 13th) among the top twenty, whereas in 1921 we have four of them (1st, 3rd, 8th, and 17th), and in 1927 the same

number of banks are ranked 1st, 3rd, 4th, and 6th, taking even more ground. In this sample, 1927 represents once again the apex of the role of these banks, since in 1936 we find only two universal banks among the twenty most central companies, ranked 7th and 20th respectively.

The counterfactual has some deep effects on the ranking of firms. In 1913, the three universal banks disappear because, by construction, they have been removed from the sample (Table 3). The top of the ranking marginally changes, with companies moving up by one position because of the removal of *Banca Commerciale Italiana*. However, in lower positions we observe some serious changes: *Unes Unione Esercizi Elettrici* moves from the 11th to the 6th position, *Società Elettrica della Sicilia Orientale* from 18th to 11th, and *Officine Meccaniche Italiane* from 20th to 14th. Five other firms – in addition to the three universal banks – disappear from the top twenty, while eight firms that did not appear in the actual ranking make their entry.

The pattern in 1921 is similar: stability in the very first ranks, a number of shifts due to removal of the universal banks, and the changes from the middle to the bottom of the ranking (Table 4). A few companies become more central, strongly improving their rank: *Unes Unione Esercizi Elettrici* from 16th to 3rd and *Banca Bergamasca di Depositi e Conti Correnti* from 20th to 11th. Five companies that were not in the ranking of the actual network appear in the top twenty in the counterfactual.

As noted before, 1927 is the benchmark year in which universal banks had the largest influence in the network. Unsurprisingly, removing the interlockers had its strongest effect. In Table 5 we find that a half of the most central companies – ten out of twenty – went out of the top twenty in the counterfactual and were replaced by as many companies.

As for 1936 (Table 6), the universal banks have already lost their power, thus the removal of their interlockers has a very limited effect. The first six positions are virtually unchanged, the reshuffling is usually limited within 3-4 positions. Only four companies that were not in the ranking in the actual network enter among the top twenty in the counterfactual but are placed from 17th to 20th position. We emphasize that *Credito Italiano* – Italy's second largest universal bank – in the actual network is relegated in 24th position.

This exercise has shown that the centrality of the universal banks in the Italian corporate system varied over time. It increased from 1913 to 1927, but then it sharply decreased in 1936, after the universal banks had been severely struck by the Great Depression and had been eventually bailed out by the big state-owned holding *Istituto per la ricostruzione industriale* (Zamagni 1993; Toninelli and Vasta 2010). Nonetheless, the demise of the universal banks did

not lead to a disentangling of the network, as new centers with a high value of $n_{\text{Betweenness}}$ emerged and played a key role in assuring the cohesion of the system. As said, these results corroborate Vasta and Baccini's (1997) claim that a sizeable and stable system of interlocks existed in parallel, or as a complement, to that hinged on the universal banks. This can be detected in all benchmark years, including 1927, when the influence of the universal banks was higher. Until 1927, such a system of interlocks extraneous to the universal banks was mainly centered on electricity companies, some large steel and trade companies and the *Banca d'Italia*, at that time a joint-stock bank. In 1936, it still hinged on electricity companies together with some new actors – such as insurance companies and some mandatory syndicates – that had taken up a central role.

6. Comparing labor- and capital-intensive industries

In this Section we analyze the bank-industry relationship in two sectors characterized by different relative intensities of factors of production: textiles and iron and steel. In performing this analysis, for each benchmark year we construct two sub-networks: in the former case we take all the banks and all the textile companies, whereas in the latter case we take the banks mentioned above and all the iron and steel companies. The methodology devised earlier is replicated for these sub-networks.

Table 7 reports the statistics of these smaller sub-networks. The pattern in terms of isolates, number and size of components is similar for the two networks and resembles the one of the whole network. The average degree shows higher values for the textile actual sub-networks than for the iron and steel ones. These results possibly reflect the fact that interlocking directorates were a common practice also in such a labor-intensive industry as textiles, which in a latecomer country as Italy at that time still accounted for a sizeable part of the largest companies.¹³

It is remarkable that the average degree, which is a normalized index whose value is not affected by the size of the sample, shows higher values for the textile sub-networks in all the benchmarks considered, even if the gap with respect to the iron and steel networks is narrow. Nonetheless, the counterfactual exercise has stronger effect for iron and steel network,

¹³ It is worth noting that, in 1913, amongst the top 200 Italian manufacturing firms there were 64 textiles companies and that, in 1936, the corresponding figures still amounted to 41. For a detailed account of the structure of Italian big business, see Giannetti and Vasta (2010, table 2.2).

confirming that the links generated by universal banks' directors were more relevant for the capital-intensive industries.

<<Table 7 around here>>

Table 8 reports the distribution of mean betweenness for the sub-networks. Compared with the whole networks the picture is somehow different. We find that the 9th decile has a much higher value in these sub-networks than in the main ones, whereas this is not always true for the other. Moreover, the distribution is more stable for textiles when we compare the actual sub-networks with the counterfactual than for iron and steel. The latter, in particular, shows a reduction of the mean nBetweenness in the highest percentile.

<<Table 8 around here>>

We observe four main findings: first, the pattern of the results is similar to those found earlier for the general network, as the effect of a counterfactual shock is increasing from 1913 to 1927 and drops in 1936. Second, and this appears surprising, the connectedness is higher in the banks-textiles sub-network; however – as it was expected – the effect of a counterfactual shock is proportionally higher in the banks-iron and steel one. Third, large universal banks are placed in a paramount position in both sub-networks in benchmarks from 1913 to 1927, but then they are marginalized as a consequence of the Great Depression. Fourth, many small local banks appear among the most central companies for both sub-networks. This feature grows over time from 1913 to 1927 with the same pattern observed for the universal banks, and it is more pronounced in the iron and steel than in the textile industry.¹⁴ In addition, the position of local banks seem to have been weakened in 1936 with regard to the previous benchmark year. Nonetheless, their ties with industry seem to have stood the Great Depression better than those of the large universal banks.¹⁵

The overall result that emerges from the analysis of the bank-industry relationship in the textile and iron and steel sectors is that, contrary to conventional wisdom, interlocking directorates were not limited to the larger banks (especially universal banks) and to the larger

¹⁴ Conversely, in Germany local banks were affiliated principally with textile and chemical firms (Fohlin 2007).

¹⁵ The list of the twenty most central in firms by nBetweenness in the textiles and iron and steel sub-networks (both actual and counterfactual) in all benchmark years is reported in Tables A5 to A8 in the Appendix.

firms operating in capital-intensive industries. Instead, we have found that the sharing of board members was a common practice in Italian capitalism, which involved to a large extent also small local banks and small firms operating in labor-intensive industries. This suggests that one of the main peculiarity of Italian capitalism, i.e. the dwarfism of its entrepreneurial base, could at least in part be reconsidered. In fact, as interlocking directorates are an element that makes it possible to broaden a firm's boundaries, we can assert that at least some of the Italian small and medium-sized firms, although remaining small, are able to be connected to other firms and banks, and act as a bigger players. This can be seen as the "only way to grow" for firms operating in a latecomer country or, at least, as the easiest way to reach a reasonable size.¹⁶ Interestingly enough, this result is very similar to Germany, where the largest firms were usually linked to the great universal banks headquartered in Berlin, whereas small firms were more commonly affiliated to local banks operating in the same region (Fohlin 2007).

In particular, our counterfactual experiments make us reconsider the respective roles of larger and smaller banks in Italian industrialization. Actually, the formation of the Italian banking system in the 19th century was characterized by the creation of a few larger banks (first French-style and then, after the 1893 banking crisis, German-style) that operated at the national level and of some thousand smaller banks, credit societies and saving banks that operated at the local level. The conventional wisdom in Italian historiography (Gerschenkron 1962; Cohen 1967; Mori 1992) maintains that, until the Second World War, the funding of industrial ventures, especially in capital-intensive industries in the North-West of the country, was carried out principally, if not exclusively, by the larger banks, especially the German-style universal banks. According to this view, smaller local banks started to play a relevant role in the financing of industry only in the 1950s during the "Golden Age", as a part of a set of policies devised to promote small manufacturing firms. The Bank of Italy played a decisive role in this respect, as after the Second World War it prompted a restructuring of the banking system to strengthen the local banks that funded small firms clustered in the industrial districts in the North-East of the country. The growth of the former was strongly associated to that of the latter. In fact, throughout the post-Second World War period the national banks within industrial districts had a much lower share of the local credit market than elsewhere. Lower assessment, monitoring, and enforcement costs, and social connections between local banks' managers and local

¹⁶ For a survey on the diffusion of a long lasting dense relationship amongst all firms' typologies, see Colli, Rinaldi and Vasta (2016).

entrepreneurs gave local banks a competitive edge within industrial districts. Bank competition was restricted to prevent an increase in industrial concentration since it was felt that if the small firms were deprived of necessary credit they would be forced to merge with the larger firms (Conti and Ferri 1997; Conti 1999; Carnevali 2005).

Instead, our analysis has shown that prior to the Second World War large universal banks were not the only relevant actor that supported Italian industrialization, and in several areas of the country (especially Lombardy and some other regions of the North), small local banks had established strong ties with industrial companies already in the 1910s. The strength of these ties grew in the interwar years. A dense web of ties between local banks and industrial companies can be detected for both a labor-intensive industry as textiles (and this could be expected) and for a capital-intensive industry as iron and steel (and this appears more surprising).

It is possible that local banks were linked to the larger universal banks in the sense that the former might function as branches of the latter. In fact, it was possible for small banks located in peripheral areas to collect funds regionally and make deposits with the universal banks in their base cities. However, our evidence shows little support for this claim. In fact, in both the textiles and the iron and steel sub-networks only a minority of local banks in the top twenty were interlocked to a universal bank, the highest proportion being one out of three in the textile sub-network in 1913.¹⁷ Thus it seems that the links between local banks and industry were largely part of a system of interlocks that existed independently on the one centered on the larger universal banks. In their respective territories, such local banks acted as small universal banks that provided firms with both short and long term loans and sometimes also participated in their share capital. The sharing of board members became also widely superimposed to credit relationships and cross-shareholdings between banks and industry at the local level (Piluso 2009).

Lombardy stands out as the region that accounted for the highest number of local banks amongst central companies in both the textiles and the iron and steel sub-networks throughout the period investigated, with a proportion ranging from 70 per cent to the totality of local banks included in the top twenty. Small universal banking existed in Lombardy already in the 1910s, but it boomed in the 1920s with the setting-up of several banks explicitly aiming at funding

¹⁷ Banking concentration in Italy was lower than in the England and Germany, but higher than in the USA. Thus, on the eve of the First World War, the four largest Italian credit banks held 15 per cent of total bank assets. At the same time, the corresponding figure for the top five banks was 36 per cent in England, 33 per cent in Germany, and only 4.5 per cent in the USA (Fohlin 2012).

industrial investment (i.e., the *Banca Industriale di Busto Arsizio*, the *Banca Industriale di Bergamo* and the *Banca Industriale Gallarate*). At the same time, several other banks that had previously invested principally in agriculture (i.e., the *Credito Agrario Bresciano*, the *Banca di Legnano* and the *Banca Agricola Mantovana*) turned also to industrial investment (Zamagni 1995). In 1927, some of these banks appear in the top twenty in at least one of our sub-networks, together with some long-established banks. Among the latter, two local banks located in the small industrial town of Bergamo stand out: *Banca Piccolo Credito Bergamasco* and *Banca Mutua Popolare di Bergamo*.¹⁸

The system of interlocks centered on small universal banks in Lombardy was partially destroyed by the Great Depression. However, most Lombard local banks overcame the crisis and were still present in our sample in 1936. In that year some of them appeared among the top twenty in either the textiles or the iron and steel sub-network and two of them – the *Banca Belinzaghi* and the *Banca Unione* – in both.

These findings can perhaps help to shed light on Fohlin's (1998, 1999) finding that investment in fixed capital did not relate to attachment to Italy's largest universal bank (*Banca Commerciale Italiana*), firms affiliated to this bank invested less on average relative to their size, and fastest-growing firms were not interlocked to it. Fohlin's evidence may at least in part be consequent on the fact that credit was available also to firms that were not linked to the *Banca Commerciale Italiana* or, more generally, to the four larger universal banks, since universal banking was a practice largely used also by small local banks, as it is indirectly shown by their propensity to generate interlocking directorates with industrial firms.

7. Conclusions

This paper has investigated, by the use of new data, the links between the universal banks and the corporate economy in Italy by focusing, with updated methodologies, on cross-

¹⁸ The *Banca Mutua Popolare di Bergamo* was founded in 1869 as a credit cooperative to provide funds to the local economy. Members were mainly tradesmen and craftsmen, and some protestant Swiss textile entrepreneurs stood out among them. Nonetheless, the bank showed a preference for smaller deposits and lending to small enterprises. Four years after the *Banca Bergamasca di Depositi e Conti Correnti* was founded and became the main source of funds to the local cotton and silk industries. Both Italian and Swiss entrepreneurs were amongst the bank's shareholders, directors and borrowers. In the 1920s the bank pursued rapid and risky expansion by lending and assuming large equity stakes in connected industrial borrowers which eventually led to its bankruptcy in 1932. In 1891 the catholic bank *Piccolo Credito Bergamasco* was founded and it also became an important source of funds to the local economy. In 1925 a fourth local bank, the *Banca Industriale di Bergamo*, was created and soon developed strong ties particularly with Italcementi, Italy's largest cement producer headquartered in Bergamo (Romani 2011).

memberships in boards of directors of joint-stock companies (interlocking directorates). It has first analyzed the structure of the Italian corporate network in four benchmark years: 1913, 1921, 1927 and 1936. Then it has presented a counterfactual experiment, by showing what would happen to the network if the universal banks and all their directors had been removed. This analysis has been replicated for the textile and iron and steel industries, characterized by different labor-to-capital intensities, to check for sectoral differences.

The main results of this paper support part of the criticism of recent historiography (Confalonieri 1974-76, 1982, 1992, 1997; Fohlin 1998, 1999) towards Gerschenkron's view about the centrality of German-style universal banks in fostering Italian industrialization, especially in capital-intensive industries. Our counterfactual exercise has shown that the centrality of the universal banks in Italian corporate system varied over time. It increased from 1913 to 1927, but it decreased sharply in 1936, as a consequence of the Great depression. At the same time, we have shown that Italian capitalism seems to be structured to a remarkable extent on a sizeable and stable system of corporate interlocks that existed in parallel to that centered on the universal banks. This latter system can be detected in all benchmark years, including 1927, which marked the apex of the influence of the universal banks. Remarkably, this result is similar to what Fohlin (2007) found for Germany, where not only the larger Berlin-based universal banks, but also the smaller provincial universal banks were linked by a dense system of interlocks to industrial companies and a web of interlocks existed also among non-financial firms.

Finally, to test Gerschenkron's hypothesis that universal banks fostered principally capital-intensive industries, this paper used the same methodology to analyze the bank-industry relationship in two sectors characterized by different relative intensities of factors of production: textiles (labor-intensive) and iron and steel (capital intensive). This exercise provides four main outcomes: i) the pattern found for the two sectors is similar to those found for the general network, as the effect of a counterfactual shock is increasing from 1913 to 1927 and drops in 1936; ii) surprisingly, the connectedness is higher in the banks-textiles sub-network even if, the effect of a counterfactual shock is proportionally higher in the banks-iron and steel one; iii) large universal banks are central in both sub-networks until 1927, but then their role fades; iv) many small local banks appear among the most central companies in both sub-networks, and this feature varies over time with the same pattern of universal banks. Nonetheless, in 1936 the ties of local banks with industry seem to have stood the Great

Depression better than those of the large universal banks. This happened also in Germany, where the largest firms were usually linked to the great universal banks headquartered in Berlin, whereas small firms were more commonly affiliated to local banks operating in the same region (Fohlin 2007). However, local banks in Germany were affiliated principally with textile and chemical firms and not so much with iron and steel ones as we have found in Italy.

Thus, on the one hand, this paper finds support for Gerschenkron's view that large German-style universal banks were linked principally to larger firms in Italy. On the other hand, it shows that Gerschenkron failed to grasp that the creation of interlocking directorates was not limited to a few large banks, but was a common practice (at least in Lombardy and some other areas of the North) that involved many local banks which in turn developed a dense web of ties with industrial firms. Only a minority of such local banks were linked to a large a universal bank, whereas most of them seem rather part of systems of interlocks that existed independently on the one centered on the larger universal banks.

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Table 1. Networks (actual and counterfactual) characteristics (1913-1936)

	1913	1921	1927	1936
<i>Actual network:</i>				
Number of vertices (n)	1,243	3,075	4,476	4,243
Number of isolates	154	295	654	895
Percentage of isolates	12	10	15	21
Percentage of multiple ties	79	82	76	68
Number of components	169	322	730	1,016
Size of the largest component	1,058	2,723	3,651	3,049
Diameter of the largest connected component	11	17	14	17
Total adjacency index	7,916	23,814	37,573	23,432
Average Degree (k)	12.736	15.488	16.788	11.042
<i>Counterfactual network:</i>				
Number of vertices (n)	1,240	3,069	4,467	4,233
Number of isolates	166	305	668	906
Percentage of isolates	13	10	15	21
Percentage of multiple ties	77	82	75	67
Number of components	186	333	749	1,024
Size of the largest component	1,034	2,705	3,615	3,029
Diameter of the largest connected component	11	18	14	18
Total adjacency index	6,279	19,687	27,936	20,971
Average Degree (k)	10.102	12.829	12.507	9.908

Note: Total adjacency index is the number of edges in a network. The Average Degree measures the average number of companies to which each one is interlocked.

Table 2. Distribution of firms by *nBetweenness* (1913-1936)

Year and network	10%	20%	30%	40%	50%	60%	70%	80%	90%
1913 actual	0.000	0.000	0.000	0.009	0.034	0.079	0.137	0.232	0.411
1913 counterfactual	0.000	0.000	0.000	0.008	0.035	0.079	0.136	0.230	0.417
1921 actual	0.000	0.000	0.000	0.005	0.013	0.033	0.058	0.095	0.184
1921 counterfactual	0.000	0.000	0.000	0.005	0.015	0.037	0.062	0.108	0.203
1927 actual	0.000	0.000	0.000	0.000	0.003	0.010	0.029	0.049	0.108
1927 counterfactual	0.000	0.000	0.000	0.000	0.004	0.013	0.033	0.057	0.121
1936 actual	0.000	0.000	0.000	0.000	0.000	0.005	0.020	0.044	0.105
1936 counterfactual	0.000	0.000	0.000	0.000	0.000	0.005	0.023	0.049	0.107

Table 3. Top twenty firms by nBetweenness centrality, actual and counterfactual networks (1913)

Firm	Industry	Actual	Counterfactual		
		nBetw.	Rank	nBetw.	Rank
Società Bancaria Italiana	Universal bank	4.592	1	-	-
Ilva	Steel	3.262	2	2.297	3
Ferro e Acciaio	Trade	2.217	3	3.329	1
Società Elettrica Riviera di Ponente Ing. R. Negri	Electricity	1.883	4	1.358	10
Banca Commerciale Italiana	Universal bank	1.871	5	-	-
Banca d'Italia	Issuing bank	1.740	6	2.646	2
Società Italiana per le Strade Ferrate del Mediterraneo	Railway	1.531	7	1.854	4
Società Generale Italiana Edison di Elettricità	Electricity	1.423	8	1.097	18
Società Italiana per Imprese Fondiarie	Real estate	1.359	9	0.263	240
Banca Bergamasca di Depositi e Conti Correnti	Bank	1.355	10	0.490	111
Unes Unione Esercizi Elettrici	Electricity	1.271	11	1.598	6
Olierie e Saponerie Meridionali	Chemicals	1.238	12	1.252	13
Credito Italiano	Universal bank	1.235	13	-	-
Veneta per Costruzione ed Esercizio di Ferrovie Secondarie Italiane	Railway	1.225	14	1.085	21
A.E.G. Thomson Houston	Mechanical engineering	1.221	15	1.530	7
Torinese di Tramways e Ferrovie Economiche	Railway	1.193	16	0.784	38
Elettrica Bresciana	Electricity	1.156	17	1.125	15
Società Elettrica della Sicilia Orientale	Electricity	1.125	18	1.332	11
Istituto di Fondi Rustici Società Agricola Industriale Italiana	Agriculture	1.117	19	0.910	26
Officine Meccaniche Italiane	Mechanical engineering	1.084	20	1.231	14

Note: eight firms that were not in the actual ranking appear in the top twenty in the counterfactual: Società Italiana per l'Industria dello Zucchero Indigeno (Food, nbetw 1.803, rank 5), SADE (Electricity, nbetw 1.406, rank 8), Lanificio Rossi (Textiles, nbetw 1.365, rank 9), Forniture Elettriche (Mechanical engineering, nbetw 1.276, rank 12), Società Anonima Navigazione Interna (shipping, nbetw 1.115, rank 16), Società Italiana per le Strade Ferrate Meridionali (railways, nbetw 1.112, rank 17), Banca Lombarda di Depositi e Conti Correnti (bank, nbetw 1.094, rank 19), Tecnomasio Italiano Brown Boveri (mechanical engineering, nbetw 1.092, rank 20).

Table 4. Top twenty firms by nBetweenness centrality, actual and counterfactual networks (1921)

Firm	Industry	Actual		Counterfactual	
		nBetw.	Rank	nBetw.	Rank
Banca Commerciale Italiana	Universal bank	5.028	1	-	-
La Rinascente Società per l'esercizio di Grandi Magazzini	Trade	2.372	2	3.034	1
Credito Italiano	Universal bank	1.709	3	-	-
La Pace	Insurance	1.600	4	2.011	4
Società Italiana per le Strade Ferrate Meridionali	Finance	1.587	5	1.997	5
Assicurazioni Generali	Insurance	1.557	6	2.148	2
Distillerie Italiane	Beverage	1.538	7	1.241	10
Banco di Roma	Universal bank	1.481	8	-	-
Elettricità Alta Italia	Electricity	1.367	9	1.063	12
Società Generale Italiana Edison di Elettricità	Electricity	1.367	10	1.520	8
Società Elettrica Riviera di Ponente Ing. R. Negri	Electricity	1.337	11	1.661	7
Generale Elettrica della Sicilia	Electricity	1.301	12	0.558	50
Società Idroelettrica Piemonte	Electricity	1.196	13	1.325	9
Istituto di Fondi Rustici Società Agricola Industriale Italiana	Agriculture	1.145	14	1.765	6
Credito Nazionale	Bank	1.139	15	0.992	14
Unes Unione Esercizi Elettrici	Electricity	1.080	16	2.119	3
Banca Nazionale di Credito	Universal bank	1.033	17	-	-
Società Ligure Lombarda per la Raffinazione degli Zuccheri	Food	0.938	18	0.939	16
Sade Società Adriatica di Elettricità	Electricity	0.863	19	0.856	19
Banca Bergamasca di Depositi e Conti Correnti	Bank	0.834	20	1.085	11

Note: five firms that were not in the actual ranking appear in the top twenty in the counterfactual: Società Nazionale per lo Sviluppo delle Imprese Elettriche (Finance, nbetw 1.047, rank 13), Officine Meccaniche Italiane (Mechanical engineering, nbetw 0.979, rank 15), Fabbriche Italiane Materie Coloranti Bonelli (chemicals, nbtw 0.896, rank 17), Banca d'Italia (issuing bank, nbtw 0.859, rank 18), Elettrica Bresciana (electricity, nbtw 0.756, rank 20).

Table 5. Top twenty firms by nBetweenness centrality, actual and counterfactual networks (1927)

Firm	Industry	Actual		Counterfactual	
		nBetw.	Rank	nBetw.	Rank
Banca Commerciale Italiana	Universal bank	3.017	1	-	-
Società Idroelettrica Piemonte	Electricity	1.892	2	2.121	1
Banca Nazionale di Credito	Universal bank	1.778	3	-	-
Credito Italiano	Universal bank	1.374	4	-	-
Società Italiana per le Strade Ferrate Meridionali	Finance	1.339	5	0.706	22
Banco di Roma	Universal bank	1.247	6	-	-
Stipel Telefonica Interregionale Piemontese e Lombarda	Telecommunications	1.238	7	0.812	14
La Rinascente Società per l'esercizio di Grandi Magazzini	Trade	1.199	8	1.134	3
Società Generale Italiana Edison di Elettricità	Electricity	1.162	9	0.588	37
Azienda Consumatori Carboni	Trade	1.007	10	0.540	45
Ansaldo	Mechanical engineering	0.968	11	0.417	78
Società Anonima Italiana la Cardinal Ferrari	Real estate	0.961	12	0.818	13
Compagnia Fondiaria Regionale	Real estate	0.954	13	0.329	115
Autostrade	Constructions	0.949	14	1.000	7
A.C.N.A.	Chemicals	0.873	15	0.933	10
Bergamasca per la Costruzione e l'Esercizio di Autovie	Constructions	0.839	16	1.492	2
Istituto di Credito per le Cooperative	Bank	0.787	17	0.761	16
Società Italiana di Navigazione Interna	Transport	0.787	18	0.956	8
Fabbrica Chimica Arenella	Chemicals	0.764	19	0.590	36
Banca d'Italia	Central bank	0.749	20	1.046	4

Note: ten firms that were not in the actual ranking appear in the top twenty in the counterfactual: Eiar Ente Italiano Audizioni Radiofoniche (Radio broadcasting, nbtw. 1.043, rank 5), Vizzola Società Lombarda per Distribuzione di Energia Elettrica (Electricity, nbtw. 1.025, rank 6), Bonifiche Pontine (Agriculture, nbtw. 0.951, rank 9), TIMO Telefoni Italia Media Orientale (Telecommunications, nbtw. 0.844, rank 11), Assicurazioni Generali (Insurance, nbtw. 0.840, rank 12), and Autostrade Meridionali (Transport, nbtw. 0.794 rank 15), Banca Industriale di Busto Arsizio (local bank, nbtw 0.742, rank 17), La Meridionale di Navigazione (shipping, nbtw 0.736, rank 18), Società Ligure Toscana di Elettricità (electricity, nbtw 0.731, rank 19), (Unes Unione Esercizi Elettrici, electricity, nbtw 0.722, rank 20).

Table 6. Top twenty firms by nBetweenness centrality, actual and counterfactual networks (1936)

Firm	Industry	Actual		Counterfactual	
		nBetw.	Rank	nBetw.	Rank
Assicurazioni Generali	Insurance	2.698	1	2.841	1
Ras Riunione Adriatica di Sicurtà	Insurance	2.620	2	2.337	3
Azienda Nazionale Consumatori Carboni Industriali	Trade	2.275	3	2.426	2
Consorzio Naz. Approvvigionamenti Materie Prime Siderurgiche	Trade	1.709	4	2.031	4
Società Italiana per il Gas	Energy	1.651	5	1.079	7
Nuova Unione Siderurgica Italiana	Trade	1.499	6	1.555	5
Banca Commerciale Italiana	Universal bank	1.177	7	-	-
Società Assicuratrice Industriale	Insurance	0.968	8	0.938	10
Sme Società Meridionale di Elettricità	Electricity	0.958	9	0.750	14
Compagnia Nazionale Imprese Elettriche Coniel	Electricity	0.956	10	1.145	6
Società Generale Italiana Edison di Elettricità	Electricity	0.870	11	0.972	8
Società Italiana per le Strade Ferrate Meridionali	Finance	0.804	12	0.243	142
Consorzio Nazionale Produttori Zucchero	Food	0.794	13	0.700	15
Autostrada Torino Milano	Transport	0.737	14	0.929	11
Nazionale Cartiere	Trade	0.737	15	0.822	13
Credito Commerciale	Bank	0.732	16	0.908	12
Acciaierie e Ferriere Nazionali	Steel	0.722	17	0.678	16
Linificio e Canapificio Nazionale	Textiles	0.705	18	0.554	24
Società Elettrica del Valdarno	Electricity	0.695	19	0.972	9
Banco di Roma	Universal bank	0.674	20	-	-

Note: four firms that were not in the actual ranking appear in the top twenty in the counterfactual: Acciaierie e Ferriere Nazionali (iron and steel, nbtw 0.678, rank 17), Orobica (electricity, nbtw 0.638, rank 18), Banca di Legnano (local bank, nbtw 0.593, rank 19), Cielis Compagnia Imprese Elettriche Liguri (electricity, nbtw 0.584, rank 20).

Table 7. Networks (actual and counterfactual) characteristics, textiles and iron and steel industries (1913-1936)

	Textiles				Iron and steel			
	1913	1921	1927	1936	1913	1921	1927	1936
<i>Actual network:</i>								
Number of vertices (n)	209	533	698	511	101	292	349	216
Number of isolates	69	136	220	212	41	112	138	102
Percentage of isolates	33	26	32	42	41	38	40	47
Percentage of multiple ties	51	55	51	39	27	44	44	31
Number of components	75	159	228	241	50	128	150	116
Size of the largest component	127	351	378	219	39	129	182	79
Diameter of the largest connected component	11	15	13	13	9	14	18	13
Total adjacency index	305	1,093	1,259	636	81	332	463	172
Average Degree (k)	2.919	4.101	3.607	2.489	1.603	2.274	2.653	1.593
<i>Counterfactual network:</i>								
Number of vertices (n)	205	527	693	589	99	289	344	213
Number of isolates	77	149	235	218	46	125	152	108
Percentage of isolates	37	28	34	43	46	43	44	51
Percentage of multiple ties	48	51	49	38	23	37	40	27
Number of components	84	174	277	247	57	146	167	123
Size of the largest component	117	329	352	213	28	109	156	60
Diameter of the largest connected component	12	16	14	14	8	19	18	16
Average Degree (k)	2.735	3.710	2.805	2.434	1.069	1.643	2.143	1.439

Table 8. Distribution of $n_{Between}$ ss, textiles and iron and steel industries

Networks and Counterfactuals	10%	20%	30%	40%	50%	60%	70%	80%	90%
Textile 1913 actual	0.000	0.000	0.000	0.000	0.000	0.011	0.530	1.038	1.717
Textile 1913 counterfactual	0.000	0.000	0.000	0.000	0.000	0.000	0.276	0.899	1.600
Iron and steel 1913 actual	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.037	0.852
Iron and steel 1913 counterf.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.269
Textile 1921 actual	0.000	0.000	0.000	0.000	0.000	0.020	0.201	0.453	0.986
Textile 1921 counterfactual	0.000	0.000	0.000	0.000	0.000	0.003	0.217	0.466	1.089
Iron and steel 1921 actual	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.303	0.716
Iron and steel 1921 counterf.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.042	0.702
Textile 1927 actual	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.155	0.453
Textile 1927 counterfactual	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.145	0.432
Iron and steel 1927 actual	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.311	0.798
Iron and steel 1927 counterf.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.167	0.621
Textile 1936 actual	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.060	0.334
Textile 1936 counterfactual	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.053	0.325
Iron and steel 1936 actual	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.670
Iron and steel 1936 counterf.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.365

Appendix

Table A1. Sectoral distribution of the universal banks network, 1913*

Sector	All firms		Firms with universal banks affiliation			
	Numb er	Share capital	Number	%	Share capital	%
A-B	12	55,134	5	41.67	46,500	84.34
CA-CB	41	125,827	9	21.95	39,190	31.15
DA	105	275,840	18	17.14	117,050	42.43
DB-DC	161	487,828	23	14.29	81,982	16.81
DD-DE	47	68,683	3	6.38	8,250	12.01
DF-DG-DH	77	202,449	24	31.17	98,825	48.81
DI	68	114,293	3	4.41	13,500	11.81
DJ	63	272,668	13	20.63	121,750	44.65
DK-DL-DM	88	298,976	19	21.59	132,391	44.28
DN	13	27,697	4	30.77	15,228	55.98
E	179	598,489	32	17.88	305,379	51.02
F	22	73,820	8	36.36	49,588	67.17
G-H	63	96,477	15	23.81	20,250	21.27
I	144	701,435	35	24.31	424,204	60.48
J	77	1,060,280	17	22.08	496,049	46.78
<i>J banks</i>	58	731,606	5	8.62	193,999	26.52
<i>J finance</i>	6	295,699	4	66.67	273,500	92.49
<i>J insurance</i>	13	32,975	8	61.54	28,500	86.43
K	46	116,38	10	21.74	38,247	22.99
L-M-N-O	33	40,275	4	12.12	8,751	21.73
Total	1,239	4,666,549	242	19.53	2,017,404	43.23

* Firms linked to at least one of the following universal banks: Banca Commerciale Italiana, Banco di Roma, Credito Italiano, Società Bancaria Italiana. Only firms with a board of directors are considered.

Legend: A-B: Agriculture, forestry and fishing; CA-CB: Food and tobacco; DB-DC: Textiles and leather, dressing and shoes; DD-DE: Wood, paper, publishing and printing; DF-DG-DH: Coke, petroleum, chemicals, rubber and plastic; DI: Other non-metallic products; DJ: Iron and steel; DK-DL-DM: mechanical and transport products; DN: Other manufacturing; E: Electricity, gas and water supply; F: Construction; G-H: Trade; I: Transport, storage, and communication; J: Financial intermediation; K: Real estate, renting, business activities; L-M-N-O: Public administration, health, social work and other social service activities.

*Table A2. Sectoral distribution of the universal banks network, 1921**

Sector	All firms		Firms with universal banks affiliation			
	Number	Share capital	Number	%	Share capital	%
A-B	105	423,664	12	11.43	107,889	25.47
CA-CB	83	548,462	19	22.89	324,205	59.11
DA	242	1,224,074	33	13.64	397,464	32.47
DB-DC	354	1,755,319	46	12.99	485,711	27.67
DD-DE	120	312,379	20	16.67	61,600	19.72
DF-DG-DH	179	1,004,240	31	17.32	422,105	42.03
DI	123	371,614	6	4.88	13,000	3.50
DJ	136	1,214,064	15	11.03	513,308	42.28
DK-DL-DM	205	2,020,588	39	19.02	1,298,541	64.27
DN	50	179,011	7	14.00	53,905	30.11
E	227	2,437,264	73	32.16	1,642,345	67.38
F	52	215,347	8	15.38	61,900	28.74
G-H	285	994,765	35	12.28	328,020	32.97
I	260	1,970,251	53	20.38	925,716	46.98
J	339	3,926,999	70	20.65	1,431,493	36.45
<i>J banks</i>	210	2,466,632	33	15.71	412,230	16.71
<i>J finance</i>	40	1,235,532	15	37.50	910,185	73.67
<i>J insurance</i>	89	224,835	22	24.72	109,078	49.51
K	244	780,488	30	12.30	175,961	22.54
L-M-N-O	66	186,455	12	18.18	71,813	38.51
Total	3,070	19,564,984	509	16.58	8,314,976	42.50

* Firms linked to at least one of the following universal banks: Banca Commerciale Italiana, Banca Nazionale di Credito, Banco di Roma, Credito Italiano. Only firms with a board of directors are considered.

Legend: see Table A1.

*Table A3. Sectoral distribution of the universal banks network, 1927**

Sector	All firms		Firms with universal banks affiliation			
	Number	Share capital	Number	%	Share capital	%
A-B	168	826,422	16	9.52	285,060	34.49
CA-CB	126	907,430	28	22.22	476,444	52.50
DA	354	2,343,134	41	11.58	592,750	25.30
DB-DC	472	2,937,612	55	11.65	1,076,535	35.65
DD-DE	174	617,740	17	9.77	113,400	18.36
DF-DG-DH	254	3,852,748	42	16.54	2,778,585	72.12
DI	200	880,699	14	7.00	201,605	22.89
DJ	180	1,687,391	27	15.00	1,092,117	64.72
DK-DL-DM	255	2,221,394	62	24.31	1,308,197	58.89
DN	56	218,806	7	12.50	75,444	34.48
E	272	7,478,680	112	41.18	6,220,925	83.18
F	140	438,536	17	12.14	161,562	36.84
G-H	448	1,928,370	36	8.04	680,454	35.29
I	349	3,862,211	74	21.20	2,303,837	59.65
J	426	7,473,444	88	20.66	2,852,207	38.16
<i>J banks</i>	263	4,635,025	25	9.51	790,021	17.04
<i>J finance</i>	80	2,377,124	36	45.00	1,805,985	76.00
<i>J insurance</i>	82	461,055	27	32.93	256,201	55.57
K	486	1,674,205	61	12.55	647,711	38.69
L-M-N-O	97	388,870	13	13.40	167,042	42.96
Total	4,457	39,728,692	710	15.93	21,033,875	52.94

* Firms linked to at least one of the following universal banks: Banca Commerciale Italiana, Banca Nazionale di Credito, Banco di Roma, Credito Italiano. Only firms with a board of directors are considered.

Legend: see Table A1.

Table A4. Sectoral distribution of the universal banks network, 1936*

Sector	All firms		Firms with universal banks affiliation			
	Number	Share capital	Number	%	Share capital	%
A-B	188	755,121	5	2.66	124,650	16.51
CA-CB	92	711,418	7	7.61	78,159	10.99
DA	287	2,050,451	11	3.83	186,650	9.10
DB-DC	427	2,533,348	7	1.63	186,900	7.38
DD-DE	154	648,019	7	4.55	44,625	6.89
DF-DG-DH	282	4,483,499	30	10.64	1,779,479	39.69
DI	162	821,106	18	11.11	342,457	41.71
DJ	171	2,071,220	7	4.09	251,350	12.14
DK-DL-DM	245	2,444,623	17	6.94	707,600	28.95
DN	34	206,735	1	2.94	100,000	48.37
E	222	10,911,704	41	18.47	5,355,650	49.08
F	139	494,392	10	7.19	89,750	18.15
G-H	343	1,034,215	17	4.96	92,088	8.90
I	303	3,463,436	25	8.25	1,220,297	35.23
J	284	7,604,657	53	18.66	2,122,314	27.91
<i>J banks</i>	123	3,997,746	6	4.88	116,779	2.92
<i>J finance</i>	95	2,998,615	23	24.21	1,649,071	54.99
<i>J insurance</i>	66	608,296	24	36.36	356,464	58.60
K	811	2,570,107	24	2.95	227,176	8.84
L-M-N-O	90	808,513	4	4.44	28,564	3.53
Total	4,233	43,612,564	285	6.73	12,937,709	29.67

* Firms linked to at least one of the following universal banks: Banca Commerciale Italiana, Banco di Roma, Credito Italiano. Only firms with a board of directors are considered.

Legend: see Table A1.

Table A5. Comparing textiles and iron and steel networks (actual and counterfactual) in 1913

Textile						Iron and steel					
		Actual		Counterfactual				Actual		Counterfactual	
Firm	Industry	nBtw	Rank	nBtw	Rank	Firm	Industry	nBtw	Rank	nBtw	Rank
Manifattura Rotondi	Textiles	7.180	1	7.629	1	Terni	I&S	6.186	1	3.386	2
Società Bancaria Italiana	Universal bank	4.727	2	-	-	Ilva	I&S	4.587	2	1.869	4
Cotonificio Cova	Textiles	4.064	3	2.463	11	Banca d'Italia	Issuing bank	4.319	3	3.702	1
Banca d'Italia	Issuing bank	3.745	4	4.577	2	Ferriere Piemontesi già Vandel & C.	I&S	2.804	4	1.897	3
Industrie Tessili Napoletane	Textiles	3.692	5	2.229	13	Metallurgica Italiana	I&S	2.386	5	1.601	5
Cotonificio Piemontese	Textiles	3.568	6	3.698	4	Industrie Metallurgiche Torino	I&S	2.226	6	1.546	6
Cotonificio Valle Ticino	Textiles	3.083	7	3.677	5	Società Bancaria Italiana	Universal bank	1.851	7	-	-
Linificio e Canapificio Nazionale	Textiles	2.901	8	4.144	3	Banco Ambrosiano	Local bank	1.505	8	0.021	16
Manifattura Rossari & Varzi	Textiles	2.830	9	1.531	23	Banca Commerciale Italiana	Universal bank	1.505	9	-	-
Società Italiana di Credito Provinciale	Local bank	2.605	10	2.579	10	Metallurgica Vittorio Cobianchi	I&S	0.917	10	0.000	80
Credito Italiano	Universal bank	2.544	11	-	-	Società Siderurgica di Savona	I&S	0.845	11	0.610	7
Lanificio Nazionale Targetti	Textiles	2.532	12	3.122	7	Società delle Ferriere Italiane	I&S	0.83	12	0.536	9
Banca Lombarda D. e C.C.	Local bank	2.527	13	3.623	6	Banca Lombarda D. e C. C.	Local bank	0.763	13	0.536	8
Cappellificio Monzese	Textiles	2.455	14	1.962	17	Banca Bergamasca D. e C. C.	Local bank	0.551	14	0.258	11
Lanificio Rossi	Textiles	2.439	15	2.795	8	Alti Forni Fonderia Acciaieria e Ferriera	I&S	0.385	15	0.010	21
Società per l'Esportazione e per l'Industria Italo Americana	Textiles	2.368	16	2.133	14	Gio. Andrea Gregorini					
Manifattura di Cuorgnè	Textiles	2.171	17	2.128	15	Credito Italiano	Universal bank	0.363	16	-	-
Cotonificio di Trobaso	Textiles	2.144	18	2.295	12	Cassa Generale	Local bank	0.305	17	0.371	10
Cotonificio Valli di Lanzo	Textiles	1.989	19	1.879	18	Società Ligure Metallurgica	I&S	0.151	18	0.105	13
Banca Bergamasca D. e C. C.	Local bank	1.749	20	1.264	27	Banco Lariano	Local bank	0.041	19	0.041	14
						Piccolo Credito Monzese	Local bank	0.041	20	0.041	15

Note: textile in the Counterfactual: Cassa Generale (Local bank, 2.779, rank 9), Cotonificio Valbormida (Textiles, 2.101, rank 16), Banca di Gallarate (Local bank, 1.707 rank 19), and Cotonificio Val D'Olonza Ognà Candiani (Textiles, 1.665, rank 20). Iron and steel: in the Counterfactual: O.R.I. Officine Riunite Italiane (I&S, 0.258, rank 12), Banca Popolare (Local bank, 0.021, rank 17), Laminatoio Di Arlenico (I&S, 0.021, rank 18), and Metallurgica Giacomo Corradini (I&S, 0.014, rank 20).

Table A6. Comparing textiles and iron and steel networks (actual and counterfactual) in 1921

Textile						Iron and steel					
		Actual		Counterfactual				Actual		Counterfactual	
Firm	Industry	nBtw	Rank	nBtw	Rank	Firm	Industry	nBtw	Rank	nBtw	Rank
Banca Industriale Lombarda	Local bank	4.859	1	4.854	1	Banco di Roma	Universal bank	7.221	1	-	-
Filatura dei Cascami di Seta	Textiles	4.727	2	2.701	11	Fonderia Milanese di Acciaio	I&S	6.027	2	0.944	21
Banca Commerciale Italiana	Universal bank	4.643	3	-	-	Banca Commerciale Italiana	Universal bank	4.774	3	-	-
Banco di Roma	Universal bank	3.601	4	-	-	Istituto Italiano di Credito Marittimo	National bank	2.520	4	5.431	3
Manifattura Tosi	Textiles	3.343	5	3.136	6	Credito Nazionale	National bank	2.469	5	2.567	6
Cotonificio di Solbiate	Textiles	2.822	6	2.974	8	Ferriere di Voltri	I&S	1.955	6	2.191	8
Banca d'Italia	Issuing bank	2.773	7	4.847	2	Banca per il Commercio Serico	Local bank	1.937	7	2.151	9
Cotonificio Dell'Acqua Lissoni											
Castiglioni	Textiles	2.54	8	2.547	12	Banca Lombarda Depositi e C. C.	Local bank	1.928	8	0.257	51
Credito Nazionale	National bank	2.469	9	3.073	7	Terni	I&S	1.790	9	0.776	24
Manifattura di Legnano	Textiles	2.468	10	2.291	15	Franco Tosi	I&S	1.784	10	0.257	47
Manifattura Rossari & Varzi	Textiles	2.455	11	1.507	34	Lavorazione Zinco F.lli Morteo	I&S	1.468	11	1.238	14
Fabbriche Italiane di Seterie Clerici	Textiles	2.298	12	2.378	14	Metallurgica Italiana	I&S	1.433	12	0.000	245
Cotonificio Veneziano	Textiles	2.257	13	4.279	3	Banca Popolare di Milano	Local bank	1.384	13	1.238	13
Banca Bergamasca Depositi e C. C.	Local bank	2.235	14	3.480	4	Metallurgica Vittorio Cobianchi	I&S	1.359	14	0.701	30
Credito Italiano	Universal bank	2.208	15	-	-	Banca Bergamasca D. e C. C.	Local bank	1.314	15	1.233	15
Industria Sete Cucirine	Textiles	2.147	16	0.467	105	Banca Nazionale dell'Agricoltura	Local bank	1.252	16	1.240	12
Wild & C.	Textiles	2.049	17	1.095	53	Società Italiana di Credito Comm.	Local bank	1.245	17	3.539	5
Tintoria Italiana	Textiles	2.002	18	3.298	5	Società Generale di Credito	National bank	1.210	18	1.005	18
Manifattura Trezzi	Textiles	1.980	19	1.555	31	Banca Genovese di Credito	Local bank	1.184	19	1.000	19
Cotonifici Trevigiani	Textiles	1.951	20	1.933	23	Banca d'Italia	Issuing bank	1.043	20	8.372	1

Note: textile in Counterfactual: Società Italiana E. De Angeli per l'Industria dei Tessuti Stampati (Textiles, 2.911, rank 9), Banca per il Commercio Serico (Local bank, 2.828, rank 10), Piccolo Credito Tirreno (Local bank, 2.406, rank 13), Banca Popolare Cooperativa di Venezia (Local bank, 2.272, rank 16), Manifattura di Rivarolo & San Giorgio Canavese (Textiles, 2.234, rank 17), Canapificio Veneto Antonini & Ceresa (Textiles, 2.060, rank 18), Cassa Generale (Local bank, 2.017, rank 19), and Industria Seterie Stampate G.L. Tondani (Textiles, 1.896, rank 20). Iron and steel: in Counterfactual: Cassa Generale (Local bank, 6.500, rank 2), Credito Veneto (Local bank, 3.905, rank 4), Acciaierie e Ferriere Lombarde Falk (I&S, 2.251, rank 7), Banca Popolare Cooperativa di Venezia (Local bank, 1.922, rank 10), Banca Popolare di Sampierdarena (Local bank, 1.865, rank 11), Trafileries e Laminatoi di Metalli (I&S, 1.201, rank 16), Credito Industriale di Venezia (Local bank, 1.026, rank 17), and Fonderia Milanese di Acciaio (I&S, 0.944, rank 20).

Table A7. Comparing textiles and iron and steel networks (actual and counterfactual) in 1927

Textile						Iron and steel					
		Actual		Counterfactual				Actual		Counterfactual	
Firm	Industry	nBtw	Rank	nBtw	Rank	Firm	Industry	nBtw	Rank	nBtw	Rank
Banca Commerciale Italiana	Universal bank	4.391	1	-	-	Banca Piccolo Credito Bergamasco	Local bank	7.424	1	6.139	4
Istituto Commerciale Laniero Italiano	Textiles	3.993	2	3.471	1	Banco San Giorgio	Local bank	6.794	2	5.638	7
Banca Nazionale di Credito	Universal bank	3.622	3	-	-	Banca Commerciale Italiana	Universal bank	5.467	3	-	-
Cotonificio della Valle Seriana	Textiles	3.297	4	2.759	5	Alti Forni Fonderie Acciaierie e Ferriere Franchi Gregorini	I&S	5.065	4	6.853	2
Linificio e Canapificio Nazionale	Textiles	3.103	5	3.106	3	Banca Nazionale di Credito	Universal bank	5.008	5	-	-
Banca Nazionale dell'Agricoltura	Local bank	2.857	6	3.254	2	Istituto Italiano di Credito Marittimo	National bank	4.235	6	3.292	13
Banca Industriale di Busto Arsizio	Local bank	2.143	7	3.024	4	Acciaierie e Ferriere Nazionali	I&S	3.640	7	4.929	8
Banca Piccolo Credito Bergamasco	Local bank	2.140	8	1.761	11	Banca Nazionale dell'Agricoltura	Bank	3.623	8	4.780	9
Manifattura Tosi	Textiles	2.009	9	2.104	8	Stabilimenti di Dalmine	I&S	3.361	9	1.163	21
Banca Popolare Coop. di Novara	Local bank	1.929	10	1.724	12	Franco Tosi	I&S	3.138	10	0.453	43
Cotonificio Francesco Turati	Textiles	1.840	11	2.168	7	Credito Agrario Bresciano	Local bank	2.763	11	7.131	1
Banca Commerciale Triestina	Local bank	1.673	12	1.833	10	Banco di Roma	Universal bank	2.692	12	-	-
Banca Mutua Popolare di Bergamo	Local bank	1.588	13	2.199	6	Banca Lombarda Depositi e C. C.	Local bank	1.715	13	3.127	14
Banco di Roma	Universal bank	1.561	14	-	-	Banca Mobiliare	Local bank	1.647	14	1.275	18
Istituto Italiano di Credito Marittimo	National bank	1.480	15	1.704	13	Banca di Legnano	Local bank	1.457	15	0.000	206
Cotonifici Trevigiani	Textiles	1.349	16	1.438	21	Istituto di Credito per le Cooperative	National bank	1.411	16	1.282	17
Manifattura Rossari & Varzi	Textiles	1.270	17	1.502	18	Banca della Provincia di Alessandria	Local bank	1.323	17	1.832	15
Banca Cattolica Agricola Operaia	Local bank	1.244	18	1.107	29	Banca per il Commercio Serico	Local bank	1.269	18	1.494	16
Banca di Legnano	Local bank	1.195	19	1.956	9	Società Italiana Tubi Togni	I&S	1.234	19	0.669	185
Luigi Bevilacqua	Textiles	1.170	20	0.514	61	Banca Piccolo Credito	Local bank	1.208	20	1.065	23

Note: textile in Counterfactual: De Angeli Frua Società per l'Industria dei Tessuti Stampati (Textiles, 1.635, rank 14), Cotonificio Piemontese (Textiles, 1.584, rank 15), Cotonificio Val d'Olonia Ogna Candiani (Textiles, 1.515, rank 16), Manifattura di Legnano (Textiles, 1.481, rank 18), Cotonificio F.lli Oltolina (Textiles, 1.461, rank 19), and Banca Industriale Gallarate (Local bank, 1.460, rank 20). Iron and steel: in Counterfactual: Trafileries e Laminatoi di Metalli (I&S, 6.721, is rank 3), Metallurgica Bresciana già Tempini (I&S, 5.890, rank 5), Metallurgica Italiana (I&S, 5.772, rank 6), Lavorazione Zinco F.lli Morteo (I&S, 4.558, rank 10), Banca d'Italia (Issuing bank, 4.537, rank 11), Alessandro Calzoni (I&S, 3.501, rank 12), Credito Pugliese (Local bank, 1.375, rank 17), Banca Industriale Gallarate (Local bank, 1.249, rank 20).

Table A8. Comparing textiles and iron and steel networks (actual and counterfactual) in 1936

Textile						Iron and steel					
		Actual		Counterfactual				Actual		Counterfactual	
Industry		nBtw	Rank	nBtw	Rank	Industry		nBtw	Rank	nBtw	Rank
Istituto Commerciale Laniero It.	Textiles	3.574	1	3.453	1	Ilva	I&S	6.351	1	2.856	4
Linificio e Canapificio Nazionale	Textiles	2.234	2	1.336	13	Acciaierie e Ferriere Nazionali	I&S	5.206	2	4.205	1
Banca Belinzaghi	Local bank	2.225	3	2.271	2	Banca Commerciale Italiana	Universal bank	3.819	3	-	-
Lanificio Targetti	Textiles	1.809	4	1.790	4	Credito Industriale di Venezia	Local bank	3.599	4	0.000	67
Manifattura Rossari & Varzi	Textiles	1.788	5	1.476	9	Metallurgica Giacomo Corradini	I&S	3.225	5	2.281	7
Lanificio di Gavardo	Textiles	1.778	6	1.669	5	Laminatoio Nazionale	I&S	2.549	6	2.204	8
Credito Commerciale	Local bank	1.540	7	1.532	7	Metallurgica Bresciana già Tempini	I&S	2.496	7	2.147	10
Esercizio Feltrifici	Textiles	1.516	8	1.456	10	Banca Unione	Local bank	2.175	8	2.967	3
Cotonificio Valle Ticino	Textiles	1.459	9	1.485	8	Acciaierie e Ferriere Lomb. Falck	I&S	2.160	9	2.790	5
Cotonificio Cesare Macchi & C.	Textiles	1.385	10	1.544	6	Banca per il Commercio Serico	Local bank	2.082	10	3.386	2
Stabilimenti Tessili Italiani	Textiles	1.352	11	1.823	3	Metallurgica Italiana	I&S	1.632	11	1.417	12
Cotonificio Cantoni	Textiles	1.288	12	0.818	25	Banca Popolare Coop. di Novara	Local bank	1.320	12	0.022	33
G.B. Borsalino Fu Lazzaro & C.	Textiles	1.261	13	1.193	14	Banca Belinzaghi	Local bank	1.117	13	2.164	9
Unione Manifatture	Textiles	1.227	14	1.415	11	Banca Popolare Di Milano	Local bank	1.060	14	2.333	6
Wild & C.	Textiles	1.203	15	1.164	15	Banca Lombarda D. e C. C.	Local bank	1.041	15	1.424	11
Manifattura Tosi	Textiles	1.143	16	1.145	16	Istituto di Credito delle Casse di Risparmio Italiane	National bank	1.000	16	0.871	15
Banca Unione	Local bank	1.104	17	0.998	18	Lavorazione Leghe Leggere	I&S	0.915	17	0.858	16
Banca di Legnano	Local bank	1.085	18	1.367	12	Stabilimenti di Dalmine	I&S	0.8.75	18	0.876	14
Banca Commerciale Italiana	Universal bank	1.028	19	-	-	Acciaieria e Tubificio di Brescia	I&S	0.854	19	0.491	20
Lanificio Rossi	Textiles	1.019	20	0.882	22	Franco Tosi	I&S	0.737	20	0.378	22

Textile: Counterfactual: Banco Lariano (Local bank, 1.144, rank 17), Schmid (Textiles, 0.957, rank 19), and Manifattura Rotondi (Textiles, 0.942, rank 20). Iron and steel: Counterfactual: Sava (I&S 1.386, rank 13), Società Italiana del Piombo e dello Zinco (I&S, 0.585, rank 17), Banca Agricola Milanese (Local bank, 0.585, rank 18), and Meccanica e Metallurgica Africana (I&S, 0.581, rank 19).