

9. Testing historical theories with SNA. Structure and evolution of a credit network

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1. Introduction

When, in 1997 the review of Erickson described the state of the art of social network approaches to historical data, she highlighted the potential as well as the requirements for performing a real structural analysis of historical phenomena. The prevalence of structure over attributes of social relations, she suggested, was to become the key concept to guide future researches, and the organization of historical datasets was required to overpass a descriptive aim and being targeted to explanation. The works of Gould (1991, 1996), Padgett and Ansell (1993) paved the way for a closer integration of social network methods and history and inaugurated a new perspective for testing hypothesis concerning social configurations of historical relationships (Franzosi & Mohr, 1997). The current research scenario, thanks to computational supports and sources digitalization, is flourishing and researchers are committed to expand the boundaries of SNA applications to great textual corpuses and longitudinal archive data (Morrissey, 2015). To escape a simply descriptivist approach, however, social networks analysis of historical cases must contemplate an accurate observation of the ancient contexts and accomplish reputable theoretical assumptions and interpretations of the study objects. As clearly stated by Gondal and Mc Lean (2013) “the meaning of relations, come to be patterned on the basis of identities acting across networks” that structural approach can bring to light and plausibly organize.

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Against the backdrop of this methodological scenario, this research work aims at investigating the structure of lending relations in a pre-modern economy; the study focuses on the network established by a merchant family along approx. forty years (1747-1786) and scrutinizes two hypothesis concerning the social and economic mechanisms of early modern credit markets. The use of multiple archival sources (Raab, 2004), specifically, allowed us to explore in details the various social relations that affected the lending activity of the merchant family and the implications of social proximity in structuring economic relations between different social classes. Structural analysis and comparison of relations among different social groups involved in the credit network put in evidence, as well, the connections between notarial and non-notarial credit circuits and their mutual functionality for the lending activity.

2. Case study description

The study concerns a family commercial house – the Salvadori firm – that achieved considerable economic and social advancement in the eighteenth century in the Prince-Bishopric of Trento, a political entity in the central eastern Alps. Likewise to other merchants trading over long distances, they profited from excess liquidity to engage in lending, thus meeting the financial requirements of several types of borrowers – among them merchants, artisans, professionals, clergymen, widows as well as noblemen and institutions.

Our analysis aims at re-constructing the credit network of the family business and interpreting the relations among clients, patrons and other actors involved in the Salvadori's lending activity. The primary data source was the family credit registry (loans' ledger) which shows all the lending positions open in a period of more intense financial activity (1747 to 1786) for the merchant family. Loans in the registry were reported as “credit entries” and for each of them were found information concerning the identity of the borrower/s, length and amount of loans and interest rate, as well as mentions about warranties and negotiations, or repayment episodes. Moreover, if the loan was secured by a legal (notarized) document, the registry mentioned also the names of notaries, of the guarantees and other relevant actors involved in collateral activities related to the lending contract (such as payments transfer for petty personal expenses). To reconstruct the whole credit network of the Salvadori family we transcribed and recoded all the name citations that appear in the credit registry. We also supplemented the main source with other information from the Salvadori family history (Lorandini, 2006, 2015), and

from other local historical archives¹. These sources were relevant for identification of personal contacts and their collocation in terms of social position, intensity of acquaintance, professions, residence and business connections with the Salvadori. Cross-information about all the cited persons allowed us to establish different types of links among the lenders (Salvadori family) and the clients (an extract of the civil society of the time). The fine-grained and exhaustive information that we could retrieve about these actors convince us that the Salvadori business case can stand out for testing economic history hypothesis portrayed by recent theories.

Before the rise of modern banking, personal and commercial credit relations were influenced by social proximity (e.g. similar social class/profession) and regional conventions (local institutions); specifically, loans were regularly settled in the form of private agreements and fiduciary relations between the borrower and the lender (Carboni & Muzzarelli, 2014). Different social classes, therefore, had diverse opportunity to access credit and to invest or respond to financial fluctuations. Merchants, specifically, preferred not to resort to notaries for their business transactions and when they could, they avoided spending time and money for the public registration of contracts (Gelderblom *et al.*, 2018). The studies of the French credit markets by Philip Hoffman *et al.* (1999, 2000, 2019), however, documented the presence of a pervasive “shadow” credit market that pivoted on notaries. Results of extensive archival researches performed on the basis of Hoffman’s *et al.* thesis established that in early modern societies notaries acted as brokers who matched lenders with borrowers and certified the borrowers’ creditworthiness, thus contributing to expansion of credit. Hence, notaries did not limit themselves to drawing up and keeping legal records of lending contracts but performed also an intermediary function (Clemens & Reupke, 2009). Due to their privileged position, they knew who was in need or in excess of money and helped overcome the problem of asymmetric information by providing the lenders with information on the borrowers and their collaterals. Extensive empirical studies carried on in early modern rural Germany (Stark in Gestrich & Stark, 2015) account also that the intermediation of notaries was functional to borrowers for coping with the script and contents of the loan contract (guarantees, further agreements due to inheritance changes) and to lenders for securing large financial transactions.

¹ Archivio di Stato di Trento (State Archives in Trento), Archivio Salvadori (Salvadori Archives), vol. 734. The Salvadori business documents are conserved in the State Archives of Trento; an inventory project financed by Fondazione CARITRO is still in progress; hence we use the old archival references.

Following these relevant theories and research findings, the design of our study focused on tracing all non-notarial and notarial transactions that register a direct financial relation between the lender and the borrowers. The main units of investigation are the lending positions recorded in the family ledger: each position is related to a main client (borrower) and to a variety of subjects involved in the transaction as either writer of the deed (notary), guarantee or other financial role.

Accordingly, the data extracted from the Salvadori archive can be classified in two main types:

- information about the borrowers and other actors (roles, type of relations to the Salvadori – e.g. kin, agents, partners and business correspondents, and details about the social position);
- information about the lending positions and loans (amount, duration and type of credit, rates of interest).

We were able to detect 152 different lending positions for a quite limited period of time (1747-1767, with a last credit position opened in 1786) and to sum up more than three hundred of name citations (397 multiple citations), identifying 206 different actors, from local businessmen and affluent notables to small artisans and clergymen². In the coding process we decided to insert also a taxonomy of the subjects which could be useful for comparing roles (e.g. subject involved at the origins of the loan and those involved in the subsequent transactions such as payers and receivers of credit for Salvadori family), and organized the data for network structural analysis (Alexander & Danowski, 1997). The raw data were then digitalized and coded according to standards suitable for the analysis with specific SNA software (Ucinet v 6.682, Borgatti, Everett & Freeman, 2002). The analysis was performed on the 152 by 206 matrix of personal relations (2-mode); for testing the hypothesis we used also 1-mode projections (206 x 206 matrices, with valued and binary data).

Table 1 reports the main characteristics of the actors registered inside the family ledger (by type/role in the transaction) and the frequency of citations for each type of actors³. We differentiated, in particular, between actors involved directly in the transaction (borrowers, notaries and guarantees), actors related to origins and developments of the loans, and actors in-

² Attribute variables of the cited actors include: social class (3 classes + 1 for institutions), role in the lending relation (main borrower, guarantee, notary, person involved in renegotiation, etc.), place of residence, amount (florins) and duration of the loan, and eventual presence of litigation about repayment.

³ Multiple citations and multiple lending positions were present in the original data.

directly related nonetheless considered relevant by the ledger's writer. For the majority of the actors was also possible to distinguish the social class, on the bases of their professions and other information retrieved from the local archives.

Tab. 1 – Main characteristics of the actors and their frequency of citations

<i>Type of subjects cited in the archive</i>		<i>Frequency of citations</i>
Borrowers (person or institution)		152
Notary		63
Guarantee		16
Other types of subjects cited at the loan origin		65
Subject involved in the transaction (e.g. debt renegotiation/transfer)		68
Other person or institution cited during the loan duration		33
<i>Total of citations (multiple name citations) by Social Class</i>		
<i>Social class of the cited actors and borrowers</i>	<i>Cited actors</i>	<i>Borrowers</i>
Institutions	10	11
Upper class and nobles	37	42
Merchants, landowners, professionals	65	35
Artisans, petty traders or other	96	64

3. Approach and hypothesis formalization

Our approach is centred on the Salvadori's lending network as a whole unit of investigation: this means to analyse the characteristics of subjects in relation to a specific position in the financial transactions and their role in the global structure of relations (White, 1992). Then, we focus our analysis on two hypotheses: each one operationalizes assumptions concerning the historical development of early modern credit markets. The role of notaries, in particular, was investigated to support literature statements about their mediation role in providing access to credit for intermediate social classes.

Hp1. The lending business strategy of pre-modern merchants involved decisions based equally on social and economic conveniences. Creation and maintenance of the lending network was influenced both by social rules delimited by Salvadori's class position and by their commercial activity (organization and control of associates). To analyse the outcomes of the Salvadori business strategy we investigated the subnetworks generated by non-notarial credit connections versus the subnetwork generated by notary credit connections.

Hp2. Maintenance of the lending network in the local context required that the Salvadori family make available credit to clients of different social classes. The notary acted as referent/mediator and rule-guarantee for different social classes, and as indirect effect their third-party role results in opportunities to access credit for a larger segment of population, mainly belonging to middle-lower classes. To scrutinize the role of the notary we compared the density of relations among different groups of actors mentioned in the transactions and evaluate the role of notaries in relation to their possible bridging position.

4. The lending network

4.1. Social composition

The linkages between the credit positions and the identity of the cited persons in the archive allow us to reconstruct the complete credit network of the Salvadori family, which was constituted of 206 actors. Some of these actors tend to be frequently cited in the ledger, with different roles in the transaction. A more detailed distribution of actors (Table 2a), shows us that while merchants and people from lower classes were among the most frequently cited, half of the loans' positions (77 out of 152) were granted to borrowers from the higher classes (nobles and patricians) and to merchants or professionals. These figures support the interpretation that despite lending contracts commonly were arranged as peer-to-peer settlements, members of the lower class could also access them under specific conditions.

As one of the most important conditions was personal trust and reputation from social proximity, we additionally classified borrowers according to the intensity of their relations with the Salvadori family (Table 2a). Priority in intensity of relations (strong) was given to established business partners, commercial agents and extended family members (bonding relations). The other borrowers were listed according to their intensity of relations with the Salvadori based on frequency of business contacts with the Salvadori (e.g. renegotiation and successful closure of several credits). Social class and intensity of relations (strong/middle/weak social proximity) were then used for the testing procedures discussed in next sections.

Tab. 2 – Actors and borrowers by frequency of citations, social class and social proximity with the Salvadori family

<i>a) N. of citations in the ledger</i>	<i>Institutions</i>	<i>Noble class and patricians</i>	<i>Merchants and professionals</i>	<i>Lower classes</i>
1	6	20	30	75
2		6	13	15
3	3	8	5	3
4			4	2
5			4	1
6 and more	1	3	9	
Actors	10	38	63	95
Borrowers	11	42	35	64
<i>b) Social proximity (intensity)</i>				
Strong		8	9	3
Middle		8	19	21
Weak		26	7	40

The Salvadori made scant recourse to intermediaries for loans granted to members of the same class or to noble and patrician families which belonged to the local social and political élite (Table 3). Likewise, trust and reputation deriving either by kin or regular contacts – as in the case of business correspondents who already had a current account in the firm’s main ledger – increased the preference for non-notarized loans. By contrast, notaries intervened much more frequently when loans were granted to the lower class, and only in very few cases member of this class could count on trust derived from intensity of contacts. This highlights that the Salvadoris’ lending activity can be properly understood only within the framework of the overall economic and social strategies of the family.

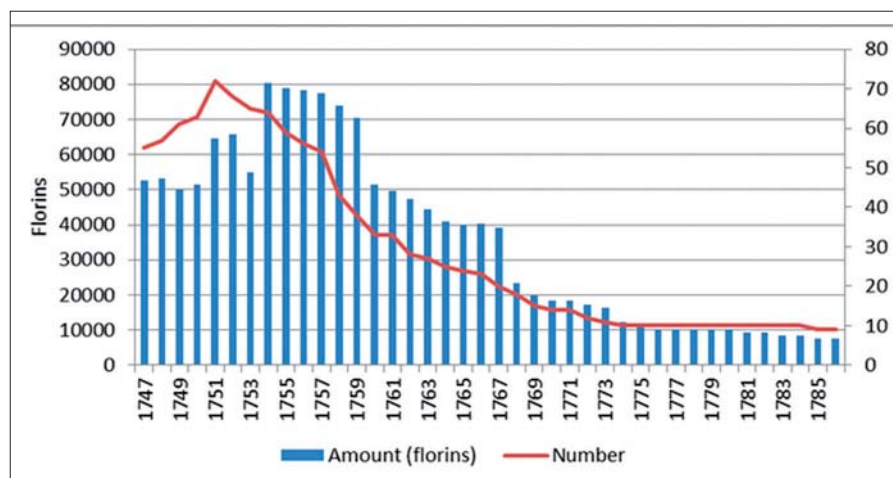
Tab. 3 – Notarial and non-notarial loans for borrowers’ social class

	<i>Institutions</i>	<i>Noble class and patricians</i>	<i>Merchants and professionals</i>	<i>Lower classes</i>
Non-notarial loans	5	34	33	22
Notarial loans	6	8	2	42
Borrowers	11	42	35	64
% notarial loans granted to weak relations		26,9%	28,6%	75%

4.2. Financial activity

Analysis of the loan ledger tells us that the Salvadori were dedicated to large loans. At a time when specialized banking had still to take root, the Salvadori belonged to the restricted group of wealthy merchant families who addressed borrowers with substantial financial requirements, flanking local charitable and assistance institutions, which applied the same interest rates. The loan size ranged from 41 florins to around 14,000 florins, averaging about 1,100 florins (Fig. 1). Non-notarial loans (94 on a total of 152) were actually private transactions in the form of a simple person to person contract (48 positions), or a more articulated ‘socially mediated’ transaction (46 positions), which usually involved one or two persons together with the borrower. They were also generally larger than notarial ones, the higher average of which was only due to investments (equity and deposit) in a company promoted by the urban government, which was included among institutions⁴.

Fig. 1 – Loans outstanding: number and value (1747-1786)



The peak of financial activity, with higher investments, is concentrated in a short period (1755-1759), when the merchant family had reached a

⁴ In two cases, deposits represented actually an investment of risk capital in limited partnerships promoted by the town government, which was remunerated with a dividend. Both were silk firms promoted by the town government with participation of patricians and prominent merchants.

prominent role in the local economy. Loans issued by the Salvadori lasted even several decades and credit positions were frequently rolled over, as emerges from the substantial difference between expected and actual duration (Table 4). Almost 60 per cent of the loans with a specified duration were to last up until 2 years, but less than 30 percent expired within that date. The planned and actual duration were both higher for notarial loans compared to non-notarial ones, but in both cases the maximum length rarely exceeds 50 years.

Finally, the interest rates. In the eighteenth century usury restrictions took the form of an interest ceiling that was determined by local authorities. In the Prince-Bishopric of Trento, different interest rates were allowed based on the type of contract and the parties involved. The Salvadori family, however, granted only few loans at 6 per cent (the higher rate), and these exclusively to merchants active in the remunerative trade of silk; while for most of the lending contracts they granted a 5 percent interest and in some cases 4,5 percent or less for some loans granted to relatives, or loans deriving from selling land property. These findings confirm as argued by Hoffman *et al.* (2000), that the lender's "decision to make a loan may [...] depend less on interest rates than on personal information about borrowers and extra-market relationships with them".

Tab. 4 – Loans' duration by type and amount

Loans	Planned duration			Actual duration		Size (fl.)	
	N	Av.	Std.D	Av.	Std.D	Av.	Std.D
<i>Not-notarial loans</i>							
	94	2.0	1,7	9.1	10.4	992	1,608
<i>Notarial loans</i>							
	58	3.3	1,9	14.8	12.4	1,295	2,746
Total	152	2.6	1,9	11.2	11.5	1,108	2,112

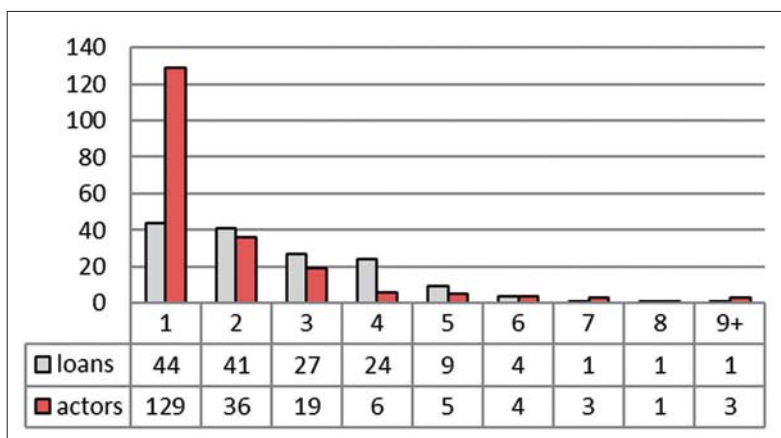
4.3. Structural analysis

The analysis of the credit network focuses on its structural features, dimensions and type of components, centrality and connectivity related to the presence of multiple links among actors, and scrutinizes the eventual presence of overlapping sub-networks.

The two-mode network of the actors by loans relations (Figure 2 for degree distributions for the actors) is characterized by a density overall of

0.014, with 47 different components (each represents a subgroup of credits and actors interconnected)⁵. This is congruent with the fact that a large part of loans was granted directly to individuals (44) with no other's presence (no notary or co-borrower). When loans involved multiple borrowers, they resulted from complex credit contracts (such as those linked to inheritances) or were renegotiated and sold to other lenders. Some actors, however, were involved directly and indirectly in multiple loans and hence mentioned several times with different affiliation and roles (borrower, payer, etc.).

Fig. 2 – Degree distribution for actors and loans



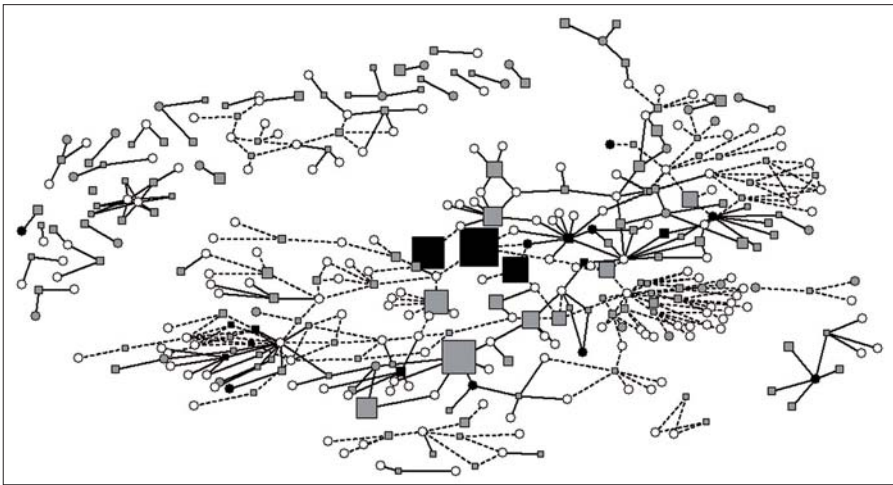
The visualization of the whole Salvadori credit network (Fig. 3) puts further in evidence the presence of several separate credit operations carried on with borrowers (a single person or same family members) having no specific social or business relation with the Salvadori business partners or other clients⁶. These transactions, moreover, usually did not involve large amounts of money (with the exception of a short term loan in 1750) even when the contract involved established commercial partners and extended family members. We can thus presume that the social relations involved in these loans had no special role for the dynamics of the lending activity.

⁵ AVD for actors 1.93 (SD 1.88) and range 1-15; AVD for loans 2.61 (SD 1.59) and range 1-10. If we exclude the actors that are mentioned just one time the AVD rises to 3,48, meaning that some actors had multiple roles in relation with the 152 loans transactions. Loans with more than one actor involved have AVD of 3.26.

⁶ Measures for the 2-mode network with all actors (206X152): 397 lines, density 0.013, AV. Deg. 2.612 and SD 0.112, AVD 7.716, Frag. 0.533, Trans. 0.602.

Instead, at the centre of the whole network is positioned a large group of loans characterized by larger amount of money and high occurrence of links between the borrowers and the other actors. This group of loans represents the major part of the Salvadori moneylending activity, related to important commercial transactions, involving family members and business partners. Since the structure of the network is an outcome of different roles in the transactions, to evaluate the interconnectedness of the relations we measured the density in the core of the 2-mode network, first for the complete network with all actors and loans (0.025), and then separately for the notarial loans (0.021) and the non-notarial loans (0.015). The results confirm that notaries are somehow involved in the core activity and may have played a role in relating different financial operations/ mediating contracts, or in providing new clients for long-term financial investments of the Salvadori family.

Fig. 3 – The credit network of the Salvadori family⁷



⁷ Graphic of the 2-mode network. Squares (sized by amount) represent loans and circles represent actors; nodes' colour is scaled by social proximity intensity; black colour stands for institutions. Dashed lines are notarial connections.

5. Testing the hypothesis on the lending network

5.1. Strategic organization of lending activity (Hp.1)

To test the first part of the hypothesis concerning the strategic management of the credits we created two separate sub-networks that contain respectively: a) the relations directly and indirectly produced by cross-references dealing only with non-notarial contracts between Salvadori and their clients; and b) the relations produced directly and indirectly by cross-references dealing only with notary acts signed by the borrowers.

Relying on previous literature suggestions (Clemens & Reupke, 2009), we assume that the notary played a bridging role eminently for the lower classes and small entrepreneurs and only in limited cases (large investments) the more affluent Salvadori's clients were involved in notary acts. As for the rest of the credit positions (approximately two thirds of the lending activity) loans were granted by the Salvadori through fiduciary contracts to small business correspondents, as well as to borrowers belonging to middle and upper classes.

Tab. 5 – Structural measures for type of subnetworks⁸

	<i>Notarial loans</i>	<i>Non-notarial loans</i>
Nodes	206	206
Ties	594	356
AV Degree	2,883	1.728
Density	0.014	0.008
Centralization (D)	0.074	0.070
N components	68	129
Fragmentation	0.846	0.937
Closure	0.631	0.710
Network Transitivity	0.221	0.449
AV Distance	4,320	3.649

The analysis of two distinguished subnetworks resulting from the selection procedure exemplifies two different types of generative linking mechanisms at the bases of credit markets and their referral mechanism (White, 2002). Connections deriving from notarial documents and legal procedures (inheritances, land and property investments) tend to create closed circuit of

⁸ Values for actors by actors matrix, 1-mode network, binary.

concurrent roles (notaries are related to other notaries, guarantees to other guarantees): when reproduced through time this generative mechanism creates a series of recurrent links among some of the actors (revealed by higher density but lower transitivity indexes in the sub-network of notarized loans). On the other side, connections based on strict commercial and business-oriented relations are based on substitutive chain mechanisms (as business partners may change according to the nature of the deal) and tend to generate a structure with a more linear shape (indexes of this sub-network display in fact lower average degree and distance). Commercial credit transactions also rely on mediators that can play multiplex roles in a network and relate credit demand and supply at the right time for a profitable investment (Haggerty & Haggerty, 2013). The presence of notaries was thus important in supporting the Salvadori lending business, helping to match both financial and social conveniences.

Concluding, both generative mechanisms combined to produce the complete lending network; the co-occurrence of the two business strategies was also facilitated by bridging partners with a strong centrality position in the network (and among them we find a significant proportion of notaries)⁹. Subjects such as trade partners and fiduciary notaries presumably were also able to support the financial strategy of the Salvadori family and/or were involved in the financial and social implications of their moneylending activities.

5.2. The mediation role of the notary (Hp.2)

According to the hypothesis that notaries distinct public role endorsed access to credit for emergent social classes, our analysis in this paragraph consists in a quantitative assessment of the role of notaries in the structure of the Salvadori lending network.

First, to analyse the contribution of notaries on the structure of the lending business network, we perform an analysis of sub-networks extracted from the complete lending network. As illustrated before, loans associated to a notary document tend to be overrepresented in the main component of the lending network (resulting in a higher core density) and are also significantly related to larger credit amounts. Therefore, to test the hypothesis of the bridging role of the notary in the business network we first juxtapose typical

⁹ Analysis performed on individual nodes (1-mode network projections) showed that notaries tend to score the highest values for several centrality measures (degree, betweenness and 2-local eigenvector centrality), together with business agents of the Salvadori and few patricians.

forms of credit situations in the Salvadori registry that involved an increasing influence of the notary over the actors involved in the credit transaction.

We thus compared (Table 6) the structural characteristics (overall density and other measures of cohesion) for the sub-networks generated by two types of relations: a) links among the borrowers and all the other actors, including those actors indirectly related to the transactions (receivers of credit from the Salvadori, other actors mentioned in the registry); b) links among actors that are directly related to the credit document (only borrowers, notaries and guarantees). To control for the hypothesis of bridging we also computed the structural values for the whole network without the actors with a notary role (Control Case).

Specifically, direct relations generate a sub-network (B) that is composed of fragmented independent units that display no interconnectedness; on the opposite side, the presence of both direct and indirect relations produces a sub-network (A) characterized by less components and higher centrality and closure, hence a context where actors interrelate and associate among them.

Indirect relations are crucial for establishing (and maintaining) an efficient business system (Mc Lean & Padgett, 1997) and besides notaries, several people – acting as guarantors, sellers or buyers of receivables, payers on behalf of the original borrower, partners of the borrowing company, and so on – played a role in the functioning of the credit market by channelling information and facilitating contacts with other actors.

Tab. 6 – Comparison between networks (hypothesis on the role of the notary)¹⁰

	<i>Network A</i>	<i>Network B</i>	<i>Network C</i>
	<i>Direct and indirect relations</i>	<i>Only direct relations with the contract</i>	<i>Control case</i>
Nodes	206	206	206
AV Degree	4,165	0,544	2,883
Centralization (D)	0,142	0,061	0,074
N components	28	154	68
Fragmentation	0,486	0,990	0,846
Closure	0,484	0,081	0,631
Average Distance	3,995	1,857	4,320

To evaluate the specific bridging role of notaries in the Salvadori lending activity we compare the control case (a sub-network without notaries) with sub-network A. Substantive variations for the average degree, as well as for

¹⁰ Values for actors by actors matrix, 1-mode network, binary.

closure and fragmentation indexes between the two sub-networks testify that notaries may have contributed to link actors other than borrowers (as the average distance increases in the control network), and to crossing social class boundaries, especially when property and inheritance transactions were involved.

Second, to evaluate the role of notaries in bridging among social circles we focus on the loans supported by a notary act. One third of the lending positions (58 out of 152, two positions having multiple acts) are supported or incorporated in a notary manuscript, which frequently includes supplementary information about the transaction (borrowers' assets, his/her family situation and other legal relevant information). The ultimate reason to provide such detailed financial profile of clients may be related to the association of social class and reputation from social proximity. This is supported by the fact that in our data notarized loans are concomitant more with transactions involving actors that are considered less trustful or have no previous commercial experience with the Salvadori.

To put in evidence differences among types of contracts (and distinct associative patterns among actors) we consider the density of relations among homogenous groups of actors¹¹. Groups are constituted by subjects that share the same level of intensity of relations with the Salvadori (strong/middle/weak social proximity). Then, to evaluate the economic function of notarized contracts we compare the density of relations that are present in the two previous subnetworks (notarized and non-notarized loans of Table 5) with a third sub-networks that contains only the actors involved in the financial transactions (borrowers, guarantees, payers/receivers of credit and the notary). This sub-network – defined as Network T – is supposedly less influenced by subjective elements (ex. ledger's transcription habits) than the complete network – here inserted for completion – and may suit better for testing our hypothesis (Table 7).

The density value previously calculated for the complete network (all types of contracts) shows that among actors with intense social proximity to the Salvadori – either by familiarity, patronage, or business linkages – there is strong interconnectivity (density 0.056); while groups of actors that report low or middle intensity of relations with the lenders show a lower internal density (0.022 and 0.012).

Since the internal cohesion of each group is also related to the type of links among actors (sub-network of contracts and subnetwork of notarized loans), comparison of group density for network T, created by the removal of “additional” linkages improves our argument. Results show that actors with

¹¹ Institutions were not included in this part of the structural analysis.

a strong social proximity with the Salvadori are associated to credit circuits regardless of the form of contract that was issued for lending (Table 7a). On the contrary, those actors that did not possess trustfulness or financial reputation were associated more frequently to notarized transactions¹². To understand how social proximity is related to loan types (private agreement/contract vs notarized loan), we additionally computed the values of the densities of the three groups controlling for the effect of social class (Table 7b). Comparing the complete network to sub-network T, the closure effect that was determined by the presence of different social classes is evident for the actors sharing high social proximity with the Salvadori, and less obvious for those actors having a middle intensity of relations.

Tab. 7 – Comparison between networks (group density by intensity of relations)

	<i>Weak</i>	<i>Middle</i>	<i>Strong</i>
<i>a) Social proximity</i>			
Contract	0,009	0,005	0,028
Notarized loans	0,013	0,007	0,028
Network T	0,014	0,005	0,028
Complete network	0,022	0,012	0,056
<i>b) Social proximity with control for social classes</i>			
Contract	0,012	0,007	0,014
Notarized loans	0,013	0,005	0,018
Network T	0,015	0,009	0,020
Complete Network	0,023	0,013	0,032

Concluding, the overall structural analysis confirms both hypotheses with supplementary details. Social class of the borrowers had ultimately an impact on the business strategy of the Salvadori. Social class specifically increased the divide among those who did not require documented credentials to access loans (actors with middle and higher proximity) and those necessitating of the notary intermediation. Nevertheless, the Salvadori were judicious in offering differentiated types of loans (notarized and private contract) to clients of different social classes, being intensity of interactions or social proximity an important requirement to stipulate secure credit transactions (Hypothesis 1). The presence of notaries – presence not necessarily related to the legal act – enhanced also traditional exchanges, usually stipulated among

¹² As the Salvadori ledger entries testify, notary loans were also a form of “social credentials” that were used in the lending market to support the borrowers, as well as to re-negotiate the credit in the following years.

subjects belonging to a similar social milieu, and hence based strictly on professional reputation and assets. As locally based professionals, notaries proved particularly crucial in establishing connections among their clients of different social classes and ensure the legal conditions of the transaction, as well as its economic accomplishment (Hypothesis 2)¹³.

6. Final comments

Which factors drove a lender to resort to a notarized loan? In the early modern economy this decision was determined mostly by the lender's characteristics and the characteristics of the prospecting clients. On one side, membership in the same social group was a priority factor that enhanced trust between the lender and the borrower and private dealings were the usual choice for loans to relatives, friends and business associates. On the other hand, the higher the uncertainty and the lower the trustworthiness of the counterparty, the higher the incentive to register with a notary. And even if according to social conventions of the time it was not mandatory to hold lending contracts with a notary act, notaries established a framework for trust and respect of rules among subjects belonging to different social classes (Levy, 2010). Their presence – not necessarily related to the legal act – enhanced traditional exchanges, usually stipulated among subjects belonging to a similar social milieu.

From this standpoint, our intent to show how Social Network Analysis can be applied to support hypothesis concerning the structural configuration of lending relationships has been partially fulfilled. As we have illustrated, strict financial relations, in fact, may induce to underestimate the combined effect of socio-economic institutes and social classes in structuring dissimilar paths to access credit. Loans that are not supplemented by a notary act were more frequently arranged among customary business partners or trustful clients, both sharing social proximity with the lender; while for lower social classes and specifically artisans or small landowners, notary acts might constitute supplementary references about their assets (ex. inheritance of land properties, investment plans) and economic reputation.

Specifically, in the peripheral local economy of the Prince-Bishopric of Trento, where our case is situated, strategic organization of lending required an accurate selection of patrons (nobles and patricians), institutional

¹³ On the topic see the analysis of the letters of credit by Padgett and McLean (2011) and Gondal and McLean (2013) in Renaissance credit market.

representatives and prominent commercial partners, as well as arm-length trading with lower classes and artisans that could enhance and provide stability to the main commercial business. Focus on the local context is not secondary to our results: as previous research has documented, explanations of credit business circuits rely also on the sources of information about the financial activity and the methodology that is adopted to investigate historical cases (Reupke, 2015; Muldrew, 1998). The assessment of the hypothesis concerning strategic organization of the lending activity and the mediation role of notaries show in fact that new historical documentation can lead to original perspectives of the borrower-lender relation. Family archives and small case studies, such as litigation records, despite being more fragmentary and circumscribed to local economies, may in this sense provide a novel source for testing determined hypothesis via direct historical sources.

References

- Alexander M.C., Danowsky J.A. (1990), "Analysis of an Ancient Network: Personal Communication and the Study of Social Structure in a Past Society", *Social Networks*, 12, 4, pp. 313-335.
- Borgatti S., Everett M., Freeman L. (2002), *Ucinet for Windows. Software for Social Network Analysis*, Analytic Technologies, Harvard.
- Carboni M., Muzzarelli M.G. (a cura di) (2014), *Reti di credito: circuiti informali, impropri, nascosti (secoli XIII-XIX)*, il Mulino, Bologna.
- Clemens G.B., Reupke D. (2009), "Der Notar als Broker: Das Management des privaten Kreditmarktes", *Zeitschrift für Verbraucher- und Privat-Insolvenzrecht*, 8-12, pp. 16-22.
- Erickson B.H. (1997), "Social Networks and History: a review essay", *Historical Methods*, 30, 3, pp. 149-157.
- Fontaine L. (2014), *The Moral Economy. Poverty, Credit, and Trust in Early Modern Europe*, Cambridge University Press, Cambridge.
- Franzosi R., Mohr J.W. (1997), "New Directions in Formalization and Historical Analysis", *Theory and Society*, 26 (Special Double Issue on New Directions in Formalization and Historical Analysis), 2/3, pp. 133-160.
- Gelderblom O., Hup M., Jonker J. (2018), "Public Functions, Private Markets: Credit Registration by Aldermen and Notaries in the Low Countries, 1500-1800", in M. Lorenzini, D'Maris Coffman, C. Lorandini (eds.), *Financing in Europe: Evolution, Coexistence and Complementarity of Lending Practices from the Middle Ages to Modern Times*, Palgrave Macmillan, London.

- Gestrich A., Stark M. (eds.) (2015), *Debtors, Creditors and Their Networks. Social Dimensions of Monetary Dependence from the Seventh to the Twentieth Century*, German Historical Institute London, Bulletin Supplement 3.
- Gondal N., McLean P. (2013), “Linking tie-meaning with network structure: variable connotations of personal lending in a multiple-network ecology”, *Poetics*, 41, pp. 122-150.
- Gould R.V. (1991), “Multiple networks and mobilization in the Paris Commune, 1871”, *American Sociological Review*, 56, pp. 716-729.
- Haggerty J., Haggerty S. (2013), “Visual Analytics for large-scale actor networks. A case study of Liverpool, 1750-1810”, in M. Casson, N. Haschimzade (eds.), *Large Databases in Economic History*, Routledge, London.
- Hoffman P.T., Postel-Vinay G., Rosenthal J.-L. (1999), “Information and Economic History: How the Credit Market in Old Regime Paris Forces Us to Rethink the Transformation to Capitalism”, *American Historical Review*, 104, pp. 69-94.
- Hoffman P.T., Postel-Vinay G., Rosenthal J.-L. (2000), *Priceless Markets. The Political Economy of Credit in Paris, 1660-1870*, University of Chicago Press, Chicago.
- Hoffman P.T., Postel-Vinay G., Rosenthal J.-L. (2019), *Dark Matter Credit: The Development of Peer-to-Peer Lending and Banking in France*, Princeton University Press, Princeton.
- Levy J. (2010), “Notaries and Credit Markets in Nineteenth Century Mexico”, *Business History Review*, 84, pp. 459-478.
- Lorandini C. (2006), *Famiglia e impresa. I Salvadori di Trento nei secoli XVII e XVIII*, il Mulino, Bologna.
- Lorandini C. (2015), “Looking beyond the Buddenbrooks Syndrome: The Salvadori Firm of Trento, 1660s-1880s”, *Business History*, 57, pp. 1005-1019.
- Lorenzini M. (2018), “Notarial credit markets in eighteenth-century northern Italy: Trento and Rovereto compared”, in M. Lorenzini, C. Lorandini, D’Maris Coffman (eds.), *Financing in Europe: Evolution, Coexistence and Complementarity of Lending Practices from the Middle Ages to Modern Times*, Palgrave Macmillan, London.
- McLean P.D., Padgett J.F. (1997), “Was Florence a Perfectly Competitive Market? Transactions Evidence from the Renaissance”, *Theory and Society*, 26, 2/3, pp. 209-244.
- Morrissey R.M. (2015), “Archives of Connections”, *Historical Methods*, 48, 3, pp. 67-79.
- Muldrew C. (1998), *The Economy of Obligation. The Culture of Credit and Social Relations in Early Modern England*, Macmillan, Basingstoke-London.
- Padgett J.F., Ansell C.K. (1993), “Robust Action and the rise of the Medici, 1400-1434”, *American Journal of Sociology*, 98, pp. 1259-1319.
- Padgett J.F., McLean P.D. (2011, March), “Economic Credit in Renaissance Florence”, *The Journal of Modern History*, 83, pp. 1-47.
- Raab J. (2004), *From Words to Numbers to Graphics: A Suggestion on How to Analyze Inter-Organizational Networks Using Archival Sources*, paper presented at XXIV Sunbelt Conference, Porteroz SLO.

- Reupke D. (2015), "Credit Markets in the Nineteenth-Century Countryside: A Comparative Study in a Rural Border Region," in A. Gestrich, M. Stark (eds.), *Debtors, Creditors and Their Networks. Social Dimensions of Monetary Dependence from the Seventh to the Twentieth Century*, German Historical Institute London, Bulletin Supplement 3, pp. 119-143.
- Stark M. (2015), "Networks of Lenders and Borrowers: A Rural Credit Market in the Nineteenth Century", in A. Gestrich, M. Stark (eds.), *Debtors, Creditors and Their Networks. Social Dimensions of Monetary Dependence from the Seventh to the Twentieth Century*, German Historical Institute London, Bulletin Supplement 3, pp. 99-118.
- Wasserman S., Faust K. (1994), *Social Network Analysis: Methods and Applications*, Cambridge University Press, Cambridge.
- White H.C. (1992), "Cases are for identity, for explanation, or for control", in C.C. Ragin, H.S. Becker (eds.), *What is a Case? Exploring the Foundations of Social Inquiry*, Cambridge University Press, Cambridge.
- White H.C. (2002), *Markets from networks: Socioeconomic models of production*, Princeton University Press, Princeton.