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The Circulation of Interpersonal Credit in Renaissance Florence

Abstract

We analyze a network of 3,590 interpersonal credit ties among Renaissance Florentine elite households to determine how Florentine personal credit was socially structured. We assess the network in light of various social and economic motivations Florentines might have had to exchange credit with each other. We explore the extent of participation by people from different categories, such as neighborhoods, factions, and guilds, and we determine whether loans flowed primarily within or between such groupings. We observe considerable homophily within families and neighborhoods, but also extensive circulation of credit among the most commercially and politically active Florentines. The overall connectivity of this network of interpersonal credit transactions resembles the social structure of other contemporaneous Florentine networks, such as marriage and business, suggesting that interpersonal credit was an important and distinct domain in which elite membership was confirmed and elite social solidarity achieved.

Keywords: Credit; Network; Florence; Renaissance; Elite; Solidarity.

If money or surety or any obligation is requested of you that may do you harm, protect yourself from it as if it were from fire, and do not put yourself in any position where you may incur harm, so that you avoid two or maybe three different dangers: one, that you will lose what is yours; two, that you will lose a kinsman or friend; third, that he will become an enemy and will hurt you like an enemy if you ask him for what is yours.

Giovanni di Pagolo Morelli, *Ricordi* (Branca 1986: 183)

FLORENTINE HISTORIANS are familiar with the caution expressed here by Giovanni Morelli concerning the pitfalls of interpersonal lending. It was an important element in the Florentine mentality on interpersonal financial relations, resonating with Giannozzo Alberti's characterization of a borrower in Leonbattista Alberti's *Della Famiglia*

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European Journal of Sociology, 55, 2 (2014), pp. 135–176—0003-9756/14/0000-900$07.50per art + $0.10 per page
 doi: 10.1017/S0003975614000083

as one "who tries by some sort of art or cunning subterfuge to take from you what is yours" (Alberti 1969: 239). Both Alberti (1969: 241) and Morelli (Branca 1986: 184-185) offered guidance about how to detect, and evade, the pleas of would-be borrowers, as did the moralist Paolo da Certaldo (e.g. passages 100, 140 and 375; Branca 1986: 18; 30-31; 91).[1] Furthermore, the historian Dale Kent tells us of one case (among surely many) in which a Medici employee was warned not to give out credit indiscriminately, on the grounds that "a creditor who had to put pressure on his debtors ran the danger of losing friends as well as money" (Kent 1978: 72, n. 6). It would seem that Florentines viewed personal loans not only as potentially problematic from a financial standpoint, but also socially risky. Giving and receiving credit, like other sorts of personal favor or obligation, could be dangerous in a society both dependent on social relations and distrustful of them (Weissman 1982).[2]

Nevertheless, a considerable flow of interpersonal credit existed in Renaissance Florence, including among members of the Florentine *elite*.[3] In this article, we analyze a network comprised of 3,590 interpersonal credits involving 2,223 Florentines from elite households. Our goals are threefold: 1) to explore Florentines' diverse economic and social motivations for offering interpersonal credit to each other; 2) to describe the patterns of giving credit we observe and link those patterns, if possible, to motivations; and 3) to explain the function and significance of this network for Florentine society writ large. Concerning this last point, as illustrated by this case, we see social network structure as providing, from the bottom up, the scaffolding of elite solidarity.

"Network" is indeed the most apt term here, because far from being distributed in a disconnected fashion, these interpersonal

[1] This desire to avoid lending, motivated by concerns over interpersonal relations, was distinct from the ubiquitous fear of usury that hung over many exchanges of money, as expressed, for example, by da Certaldo: "And so prevent yourself as much as you can from lending, and from borrowing, any sum under conditions of usury, whether small or large, for if you act usuriously, you will be ruined" (#321, Branca 1986: 66; *our translation*). We expect that lending at effectively fixed interest rates was not common in the interpersonal transactions we discuss in this article, unlike the loans from Jewish moneylenders analyzed by Botticini (2000). However, principal and/or "interest" were likely often repaid by non-monetary means, such as loyalty or favors in kind. A small number of the loans we analyze were labeled as *depositi*, or they were held *a discrezione*—terms which suggest interest payment of some sort. Such credits were more common in the world of Florentine business and in person-to-company investment ties than in the domain of interpersonal lending strictly speaking (Goldthwaite 1985).

[2] The danger of interpersonal financial exchanges affected the borrower as well. Poggio Bracciolini claimed that bankruptcy for the Florentines was "a form of ignominy similar to eternal damnation" (quoted in Brucker 2005: 87). And while individual loans might help Florentines cover their tax obligations (Conti 1984), too much indebtedness jeopardized their eligibility for communal office-holding.

[3] We offer our operational definition of "elite" below.

credits linked a large number of Florentines directly or indirectly to each other in a web of exchanges.[4] Over 2,000 of the 2,223 participants could reach each other stepwise along a concrete chain of credits linking givers and recipients—what social network analysts call a *weak component* structure. In other words, they were *not* neatly separated into distinct pools of credit. Equally strikingly, 301 of these people—an inner circle of sorts—were linked in what network analysts term a *strong component*, defined as that portion of a network of directed ties where, following the direction of ties, all nodes are reachable from one another—the way, for example, that participants in the ring of Kula exchange were linked (Mauss 1990, Ziegler 2008; also see Gondal and McLean 2013b). While structurally distinct, this strong component (SC) was not disconnected from the rest of the network. Credits crossed into it and out of it, as well as circulating within it, rather like streets entering and exiting a roundabout (see Figure 1).[5] The participants in this SC both gave and received credits (by definition), and as we have discovered, they were disproportionately members of the recently consolidated Florentine elite, or really an elite within the elite: an inner *reggimento* (Brucker 1977, Kent 1975, Padgett and McLean 2006, Rubinstein 1997). That is, they were largely business owners and communal office-holders who held the reins of commercial and political power. This strong component will be an important focus of our attention in this article.

That interpersonal credit flowed in this networked way is interesting and important from both an economic and a social standpoint. Economically, a distributed flow of personal credit suggests an increase in liquidity in the market: more people have more access to more money, and those wanting money are more readily connected with those who wish to supply it. That point is similarly highlighted in several historical cases of interpersonal lending (for example, Beveridge 1985, Bowers 1983, Garfinkle 2004, Holderness 1976, McIntosh 1988).[6] In one well-documented case—17th and 18th century Paris—such a beneficial flow of interpersonal credit was accomplished via the mediation of notaries at the center of the network (Hoffman, Postel-Vinay, and

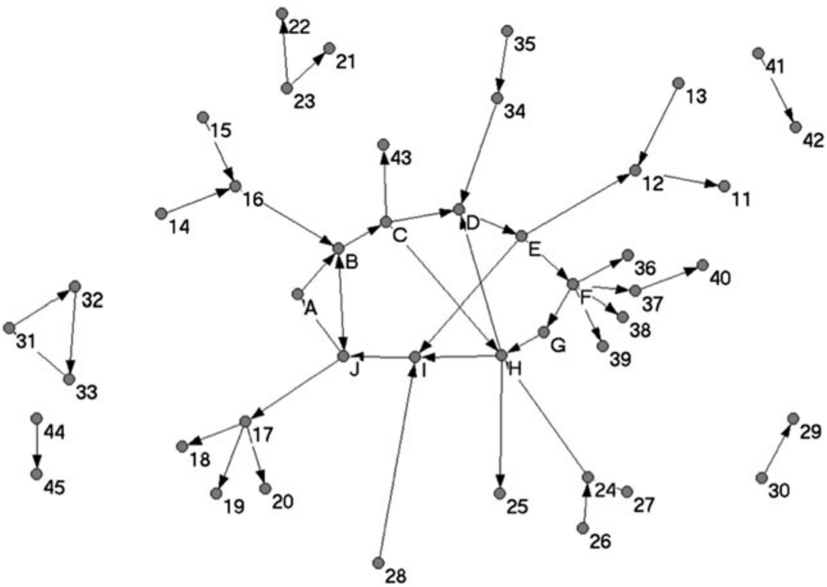
[4] For a few noteworthy examples of network analysis in economic historical research, see van Doosselaere (2009), Erikson and Bearman (2006), and Hillman (2008).

[5] 208 (69%) of the persons in the SC gave at least one credit to 301 different people outside it, while 174 (9.1%) of the 1,922 people outside the strong component gave credits to 193 different actors inside it.

[6] Lamoreaux's (1994) work is frequently cited as an example of how personal ties undergird an historical credit market; but the actual lenders in her case were corporate entities, however much their owners knew the banks' clients personally.

FIGURE 1

Schematic Representation of the Florentine Elite Interpersonal Credit Network, 1427



Credits circulate in the direction of the arrows around the central circle, or *strong component* (nodes A through J). Some credits traverse the circle, creating shortcuts without destroying the larger circuit. Some credit flows into the circle from outside, as from node 16 (and indirectly nodes 14 and 15) to B, while some flows outward from the circle to one or more borrowers in the periphery (for example, from F to nodes 36 through 39 and indirectly on to node 40). These numbered lenders and borrowers are connected to the strong component, but only weakly so. Some pairs of participants and small groups of participants engage in lending that is disconnected from the rest of the network, as in nodes 31-33 and nodes 44 and 45.

Rosenthal 1999 and 2000). Much closer in time and place to our case, in a study of tax documents from over 7,500 households in the countryside around Florence in the 1420s, Maristella Botticini (2000) has argued that Jewish moneylenders, linked to each other, were essential for making a market in personal loans, providing access to capital otherwise unavailable to these borrowers. Indeed, the Florentine government allowed Jewish lenders into the city proper in the 1430s to increase liquidity and the supply of credit (Botticini 2000, Goldthwaite 1985 and 2009,

https://doi.org/10.1017/S0003975614000083 Published online by Cambridge University Press

Gow and Griffiths 1994)—as Brian Pullan (1987) put it for the case of Venice, accomplishing a public service out of private enterprise.

What we describe differs from Hoffman *et al*.'s and Botticini's accounts, however, in that we find no "outside" group making this market. The connectedness of this network of loans was accomplished by its core participants, especially by those located in the SC. Moreover, those core participants were not professionals. To be as precise as possible, although many of them also operated banks or shops, the records indicate that they did not specifically offer or receive these particular credits *in their capacity* as bankers or merchants. Accordingly, while economic motives for their behavior were undoubtedly germane, social considerations likely played a considerable role as well, in much the way that Morelli viewed finances and friendship as being entangled.

A networked distribution of credit may also yield certain *social* benefits, rendering people more dependent on each other, more attuned to each other, and more implicated in a common fate. Consider research on rotating credit associations (Portes and Sensenbrenner 1993) or micro-financing arrangements (Anthony 2005, Zhou and Takeuchi 2010) and how such arrangements depend upon, and in turn produce, feelings of social solidarity. One could also point to research in economics emphasizing the importance of the social fabric for supporting exchanges of favors today (Jackson *et al*. 2012), and the importance of reputations and collectivist sentiments historically for monitoring and guaranteeing economic transactions (Greif 1989). Participants may or may not consciously seek this collective social good, and in fact they may have limited awareness of its existence. They undoubtedly will have selfish motives for participating in any network of exchange, whether those motives are economic, social, or political in nature. The link between micromotives and collective outcome is a fascinating question for researchers (Bearman *et al*. 2004, Greif 2006, Schelling 1978), but far from simple to ascertain. Of course, from the perspective of people excluded from a given network, it may not seem like a collective good at all. Nevertheless, we argue, a collectivity in which credit circulates—especially in the sense that participants receive from some and give to others, effectively passing credit around a circle—is predicated upon, and in turn reproduces and reinforces, social solidarity among those who participate.[7]

Finally, economists and sociologists alike argue that the unequal distribution of information about would-be borrowers, and the need

[7] Our claim parallels research on systems of generalized exchange. In both experimental and real-world settings, such structures have been demonstrated to depend upon and/or reproduce trust and social solidarity (e.g. Molm *et al*. 2007; Takahashi 2000).

to overcome information asymmetries between lender and borrower, are crucial factors shaping the market, fostering (or inhibiting) trust, and even allowing loans and other kinds of interpersonal financial transactions to arise in the first place (Beveridge 1985, Granovetter 1985, Greif 2006, Hoffman *et al.* 1999, Jackson *et al.* 2012, Nisbet 1971, Stiglitz and Weiss 1981, Uzzi 1996; 1999). Because information about the trustworthiness of the recipients of favors or credit flows through social ties, we expect credit to follow in the pathways of existing social ties, or that such ties will support credit relations in other discernible ways. It is precisely such social embedding of Florentine interpersonal credit that we explore in detail in this article, just as Hoffman *et al.* (1999; 2000) did for early modern Paris.

In what follows, we first delve more fully into the question of Florentines' motives to lend, and specifically with whom. Next we describe our data, and proceed to analyze this network of interpersonal credit flows, identifying which types of persons gave credit, how much they gave, to whom they gave it, what was exchanged, and how credits clustered. We document the extent to which interpersonal credit flowed within or between important social groupings, such as families, neighborhoods, political factions, social status groups, political elites, and guilds. Knowing these patterns allows us to judge the extent to which loans effectively integrated and/or segregated these different groups. It also helps us to determine the *function(s)* of lending, not only in terms of the goals that inclined individuals to lend, but also in terms of the macrostructural consequences that arose from the giving of credit. Finally, we discuss how this network of interpersonal credits—characterized both by considerable *connectivity* (i.e. a large weak component) and by *internal differentiation* (that is, having a strong component nested within it)—resembled the network structure of other important domains of Florentine social life. Ultimately we argue that the structural similarity between this lending network and other concurrent networks—notably networks of marriage ties, commercial credit relations, and political organization—suggests that interpersonal credit, like these other networks, played a role in inducing (or more modestly, expressing) solidarity among the politically and commercially active elite. Having personal credit relationships with members of the Florentine establishment, whether on the giving or receiving end, signaled one's membership in that loosely defined group. Hence the core component of the Florentine elite was reproduced in part through the circulation of interpersonal credit, even as many participants probably remained ambivalent about offering or accepting it.

The complex microfoundations of interpersonal credit

We start with economic motivations. Botticini, for example, persuasively claims that credit served both production- and consumption-oriented goals, "enabl[ing] households to smooth consumption, purchase working capital, and provide their daughters with dowries" (2000: 166). Certainly interpersonal credit could be seen as a vital tool for increasing liquidity in a cash-starved economy (Goldthwaite 2009)—and we know the late 1420s and early 1430s to have been a time when cash was in short supply in Florence (Molho 1971: 155). Lenders might also have reaped robust profits from their loans, thereby using their savings productively at a time when agricultural profits were relatively modest (Goldthwaite 1968). And undoubtedly some lending would have been quite self-interested, even predatory. For example, Mark Phillips (1987: 52) tells us that Marco Parenti lent "a substantial sum" of money to a poor female neighbor in the 1440s, "with half the property as security and the proviso that he would have first rights if the house were sold. A year later the house was his".

However, alongside such economic motivations, Florentines entertained other noteworthy reasons for offering personal loans. One motivation, applied to certain people at least, was familial obligation. F.W. Kent (1977: 154) has claimed that "tradition required that wealthier kinsmen help their poorer fellows, and barriers created by big or even extreme variations in wealth must often have melted away in the sun of family affection and dutifulness". Though probably overstated, the claim echoes a remark from Alberti's *Della Famiglia*, in which the character Giannozzo asserts that "If I could do it without great loss to myself, and if it would help my kinsman, I would lend him all the money and property he wanted, all I could possibly lend" (Alberti 1969: 241). It is likely that patrilineages periodically had to pool resources across households—for example, at times when the daughter of one household was to be married and a suitable dowry had to be provided, or a young man was to go into business for himself. Such events, set amidst the life course of the clan as a whole, could well spur inter-household transfers.

The historian David Herlihy (1977) extends the ethic that entailed an obligation to lend to family to the relationship between landlord and sharecropper. Elite household tax declarations frequently document small monetary loans to their workers. Palla di Nofri Strozzi, for example, Florence's richest man in 1427 (and a participant in our SC), listed 122 of these loans with *lavoratori* in his tax declaration, amounting to 3,200 florins (Herlihy 1977: 13; Cat. 76: 169ff.). Herlihy suggests that such loans to poorer Florentines were quasi-familial, as they took place within the extended household. Loans to workers are *not* examined in this article, and furthermore we doubt that *lavoratori* were routinely considered part of the elite household; but we do agree with Herlihy that Florence exhibited certain characteristics of "a primitive 'gift' economy, in which payments are made not exclusively in return for goods and services, but in accordance with social roles, in recognition of status, in response to need" (1997: 13). Such a sense of obligation to one's neighbors or dependents may have factored into interpersonal credit, even among elite households.

Richard Trexler indirectly suggests another motivation when he argues that "honored families in economic straits were not just a private matter" (1994: 64), but a matter of concern to the commune as a whole. The jurist Baldus had argued that a noble who could not preserve his dignity was entitled to assistance, as he "lacks sustenance according to the state of his birth" (1994: 69). Although Trexler acknowledged that blood relatives would be the primary source of such help, confraternities and the state itself took on more responsibility for charity work over the course of the 15th century. Individual Florentines may also have felt some obligation or compulsion or desire to "subvent their shamed poor" (1994: 74).

Another way in which Florentines might have overcome the kind of hesitation to lending articulated by Morelli was expressed by Morelli himself. Despite his trepidation, he counseled that it was probably better to accede to a friend's request for money and mentally write it off immediately than risk offending him (Branca 1986: 183). In this instance social concerns outweighed economic ones. A similar sensibility seems to have animated Lapo Mazzei in his advice to his friend, the merchant Francesco Datini, to accede to the requests of the del Palagio family in order to ingratiate himself with them (Mazzei 1880, II, 48; also see Trexler 1980: 140). Mazzei wrote:

> Nofri di Andrea [del Palagio] returned, last night. I think it would be best for you to come and pay him your respects, and be cheerful about his return. … Certainly it is best to hold on to this family, for in serving it you have acquired it. It would not be honorable to lose it by neglect, and the circumstances and needs that will arise for them one cannot imagine. I believe they will ever dare to ask things of you, and always it will seem to them that they are obligated to you, at least when they see you [*our translation*].

Morelli's and Mazzei's attitudes suggest that we may plausibly view interpersonal monetary exchanges, at least on some occasions, as variants on the idea of gift-giving.[8]

In short, without ignoring or denying the economic considerations that could spark interpersonal credit relationships, social considerations seem to have been centrally important as well. One key question we ponder in the balance of this article is how these various considerations may have produced and reinforced the pattern of interpersonal credit we actually observe.

Data

Our dataset of interpersonal credits is drawn from the 1427 *catasto* of the city of Florence, a remarkable census of the 9,780 households in the city proper (Herlihy and Klapisch-Zuber 1985), as well as thousands more households in the surrounding *contado*, including some whose records have been utilized by Botticini (2000) and others (for example, Emigh 2009). Each household declaration, or *campione*, among its many elements, identifies the location of the household, documents its agricultural assets, enumerates its shares of the public debt, describes members' participation in commercial activities, and lists all members of the household by name. Each *campione* also lists all individuals and companies who were debtors or creditors of members of the household at a single point in time—as of July 12, 1427—along with the amount owed/owing.[9] Further details about

[8] The idea of gift-giving is hardly a simple one. Morelli implies that these "gifts", if they were such, were grudgingly given. Mauss (1990) viewed gift-giving as having a strongly integrative function in society, but more recent authors (e.g. Camerer 1988, Bourdieu 1977: 4-8) stress its instrumental and strategic qualities.

[9] The *catasto* was repeated in the city in 1433, and similar efforts were attempted a few times later in the 15th century. However, scholars agree that the comprehensiveness and reliability of the data is not as great as in the 1427 document. Further, while historians have used data from all *catasti* to identify trends in household size and aggregate wealth over time (for example, Goldthwaite 1968 and Kent 1977), the original collection of information was too sporadic to permit a meaningful dynamic analysis of anything like personal lending beyond anecdotal reports. Given the likely fairly high frequency of the churning of interpersonal credit, compared to the slow rate of change of, say, family size, and given the temporal aspect inherent in successful gift exchange (see, for example, Bourdieu 1977), the fact that our data are from one point in time is definitely a limitation. Yet scarcely any other premodern source permits a comprehensive analysis of the empirical structure of social interaction to the remarkable extent that this one does.

each credit tie are frequently lacking (although we report some information on content in Table 2 below).

It would be very challenging to collect information on every personal loan in every *campione*.[10] Instead, we chose to gather personal loan information from a (large) subset of elite households within the city. We define "elite" as follows: 1) the household belonged to one of those patrilineages with at least three members appearing in *Consulte e pratiche* discussions (communal debates) in the 1420s (Kent 1975); or 2) the household belonged to one of the so called magnate families (i.e. powerful clans forbidden from office-holding on account of their perceived threat to the republic); or 3) the household was among the 500 richest households in 1427; or 4) the household belonged to a family known to have strong political loyalties to the Medici or to their arch-enemies in the early 1430s; or 5) the household head was active in at least one of the city's major export-oriented industries. These criteria led us to seek data from somewhat more than 3,000 households. Some of these households were poor; some were venerated but on their way to extinction; some were run by rich men still lacking in social status; some were the foot soldiers in the most active factions of the day; some were led by men at the heart of communal life. It was a heterogeneous group. There is no definitive way to set the boundaries of the Florentine elite (Trexler 1994: 62), in part because its openness to new members rendered it an evolving entity (Padgett 2010). We do the best we can with our multiple-criteria strategy and snowballing process. Furthermore, it is important to note that using these multiple criteria to measure the elite, broadly understood, does not predetermine the internal structure of the network we detect.

In an effort to focus on substantial transactions, we chose to record only those credits with a value of ten florins or higher. Were our goal to document elite Florentines' distribution of loans to their workers, such a cutoff would be untenable; but

[10] Botticini's (2000) efforts at collecting loan data are impressive, but she did not handle her data using network techniques. Doing so would have been a major challenge, as many of the borrowers she studied had no last names, making it much harder to trace them in other persons' records. Effectively she treated each *campione* as an independent portfolio of loans, rather than empirically tracing its connection to a wider network. The fact that the account books of the Jewish moneylenders so central to her study are lost massively compounds the problem of actually documenting credit circulation.

it is the flow (or lack of flow) among elite households which concerns us.[11]

We must emphasize that the distinction between personal debt and commercial debt in the *catasto* is real, but imprecise, requiring both judgment and cross-checking. The relationship between companies and their owners was not always at arm's length. Florentines sometimes craftily moved funds around among separate accounts to their own advantage. Borrowers may have perceived a particular transaction to be a personal loan when the lender perceived it to be, or ended up treating it like, a commercial one. In addition, a few individuals participated in the network of personal loans in a way that seems to have resembled commercial lending practices, even though they nowhere identify themselves as commercial enterprises.

A *semantic* uncertainty also exists. Florentine company names were exclusively of the sort, "Personal Name & Compagni," or in the case of multipartner companies, "Personal Name1 and Personal Name2 &co" (for example, Bernardo Carnesecchi e Vieri de' Medici &co"). Where the "&co" designation is explicitly used, or the tie was recorded in the summarized account books of a company, or when multiple persons are listed as creditor/debtor whom we know to have been partners, or when a location is indicated (for example, "i Tornabuoni di Londra"), we are confident the tie was to (or from) a company, and thus filtered out of our interpersonal credits dataset.[12] However, the "&co" label was likely accidentally left off at times, making a commercial tie appear to be a personal one (and thus inadvertently being included in our dataset).

The *catasto* was meant to function as a giant "double-entry" book-keeping system, in which one person's (or company's) credit would be recorded as another's debit. Unfortunately, the reality is far from this ideal. Where it was possible to examine both parties' records, we found only a 31.6% matching rate. Some of this shortfall may arise because our data are taken from a single moment in time, whereas

[11] The effect of this cutoff in research conducted on commercial credit is miniscule, as a very high percentage of ties among companies relate to amounts that are considerably greater than 10 florins. There is some danger here that meaningful loans will have been lost by this arbitrary cutoff, given the paltry assets of some loan recipients. Still, the average florin value of interpersonal credits in our data is about 184 florins (median value 49 florins), even with many credits that barely surpass the 10 florin cutoff. Furthermore, our sense in culling through thousands of *campioni* is that the 10 florin cutoff did not truncate the dataset unduly, given our target population.

[12] At times, to avoid confusion, ties to persons were recorded in the form, Personal Name *proprio* ("himself", or "strictly speaking"), but that practice was not widespread and was primarily restricted to relationships where companies owed money to their own partners.

https://doi.org/10.1017/S0003975614000083 Published online by Cambridge University Press

delays in payment and accounting could mean a debt paid off by one party still appeared as outstanding to the other. Some discrepancy is due to the fact that a substantial number of debts were explicitly regarded as old and unlikely to be repaid (*cattivi*).[13] As we noted above, Morelli advised his readers to mentally write off some debts immediately as unrecoverable, in order to preserve friendships.[14] We adopted the coding procedure of assuming a credit to exist, or to have existed, if either party recorded it.[15]

We are aided in our efforts in exploring the social context of Florentine personal credit by the rich array of archival data available. The individual-level data we incorporate includes information on the following:

- neighborhood of residence
- social status
- family of origin
- *parentado*, i.e. the names of the families into which they married
- factional loyalties during the 1433 Medici ouster
- participation as judges in the *Mercanzìa* (commercial court)
- experience of having been chosen for one of the three major administrative bodies (*tre collegi*) of the commune (*Priori, Buonuomini, Gonfalonieri*)
- guild membership(s)
- ownership of companies.

Virtually everyone in our dataset possessed a known, de facto "membership" in a neighborhood, a social status group, and a family (although some participants had no surname). The city was divided into four quarters, each of which was in turn divided into four administrative neighborhoods (*gonfaloni*), for a total of sixteen categories. Families were accorded different amounts of social status based on their

[13] 9.7% of the transactions in our dataset are explicitly labeled as *cattivi*, and those are disproportionately unmated ties.

[14] One might expect that recipients would more frequently report debts than lenders, as they had a greater incentive to report the tie: for them, it was a deductible liability, whereas for lenders it was a taxable asset. But among cases where only one person reports a tie, givers outstrip recipients as reporters, 54.7% to 45.3% of the time. Likely this is because lenders were required to report even unrecoverable debts—items that debtors no longer felt an obligation to repay, and hence no longer felt an entitlement to report.

[15] We are confident about our decision to include unmated ties because statistical tests indicate that the mated and unmated subsets of credit ties do not differ significantly, except that within-family ties occur at a significantly higher rate in the mated tie subset, and average difference in household wealth between giver and receiver of credit is higher in the mated ties. Substantively speaking, these differences reflect the fact that within-family ties across households of different wealth were viewed with seriousness, and not treated as internal to a single patrimony. They also expressed familial obligation of the sort to which Alberti (1969) and F.W. Kent (1977) referred.

https://doi.org/10.1017/S0003975614000083 Published online by Cambridge University Press

first entry into communal politics. *Popolani* families participated in the founding of the republic in 1282, displacing the magnate families that had previously ruled the city. Some families who were later viewed as threats to communal stability were also categorized as *magnati*. Lower in status were those "new man" (*gente nuova*) families that entered office only after the Black Death. Lower still in status were families who entered after 1382, after 1434, or not at all.

Regarding *parentado*, Padgett (2010) has gathered information on approximately 11,000 marriages contracted between 1282 and 1500, coded primarily from the 17th century *Carte dell'Ancisa*. We coded any dyadic pair as sharing *parentado* if the giver's surname was the same as the recipient's spouse's surname, or if the recipient's surname was the same as the giver's spouse's surname.

Kent (1978) provides lists of individuals who sided with the Medici or with their oligarchic opponents in the 1433-34 factional conflict. Information on *Mercanzìa* involvement, selection for any of the *tre collegi* offices, and guild membership was coded by Padgett and his colleagues from archival sources. In all cases we restrict ourselves to coding involvements prior to 1427, the year of our credit data. We consider two persons to have shared a *mercanzìa* or *tre collegi* tie if they had both served, though not necessarily simultaneously.[16] These past involvements functioned as opportunities for exposure to commercial and cosmopolitan ways of thinking, rather than providing concrete ties upon which other ties could be erected. In addition, they bestowed on participants a certain credential and prestige that raised their salience in the commune, making them more likely targets of interaction. Finally, ownership of companies clearly exposed actors to the world of commerce.

Basic Features of the Florentine Interpersonal Credit Network

Participants

Table 1 provides information on participants in the network as a whole and within the SC, classified according to a variety of salient social categories. *Popolani* families were the most prestigious ones in the Florentine *reggimento*, and they dominated this network numerically

[16] Office-holders served for two months before being replaced with the next group whose names had been drawn. We could measure actual co-participation in office, but the resulting network would be extremely sparse.

https://doi.org/10.1017/S0003975614000083 Published online by Cambridge University Press

Table 1
Participation by Different Groups, Entire Network versus Strong Component

		Entire Network						Within Strong Component					
		N = 2,223	**%**	**# of Credits Given N = 3,590 (%)**	**# of Credits Rec'd N = 3,590 (%)**	**Avg Value Given**	**Avg Value Rec'd**	**N = 301**	**%**	**# of Credits Given N = 703 (%)**	**# of Credits Rec'd N = 703 (%)**	**Avg Value Given**	**Avg Value Rec'd**
Status group	Magnates	384	17.3	463 (12.9)	657 (18.3)	222	143	40	13.3	92 (13.1)	108 (15.4)	285	230
	Popolani	991	44.6	1,635 (46)	1,760 (49)	192	205	146	48.5	337 (47.9)	349 (49.6)	433	442
	New Men	282	12.7	564 (15.7)	488 (13.6)	159	193	55	18.3	133 (18.9)	121 (17.2)	277	335
	New new men	406	18.2	858 (23.9)	585 (16.3)	165	197	55	18.3	136 (19.3)	121 (17.2)	367	324
Factions	Oligarchs	75	3.4	209 (5.8)	163 (4.5)	131	172	16	5.3	37 (5.3)	32 (4.6)	66	153
	Neutral	2,084	93.7	3,108 (86.6)	3,216 (89.6)	175	164	256	85.0	550 (78.2)	581 (82.6)	349	301
	Medici	64	2.9	278 (7.7)	216 (6)	330	489	29	9.6	116 (16.5)	90 (12.8)	559	883
Tre Collegi	No	1,581	71.1	2,196 (61.2)	2,133 (59.4)	181	163	164	54.5	361 (51.4)	362 (51.5)	315	344
	Yes	642	28.9	1,399 (39)	1,462 (40.7)	189	215	137	45.5	342 (48.6)	341 (48.5)	426	394
Major Guild	No	1,508	67.8	1,715 (47.8)	1,979 (55.1)	177	138	141	46.8	249 (35.4)	271 (38.5)	283	287
	Yes	715	32.2	1,880 (52.4)	1,616 (45)	191	241	160	53.2	454 (64.6)	432 (61.5)	416	420

		Entire Network						Within Strong Component					
		N = 2,223	**%**	**# of Credits Given N = 3,590 (%)**	**# of Credits Rec'd N = 3,590 (%)**	**Avg Value Given**	**Avg Value Rec'd**	**N = 301**	**%**	**# of Credits Given N = 703 (%)**	**# of Credits Rec'd N = 703 (%)**	**Avg Value Given**	**Avg Value Rec'd**
Mercanzia	No	2,106	94.7	3,245 (90.4)	3,239 (90.2)	184	182	265	88.0	607 (86.3)	599 (85.2)	372	387
	Yes	117	5.3	350 (9.7)	356 (9.9)	182	202	36	12.0	96 (13.7)	104 (14.8)	349	263
Companies	0	1,710	76.9	1,872 (52.1)	2,386 (66.5)	167	135	136	45.2	244 (34.7)	307 (43.7)	298	231
	1	390	17.5	1,054 (29.4)	903 (25.2)	222	256	105	34.9	272 (38.7)	252 (35.8)	494	479
	2	79	3.6	325 (9.1)	149 (4.2)	210	413	32	10.6	85 (12.1)	68 (9.7)	328	559
	3+	44	2.0	344 (9.6)	157 (4.4)	138	303	28	9.3	102 (14.5)	76 (10.8)	236	387
Quarter	S.S.	519	23.3	864 (24.1)	872 (24.3)	244	277	79	26.2	225 (32)	217 (30.9)	523	601
	S.C.	496	22.3	825 (23)	859 (23.9)	165	194	65	21.6	146 (20.8)	153 (21.8)	299	407
	S.M.N.	499	22.4	792 (22.1)	837 (23.3)	169	135	77	25.6	169 (24)	168 (23.9)	298	213
	S.G.	553	24.9	1,039 (28.9)	928 (25.8)	160	143	76	25.2	159 (22.6)	162 (23)	297	188
Gender	Female	108	4.9	99 (2.8)	54 (1.5)	289	214	2	0.7	3 (0.4)	2 (0.3)	180	83
	Male	2,115	95.1	3,496 (97.4)	3,541 (98.6)	181	184	299	99.3	700 (99.6)	701 (99.7)	369	369

Major guildrefers to members of the Calimala, Cambio, Lana, and Por Santa Maria (silk, among other trades) guilds. 152 individuals appear to have had multiple guild affiliations. The *tre collegi* was comprised of priors, *gonfalonieri*, and *buonuomini*, but many individuals held more than one of these positions during their civic careers.
Source: Authors' data.

relative to other elites. They also predominated in terms of the quantity of florins that passed through their hands on average, especially in the SC. Members of lower status new man and new-new man families tended to give more credits than they received, whereas *popolani*, and more so magnates, received more than they gave, suggesting in the aggregate that credit flowed *up* the social status hierarchy—reminiscent of outsider Francesco Datini's relationship to *popolano* Nofri del Palagio mentioned above.

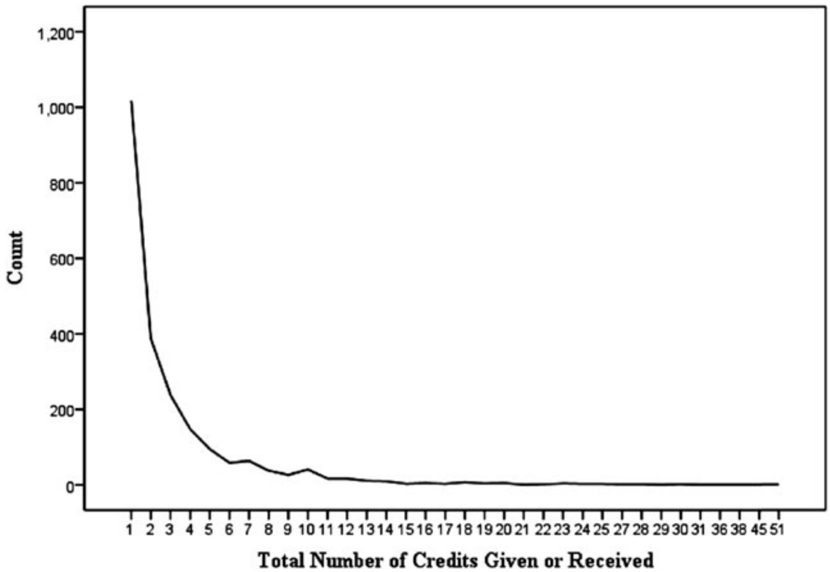
Rates of involvement were higher than average for individuals identified as members of political factions. But the participation of supporters of the Medici faction is especially noteworthy: their level of credit activity and the florin value of the loans they gave and received were considerably higher than other participants in both the whole network and the SC—not enough to exert control perhaps, but consistent with claims that the Medici used personal loans judiciously to buttress their support (Kent 1978; Padgett and Ansell 1993).

Next we consider the differential involvement of past occupants of communal offices and civic organizations in the personal credit market. Those who had served on the *tre collegi*, those who were members of major guilds, and those who had served on the commercial court (*Mercanzìa*), all manifested high rates of participation in interpersonal credit transactions and exchanged more florins on average than those without such experiences. They also exhibited a tendency to accept more florins of debt than they gave out, although the average florin values of in-flows and out-flows were more equal within the SC. A similar pattern emerges when we look through the lens of company ownership,[17] as those most active commercially demonstrated fuller than average involvement in this (ostensibly non-commercial) credit market, while also showing a willingness to take on more debt than the credit they offered to others. Thus, members of the inner circle of the Florentine elite—the establishment—participated actively in interpersonal credit relations, and did so disproportionately in this network's core.

Rates of participation were similar across the four residential quarters of the city (Santo Spirito, Santa Croce, Santa Maria Novella, and San Giovanni), but not with respect to gender, as women were quite infrequent participants. When they did participate, on average women gave more often than they received and for greater amounts,

[17] Office-holding, guild membership, Mercanzìa service, factional involvement, and company ownership are positively correlated with each other at the 0.01 level, with coefficients ranging from 0.056 to 0.449. With each of these cuts at the data, it should be clear that we are not dealing with independent populations.

FIGURE 2
Degree Distribution of the Total Number of Credits Given and Received



relative to men's participation. These findings are basically consistent with evidence of women's participation as investors or lenders in other historical credit networks (e.g. Hoffman *et al.* 1999; Spicksley 2008).

Not only groups, but also individuals, participated in this network to quite different extents. That can be seen in the degree distribution of the network, as shown in Figure 2. 45.8% of all participants were involved in only one transaction. At the other extreme, 148 persons (6.7%) gave or received a total of at least ten. Although this latter group is not exactly coextensive with the inner circle-like SC we have found—only 101 of them were also in the SC, indicating that some rather significant concentrated lending action was going on outside the SC—there are resemblances. The most active people were twice as likely, percentage-wise, to operate companies and to have served on the *tre collegi*, more than twice as likely to have been a member of a guild, and four times as likely to have sat on the *Mercanzia*. They were also approximately three times as likely to have been members of a faction, with both Mediceans and anti-Mediceans over-represented.

Thus the engine of this personal credit network—and again, we stress that these are credit ties between individuals, not transactions involving companies[18]—appears to have been politically and commercially active Florentines spread more or less evenly across the city. In the aggregate, this group showed a tendency to give more loans than they received while also accepting a greater florin value of indebtedness than they lent out to others.

Categories of Credits

As we noted above, it is uncommon for the *campioni* records to offer much detail of what was being exchanged in these interpersonal credits. Nevertheless, in about 30% of cases, we have some idea of what was being transacted. We present select information on tie content in Table 2, distinguishing within our interpersonal credit network between credits inside the SC and those outside it. For purposes of comparison, we also include information on tie content for company-to-person and person-to-company networks from our larger dataset.

For example, some profit-oriented foreign exchange (*cambio*; see de Roover 1944) took place between persons, but clearly not as much as in transactions involving companies (predominantly banks). Some individuals referred to their credit relations with each other as deposits and *depositi a discrezione*, but not to the extent they used that language to record credit relations with companies. For those deposits coded as interpersonal credits, far more occur outside the SC of our network than within it; some come from widows whose only involvement in this network arises through such activity. Far more striking is the fact that credit relations pertaining to dowries are located overwhelmingly in the interpersonal credit network, and these quite disproportionately outside the SC. For those outside the SC, dowries might be their one venture into substantial interpersonal credit exchange; for those in the SC, it was one among many possible motivations to exchange.

[18] We compared the lending profiles of bankers in our personal credits dataset with the lending profiles of banks offering loans or credit to persons in our commercial credit dataset, to determine whether interpersonal credits were simply a form of bank lending under another guise. Banks surprisingly made loans to family co-members at a significantly higher rate than did bankers as persons. Banks also offered more credits to businessmen, to fellow *Cambio* guild members, and considerably more to past occupants of major communal offices than did bankers in their capacity as persons—enough to see the two pools of lending as different. We also identify differences in the substance of what was being given and received by persons as opposed to banks in Table 2.

TABLE 2
Frequencies of Types of Credits Exchanged

Type of Tie	**Outside the Strong Component**	**Within the Strong Component**	**All Persons to Persons**	**Companies [Banks] to Persons**	**Persons to Companies [Banks]**
Cambio (money-changing)	11	6	17	36 [28]	29 [22]
Corpo, Sopraccorpo (start-up capital)	0	0	0	1 [0]	356 [107]
Deposits	37	14	51	19 [14]	77 [40]
Depositi a discrezioni	15	6	21	7 [6]	32 [15]
Dowry (or return) and kinship-related credits	91	9	100	3 [2]	2 [0]
Lascio (Bequest)	16	0	16	0 [0]	2 [0]
Merchandise and Alimenti (grain, cloth, wine, livestock, mules, other)	35	8	43	83 [19]	73 [12]
Old/Bad Debts	319	29	348	128 [33]	67 [27]
Obrigati	9	42	51	13 [11]	7 [6]
Promesse	33	10	43	28 [15]	19 [9]
Ragione corrente/conto (account)	8	4	12	41 [21]	44 [30]

(Continued)

TABLE 2 (Continued)

Type of Tie	Outside the Strong Component	Within the Strong Component	All Persons to Persons	Companies [Banks] to Persons	Persons to Companies [Banks]
Real Estate/ Rent	104	37	141	4 [2]	21 [6]
Sentenzie (legal judgments)	12	0	12	3 [2]	1 [0]
Sicurtà (security, collateral, insurance)	10	4	14	18 [9]	3 [2]
Speculation on *monte* shares	11	80	91	25 [25]	19 [17]
Taxes (*gabelle*, *prestanze*)	5	0	5	10 [7]	2 [1]

Source: Authors' data.

Something similar holds for bequests, which were typically family affairs. Merchandise-based credits arose in the interpersonal credit realm, but nowhere to the extent reported (and undoubtedly unreported as well) in the company-related networks. Old/bad debts occurred everywhere, but preponderantly outside the SC in the person-to-person network. This seems to reflect that phenomenon Morelli discussed: mentally writing off debts to family, friends, and neighbors who may have had social status but were not solvent enough to participate in the circulation of interpersonal credit. *Obrigati*, *promesse*, *sentenzie*, were all obligations of one sort or another to pay, and they seem to have predominated in interpersonal credit relations (although with inexplicably contrary patterns inside that network). Current accounts and *ragioni* were the affairs of inter-company commercial credit (Padgett and McLean 2011), not interpersonal credit. By contrast, real estate transactions were almost entirely treated as interpersonal exchanges. Like merchandise transactions, these accumulated outside the SC—that is, among those who were generally not fully involved in the circulation of interpersonal credit. Finally, a small number of persons, and some companies, were involved in somewhat murky speculative deals on the value of shares of the public debt. A large number of those involved were located in the SC.

To summarize, this necessarily partial account of the content of interpersonal credit ties suggests that credits outside the SC had to do with family matters, with neighborhood real estate matters, and payments to the indigent elite (indigent, because many of the ties were *cattivi*, and elite, because that is built into our sampling strategy). By contrast, SC activity included more financially oriented activity. We begin to sense that a sentiment of family and familial obligation predominated in the large periphery of the network, while an interest in liquidity predominated more in the SC.[19] But note that the unmarked credit relations were probably *unlike* these ties. We suspect they were predominantly loans of indeterminate sorts.

Relations

Who exchanged credit with whom in this network? For example, did the richest lenders compete with each other, or exchange with each other? As opposed to the question of which *persons* were involved in

[19] We arrive at this same conclusion via a more theoretically driven account of network structuration *in* Gondal and McLean (2013a).

the credit network examined above, this question requires an examination of *credits* as the unit of analysis.

It might seem reasonable to assume that money in an interpersonal credit network would flow from rich households to poor ones, but we find this to be only weakly so. The wealth of the giver's household exceeds the wealth of the receiver's household by an order of magnitude of thousands of florins for more than 1,400 of the 2,255 loans for which we have complete household wealth data. Nevertheless, there are also hundreds of cases in which the recipient's household wealth exceeds that of the giver to a comparable extent. We also find a significant difference between the SC and the rest of the network: givers of credit had significantly greater household wealth on average than recipients in the periphery (and even more so, at the boundary between the SC and the rest of the network), but that difference is considerably reduced within the SC, where credit "circulated" among relative "equals", measured in terms of household assets.[20]

From differences in wealth we proceed to examine similarities in the social attributes of givers and recipients of credit. Research on social networks suggests that ties of various sorts are more likely to occur within social groupings than predicted by chance—a property called homophily (McPherson, Smith-Lovin, and Cook 2001). We apply this idea in Table 3 to explore the extent to which a significant proportion of credits were exchanged between persons who were similar on specific dimensions, both for all credits, and then specifically for those found in the SC.[21]

[20] We also examined age difference for the approximately 1,200 cases where birth year data exists for both giver and receiver. There is no meaningful effect at the level of the whole network, but there is a significant difference between the SC and the rest of the network. Outside the SC, givers are older than receivers, whereas on average givers are slightly younger than receivers inside the SC. This adds more support for the idea that offering credit outside the SC had some overtones of patriarchy, which was absent in the SC. The average age of recipients in general was about 40, older than Herlihy's (1977: 24) estimate of 30 as the age of Florentines' peak indebtedness.

[21] Ideally one would evaluate the statistical significance of particular associations, net of other associations, in a multivariate regression framework. However, such a framework would be impractical and inappropriate in this case. First, to properly assess the significance of within-family homophily, for example, or within-neighborhood homophily, we would have to include all cases in which family members or neighbors did *not* give money to each other, not only those in which credits were exchanged. Such a task is doable, but would involve a dataset of millions of cases. More importantly, such a model assumes that each giver or recipient of credit among our 2,223 participants is an equally likely target and that each loan is independent of every other. This is an extremely unrealistic and technically inappropriate baseline assumption. In addition, some elite Florentines who did not participate in the exchange of interpersonal credit at all—those like Giovanni Morelli who perhaps successfully avoided lending—ought to be included as meaningful possible targets of requests for money. But we have no simple way of knowing who those people were.

TABLE 3
Homophily of Lending by Various Social Categories, Entire Network versus Strong Component

Type of Similarity	Whole Network	% within Group	SC	% within Group
	N		N	
Family (blood kin)*	3,590	18.1	703	14.3
Parentado (including direct in-laws)	3,590	5.3	703	5.7
Gonfalone	2,283	32.6	565	27.3
Gonfalone net of family*	1,833	19.9	475	15.4
Quarter	3,429	50.5	699	46.6
Social Status	3,415	42.8	694	40.5
Social Status net of family	3,415	23.8	694	25.9
Aligned with same faction	3,590	1.7	703	4.0
Tre Collegi	3,590	15.6	703	23.2
Ties involving at least one former official	2,251		703	
Ties involving two former officials*	560		163	
Tre Collegi homophily net of family*	485		145	
Tre Collegi homophily net of neighborhood*	439		133	
Tre Collegi homophily net of family and neighborhood*	418	74.6	130	79.8
Belonged to same guild	3,590	10.7	703	19.8
Ties involving at least one guildsman	2,643		615	
Ties involving two people from the same guild*	383		139	
Guild homophily net of family*	310		112	
Guild homophily net of neighborhood*	307		107	
Guild homophily net of family and neighborhood*	281	73.4	101	72.7

(Continued)

https://doi.org/10.1017/S0003975614000083 Published online by Cambridge University Press

TABLE 3 (Continued)

Type of Similarity	Whole Network	% within Group	SC	% within Group
Had both served on Mercanzia	3,590	1.0	703	1.3
Both in business	3,590	16.1	703	37.3
Ties involving at least one businessman	2,342		594	
Ties involving two businessmen*	578		262	
Business homophily net of family*	508		235	
Business homophily net of neighborhood*	477		213	
Business homophily net of family and neighborhood*	461	79.8	209	79.8
Partners in same company	3,590	0.6	703	1.6

Note: The base number of cases is 3,590 for all variables where it is not possible to distinguish zero ties from missing information. Gonfalone of residence is missing for many cases, although for many (though not all) of those cases residential information is known at the level of the quarter. Social status is also not known with certainty for a small subset of cases. For factionalized persons, former civic officials, and businessmen, frequency of homophilous selection was also separately calculated for that subset of cases where the lender and/or the borrower belonged to the target category. An * indicates significance from cross-tabular analysis and/or comparison of distribution means.
Source: Authors' data.

To begin with the most obvious case, interpersonal credit flowed to a considerable extent within patrilineages in Florence. Nearly one in five of the loans recorded took place between blood relatives. The number of within-family ties approaches one in four when we include loans between people connected by *parentado*. This finding substantiates claims about the importance of family solidarity in the protection and maintenance of economic prosperity, although note that family is statistically significantly less important (though by no means entirely absent) within the SC.

Moving further outwards from the intimacy of the family to the neighborhood, we see once again a strong homophily effect: about one-third of all our recorded credits occurred between residents of the same neighborhood, and that number remains high and significant even when we control for family. This pattern confirms what Morelli

https://doi.org/10.1017/S0003975614000083 Published online by Cambridge University Press

and Alberti discussed, and it coincides with research by Eckstein (1995), Kent and Kent (1982), and Klapisch-Zuber (1985) that depicts *vicini* and *amici* as important elements of the typical Florentine's social network and mental universe. As with family, though, neighborhood is less relevant within the SC, and that difference is statistically significant. We observe no significant tendency anywhere to exchange with those of the same social status or faction.

Those with *tre collegi* experience gave or received from each other at a rate that was modestly but significantly higher than expected, such that interpersonal credit flows in effect *integrated* this group, even though a considerable amount of credit also spilled over outside it. Note further that these politically prominent actors offered significant amounts of credit to each other net of family and neighborhood identities; that is, a substantial quantity of lending among these politically prominent actors spanned both family boundaries and neighborhood locales. Finally, this tendency for politically experienced Florentines to exchange with each other was even more pronounced within the SC than in the network as a whole, and statistically significantly so.

With guild membership, too, we find a significant tendency towards homophily net of family and neighborhood similarity, as members of the banking, wool, and silk guilds offered more ties than expected to co-members, while those with multiple guild affiliations also linked up with each other notably more than expected. If lending were simply an extension of business relations, we would expect to see loans distributed *across* guilds, following the patterning of credit among businesses, which to a significant extent followed a chain-of-production logic (see Padgett and McLean 2011, Figure 1).[22] The higher than expected incidence of within-guild lending suggests instead some persistent modicum of group identity on the basis of guild membership, which is perhaps surprising for this time period (Najemy 1982).[23]

Finally, we see the same homophilous pattern among businessmen, although credit ties between partners in the same company were rare. 16.1% of all loans were between businessmen, but more than twice this percentage obtained in the SC. Even after controlling for shared family and neighborhood affiliations, nearly 80% of ties between

[22] Notably, wool manufacturers undertook a high volume of business with *ritagliatori* downstream, and banks and importers upstream. But personal lending relationships between those groups are not abundant. Many commercial credits flowed among banks; but the number of ties among bankers in our interpersonal credit dataset is not much greater than the baseline expectation.

[23] However, Franceschi (2004) argues for the flexibility and ongoing relevance of the guilds in Florentine economic life, even as their importance for political organization had waned.

businessmen remain, although here no difference exists between the SC and the rest of the network. The substantial presence of businessmen amply suggests that liquidity and profit concerns were an important part of how and why this interpersonal credit network operated.

To summarize, family and neighborhood solidarity strongly undergirded the distribution of interpersonal credit, but especially so outside of the SC, in the network's periphery, where credit dispersed rather than circulated. Loans were one evident means of expressing such solidarity, as Leonbattista Alberti suggested when his character Giannozzo stressed his duty "to help my relatives with property, with sweat, with blood, with everything even to the sacrifice of my life, for the honor of my house and my kinsmen" (Alberti 1969: 241). In contrast, this credit network was not significantly structured by the distinctive Florentine sense of social status—neither in the sense of loans flowing predominantly within status groups, nor between them in a classical, simple patronage system. However, we find that shared experience of communal office-holding, guild membership, and business ownership did provide important channels within which personal credit could be exchanged, over and above family and neighborhood ties, especially in the heart of the network where credit circulated. Partly this must have been because those Florentines could *afford* to participate. But they also seemed to cast their credit nets widely in a way that was somewhat at odds with the circumspection about interpersonal credit relations articulated by Morelli, Alberti, da Certaldo, and others.

Local Clusters

Sometimes a dyadic tie between any two persons may exist practically independently of the rest of a network.[24] Commonly, however, a tie between any given pair of persons is *not* formed independently of other ties. For example, one is likely to be or become friends with one's friend's friends. Friendship gathers people into cliques. Or someone known to offer loans may attract additional borrowers,

[24] Indeed, 67 isolated pairs are part of our network by virtue of engaging in isolated interpersonal credit transactions. Consistent with our analysis so far, 30% of these marginal pairs are fully within-family, but only one involves two persons active in business, and only half a dozen involve two persons ever active in communal administration. We also found twelve small components each consisting of three or four persons, and four slightly more complex, non-closed chain-like structures consisting of five to seven persons. These small weak components involve largely persons who were politically and commercially inactive. Many of these components were entirely family-based; a few more had a neighborhood basis.

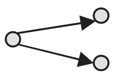
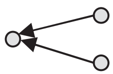
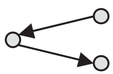
creating a star lender by means of a process network that analysts call preferential attachment. By implication, we might expect interpersonal credits, like other kinds of network ties, to cluster in determinate ways.

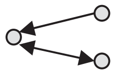
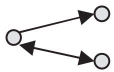
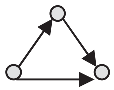
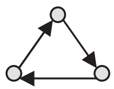
In Table 4 we report on the frequency and location of certain particular micro-level structures, using the distinction between the SC and the rest of the network as we have before. The first two columns identify certain network structural properties and depict certain local structural configurations. The third column provides information both on the frequency with which these configurations occur in our data, and the average frequency with which they occur in 1,000 randomly generated networks of the same size. The fourth column repeats that exercise specifically for the SC as a distinctive structural element. The fifth tells us where these configurations occur in our network.

All the structures reported here occur more frequently in our data than at random—a confirmation that social networks are typically generated by tendencies such as triadic closure, preferential attachment, and homophily rather than random assignment. That said, we can see specifically that, in our network, "stars" with a single lender and multiple borrowers are considerably more common than stars with a single borrower and multiple lenders, although both are abundant. The substantive implication is that the supply of credit was rather concentrated: borrowers would have had relatively few alternative lenders they could consider while, as Giannozzo Alberti complained, the affluent found themselves harassed by "irresponsible people who come with their importunate demands under color of friendship, kinship, and old acquaintance" (Alberti 1969: 241). On the next line down, while the pass-along configuration occurs frequently, it exceeds random occurrence by a considerably smaller margin than either star configuration does, hinting that some social force is suppressing it. And, in fact, the SC we observe is much smaller than one that would arise through random generation. Also note that both kinds of star structures occur less frequently in the SC than would be expected if they were distributed evenly throughout the whole network. Star structures reside, slightly predominantly, in the periphery of this network, where patriarchs and *padroni* operated.

Next consider reciprocal dyads—cases in which credits flowed in both directions, as if the parties maintained two distinct accounts with each other. Reciprocity seems at odds with any notion of lending as an inherently hierarchical relationship; note that it occurred predominantly

TABLE 4
Frequency of Selected Structural Elements in the Complete Lending Network and the Embedded Strong Component

Feature		**Complete Network (Average in 1,000 Simulations)**	**Strong Component (Average in 1,000 Simulations)**	**Percentage With Which the Feature Occurs Specifically in the SC**
Number of Nodes		2,223 (Constant)	301 (906.3)	13.5
Number of Arcs		3,590 (Constant)	703 (1,443.9)	19.6
Density		0.07% (Constant)	0.77% (0.17%)	–
	2-out Star	10,774 (2,823.2)	1,296 (730.8)	12
	2-in Star	6,279 (2,826.5)	1,073 (732.5)	17
	Pass-Along	9,832 (5,647.2)	2,275 (2,294.4)	23.1
	Reciprocal	83 (1.21)	69 (0.9)	83.1

Feature		Complete Network (Average in 1,000 Simulations)	Strong Component (Average in 1,000 Simulations)	Percentage With Which the Feature Occurs Specifically in the SC
	2-in 1-out	842 (3.5)	565 (1.9)	67.1
	1-in 2-out	1,221 (3.7)	633 (2)	51.8
	Transitive triad	301 (4.1)	190 (1.6)	63.1
	Cyclical triad	62 (1.2)	61 (1.2)	98.4

Source: Authors' data.

in the SC. These reciprocal relationships often did not stand alone, but were embedded in pass-along structures at levels far exceeding random. We also observe a small but significant number of complete triads in the network. 190 of these are transitive triads: cases such as when a person has his debtor pay off his own creditor directly. Goldthwaite (2009) has argued that such offsetting was commonplace, and although we do not see much evidence of it in our network, when observed it appears predominantly among the commercially oriented types active in the SC. Finally, note the 60 cyclical triads. Their existence, as with reciprocal dyads, defies the notion of interpersonal credit as a hierarchical relationship. Instead, they suggest an infrequent (but statistically noteworthy) micro-level flow of credit among status equals. And these micro structures, too, are disproportionally present in the SC. In fact, the SC of the network is structurally rich with multiple pathways connecting actors, which is partially reflected in its much higher density, also reported in Table 4.

We conclude this section with an examination of Table 5, which reports on the social composition of the small number of complete triads in the network (that is, cases in which three persons in a group are all tied in one way or another directly to each other). In rather few cases did all three participants in a triad share a single social attribute. That occurs in less than 10% of cases, except with respect to *tre collegi* experience and commercial involvement, where the percentages are still surprisingly low given the preponderance of these actors in the SC. Compare that idea to rotating credit associations, for example, where a specific, strong identity such as ethnicity commonly unites all participants and reinforces their compliance with group goals. That kind of group integration and exclusion did not operate here. For the Florentines, dense pockets of interpersonal credit flows were *hybrids* from a social composition standpoint—say, for example, A and B were members of the same family, while A and C had both occupied *tre collegi* offices, and B and C were neighbors (24 cases); or say A and B were neighbors, A and C had both been *tre collegi* officeholders, and B and C were both members of the banking guild (19 cases). Then we find, progressively, more triads being "fully" socially embedded. Thus, the Florentine interpersonal credit network did not simply reproduce or reinforce other individual domains of social connection, and loans did not cluster, enclave-like, within categories of actors, like family or neighborhood. To the extent that dense

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TABLE 5
Homophily at the Triadic Level

Type of Homophily	**Number in Complete Network (N = 207)**	**Percentage of total**	**Number entirely nested in Strong Component (N = 104)**	**Percentage of SC Triads**
Family (blood kin)	20	9.7	6	5.8
Gonfalone (net of family)	11	5.3	3	2.9
Same Faction	3	1.4	3	2.9
Tre Collegi (net of family)	29	14.0	18	17.3
All Wool Guild	2	1.0	1	1.0
All Cambio Guild	15	7.2	8	7.7
All Silk Guild	1	0.5	0	0
All Businessmen	33	15.9	27	26.0
All Wealthy (over 8,000 florins)	4	1.9	2	1.9

Source: Authors' data.

clusters existed, they were typically built out of disparate types of social connectedness.[25]

Discussion

Let us briefly recapitulate and synthesize the key findings we have identified so far. Personal lending among prominent Florentine households in 1427 was more or less evenly distributed geographically across the city. Although family and neighborhood were important domains within which interpersonal credit was distributed, the network was not separated into family- or neighborhood-based enclaves. While there are hints that new men were more active on average than magnates and *popolani*, loans did not flow significantly either within elite status categories (as in social closure arguments) or across them (in keeping with patron-client presuppositions). Politically partisan persons participated at above average levels, but not significantly with each other. However, civically and commercially active people participated at pronouncedly high levels. They are over-represented in any sample of the most active purveyors of interpersonal credit (whether the SC, or the tail end of the degree distribution in Figure 2). While there is some statistical tendency for these people to offer credit to those like them (homophily), net of more chthonic identities like family and neighborhood (Table 3), they were by no means exclusionary in their dealings. They disproportionally occupied the densest and structurally richest part of the network, but that was a place in which interpersonal credit circulated, and in some places even swirled in local eddies. Civic and commercial elites participated at very high rates in these tightest swirls of lending. However, within those swirls, no single dimension of social similarity undergirded, or rendered redundant, their personal credit-based connections (Table 5).

Star structures—formed by a single person offering credit to two or more borrowers—were more characteristic of the periphery of this network than its core. Credit relations such as dowry payments,

[25] This need not be surprising. People routinely introduce those they know in one domain (example, from work) to those they know from other domains (say, as neighbors), frequently doing so because of some real or perceived similarity between those people on some third dimension. Our reach through social space depends upon piecing together ties existing in multiple different domains of our own experience. Acquaintance networks ("my cousin has a friend who used to work for Barack Obama") and the phenomenon of six degrees of separation necessarily work in the same manner (Granovetter 1973; Watts 1999).

property rental, and within-family and within-neighborhood loans, often to insolvent persons, abounded there whereas, in the SC, the limited extant data on tie content suggests the predominance of financially oriented transactions.

What does all of this mean? We propose, first, that interpersonal credit was seen the traditional way, as an onerous obligation—best not incurred oneself, and best shouldered, if necessary, only with family and neighbors—in the isolated dyads and small weak components of this network, as well as in the weakly connected area outside the SC. Those parts of the network constitute a graphical residue, as it were, of Albertian and Morellian sensibilities. Florentines here were reluctant to accept interpersonal credit and pass it along in turn.

However, the existence of a SC (small by statistical standards, but surprisingly large given Morelli's sentiments), the pronounced presence of civic and commercial leaders within it (an inner elite), their credit interconnections with each other, and the presence of micro-level transitive triads (hinting at offsetting) and cyclical triads (betokening circulation): these features jointly suggest that for this inner elite the construal of interpersonal credit dealings as an "onerous obligation" had been effaced. Interpersonal credit for them seems to have been, at least in part, a monetary convenience, along the lines of what Goldthwaite (2009) has suggested. Loans here offered liquidity.

Nevertheless, questions of trust and identity linger. As we noted at the outset, economists and sociologists both consider that credit relations are fraught with uncertainty. Borrowers can proclaim their capacity to repay, but lenders cannot always tell if they are reliable. Now, in the case of family, one might feel an obligation to lend, regardless of repayment. That may not be sound from an economic perspective, but it can nevertheless precipitate the flow of credit and that might be socially beneficial. One's neighbor's pathways cross one's own repeatedly; this provides an opportunity to monitor compliance, thus potentially underwriting loans via personal reputations. Greif (1989, 2006) has argued that the capacity of economic agents to monitor each other in distant ports provided assurance for principals back home that they would not be taken advantage of. Jackson *et al.* (2012) have argued that third parties known to both the giver and recipient of a favor effectively ensure the compliance of both parties. Giovanni Morelli and Lapo Mazzei seemed to believe that borrowers could threaten lenders simply with the loss of their friendship! And we have seen in general that Florentines seemed to entangle economic motivations with social ones. What, then, were the *social* integuments behind the SC, alongside its

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economic benefits, that stimulated a rich circulation of interpersonal credit, effectively aerating the system of interpersonal credit city-wide?

Crucially, we believe that business ties, communal service, and guild membership were not only tokens of prosperity indicative of these Florentines' financial capacity to participate in high-volume flows of credit. They were social markers—aspects of identity constitutive of motives, like family or neighborhood. Understanding one's membership in such city-wide communities catalyzed the circulation of interpersonal credit, perhaps even making it incumbent upon participants to act "as if" they trusted each other to extend and receive credit honorably. These personal economic exchanges constituted an additional domain, alongside political activity, commercial activity, and undoubtedly other forms of connectedness more difficult to measure and thus not captured here, gathering the inner circle of the Florentine elite in a web of complex (and increasingly self-conscious) interconnectedness.

This claim is rendered more plausible when we consider similar network structural developments occurring at roughly the same time in other domains of Florentine social life—notably marriage, business, and politics. As we describe these relations in general terms, some precision inevitably slips away, but we are persuaded that these networks were roughly structurally isomorphic with the pattern we observe for lending.

Marriage

Padgett and Ansell (1993) argued that in the aftermath of the 1378 Ciompi rebellion—a revolt initiated from below against elite control of the Florentine state—marriages which formerly had been sent only "downward" to families of inferior social status within neighborhoods came to be directed to social equals across neighborhood boundaries. Subsequently, elite families even began to accept marriages with social inferiors in other neighborhoods. Thus, marriages that formerly aggregated into hierarchical trees within neighborhoods began to form into cycles that increasingly spanned neighborhood boundaries, even as they excluded pariah families considered too dangerously oriented towards reform (see Padgett and Ansell 1993: 1293-1298, and Figure 2a on page 1276). The shift from trees to cycles is curiously similar to the co-presence of small "stars" in the greater part of the personal lending network alongside triads, circulation, and complex interconnection found in the SC. Our cyclical imagery is somewhat echoed in Molho's (1994) argument that Florentine elite patrilineages in the 1400s achieved joint preeminence and persistence by circulating brides among themselves.

Business

We have already documented the idea that personal loans are significantly related to business involvement, especially within the SC. There is good reason, therefore, to see personal lending—for those participating in the SC—as a continuation of business by other means.

In addition, however, there is a structural feature of the network that resonates with Padgett and McLean's (2006; 2011) research on Florentine commercial credit. In the late 14th century, there emerged a new organizational form: the "partnership system", a set of geographically dispersed and/or functionally distinct quasi-independent companies linked under the ownership of a single controlling partner or a small number of partners. While these partnership systems engaged in myriad internal transactions, they also did a considerable amount of business *with each other* (2011: 30), inducing a network of *interconnected clusters* of commercial ties—similar to patterns in our SC. That is, both commercial and personal lending networks featured a fairly large, cohesive structure of cooperating "groups". Furthermore, Padgett and McLean (2011: 34) argue that the core of the export-oriented Florentine economy was populated with "ex-members of the city council" who "provided a pool of highly respected citizens, certified to have honor". In short, commercial credit was closely tied up with civic and political merit, as we believe interpersonal credit to have been also.

Politics

We have shown that participation in communal politics was significantly associated with enhanced participation in our personal lending network. Long ago, Najemy (1982) argued that, through an expansion of the pool of political eligibles, new men were coopted into accepting a *popolani*-dominated regime run by the *vantaggiati* (the "advantaged ones"; Najemy 1982: 304) because it was consistently characterized as a consensually run meritocracy in which they could hope at some point to play an active part. Najemy writes (1982: 308): "the idea that political opportunity was offered in equal measure to 'all those who merit it' [...] became one of the cardinal points of Leonardo

Bruni's civic humanist vision of the Florentine republic". Interpersonal credit likewise became less parochial in the hands of the elite. Furthermore, the overlaying of personal loans on civic participation, especially in the SC, was an added element of the complete experience of membership in this consensual elite—an "open" elite (Padgett 2010) connected to the larger population of Florence's noteworthy patrilineages, yet as distinct from it in its lending and borrowing practices as it was in its degree of political participation and political awareness.

Recall Lapo Mazzei's advice to Francesco Datini, cited above: ingratiate yourself with the Florentine political elite through your willingness to lend. Interpersonal credit according to this formula was a selfish means of ensuring recognition and granting recognition, a part of the complex blend of the instrumental and affective that constituted Florentine friendship and guaranteed social stature. To participate in this game of credit exposed one to various dangers—the danger of not being repaid, the shame of not being able to repay, the danger of overextension, and conflicts among multiple obligations. We suspect that all of these considerations had a suppressive effect on the size of the group of people freely circulating credit amongst themselves. But not to play this game reduced one's claim to membership in the elite. Not all Florentines, not even all the members of our broadly construed Florentine elite, participated in this circulation of loans. But given that those who did were disproportionately the most commercially and politically active citizens, we believe it is fair to conclude that personal lending acted as yet another domain in which their elite status was constructed and tested, and by means of which the identity of the Florentine elite was defined and solidified.

By virtue of the existence of similar "circulatory" network structures and similar "expansive" social sentiments towards specific alters in the world of politics, business, and marriage, it appears to us that the meaning of interpersonal credit for elite Florentines went beyond its convenience as a device for increasing liquidity. Credit (and specifically its circulation) connoted membership—and probably also aspirations towards deeper membership—in the elite of Florentine society.

Conclusion

For some scholars, the Florentine case may be of inherent interest. But, for many sociologists, its value, and the value of our analysis of it, will be primarily illustrative. We conclude, then, with some brief remarks on the significance of our research for comparative-historical sociologists.

First, we are committed to the use of a large quantity of historical data synthetically, to move from a description of micro-level interactions to a characterization of the organization of a society as a whole. Network analysis provides one way to bridge the micro-macro divide and say something very empirically grounded about the constitution of the social order. We encourage other sociologists to pursue the same agenda. At the same time, synthetic statements about social order must go beyond identification of structural patterns in network analytic terms, to substantive *interpretation* of the character of historical situations or configurations. Moody (2004), for example, offers an elegant illustration of the use of dyad-level data to characterize the overall structure of a network, in his case a network of scholarly collaboration. But we have tried to go beyond the gist of Moody's argument by linking the interactional patterns we find not only to abstract macrostructural properties, such as "small worlds" or structural cohesion, but also to interpretive understanding of the historical case we have studied. For us, this meant understanding how the participation of particular types of people in the network, and the patterns of interaction they concretely chose, signaled the solidification of an inner Florentine elite, a phenomenon we have reason to believe was developing based on several historians' detailed research.

The work of interpreting social network patterns into historically grounded judgments must be based on sensitivity to actor-level motivations for action. In our case, that task demands attending to both economic and non-economic motivations for economic exchange. Evaluating the relative importance of these motivations remains, to some extent, an area of contention between economists (and even economic historians) on the one hand, and economic sociologists on the other. Rather than dogmatically choosing one set of assumptions or another, we suggest being open to multiple possible motivations, and using, in addition to documentary sources, the empirical pattern of exchange relationships, and the way those exchanges aggregate into larger structures, to surmise which kinds of motivations are most likely to have prompted exchanges in which particular contexts (Gondal and McLean 2013a).

At the same time, we recognize that historical outcomes cannot be understood solely in terms of micro-level motivations. While individuals participate agentically in the creation of a social structure, that structure is capable of accomplishing goals and imposing constraints not fully understood or designed by the participants. We have suggested that interpersonal credit flows expressed and deepened social solidarity among the inner core of the Florentine elite. That "function" was only partially recognized, and probably not deliberately sought, by the participating Florentines themselves. Rather, such corporate solidarity was an emergent phenomenon. The process of risking exchange to secure recognition, repeated over and over by differently situated, strategically acting Florentines, yielded a cohesive structure that was in part based on, but surely also in turn crystallized, elite Florentines' consciousness of themselves as a ruling class.

Out of many sticks a nest is built, with the whole having a coherence and strength greater than the sum of its parts—only here neither bird nor genes are engineering the process. It may be tempting to account for such a process with a certain kind of functionalist analysis, as having an inner logic or purpose to it, using some kind of *deus ex machina* formulation.[26] We disagree with any such line of argument. But we fully support the idea that collective outcomes are frequently unintended consequences of individual-level action, and they come to reinforce patterns of individual behavior (see Douglas 1986, chapter 3). In Florence, the flow of interpersonal credit, undertaken locally but circling back on itself globally, created conditions that reinforced elite Florentines' consciousness of themselves as collective custodians of a city having epochal significance.

Acknowledgments

Portions of this research were presented at annual meetings of the American Sociological Association, the Social Science History Association, the International Network of Social Network Analysis,

[26] Structural-functionalism is rightfully long out of style in sociology. Unfortunately, however, some specious sorts of functionalist argument (for example, that if something exists, it must serve a purpose; or that the way things are is necessarily a product of natural selection processes) are making a comeback, perhaps primarily in evolutionary anthropology, but also in sociology, including in the analysis of social networks. A few such arguments are articulated in Christakis and Fowler's (2009) generally thought-provoking work.

and the Workshop on Information in Networks (WIN) at NYU. We have benefited from constructive feedback from audiences at Rutgers University, Northwestern University, the Center for Digital Humanities at the University of South Carolina, and the University of Leuven. We are especially grateful to John Padgett for inspiring and encouraging this project.

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Résumé

L'article étudie un réseau de 3 590 liens interpersonnels de crédit au sein de l'élite des ménages florentins de la Renaissance, pour rendre compte de la manière dont les prêts personnels étaient socialement structurés. Nous analysons le réseau à la lumière des diverses motivations socio-économiques associées à l'échange de crédit. Nous rendons compte du degré d'implication des Florentins en fonction de différentes catégories telles que le voisinage, la faction et la guilde et nous déterminons si les prêts avaient lieu prioritairement à l'intérieur ou entre ces groupes. Nous mettons en évidence une forte homophilie à l'intérieur des familles et des voisinages, mais également une circulation importante de crédit parmi les Florentins les plus actifs commercialement et politiquement. La connectivité globale de ce réseau de transactions interpersonnelles de crédit rappelle la structure sociale d'autres réseaux florentins de la même période, tels que des réseaux de mariages ou d'affaires. Ce qui suggère que le crédit interpersonnel était un domaine distinct et important dans lequel se jouait tant l'appartenance à une élite que la réalisation d'une forme spécifique de solidarité sociale.

Mots-clés: Crédit ; Réseau ; Florence ; Renaissance ; Élite ; Solidarité.

Zusammenfassung

Der Aufsatz untersucht ein Netz von 3590 interpersonellen Krediten florentinischer Elitefamilien der Renaissance, um darzulegen, wie florentinische persönliche Kredite sozial strukturiert waren. Es handelt sich um eine Analyse der verschiedenen sozialen und wirtschaftlichen Beweggründe, die dem Kredithandel zugrunde lagen. Der Grad der Involvierung verschiedener Kategorien, wie Nachbarschaft, Faktion und Gilde wird untersucht und die Vergabe von Leihen, ob hauptsächlich innerhalb oder zwischen diesen Gruppen, bestimmt. Es lässt sich eine starke Homophilie innerhalb der Familien und der Nachbarschaften ausmachen, gleichzeitig aber auch ein bedeutender Kredithandel zwischen den wirtschaftlich und politisch aktivsten Florentinern. Die globale Verflechtung dieses Netzwerks interpersoneller Kredittransaktionen erinnert an die soziale Struktur anderer florentinischer Gruppen der gleichen Epoche, z.B. Ehe- und Handelsverbindungen. Dies deutet darauf hin, dass der interpersonelle Kredit ein eigenes und wichtiges Gebiet war, von der Zugehörigkeit zur Elite und der sozialen Solidarität der Eliten geprägt.

Schlüsselwörter: Kredit; Netzwerk; Florenz; Renaissance; Elite; Solidarität.