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# Drivers of demand and supply in the Euro interbank market: The role of 'key players' during the recent turmoil

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#### Abstract

We study frictions in trading patterns in the Euro money market. We characterize the structure of lending relations during the period of recent financial turmoil. We use a network-topology method on data from overnight transactions in the ElectronicMarket for Interbank Deposits (e-MID) to investigate two main issues. First, we characterize the roles of borrowers and lenders in long-run relationships by providing evidence on network formation at a 3-month frequency. Second, we identify the "key players" in the marketplace and study their behavior. In our formalization, key players are "locally-central banks" within a network that lend (or borrow) large volumes to (from) several counterparties, while borrowing (or lending) small volumes from (to) a small number of institutions. Our results are twofold. We show that the aggregate trading patterns in e-MID are characterized by largely asymmetric relations. This implies a clear difference in the roles of lenders and borrowers, with market positions changing only gradually over time. We also find that the large net lenders exploit their positions as network leaders by imposing aggressive pricing policies on their counterparties.

Keywords: Market microstructure, network analysis, money markets, money supply. JEL classification: D85, G01, G10, G21.

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"In the no-holds barred world of trading over-the-counter derivatives in the interbank market, traders and brokers view themselves as combatants in a professional market, where you lose one day, but can win the next. (...) The industry is reluctant to fully automate OTC trading because it would result in a more open and transparent market and erode the informational advantages of the big dealers. Smaller banks have little choice but to abide by the rules."

MacKenzie (2012)

#### 1 Introduction

Money market transactions are one of the key funding vehicles for financial institutions. The structure of the market comprises a primary provider of money, namely, the central bank, as well as many other banks lending to each other. The centrality of the money market was noted during the recent financial turmoil, which erupted in August 2007 in the form of a freeze on interbank lending (see Holthausen and Pill 2010). This event demonstrated that a lockup of interbank activity has systemic implications for all asset markets (see Holthausen and Pill 2010). Therefore, understanding trading patterns in the interbank market is crucial for evaluating its functioning both during normal conditions and during times of stress.

The interbank market has been characterized as a network of exchange, where banks are nodes and cash flows denote ties (see, e.g., Iori et al. 2008). Many papers use network-topology methods to study linkages between banks (see, e.g., Bech and Atalay 2008; Iazzetta and Manna 2009a), and the impact of these networks on demand for and supply of cash (see, e.g., Soramaki et al. 2006). Most studies focus on describing short-term bank behavior, thus studying issues of price volatility (see, e.g., Cassola and Morana 2010) and the impact of policy measures (see, e.g., Durreé and Nardelli 2008).

The literature shows that interbank markets are often organized as core-periphery structures (see, e.g, Soramaki et al. 2006). This means that money markets are characterized by "locally-central" banks that are closely connected, and on which all the other banks depend for the distribution of cash. In this paper, we provide empirical evidence on the role played by "money centers" (see Craig and von Peter 2014) in an unsecured segment of the Euro money market, the so-called Electronic Market for Interbank Deposits (e-MID).

The e-MID platform provides a transparent and non-anonymous market. The way exchanges are organized allows market participants to differentiate with regard to counterparty characteristics, and to evaluate past trading behavior. Thus, a bank's reputation is a key factor in the establishment and maintenance of lending relations.<sup>2</sup> Our dataset covers the period of the recent financial turmoil (between 2006 and 2009), during which reputational effects were strengthened.

<sup>&</sup>lt;sup>1</sup>Recent contributions focus on the systemic implications of funding risk, namely, the risk that a bank's shortage of cash may spill over into the entire financial system (see, e.g., Drehmann and Tarashev 2011).

<sup>&</sup>lt;sup>2</sup>The role of market reputation is also stressed by Idier and Nardelli (2011) in the context of over-the-counter segments of the Euro interbank market.

Our preliminary investigation of the data indicates that aggregate trading patterns in e-MID are characterized by largely asymmetric relations in each network, implying that there are clearly different roles played by lenders and borrowers. To put it more clearly, there are institutions that exercise strong control on either the supply or the demand side of the market.

We propose a methodology for identifying what we call "key players". Key player banks lend (borrow) large amounts of cash to many counterparties, while borrowing (lending) small amounts from (to) a small group of banks. In short, these key players are the driving forces behind demand and supply in the market.

Key players are especially important in networks with an asymmetric structure because they have the power to create a bottleneck in the distribution of cash. This may arise as the by-product of the central nodes' "market power". The question of interest is whether this feature benefits the key players. In other words, we would like to understand whether key players exploit their leading position by demanding higher (lower) lending (borrowing) interest rates than the market average.

The analysis of key players reveals two main empirical facts. We show that the composition of the group of key players – both for the supply and the demand side – has changed every year since 2006. This indicates that e-MID is not comprised of market players with medium- or long-term trading strategies. Rather, banks' patterns of exchange appear contingent on short-term developments. In terms of pricing policies, key players exploit their market position. Specifically, we find statistical evidence suggesting that the big lenders charge interest rates above market average.

The results presented in this paper differ from those in the literature in several respects. For example, the existent literature argues that size matters in the interbank market. Gabrieli (2009, 2012) shows that larger European banks enjoyed a significant reduction in overnight rates after the Lehman Brothers bankruptcy. This is the socalled too-big-to-fail guarantee that larger banks have enjoyed ever since European governments promised not to let fail any systemically important institution. Angelini et al. (2011) study the spread between uncollateralized rates and European governments. Their results corroborate the findings of Gabrieli (2009, 2012).

We provide an exact identification of which banks drive the buy and sell side of the market using the identifiers provided in our dataset. Unlike Fricke and Lux (2015), we refrain from estimating models of network structure, which may then be used to identify the "core" banks. Rather, we build on economic intuition, and propose an empirical strategy that is free from tight modeling assumptions. Hence, our strategy for identifying key players takes into account—and encompasses—the core-periphery structure documented by Fricke and Lux (2015). Our empirical strategy also allows to evaluate the cross section of the pricing effect of key players.

Our analysis provides relevant economic insights for the ECB's money supply policy. The

<sup>&</sup>lt;sup>3</sup>The issue of market power in financial networks is also investigated by Kraenzlin and von Scarpatetti (2011), who study the price setting behavior in the Swiss Franc repo market during the turmoil period. They find that banks use both their market power and private information to offer different lending rates depending on the characteristics of their counterparties.

asset exchanged in the interbank market is very different in nature from other "standard" assets. Banks need cash to carry out their daily operations. However, due to market polarization of roles, a small group of banks controls how the cash provided by the ECB is distributed throughout the interbank market. This suggests that changes in the interbank rates alone are not an appropriate indicator of the success of a loose money supply policy, an especially relevant issue in the context of the recent market turmoil. In fact, during this period, the ECB implemented several extraordinary money supply operations with the aim of easing tensions in themarket (see Lenza et al. 2010). Another relevant finding is that the market role played by large net lenders may create conditions for "distortions" or inequality in access to cash across the demand side, whichmay directly and negatively affect the ECB'smoney supply policy in times of stress.

The paper is organized as follows. Section 2 contains a literature review. Section 3 describes the information available in our dataset. Section 4 provides a descriptive analysis of the data. Section 5 describes our approach to network analysis. Section 6 presents the main patterns of the networks that provide the foundation for our study of key players. Section 7 discusses our methodology for identifying the largest net lenders or borrowers in each network. Section 8 discusses key player characteristics. Section 9 concludes.

#### 2 Literature overview

The literature on Euro area money markets suggests that the prevailing patterns of exchange are characterized by asymmetries in the distribution of cash. It thus appears that a small subset of banks is playing a disproportionately large role in the market, which both justifies and makes our study relevant.

The empirical results suggest that e-MID is comprised of local structures with hierarchical relations, core-periphery structures, and clusters. Iori et al. (2008) show that the number of vertical links in the trading networks is heavy tailed, which suggests that a few banks trade with many counterparties. De Masi et al. (2006) find that banks build subgroups of trading partners to which they lend persistently. This indicates that interbank lending has a propensity to cluster. e-MID is also characterized by a stable core-periphery structure, whereby the "core" banks are both borrowers and lenders (see Fricke and Lux 2015). The core-periphery is asymmetric, as the "core" borrowers engage in more trading activity than do the "core" lenders.

Our contribution is also related to recent analyses of relationship lending in the money market. By our definition, key players trade with many banks. In this sense, they can be thought of as "preferential" net lenders or borrowers, as they choose their counterparties and are, in turn, chosen as counterparties.<sup>4</sup> The role of preferential relations in the money market is widely documented (see, e.g., Craig et al. 2013). The literature, however, tends to focus on the pricing implications of these relationships. Cocco et al. (2009) find that banks pay lower borrowing rates within

<sup>&</sup>lt;sup>4</sup>Iori et al. (2014) suggest that "preferential" trading is related to the "memory" of transactions. Hence, the more often a bank has lent to a counterparty, the more likely it is that it will lend again to that borrower.

their network of relations, and trade with counterparties that face uncorrelated money-demand shocks. Fecht et al. (2011) provide a study of the role of stable connections in the German moneymarket. Their empirical results indicate that banks operating in formal networks do not enjoy any preferential price treatment. Stable relations between banks do not necessarily lead to borrowing rates that are lower than average. Rather, preferential pricing appears correlated with the ability of an institution to avoid a net "squeeze" vis-à-vis the aggregate money supply. Raddant (2014) identifies preferential lending relationships in e-MID by studying the discounts offered against average lending rates. The author shows that banks tended to borrow at a slight discount before the Lehman bankruptcy. In the following period, borrowers with large net exposures paid a premium on top of the average market rate.

What explains the rise and persistence of key players? The literature reveals two important characteristics of the Euro moneymarket that may help answer this question. The first involves the institutional rules governing private banks' access to the primary supply of cash at the ECB. The second involves asymmetric information in e-MID.

Can the institutional organization of the moneymarket lead to the emergence of key players? Idier and Nardelli (2011) suggest that this is indeed the case. They point out that the rules for taking part in ECB tenders have a discriminatory character. Specifically, private banks can take part in liquidity operations only if they are listed as eligible counterparties by the ECB. In addition, banks face substantial administrative costs when taking part in ECB tenders, which can prove a disincentive, especially for smaller banks. Idier and Nardelli (2011) provide empirical evidence suggesting that trading in the uncollateralized segment of the overnight interbank market is affected by asymmetric information among counterparties. Moreover, certain banks are not constrained by compulsory reserve requirements. These institutions engage in significant trading activity. They can collect and exploit information about the aggregate liquidity imbalance that smaller banks cannot. In otherwords, these studies hint at a relationship between bank financial strength, trading propensity, and superior information about the market.<sup>5</sup>

In this paper, we identify as key players those banks that lend/borrow large amounts of cash from many counterparties. There are thus two main features that characterize the key players: engagement in stable networks of market relations and quantitatively relevant lending/borrowing activity. We design both our data handling and key-player detection methodology based on these characteristics.

Craig and von Peter (2014) provide an insightful empirical study on the role of "centers" in the distribution of cash. They use data on German banks to show that these institutions lend to each other through core-periphery structures. Specifically, these institutions have a preference for supplying cash through the intermediation of 'locally-central' banks, with which they already

<sup>&</sup>lt;sup>5</sup>Babus (2006) characterizes the information leading to network formation as information about counterparty risk, or "risk of contagion". The author provides a theoretical model suggesting that banks minimize the tradeoff between the costs and benefits of creating a network by choosing partners resilient to contagion from adverse shocks. Thus, an equilibrium network has a contagion probability equal to zero. In addition, the banks outside the network face credit rationing from part of the network components.

have a lending relationship. The centrality of banks is largely correlated to their idiosyncratic characteristics. Banks with large balance sheets tend to occupy central positions in the network. Overall, these findings support our strategy for identifying key players.

#### 3 The dataset

We investigate the ElectronicMarket for Interbank Deposits (e-MID). Transactions in this marketplace operate through an electronic platform that is fully centralized and operates in Milan. The market has several peculiar characteristics. The first is that it consists of two submarkets, and, consequently, there are two types of transactions, each of which follows different rules. In the "ask" (or buy) market, the transaction is started by the borrower—that is, the aggressor—who borrows cash from the lender -that is, the quoter-. In the "bid" (or sell) market, the transaction is initiated by the lender (i.e., the aggressor) who lends to the borrower (i.e., the quoter). Transactions in e-MID involve money exchange at various maturity structures, ranging from overnight to 11 months. However,most of the trades involve overnight maturity contracts. Banks can choose their trading counterparty, whereas the information on rates and amounts is made public. In addition, the minimum trade size is established a priori.

The information available distinguishes between regular size transactions, for which the minimum involved is 1.5 million euros, and large transactions, for which the minimum involved is 100 million euros. For each transaction executed through the system, a record is produced that provides information on the identity of the aggressor and the quoter, the amount traded, the interest rate, the date and time of delivery, and the loan length and type. Because of privacy concerns, each e-MID member is identified by a unique six-digit code, the first two digits signifying country of origin and the following four a 0001 to nnnn code. This system allows determining the nationality of a bank, but not its identity.

Table 1 reports some key statistics on the number of trading banks and trades. It shows that our sample contains 305,489 overnight "ask" and "bid" events taking place between January 1, 2006 and December 31, 2009. Since the overwhelming majority of interbank market activity involves overnight transactions, we exclude longer duration trades from the sample.

# 4 The organization of lending-borrowing relations: a descriptive outline

An important issue in analyzing money market transactions is defining the time unit over which to observe market properties. Several studies document changes in the money market at a daily frequency to discover how money exchanges occur in the short term (see, e.g., Brunetti et al. 2011). However, this strategy does not suit the purposes of our contribution.<sup>6</sup> As stressed by

<sup>&</sup>lt;sup>6</sup>Specifically, we are interested in identifying themarket structure—i.e., discovering the existence of stable relationships among pairs or subgroups of banks, detecting the persistence of roles, and interpreting our results

Finger et al. (2013), exchange relations in the interbank market cannot typically be observed at a given point in time but have to be approximated by aggregating trades. Finger et al. (2013) also show that aggregation over a sufficiently long time horizon might reveal a non-random structure for longlasting relationships. Building on their results, we aggregate our data over a quarterly frequency. This choice also takes into account the key patterns emerging from the data. Table 2 reports the Spearman's rank correlation coefficients computed per pairs of quarters for the net traded volumes.<sup>7</sup> The resulting figures confirm that using a quarterly dataset is appropriate for our study. The values of the correlation computed for two consecutive periods are never lower than 0.719, hinting at substantial stability in trading behavior over a quarterly frequency.

The 2007 turmoil had several impacts on e-MID transactions. Table 1 shows the number of market participants and the number of transactions. Both figures have decreased over time. The number of banks active on at least one side of the market is around 170 until the first quarter of 2008. The highestmarket participation occurs in the fourth quarter of 2006, after which the number of participating institutions drops. The lowest number of banks (124) is observed in the third quarter of 2009. Similar patterns can be seen in the number of trades. Interestingly enough, the percentage of overnight trades has become a progressively more significant part of overall trades since the third trimester of 2007, revealing a higher propensity of banks toward short-term loans.

Finally, the size of trades also changed noticeably after the turmoil began. In the first panel of Table 3, we report some selected statistics on traded volumes. The freeze in market activity that characterizes the turmoil period is reflected by the decrease in total volume traded, which drops by 14% from 2006 to 2007, by 20% from 2007 to 2008, and by about 40% from 2008 to 2009. The decrease in average volumes from 25,866 in the second trimester of 2006 to 15,450 in the third trimester of 2009 paints a similar picture. The decreasing trend becomes sharper after the third quarter of 2008.

The patterns in volumes traded affect the evolution of lending rates over the sample period. The second panel of Table 3 reports some statistics on the interbank interest rates. Both the mean and the median rates rose steadily from the beginning of the observation period (i.e., the average interest rate was 2.398 in the first quarter of 2006) to the beginning of the financial crisis (i.e., the average interest rate was 4.218—the highest value observed—in the third quarter of 2008). In contrast to the findings on traded volumes, this evidence signals that the market had started raising interest rates long before the turmoil period begun. From the third quarter of 2008, then, the market freeze led to a consistent drop in interest rates, hitting a low of 0.299 in the third trimester of 2009.

Changes in the behavior of e-MID participants deserve attention. Table 4 reports some

in light of the turmoil.

<sup>&</sup>lt;sup>7</sup>The net traded volume distribution is obtained as the difference between volumes lent and volumes borrowed per bank.

<sup>&</sup>lt;sup>8</sup>There are banks that join or leave the system at different points in time. Across the sample period, the total number of actors operating in e-MID is 194.

descriptive statistics on volumes lent and borrowed per bank. In each period, only a fraction (though high) of the banks active in e-MID operate on both sides of the market. The share of lenders is high (with a maximum of 93.7% of the total number of banks) and almost constant in the first 3 years of the observation period. Then, this number drops during 2009, reaching its lowest point (83.3%) in the fourth trimester of that year. The share of borrowers reaches a peak of 86.3% in the third quarter of 2006; a low of 73% is observed in the second quarter of 2009.

These statistics indicate that e-MID is comprised of financial institutions that focus on lending activities, banks devoted mostly to borrowing, and banks operating on both sides of the market. In short, e-MID appears to be a market in which banks with diverse dominant roles co-exist. Additional evidence for this is obtained by observing standard deviations of the distributions of deposits (both lent and borrowed) per bank. The high dispersion of the data with respect to the average indicates rather different approaches to trading.

The volume traded distributions reveal an important fact, and one that is the starting point for further analysis in this paper: there is a high concentration of banks on both the lending and the borrowing side. At the beginning of the observation period, 10 banks, most of which are Italian, are responsible for 39.71% of the total volume lent. This percentage remains almost constant over time: it drops to 37.51% in the third trimester of 2007, rises again to a maximum of 43.37% in the second quarter of 2008, and finally decreases to 40.86% at the end of the observation period. A similar picture emerges for the demand for deposits. On this side of the market, however, the level of resource concentration is stronger and the trend slightly more unstable. The first 10 banks—again, all of Italian—account for 61.08% of the market at the beginning of 2006 and for 73%—the highest value—at the end of 2009, with a minimum of 51.84% in the first quarter of 2007. As discussed thoroughly by the ECB (2010), the nationality of market participants plays a key role in e-MID. The counterparties belong to 16 different countries, with Italian banks the largest group of institutions. The weight of Italian banks in e-MID increases over time, as an increasing number of foreign banks leaves the market. Statistics not reported in the interest of brevity point to a division of roles across nationalities, with French, Greek, and Dutch banks mostly lending, and British banks mostly borrowing.

### 5 Aspects of data handling and methods for network analysis

To analyze the structure of the money market and detect individual behavior, we use methods from social network analysis (SNA) (see, e.g., Wasserman and Faust 1994; Carrington et al. 2005; Borgatti et al. 2009). This framework has been applied in many contexts, ranging from the study of interpersonal relations to inter-organizational dynamics. With regard to relationships among banks, SNA has proven effective in examining the topological properties of the money market (see De Masi et al. 2006; Iori et al. 2008; Hatzopoulos et al. 2013) and in assessing the resilience of the banking system to financial crises and risks of contagion (Markose et al. 2009).

In this paper, we use SNA to assess the stability of network relations and to identify the

most important actors in such networks. Building on previous studies (e.g., see Iori, De Masi, Precup, Gabbi, and Caldarelli, 2008), the transactions are represented as a network N(V, E). The network nodes V are the banks, and ties E are identified as the money lent from one institution to another. Aggressors and quoters are reclassified as lenders and receivers (or the opposite, depending on the sub-market explored), following the cash flow direction. Therefore, we assume that a tie exists from the bank i to the bank j when i lends money to j, independently from the origin of the transaction (i.e., the transaction is of 'ask' or 'bid' type). We have the following two cases:

- 1. for bid transactions, the tie goes from the aggressor (lender) to the quoter (receiver)
- 2. for ask transactions, the tie goes from the quoter (lender) to the aggressor (receiver).

Since the tie from i to j ( $e_{ij}$ ) is different from the tie from j to i ( $e_{ji}$ ), the network is defined as 'directed'. To each tie, we attach a weight  $w_{ij}$  that represents the amount of money that i lends to j over a given time span.

We computed the weight  $w_{ij}$  as the three-month amount lent from i to j. Formally:

$$w_{ij} = \sum_{z=1}^{H} t_{ijz} \tag{1}$$

where  $t_{ijz}$  is the amount of the transaction z from i to j per three-month time windows, and H denotes the number of transactions from i to j per three-month time windows. Then, we build sixteen networks, one for each period. Each network corresponds to an asymmetric adjacency matrix W of size  $n \times n$  whose generic element is  $w_{ij}$   $(i=1,...,n; j=1,...,n; i \neq j)$ .

The analysis is performed on two levels. First, we consider the full structure of transactions at the network level for each period. This analysis is intended to provide some general insight into the interaction among banks and verify the existing of a network structure, thus justifying further investigation. We then shift our focus to the role played by banks in the network. This second level of analysis leads to the identification of market inefficiencies or bottlenecks, that is, the existence and persistence over time of banks that control the supply or demand of deposits in the market. Their behavior and pricing policies are then studied in detail. We repeat this process for each of the 16 quarterly networks to have some insight into the stability of long-term network relations over time.<sup>9</sup> Also, this analytic framework allows us to shed light on how various phases of the turmoil affected the market behavior of e-MID participants.

<sup>&</sup>lt;sup>9</sup>To run the analysis, we use the software packages sna (see Butts 2008, 2010), igraph (see Csardi and Nepusz 2006), and tnet (see Opsahl 2011), developed within the R statistical computing environment and specifically designed for network studies.

#### 6 Measures of network activity

#### 6.1 Results from network-level analysis

In this section, we study the entire network structure with the purpose of detecting preferential trading patters. We also investigate how these patterns changed during the turmoil period.

We compute relevant measures of network activity. Network density is the most basic descriptive index. Density is the proportion of possible ties that are actually present in the network to the maximum possible. This is, a measure of completeness. Formally, in the case of a directed network, the density  $\Delta$  is computed as follows (see Wasserman and Faust 1994):

$$\Delta = \frac{L}{n(n-1)} \tag{2}$$

The term L denotes the number of ties in the empirical network. Since a directed tie can be seen as an ordered pair of nodes, there are n(n-1) possible ties. The density coefficient ranges between 0 - if no ties are present - to 1 - if all ties are present.

The results are reported in Fig. 1. In our network, density is moderate (it ranges from 0.10 to 0.14) and almost constant over time. A slight decrease is observed in the third quarter of 2007 and again in the third quarter of 2008. Overall, the density values indicate that the network is sparse; less than 15% of the possible ties among the banks actually exist. Although all the banks can participate in trading, this value signals that only a fraction of them are actually active and/or selected as counterparties (see Fig. 2).

Reciprocity focuses on the relationship between pairs of nodes. It identifies a mutual exchange of money within pairs of banks. Therefore, it implies the existence of a non-hierarchical relationship among actors. A node pair (i,j) is called 'reciprocal' if there are arcs between them in both directions. Hence, the reciprocity of a directed graph is the proportion of all possible (i,j) pairs which are reciprocal, provided there is at least one arc between i and j. Like the density, the reciprocity index varies between 0 and 1:

$$r = \frac{\sum_{ij} e_{ij} e_{ji}}{L} \tag{3}$$

The values of the reciprocity index for e-MID are very low and point to a lack of bidirectional exchange between banks. The percentage of reciprocal dyads is always lower than 15% and declines significantly over time. It is equal to 10.80% in the first period of 2006, increases to 15.10% in mid 2007, and then decreases almost steadily to 5.80% by the end of 2009. This indicates a tendency toward asymmetric relations that becomes stronger over time. In other words, there seems to be a strong and increasing distinction of roles in e-MID when shifting from stability to financial crisis. Indeed, this tendency emerges as soon as the turmoil starts.

Finally, the clustering effect studies the network's degree of interconnectedness and the structural embeddedness of its nodes. In organizational studies, embeddedness is interpreted

as the overwhelming presence of links, which fosters both trust and cooperative behavior. Also, embeddedness and closure reduce uncertainty and information asymmetry between two actors. The clustering coefficient examines relations involving three nodes and measures the tendency of nodes to cluster into tightly knit groups. A positive clustering coefficient, therefore, implies an increase in the likelihood that two nodes will be connected if they share a common acquaintance. We apply the specification of clustering coefficient proposed by Opsahl and Panzarasa (2009), that is, the generalized global clustering coefficient. It is defined as the number of closed triplets (i.e., three nodes connected by three ties) over the total number of triplets. Also, it explicitly takes weights of ties into account. In formula:

$$C_w = \frac{\sum_{\tau_\Delta} w}{\sum_{\tau} w} \tag{4}$$

with  $\tau_{\Delta}$  the number of closed triplets,  $\tau$  the number of triplets and w the weights of ties. C ranges between 0 and 1.

The interconnectedness of the interbank market is fairly moderate and seems to follow a slightly increasing trend. The coefficient reaches its maximum in 2008, when the turmoil turns into the financial crisis and remains high during the crisis. The low is 0.51, which occurs at the beginning of the observation period, before the turmoil starts. The highest peak (0.62) is in the third period of 2008, exactly when the most severe phase of the crisis began. The increase inmarket uncertainty, therefore, seems to slightly increase market complexity as well as banks' propensity to trade money with closed cohesive groups of partners. The increase in the tendency toward clustering emerges later than the tendency toward reciprocity.

#### 6.2 Perspectives from actor-level analysis

The second level of our analysis examines the position of each bank within the interbank network. We also study the relation between network position and pricing policies. This is a relevant investigation in light of empirical findings in the literature on relationship lending. For instance, Hatzopoulos et al. (2013) show that information on volumes lent does not suffice to explain the average interest rates that classes of borrowers pay in e-MID.

The identification of an actor's involvement in network activity is a crucial topic in the literature on social networks. For instance, the detection of actors important for the network is a long-standing issue. These actors are generally defined as "key players" (see Borgatti 2006), and are usually identified via several indices. Centrality measures focus on the structural importance of nodes (see Freeman 1979). Social capital measures assess which actors benefit most from a specific network structure (see Burt 1992; Borgatti et al. 1998). Key-player detection algorithms identify actors that contribute to cohesion and resource diffusion or to network disruption and fragmentation (see Borgatti 2006) and are employed when investigating systemic risks and related issues.

The literature on financial markets focuses mainly on centrality measures by computing

their distributions (Iori et al. 2008; Iazzetta and Manna 2009b), or by studying the correlation between actor centrality values and actor behaviors (Ozsoylev et al. 2011). Various centrality measures have been adopted for these purposes. For instance, Ozsoylev et al. (2011) use eigenvector centrality, which links actor centrality to the centrality of others to which the actor is connected. Walden (2013) underlines that other frequently used centrality measures—for example, betweenness and closeness centrality—do not capture the information advantage of the key players. Adamic et al. (2010) use a linear combination of in- and out-degree centrality to identify dominant buyers and sellers.

Our goal is to detect the key players so that we can study the relation between their market activity and their pricing strategies. Hence, we extend the approach of Adamic et al. (2010) in several directions. We detect key players using a complex index that combines different aspects of trading behavior. Intuitively, we would like to measure the importance of a node by looking at its direct ties, which indicate the lending (outgoing) or receiving (incoming) position of a node. In line with Adamic et al. (2010), we assume that both lending and pricing patterns are mostly based on a bank's local position within its neighborhood, that is, mainly on direct interactions rather than on position within the entire network structure.

We identify prominent banks through a measure that weights the amount traded by each bank by the centrality of the bank within the network of transactions. This is a linear transformation of the generalized degree centrality proposed by Opsahl et al. (2010), defined as the product between the number of nodes actor i is connected to (i.e., degree centrality) and the average weight of these nodes (i.e., degree strength). Degree centrality takes into consideration the network activity of each bank. Degree strength accounts for the values of ties, namely, the amount traded by each bank. In doing so, generalized degree centrality summarizes pieces of information that previous papers only interpret separately (see, e.g., Bech and Atalay 2008). Generalized degree centrality has been applied in various settings. It has proven capable of capturing the existence of network hierarchies (Wycislik andWarchal 2012; Kinne 2012). We write our centrality index as:

$$C_D^{w\alpha}(i) = k_i \times \left(\frac{s_i}{k_i}\right)^{\alpha} = k_i^{(1-\alpha)} \times s_i^{\alpha}$$
(5)

The constant  $\alpha$  is a positive tuning parameter that determines the relative importance of the number of ties compared to tie weights (the amount). For  $\alpha=0$ , the value of the measure equals the degree centrality. So, the measure identifies prominent actors looking at their network activity only. For  $\alpha=1$  the measures equals the node strength. Hence, it accounts for the amount traded only.

To investigate the information content of both degree centrality and degree strength, we start by studying the distributions of these indices separately. Then, we provide a synthesis in a key-player measure. Degree centrality counts the number of ties that are incident to a node or,

<sup>&</sup>lt;sup>10</sup>This choice is based on the assumptions that actors earn high profits by trading on the information they obtain through the network and that eigenvector centrality effectively captures access to information.

equivalently, the number of nodes adjacent to it (see Freeman 1979). In directed networks, this can be specified as either "in-degree" or "out-degree" centrality, depending on whether incoming or outgoing ties are considered.

In-degree centrality looks at the number of actors that choose i as a counterparty and lend money to it. This is an indicator of a bank's prestige or popularity because it evaluates the i's market reputation as a trading partner. This is extremely important in the context of our analysis. Since our study focuses on a non-collateralized market, a measure of a bank's reputation in the marketplace conveys relevant information. In-degree centrality is computed as:

$$k_{+i} = \sum_{j} e_{ji} \tag{6}$$

where  $k_{+i}$  ranges between 0, if i has no incoming ties, and (n-1).

Outdegree centrality counts the number of nodes to which actor i sends ties, and measures i's trading activity. This statistics sheds light on a bank's capability to lend cash, and to maintain relationships. It takes the form

$$k_{i+} = \sum_{j} e_{ij} \tag{7}$$

Examining the shape of the indegree and outdegree centrality distributions can shed light on relevant patterns. In the literature on social networks, this analysis is usually performed by plotting the empirical distributions against the corresponding power-law ones (see Barabasi and Reka, 1999). The power-law distribution postulates that the probability P(k) that a node interacts with k other nodes decays following  $P(k) \propto k^{-\gamma}$  with an exponent  $\gamma$  between 2.1 and 4. The distribution shape introduces the hypothesis that the networks are built through a preferential mechanism, where new actors have a high probability to connect to more popular actors than to other agents. This feature leads to a 'richer-get-richer' phenomenon, where highly-connected nodes (large k) have a large chance of occurring.<sup>11</sup>

Figures 3 and 4 plot the distributions for in-degree and out-degree centrality, respectively. Consistent with studies based on higher frequency data (e.g., see Iori et al. 2008), our findings show that both the in- and out-degree distributions are heavy tailed, although they do not follow a proper power law. This shape suggests the presence of a high degree of heterogeneity across banks in their trading behavior. It also justifies the choice of accounting for the network activity of each bank when studying its behavior. Figures 3 and 4 also indicate that there are several banks that exchange cash with just a few counterparties, whereas other banks tend to deal with a wider pool of institutions. The in-degree distribution is especially right tailed, suggesting that some banks borrowed from a range of 103–107 banks at most until 2007, 89–99 banks in 2008, and 66–73 in 2009. While the shapes of the in- and out-degree distributions remain almost the same over time, a deeper investigation of the descriptive statistics indicates that the absolute

<sup>&</sup>lt;sup>11</sup>Ozsoylev and Walden (2009) suggest that this topological property holds for complex networks.

values have decreased fairly constantly, in line with the reduction in market size. The average number of counterparties is 19 in all quarters of 2006 and 18 in 2007, then falls to 14 at the end of 2008 and to 14 in 2009.

Building on Bech and Atalay (2008), we then explore the amount traded by each bank, i.e. its financial strength. The key question in this context is whether the traded volumes are controlled by a small number of banks.<sup>12</sup> Hence, we measure node strength (see Barrat, Barthelemy, Pastor-Satorras, and Vespignani, 2004) as the sum of i's incoming or outgoing tie weights  $w_{ij}$ :

$$s_{+i} = \sum_{j} w_{ji} \tag{8}$$

for incoming ties and

$$s_{i+} = \sum_{j} w_{ij} \tag{9}$$

for outgoing ties. For reasons of parsimony, the in- and out-strength distributions are not displayed here. However, we note that they resemble the related dichotomous degree version. They are both skewed and heavy tailed, suggesting that few banks borrow — or lend, on the other side of the market — large amounts of cash.

In Tables 5, 6, 7 and 8, we report Pearson's correlation coefficients between node degree and strength for each quarter.<sup>13</sup> These measures are only partially proportional to one another. Specifically, the values vary between 0.39 (in the fourth quarter of 2008) and 0.69 (in the second quarter of 2007) for outgoing ties, and between 0.70 (in the third quarter of 2009) and 0.97 (in the second quarter of 2007) for incoming ties. Hence, a separate analysis of the two measures – especially for outgoing ties – may provide incomplete information on node prominence. Using a composite indicator such as the generalized degree centrality index appears to be a reasonable empirical strategy for detecting key players.

## 7 Our approach for detecting key players

We define key players with a linear transformation of the generalized degree centrality index. This approach accounts for node degree and node strength and for outgoing and incoming ties. This definition allows testing the proposition that actors in the interbank market play different roles, that is, some banks are net lenders while others are net borrowers. In particular, we consider the idea that some of the institutions control the cash flow exchanged in the market by lending (or borrowing) large amounts of money to (from) many counterparties. They represent large net lenders (borrowers) to (from) the market. In other words, the role of a big lender involves a combination of lending large volumes to many banks, and borrowing small volumes

 $<sup>^{12}</sup>$ The reader should notice that the high values of market concentration support this proposition.

<sup>&</sup>lt;sup>13</sup>The correlations are computed for five values of  $\alpha$ , within a range of  $\alpha = 0$  and  $\alpha = 1$ .

from just a few others. A big borrower is one that receives cash from many counterparties, while lending to a few.

In statistical terms, the key players are identified by a high absolute value of the difference between the generalized out- and in-degree centrality, denoted by  $C_{O-I}^{w\alpha}(i)$ . If this difference is positive, the key player is a net lender. Otherwise, it is a net borrower. From an economic point of view, understanding the role of key players requires introducing hypotheses that have not been considered earlier in the literature. A large share of market volumes controlled by the key players would suggest that the available funds are not distributed evenly across market participants. The presence of non-atomistic actors raises the question of whether e-MID is characterized by perfect competition.

Since there is no guiding information on the weight assigned to node degree and strength, a meaningful value for the parameter  $\alpha$  cannot be set a priori. Following Opsahl et al. (2010), we experiment with five different values, namely 0, 0.25, 0.50, 0.75 and 1. Using only the volumes traded would ignore completely the network structure, and it would imply  $\alpha = 1$ . By contrast, considering only the network position would require setting  $\alpha = 0$ . Hence, we use these two extreme values as a benchmark. On the other hand, using the three central values of  $\alpha$  - i.e.  $\alpha = 0.25, 0.50, 0.75$  - would assign an increasing role to information on traded volumes, while providing understanding of the contribution of network degree centrality to banks' pricing strategies.

The Pearson's correlation coefficients computed between pairs of generalized degree centrality distributions suggest that the value  $\alpha=0.5$  is the most suitable for our exploratory investigation. For both outgoing and incoming ties, this value generates correlation coefficients that are higher than those of alternative  $\alpha$ . It summarizes adequately both the information on volumes traded and the number of counterparties. Also it assigns equal importance to them, thus offering the most cautious representation of 'key players'.

Figure 5 plots the  $C_{O-I}^{w\alpha}(i)$  distributions,  $\alpha=0.5$ . For all the sample period, the distribution exhibits a similar shape, which is fairly symmetric around 0, i.e. the neutral position. The first part of the distribution is flat, then increases steadily, following a linear function, and finally very sharply in the tails. About 35%-40% of the actors falls in a very small interval around 0. Therefore, they do not have a definite role nor market power, but lend/borrow around the same amount of money to/from a similar number of counterparties. Each of these banks has a market share smaller than 0.2%.

The left and right tails of the distributions depicted in Fig. 5 identify banks that act mainly as either only lenders, or only borrowers. Depending on which value of  $C_{O-I}^{w\alpha}(i)$  we use to identify the tails, we observe that institutions located in this part of the distribution account for around 35-40% of volume traded in the market. In other words, the largest share of cash in e-MID is traded by a small number of banks. Both the demand and the supply-side of the market are characterized by banks that play a clear role either as lenders, or as borrowers.

The increase in the values of  $C_{O-I}^{w\alpha}(i)$  and also in the market shares is particularly sharp

after the 95th percentile, and before the 5th percentile. To investigate the link between being a key-player and enjoying market power, we focus our attention of the tails of the  $C_{O-I}^{w\alpha}(i)$  distribution. Hence, we set a threshold  $t_1$ =95th percentile and define as large cash providers the banks with  $C_{O-I}^{w\alpha}(i) \geq t_1$ . Then, we set  $t_2$ =5th percentile and consider as large cash borrowers the institutions with a value of  $C_{O-I}^{w\alpha}(i) \leq t_2$ . According to our definition, we consider both types of banks as key players.

#### 8 What role for big lenders and big borrowers?

Identifying which nodes play a key role in a network is a difficult task. This is especially the case in financial markets where the opportunistic behavior of market players is hard to detect. The descriptive measures proposed in the previous section point to the presence of asymmetries in the interbank market. However, the opacity of the information available does not allow a structural interpretation of these patterns.

In this section, we discuss key-player characteristics in detail. We start by focusing on the 95th percentile of the distribution in Fig. 5. This provides information on the "big lenders", namely, the banks that lend a great deal of cash while borrowing little. We then examine the 5th percentile of the distribution in Fig. 5. This tail identifies the "big borrowers", which are the key drivers of the net demand for cash.

The empirical distributions reported in Fig. 5 are characterized by an invariant right tail for 2006 and 2007. A similar picture emerges between 2008 and 2009. The nodes change between 2007 and 2008, suggesting that an important change took place in 2007. In general, the eruption of financial market turmoil the Euro area in August 2007 appears to have modified the prevailing organization of the market.<sup>14</sup>

Who are the key players? To shed light on the microstructure of exchanges, we report some descriptive statistics on the lending activities of the big lenders in Tables 9 and 10. To avoid approximation errors, in this section we report statistics from the original tick-by-tick dataset. There are several dimensions of interest. The first one concerns the market share covered by the big players. The descriptive statistics in Tables 9 and 10 show that these actors are indeed "big". For instance, in each quarter of 2006 and 2007, the percentage of cash supplied by these banks to the market was never less than 29% of the total volume. Tables 11 and 12 report some descriptive statistics on the borrowing activities of the big borrowers. The tables reveal that the market is more concentrated on the demand side than on the supply side. In fact, the large borrowers control between 38 and 55% of traded volumes for the time span considered. This suggests that the key players have a tight grip on traded volumes both on the lending side and the demand side.

How stable is the composition of the group of key players? Tables 9 and 10 reveal a rich

<sup>&</sup>lt;sup>14</sup>Tensions in segments of the U.S.-dollar-denominated money markets reached their highest point on August 9, 2007. To stabilize market conditions, the ECB started a series of open-market operations supplying Euro-denominated cash.

landscape of behaviors. First, identification of the key players confirms the marked changes in network structure that took place during the turmoil. There are substantial entry and exit dynamics in the two groups across time. For example, the percentage of long-lasting big lenders (i.e., present for more than four quarters) is 26%; the corresponding figure for big borrowers is 41%. This confirms our previous results indicating that the interbank market is not populated by actors with long-term strategies. Rather, large net-lending and net-borrowing decisions appear contingent on temporary factors, and are driven only by opportunistic behaviors and short-term strategies.

The changing ranks at the top layer of banks may be due to several factors. As stressed by Heider et al. (2009), cash hoarding is engaged for precautionary reasons during phases of market breakdown. Hence, banks that are large net cash suppliers at a given point in time may choose to reverse their course of action and become net borrowers. These banks may even choose to stay out of the market to avoid the adverse consequences of the increase in system-wide counterparty risk. The entry-exit dynamics displayed by the group of big borrowers is instead largely affected by the stigma that attaches to large demands for cash (see La Ganga and Vento 2010). Since the posting of ask trades in e-MID is public information, banks have an incentive to leave the platform during phases of market turbulence and opt for over-the-counter trading.

#### 8.1 Pricing interbank deposits and the key players

The big lenders have market power over the distribution of money. In other words, their behavior determines how the ECB's money supply propagates through e- MID. Hence, it is worth understanding whether the big lenders exploit their market power by engaging in pricing policies that are more aggressive, or "predatory", than those of other lenders. Two alternative and "extreme" hypotheses are proposed. On one hand, a bank that controls the relative supply of deposits within a network has the power to charge lending rates higher than the average rate. On the other, exchanges within a network may be driven by trust among counterparties (see, e.g., Cocco et al. 2009). Thus, a lender may refrain from charging above market rates to secure a "safer" demand for funds that carry below-average counterparty risk.

To investigate this issue, we compare the average interest rates big lenders demand from alternative classes of borrowers. We divide the borrowers in four groups based on the volume of funds they receive from each big lender. In practice, we compute the quartiles of the distribution of volumes borrowed, and classify the banks that borrow from the key lenders using the empirical quartiles. Group 1 includes those banks that borrow little, while Group 4 contains large borrowers. We then run an analysis of variance on the interest rates. We test whether a key player's lending rate to each group of borrowers is equal or lower than the overall group's average rate. The alternative hypothesis is that a key player's lending rate is larger than the average rate. We report the test results in Tables 13 and 14, where we denote by "rate group n" the lending rate relative to the nth quartile of the distribution of volumes lent. The evidence suggests that there is a large variation in the key lenders' pricing behavior across time. In 2006,

the big lenders that exhibit higher average lending rates in the market are those engaged in aggressive pricing behavior. This pattern reverses during 2007 until the second quarter of the 2008 and it turns again during 2009.

We also look at whether big borrowers are drivers for the borrowing rates. In this case, we are interested in understanding whether the key borrowers pay aboveaverage interest rates in a systematic manner. Tables 15 and 16 report the average borrowing rates offered by four groups of lenders. These groups are again identified from the quartiles of the distribution of volumes borrowed. We test the null of equality between the borrowing rates of each key borrower from each lender group and the average rate for the group itself. The alternative hypothesis is that the former rate is higher than the latter. Within the class of big borrowers, different banks receive different treatment from alternative groups of counterparties. Tables 15 and 16 show that larger net borrowers pay higher interest rates. This pattern was observable before the beginning of the turmoil and becomes more evident after 2007.

What are the economic implications of our findings? The identification of key players emphasizes the uneven access to money in the interbank market. In the presence of consolidated network links between financial institutions, a buoyant supply of cash from the central bank may not necessarily "pass through" the system if key players take advantage of market bottlenecks. Therefore, during periods of market stress, even through a central bank might lower the benchmark rate, the market may not show improvement in terms of traded volumes. We find that large net lenders in e-MID exploit their "market power" in the supply of cash to the interbank market.

#### 8.2 Robustness analysis

To investigate the robustness of our modelling approach, we compute the list of key players according to each of the five values of  $\alpha$ . We repeat the analysis carried out in the body of the paper, and compare the results on banks' pricing policies. For the largest number of quarters, we find that the value  $\alpha=0.5$  allows to detect the highest number of banks that impose above-average lending rates. Hence, for  $\alpha=0.5$ , banks lend/borrow money at a price higher than the market price on average in twelve of the sixteen periods considered. Overall, the proportions of banks demanding/pay above-average rates are equal to 55.59% for  $\alpha=0.5$ , 48.25% for  $\alpha=0.75$ , 1, 44.76% for  $\alpha=0$ , and 40.77% for  $\alpha=0.25$ .

#### 9 Conclusion

Extant work on network effects in the money market studies short-term relations between banks. In this paper, we focus on the long-term patterns of network formation. Using a dataset from the electronic platform e-MID, we provide evidence of evolving relations that induced an uneven distribution of cash between banks during the recent financial turmoil. These patterns of exchange are largely asymmetric and imply a clear division of roles between lenders and

borrowers. We identify key players that affect the demand and supply sides of the market and consider the implications of their pricing strategies. We find that the banks driving the supply of interbank deposits do, indeed, exploit their market power by imposing additional interest-rate charges. At the same time, the large borrowers pay above-average rates.

Our results are a starting point for future research. First, available panel-data methods could be used to estimate loan demand and supply in the Euro interbank market. A study of supply and demand shocks would shed light on the drivers of the market. Look at each bank's contribution to these aggregate shocks would be of interest. The idea of relationship lending could be formalized in the form of anticipated persistent shocks to the supply of cash.

This would allow formally testing for the pricing effects of these shocks. In this paper, we disregard the explicit role of the primary supply of money. However, a study that investigates whether the interbank market is driven by key players at a higher frequency, for instance, at a weekly frequency, would allow factoring in the indirect effect of the ECB's liquidity supply on network relations.

Since the issue of systemic risk has become very important, providing networkbased measures for the risk of contagion would be very helpful. Alternative methodologies could be employed to study whether the big players can be a source of systemic risk, thus contributing to network disruptions. For this purpose, it would be relevant to study how big players contribute to the probability of network fragmentation.

Babus (2006) suggests that interbank networks are formed between banks that are privy to information about counterparty risk, or "risk of contagion". In future work, we are planning to compute formal measures of asymmetric information, such as the probability of informed trading (see Easley and O'Hara 1987). We can then study the relation between asymmetric information and indicators of network structure. Since information is often argued to be a determinant of asset prices (see, e.g., Easley et al. 2002), we can also investigate the joint contribution of private information and network centrality to the determination of interbank rates.

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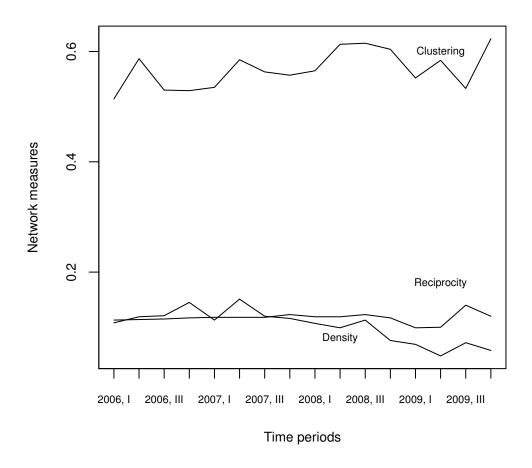
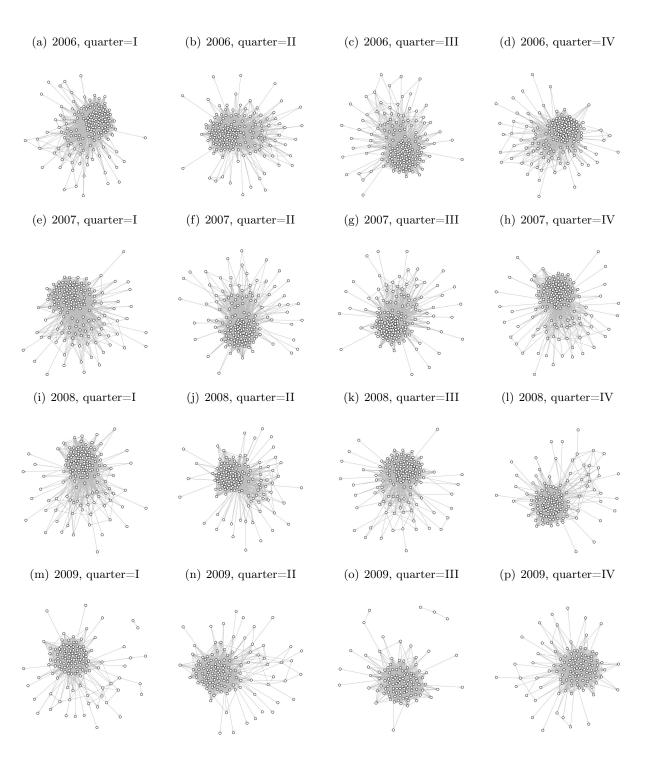


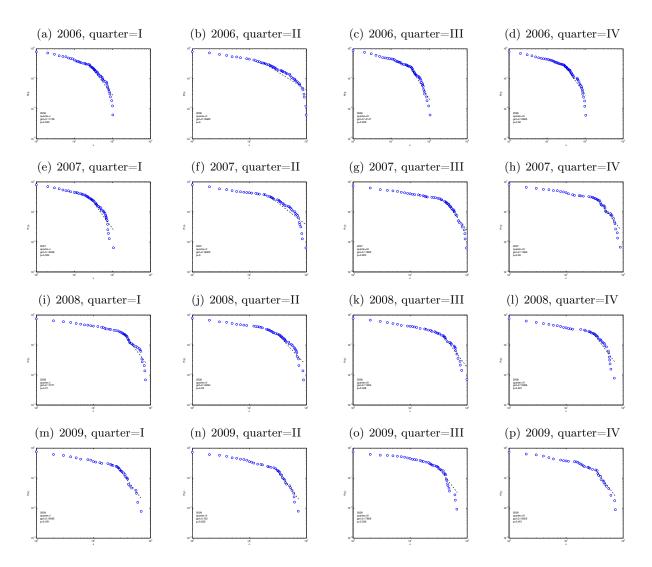
Figure 1: Descriptive network measures

Figure 2: Networks of borrowing-lending relations



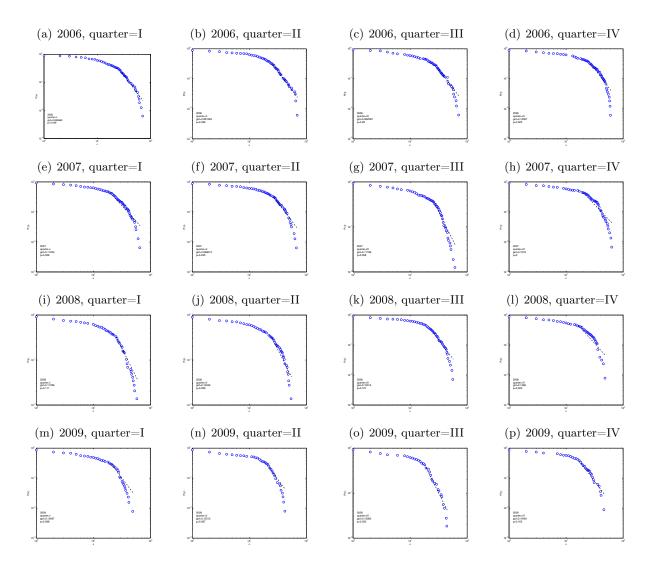
Legend: The white circles denote banks and the gray lines denote directed ties between pairs of them.

Figure 3: Indegree probability distribution with power-law fitting



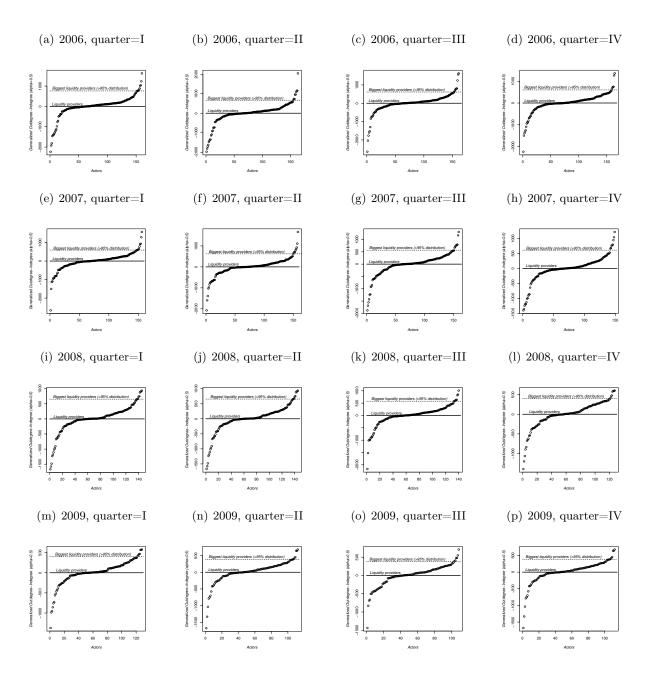
Legend: On the horizontal axis there are the indegree (panel (a)-(d)) values and on the vertical axis the complement of the cumulative distribution function  $P(X) = P(X \ge x)$ . The points represent the observed values of the cumulative density functions and the dashed line the corresponding power-law. The goodness-of-fit between the data and the power law are calculated using the method described in Clauset, Shazili, and Newman (2009) and based on a Kolmogorov-Smirnov statistic. Since the resulting p-value is smaller than 0.1 the power law is not a plausible hypothesis for the data.

Figure 4: Outdegree probability distribution with power-law fitting



Legend: On the horizontal axis there are the outdegree (panel (a)–(d)) values and on the vertical axis the complement of the cumulative distribution function  $P(X) = P(X \ge x)$ . The points represent the observed values of the cumulative density functions and the dashed line the corresponding power-law. The goodness-of-fit between the data and the power law are calculated using the method described in Clauset, Shazili, and Newman (2009) and based on a Kolmogorov-Smirnov statistic. Since the resulting p-value is smaller than 0.1 the power law is not a plausible hypothesis for the data.

Figure 5: Distributions of net cash providers



Legend: The graphs have the actors on the horizontal axis and  $C_{O-I}^{w\alpha}(i)$  on the vertical axis.

Table 1: Number of banks and trades					
Year	Quarter	N banks	N trades	N ON trades	% ON trades
2006	1	170	30230	23068	76.308
	2	170	30130	22979	76.266
	3	171	29502	22328	75.683
	4	173	28684	21993	76.673
2007	1	171	27747	21083	75.983
	2	171	26622	20047	75.302
	3	172	29332	23738	80.928
	4	171	26889	21579	80.252
2008	1	170	25156	20725	82.385
	2	169	25428	20612	81.060
	3	165	22856	18582	81.300
	4	150	19627	16012	81.581
2009	1	145	16612	14354	86.407
	2	147	16312	14150	86.545
	3	124	13959	12550	89.906
	4	132	16132	14087	87.323

Table 2: Spearman's rank correlation coefficients per pair of quarters for net traded volumes

	corr I-II quarter	corr II-III quarter	corr III-IV quarter
2006	0.788	0.825	0.786
2007	0.878	0.734	0.778
2008	0.876	0.755	0.723
2009	0.874	0.749	0.719

Note: The correlation coefficients are all significant at 0.05 level.

Table 3: Selected average statistics on traded volumes and interest rates

			Volumes		
Year	Quarter	1	2	3	4
2006	Mean	25.125	25.867	24.965	22.582
	Median	15	15	15	1:
	Min	0.050	0.050	0.100	0.050
	Max	500.000	500.000	500.000	500.000
	$\operatorname{Sum}$	579586.340	594392.460	557422.510	496636.840
	St. dev	29.619	33.389	32.344	28.619
2007	Mean	23.223	22.944	21.968	20.284
	Median	12.500	13.000	11.000	10.000
	$\operatorname{Min}$	0.100	0.100	0.050	0.060
	Max	600.000	980.000	600.000	850.000
	$\operatorname{Sum}$	489614.460	459956.790	521465.090	437707.900
	St. dev	32.249	31.230	31.873	34.398
2008	Mean	19.547	20.888	20.091	18.84
	Median	10	10	10	10
	$\operatorname{Min}$	0.100	0.050	0.050	0.300
	Max	1000.000	1050.000	700.000	1000.000
	$\operatorname{Sum}$	405109.340	430543.410	373334.620	301774.060
	St. dev	33.335	29.096	26.512	30.943
2009	Mean	16.444	18.602	15.450	19.26
	Median	10.000	10.000	10.000	10.000
	Min	0.300	0.450	0.050	0.250
	Max	200.000	600.000	450.000	1000.000
	$\operatorname{Sum}$	236035.410	263223.960	193894.120	271419.960
	St. dev	18.876	22.596	17.755	26.308
			Interest rate	2S	
Year	Quarter	1	2	3	
2006	Mean	2.398	2.628	2.928	3.36
2000	Median	2.345	2.605	3.000	3.32
	Min	1.100	1.450	1.720	2.200
	Max	2.680	2.970	3.160	3.820
	St. dev	0.129	0.127	0.137	0.150
2007	Mean	3.601	3.850	4.077	3.943
2001	Median	3.570	3.830	4.070	4.00
	Min	2.450	2.700	2.000	1.500
	Max	4.300	4.310	5.000	4.700
	St. dev	0.152	0.172	0.216	0.17
2008	Mean	4.040	3.971	4.218	3.06
_000	Median	4.030	3.990	4.210	3.120
	Min	2.600	2.700	2.800	1.870
	Max	4.500	4.500	4.800	5.100
	St. dev	0.095	0.126	0.207	0.58
2009	Mean	1.234	0.120	0.207	0.38
2003	Mean	1.234	0.006	0.329	0.29

Legend: Traded volumes are expressed in million Euros.

0.700

0.180

 $1.700 \\ 0.237$ 

0.300

0.180

0.850

0.077

0.290

0.180

0.750

0.057

1.150

0.470

2.600

0.394

 ${\bf Median}$ 

St. dev

 $\operatorname{Min}$ 

Max

Table 4: Selected average statistics on cash volumes lent and borrowed

	Amount Lent					
Year	Quarter	Banks	Mean	St. dev		
2006	1	0.913	3969.769	6532.446		
	2	0.890	4099.258	7623.740		
	3	0.925	3741.091	7278.590		
	4	0.896	3378.482	5462.841		
2007	1	0.929	3376.651	5568.977		
	2	0.880	3309.042	5465.255		
	3	0.937	3499.766	5718.777		
	4	0.919	3194.948	5133.523		
2008	1	0.917	3045.935	4775.071		
	2	0.897	3311.872	5264.287		
	3	0.921	2894.067	4442.886		
	4	0.882	2694.411	4808.469		
2009	1	0.867	2126.445	3000.817		
	2	0.881	2371.387	3354.567		
	3	0.917	1958.526	2480.658		
	4	0.833	$2467,\!454$	3048,374		

	Amount	Borrowea
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Year	Quarter	% Banks	Mean	St. dev
2006	1	0.794	4563.672	10229.864
	2	0.804	4537.347	9652.734
	3	0.863	4010.234	10273.038
	4	0.799	3791.121	7971.481
2007	1	0.808	3885.829	8146.682
	2	0.804	3621.707	7191.813
	3	0.742	4419.196	8316.538
	4	0.832	3529.902	6610.083
2008	1	0.752	3716.599	7003.744
	2	0.779	3810.119	7496.590
	3	0.771	3456.802	7232.545
	4	0.748	3176.569	6178.868
2009	1	0.758	2433.355	5138.561
	2	0.730	2861.130	6064.351
	3	0.750	2393.755	4642.110
	4	0.750	2741,616	3048,374

Legend: The figures reported here are expressed in million Euros.

Table 5: Pearson's correlation coefficients between pairs of generalized degree centrality indices for year 2006 ( $0 \le \alpha \le 1$ )

		Out	Outgoing ties				_	Incoming ties	r <b>o</b>	
$\alpha$	0	0.25	0.50	0.75	1.00	0	0.25	0.50	0.75	1.00
			quarter I					quarter I		
0	1.000					1.000				
0.25	0.951	1.000				0.973	1.000			
0.50	0.859	0.974	1.000			0.920	0.985	1.000		
0.75	0.765	0.920	0.984	1.000		0.861	0.952	0.990	1.000	
1.00	0.675	0.853	0.945	0.988	1.000	0.800	0.909	0.965	0.992	1.000
			quarter II					quarter II		
0	1.000					1.000				
0.25	0.952	1.000				0.974	1.000			
0.50	0.853	0.970	1.000			0.922	0.985	1.000		
0.75	0.746	0.906	0.981	1.000		0.864	0.953	0.990	1.000	
1.00	0.648	0.833	0.938	0.987	1.000	908.0	0.912	0.967	0.993	1.000
			quarter III					quarter III		
0	1.000					1.000				
0.25	0.950	1.000				0.964	1.000			
0.50	0.844	0.967	1.000			0.888	0.977	1.000		
0.75	0.720	0.890	0.976	1.000		0.804	0.929	0.986	1.000	
1.00	0.600	0.794	0.917	0.981	1.000	0.727	0.874	0.955	0.991	1.000
			quarter IV					quarter IV		
	1.000					1.000				
0.25	0.950	1.000				0.964	1.000			
0.50	0.844	0.967	1.000			0.888	0.977	1.000		
0.75	0.721	0.890	0.976	1.000		0.804	0.929	0.986	1.000	
1.00	0.600	0.794	0.917	0.981	1.000	0.727	0.874	0.955	0.991	1.000

Note: The correlation coefficients are all significant at 0.05 level.

Table 6: Pearson's correlation coefficients between pairs of generalized degree centrality indices for year 2007 ( $0 \le \alpha \le 1$ )

	5 1.00					0	9 1.000					0	1.000					0	0 1.000					0	1.000
es	0.75					1.000	0.989					1.000	0.992	I				1.000	0.990	7				1.000	0.992
Incoming ties	0.50	quarter I			1.000	0.987	0.953	quarter II			1.000	0.989	0.963	quarter III			1.000	0.988	0.955	quarter IV			1.000	0.990	0.964
	0.25			1.000	0.983	0.941	0.885			1.000	0.984	0.947	0.901			1.000	0.984	0.945	0.891			1.000	0.985	0.950	0.906
	0		1.000	0.975	0.919	0.848	0.773		1.000	0.975	0.920	0.856	0.971		1.000	0.979	0.928	0.862	0.788		1.000	0.975	0.923	0.862	0.800
	1.00						1.000						1.000						1.000						1.000
	0.75					1.000	0.988					1.000	0.990					1.000	0.987					1.000	0.955
Outgoing ties	0.50	quarter I			1.000	0.982	0.943	quarter II			1.000	0.984	0.951	quarter III			1.000	0.980	0.936	quarter IV			1.000	0.979	0.882
Out	0.25			1.000	0.969	0.906	0.836			1.000	0.974	0.919	0.860			1.000	0.968	0.900	0.824			1.000	0.973	0.909	0.778
	0		1.000	0.946	0.840	0.732	0.638		1.000	0.955	0.865	0.771	0.689		1.000	0.946	0.837	0.724	0.622		1.000	0.953	0.861	0.754	0.604
	α		0	0.25	0.50	0.75	1.00		0	0.25	0.50	0.75	1.00		0	0.25	0.50	0.75	1.00		0	0.25	0.50	0.75	1.00

Note: The correlation coefficients are all significant at 0.05 level.

Table 7: Pearson's correlation coefficients between pairs of generalized degree centrality indices for year 2008 ( $0 \le \alpha \le 1$ )

		)						0		
	0	0.25	0.50	0.75	1.00	0	0.25	0.50	0.75	1.00
			quarter I					quarter I		
Ι	1.000					1.000				
0	0.953	1.000				0.975	1.000			
0	0.861	0.973	1.000			0.923	0.985	1.000		
0	0.754	0.909	0.979	1.000		0.863	0.950	0.990	1.000	
0	0.604	0.778	0.882	0.955	1.000	0.800	0.906	0.964	0.992	1.000
			quarter II					quarter II		
1	1.000					1.000				
$0.25 \mid 0$	0.953	1.000				0.974	1.000			
0	0.856	0.971	1.000			0.924	0.986	1.000		
$0.75 \mid 0$	0.749	0.908	0.981	1.000		0.868	0.954	0.991	1.000	
0	0.649	0.835	0.938	0.987	1.000	0.809	0.912	0.966	0.992	1.000
			quarter III					quarter III		
1	1.000					1.000				
0	0.951	1.000				0.975	1.000			
0	0.849	0.970	1.000			0.922	0.984	1.000		
$0.75 \mid 0$	0.740	0.906	0.981	1.000		0.861	0.949	0.989	1.000	
0	0.643	0.834	0.940	0.988	1.000	0.799	0.905	0.964	0.992	1.000
			quarter IV					quarter IV		
Н	1.000					1.000				
0.25   0	0.954	1.000				0.975	1.000			
0	0.819	0.950	1.000			0.910	0.979	1.000		
0	0.611	0.798	0.943	1.000		0.821	0.922	0.981	1.000	
1.00 0	0.389	0.591	0.795	0.949	1.000	0.718	0.843	0.932	0.984	1.000

Note: The correlation coefficients are all significant at 0.05 level.

Table 8: Pearson's correlation coefficients between pairs of generalized degree centrality indices for year 2009 ( $0 \le \alpha \le 1$ )

			1.0	1.0 0.9	1.00 0.99	1.00 0.99	1.00	1.000 0.990 1.000 0.990											
			- T	ďρ	d	դ <u></u>	nb	nb	nb	1.000 0.986 0.953 quarter 1.000 0.986 0.953 quarter	1.000 0.986 0.953 quarter 1.000 0.986 0.983 quarter	1.000 0.986 0.953 quarter 1.000 0.986 0.953 quarter 1.000	1.000 0.986 0.953 quarter 1.000 0.953 quarter 1.000 0.981	1.000 0.986 0.953 quarter quarter 1.000 0.981 0.983	1.000 0.986 0.953 quarter quarter 1.000 0.981 0.935 quarter quarter				
,		1.000 0.970 0.904 0.826	1.000 0.970 0.904 0.826 0.749	1.000 0.970 0.904 0.826 0.749 1.000	1.000 0.970 0.904 0.826 0.749 1.000 0.970	1.000 0.970 0.904 0.826 0.749 1.000 0.970	1.000 0.970 0.904 0.826 0.749 1.000 0.970 0.904	1.000 0.970 0.904 0.826 0.749 1.000 0.970 0.970 0.970 0.970	1.000 0.970 0.904 0.826 0.749 1.000 0.970 0.970 0.926 0.749	1.000 0.970 0.904 0.826 0.749 1.000 0.970 0.904 0.826 0.749	1.000 0.970 0.904 0.826 0.749 1.000 0.970 0.970 0.826 0.749	1.000 0.970 0.904 0.826 0.749 1.000 0.970 0.926 0.749 0.826 0.749 0.826 0.749	1.000 0.970 0.904 0.826 0.749 1.000 0.970 0.826 0.749 0.826 0.749 0.826 0.749 0.826 0.749	1.000 0.970 0.904 0.826 0.749 0.970 0.970 0.974 0.826 0.749 0.826 0.749 0.826 0.749 0.826 0.749	1.000 0.970 0.904 0.826 0.749 1.000 0.970 0.826 0.749 0.826 0.702	1.000 0.970 0.904 0.826 0.749 0.970 0.970 0.971 0.826 0.749 0.826 0.749 0.826 0.749 0.826 0.7702	1.000 0.970 0.904 0.826 0.749 0.970 0.970 0.971 0.826 0.749 0.826 0.749 0.826 0.749 0.826 0.749 0.871 0.899 0.803 0.970	1.000 0.970 0.904 0.826 0.749 0.970 0.904 0.826 0.749 0.826 0.749 0.899 0.899 0.803 0.702	1.000 0.970 0.904 0.826 0.749 0.970 0.970 0.971 0.899 0.803 0.702 0.909 0.969 0.969 0.969
			II																
000			1.000 0.972 0.907 0.828	1.000 0.972 0.907 0.828	1.000 0.972 0.907 0.828 1.000	1.000 0.972 0.907 0.828 1.000	1.000 0.972 0.907 0.828 1.000 0.972 0.907	1.000 0.972 0.907 0.828 1.000 0.972 0.907	1.000 0.972 0.907 0.828 1.000 0.972 0.907 0.828	1.000 0.972 0.907 0.828 1.000 0.972 0.907	1.000 0.972 0.907 0.828 1.000 0.972 0.907 0.828	1.000 0.972 0.907 0.828 1.000 0.972 0.907 0.828 0.828	1.000 0.972 0.907 0.828 1.000 0.972 0.907 0.828 0.967 0.967	1.000 0.972 0.907 0.828 1.000 0.972 0.828 0.828 0.967 0.867 0.899	1.000 0.972 0.907 0.828 1.000 0.972 0.907 0.828 0.967 0.967 0.828	1.000 0.972 0.907 0.828 1.000 0.972 0.828 0.967 0.967 0.899 0.899	1.000 0.972 0.907 0.828 1.000 0.972 0.828 0.967 0.867 0.899 0.829	1.000 0.972 0.907 0.828 0.972 0.907 0.828 0.967 0.869 0.869 0.822 0.822	1.000 0.972 0.907 0.828 1.000 0.972 0.828 0.828 0.967 0.899 0.829 0.822 0.967 0.899 0.967 0.967 0.899
	9	85 85 85 85 85 85 85 85 85 85 85 85 85 8	63 69 63	63 69 63 00	63 776 69 63 000	963 376 769 963 963 376	363 376 363 363 000 363 376	963 876 769 363 963 876 769	963 876 769 663 000 963 876 769 663	876 769 663 000 963 769 663	963 876 769 663 000 963 876 769 663 000 949	963 876 769 663 000 963 876 769 663 663 841	963 876 769 663 000 963 876 769 663 000 949 841	963 876 769 663 000 963 876 663 663 663 663 663	963 876 769 663 000 963 876 769 663 663 617	963 876 769 663 000 963 876 769 663 000 949 841 724 617	963 876 663 600 000 963 876 663 663 663 663 663 663 663 949 949	963 876 769 663 663 963 876 663 663 663 663 663 663 841 724 617	0.963 0.876 0.663 0.663 0.963 0.663 0.063 0.049 0.949 0.841 0.724 0.949 0.949 0.949 0.949 0.949 0.949
	1.000   0.904 0.980	1.000	1.000 0.980 0.980 0.986 0.935 0.934 0.986 1.000 0.749 0.878 quarter II qu	1.000 0.904 0.980 0.904 0.980 0.980 0.934 0.986 1.000 0.749 0.878 quarter II qu	1.000 0.904 0.980 0.980 0.935 0.935 0.934 0.986 1.000 0.749 0.878 quarter II	1.000 0.980 0.984 0.984 0.986 1.000 0.749 0.878 quarter II 1.000 1.000 0.904 0.985 0.935 0.935 0.935 0.935 0.935 0.935 0.970 1.000 0.970 0.970 0.970	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1.000 0.980 0.980 1.000 0.934 0.986 1.000 0.749 0.878  quarter II 1.000 1.000 0.980 0.980 0.980 0.980 0.980 0.980 0.986 0.986 0.935	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.000 $0.904$ $0.980$ $0.980$ $1.000$ $0.826$ $0.980$ $0.934$ $0.986$ $1.000$ $0.749$ $0.878$ $0.934$ $0.986$ $1.000$ $0.970$ $1.000$ $1.000$ $0.980$ $0.904$ $0.980$ $0.934$ $0.986$ $1.000$ $0.749$ $0.878$ $0.934$ $0.986$ $1.000$ $0.749$ $0.878$ $1.000$ $0.980$ $1.000$ $0.971$ $1.000$ $1.000$ $0.980$ $0.976$ $0.976$ $0.980$ $1.000$ $0.803$ $0.917$ $0.936$ $0.987$ $1.000$ $0.702$ $0.840$	1.000 0.980 0.980 1.000 0.984 0.986 1.000 0.749 0.878  quarter II  1.000 0.934 0.986 0.986 1.000 0.934 0.986 1.000 0.970 1.000 0.970 0.975 0.987 0.986 0.986 0.987 1.000 0.899 0.976 0.980 0.980 0.980 0.980 0.980 0.980 0.981	1.000 0.980 0.980 1.000 0.984 0.986 1.000 0.749 0.878  quarter II  quarter III  1.000 1.000 0.986 1.000 0.986 1.000 0.987 1.000 1.000 0.980 0.987 1.000 0.980 0.980 1.000 0.980 0.981 1.000 0.980 0.981 1.000 0.980 0.981 0.981 0.981 0.981 0.981 0.982 0.982 0.983	1.000 $0.904$ $0.980$ $0.980$ $1.000$ $0.826$ $0.935$ $0.934$ $0.986$ $1.000$ $0.749$ $0.878$ quarter II $1.000$ $0.970$ $1.000$ $0.980$ $1.000$ $0.926$ $0.935$ $0.934$ $0.986$ $1.000$ $0.749$ $0.878$ quarter III $1.000$ $0.971$ $1.000$ $1.000$ $0.980$ $1.000$ $0.899$ $0.976$ $0.980$ $1.000$ $0.803$ $0.917$ $0.936$ $0.987$ $1.000$ $0.803$ $0.917$ quarter IV $1.000$ $0.969$ $1.000$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

Note: The correlation coefficients are all significant at 0.05 level.

Table 9: Descriptive statistics for the big lenders for 2006-2007

Rate Rate Rate Rate 2.398         C.2400 Rate 2.498         Rate 2.698         C.2670 Rate 2.497         C.2627 Rate 2.699         C.2627 Rate 2.699         C.2628 Rate 2.670         C.2627 Rate 2.698         C.2627 Rate 2.698         C.2628 Rate 2.698         Rate 2.698 Rate 2.497         Rate 2.698 Rate 2.697         Rate 2.697 Rate 2.698         Rate 2.697 Rate 2.698         Rate 2.698 Rate 2.6988         Rate 2.698 Rate 2.6988         Rate 2.698 Rate 2.6988		Table	e 9: Descr		tistics for		nders for 2	2006-2007		
Name	2006 I	Market	GR0006	IT0185	IT0187	IT0257	IT0258	IT0259	IT0269	IT0278
Anomut         579586.34         1919.9         17840.05         18110.13         31921.32         28070.16         1641.54         47313.8         18082.8           Trades         3.78         4.428         11169         859         11008         8.87         1375         870           2006 II         Market         170185         170289         170269         170265         170260         170279           Rate         2.628         2.670         2.627         2.619         2.653         2.621         2.633         2.617         2.680           Std Dev         0.111         0.108         0.117         0.133         0.009         0.092         0.121         0.153           Amount         594392.460         18831.7         128241         22543.85         16685.08         26772.28         31660         26383.6         783         2807         4.504         5.310         11.303         4.439         29206 III         Market         17039         170261         170263         170269         170279         Rate         2.927         2.941         2.887         2.928         2.919         2.923         2.916         2.924         2.916         5.34         10.1033         10.013         10.014 </td <td>Rate</td> <td>2.398</td> <td>2.420</td> <td>2.433</td> <td>2.408</td> <td>2.360</td> <td>2.406</td> <td>2.418</td> <td>2.418</td> <td>2.396</td>	Rate	2.398	2.420	2.433	2.408	2.360	2.406	2.418	2.418	2.396
Perc         378         428         1169         859         1008         837         1375         870           2006 II         Market         170185         170187         170258         170259         170261         170265         170269         170279           Rate         2.628         2.670         2.627         2.619         2.653         2.621         2.633         2.617         2.668           Std Dev         0.111         0.108         0.117         0.138         0.09         0.902         2633         2.617         2.668           Amount         594392.460         1883.7         28241         22543.85         16685.08         2677.228         31562.68         67186.09         2638.6           Trades         3.68         8.28         8.22         658         5.75         3.54         1.6157         989           Perc         3.168         2.188         3.793         2.807         4.504         5.310         11.303         4.439           2006 III         Market         17030         170288         170259         170261         170265         170269         170279           Rate         2.927         2.941         2.288         2.929	Std Dev		0.119	0.111	0.116	0.130	0.123	0.129	0.124	0.111
Perc         3.312         3.078         3.125         5.508         4.843         2.830         8.163         3.120           2006 II         Market         170185         170258         170259         170261         170265         170269         170279           Rate         2.628         2.670         2.619         2.653         2.621         2.633         2.617         2.668           Std Dev         0.111         0.008         0.117         0.138         0.109         0.092         0.121         0.153           Amount         594392.460         18831.7         12824.1         2254.85         16685.08         2672.28         3166 86         6718.09         20833.6           Perc         3.168         2.158         3.793         2.807         4.504         5.310         11.303         4.439           2006 III         Market         17019         2.887         2.928         2.919         2.93         2.916         2.924         2.916           Std Dev         0.135         0.118         0.134         0.129         0.141         0.140         0.132         11726         117269         117279           Trades         789         790         839	Amount	579586.34	19193.9	17840.05	18110.13	31921.32	28070.16	16401.54	47313.8	18082.8
Rate	Trades		378	428	1169	859	1008	837	1375	870
Rate   2.628   2.670   2.627   2.619   2.653   2.621   2.633   2.617   2.668   Std Dev   0.111   0.108   0.117   0.138   0.109   0.092   0.092   0.121   0.153   0.109   0.092   0.092   0.121   0.153   0.109   0.092   0.092   0.153   0.153   0.109   0.092   0.092   0.153   0.153   0.109   0.092   0.092   0.153   0.153   0.109   0.092   0.092   0.153   0.153   0.109   0.092   0.092   0.165   0.153   0.153   0.118   0.154   0.155   0.1	Perc		3.312	3.078	3.125	5.508	4.843	2.830	8.163	3.120
Std Dev Amount         0.111         0.108         0.117         0.138         0.109         0.092         0.121         0.153           Amount         594392.460         18831.7         128241.         22543.85         6688.08         2677.228         31562.68         67186.09         26383.6           Perc         3.68         2.158         3.793         2.807         4.504         5.310         11.303         4.439           2006 HII         Market         170193         170258         170269         170261         170265         170269         170279           Rate         2.927         2.941         2.887         2.928         2.919         2.923         2.916         2.924         2.916           Std Dev         0.135         0.118         0.134         0.129         0.141         0.140         0.132         51037           Amount         5742.51         10430.79         2023.23         4.673         3.348         2.55         1280         1533         5403         1533           Perc         1.877         3.630         4.673         3.348         2.536         3.801         7.794         9.940           2006 IV         Market         460000         0.	2006 II	Market	IT0185	IT0187	IT0258	IT0259	IT0261	IT0265	IT0269	IT0279
Amount Trades         594392.460         1881.7         12824.1         22543.85         16685.08         26772.28         3156.268         67186.09         26383.6           Trades         3.65         8.82         822         658         5.75         3.34         1657         989           Pere         3.168         2.158         3.793         2.807         4.504         5.310         11.333         4.439           2006 III         Market         170193         IT0258         IT0259         IT0261         IT0263         IT0265         IT0269         IT0279           Rate         2.927         2.941         2.887         2.928         2.919         2.923         2.916         2.924         2.916           Std Dev         0.135         0.118         0.134         0.129         0.141         0.140         0.132         0.137           Amount         557422.51         10430.79         2023.34         260467         18495.55         14135         2187.62         43444.93         55409.01           Trades         7.80         7.80         7.90         8.39         4.15         3.48         2.55         133.01         170269         170269         170269         170279     <	Rate	2.628	2.670	2.627	2.619	2.653	2.621	2.633	2.617	2.668
Perc         365         828         828         625         575         334         1657         989           2006 III         Market         IT0193         IT0258         IT0269         IT0261         IT0265         IT0269         IT0279           Rate         2.927         2.941         2.887         2.928         2.919         2.923         2.916         2.924         2.916           Std Dev         0.135         0.118         0.134         0.129         0.141         0.140         0.132         0.137           Amount         557422.51         10430.79         20232.34         26046.97         18495.55         114155         21187.02         33440.33         55409.01           Trades         789         790         839         415         348         255         12340.17         1503           Perc         1.871         3.363         3.352         3.359         3.382         3.359         3.403         3.431         3.355         3.354           Std Dev         0.151         0.148         0.144         0.140         0.161         0.181         0.151         0.148           Amount         496636.84         14159.7         11520         12451.2 </td <td>Std Dev</td> <td></td> <td>0.111</td> <td>0.108</td> <td>0.117</td> <td>0.138</td> <td>0.109</td> <td>0.092</td> <td>0.121</td> <td>0.153</td>	Std Dev		0.111	0.108	0.117	0.138	0.109	0.092	0.121	0.153
Perc         3.168         2.158         3.793         2.807         4.504         5.310         11.303         4.439           2006 III         Market         170193         170258         170259         170261         170265         170265         170269         170279           Rate         2.927         2.941         2.887         2.998         2.991         2.923         2.916         2.924         2.916           Std Dev         0.135         0.118         0.134         0.129         0.141         0.140         0.132         0.137           Amount         557422.51         10430.79         20232.34         26046.97         18495.55         14135         21187.62         43444.93         55409.01           Trades         789         790         839         415         3.48         2.55         1230         1533           Perc         480618         41819.71         1710187         1710187         171024         170265         170269         170279           Rate         3.363         3.352         3.359         3.382         3.359         3.343         3.431         3.355         3.354           Std Dev         0.151         0.148         0.144	Amount	594392.460	18831.7	12824.1	22543.85	16685.08	26772.28	31562.68	67186.09	26383.6
Rate	Trades		365	828	822	658	575	334	1657	989
Rate Std Dev Std Dev         2.921         2.941         2.887         2.928         2.919         2.923         2.916         2.924         2.916           Amount         557422.51         10430.79         20232.34         26046.97         14495.55         14135         21187.62         34344.93         55490.01           Trades         789         790         839         415         348         255         1280         1533           Perc         1.871         3.630         4.673         3.318         2.536         3.801         7.794         9.940           2006 IV         Market         GR0006         IT0173         IT0187         IT0193         IT0242         IT0265         IT0269         IT0279           Rate         3.363         3.352         3.359         3.382         3.359         3.403         3.431         3.355         3.354           Std Dev         0.151         0.148         0.144         0.140         0.164         0.181         0.156         0.148         0.144         0.140         0.164         0.181         0.155         1.2451.2         9023.71         7264.4         14336         40279.56         36338.89         1361         2.86         2.2851	Perc		3.168	2.158	3.793	2.807	4.504	5.310	11.303	4.439
Std Dev         0.135         0.118         0.134         0.129         0.141         0.140         0.132         0.137           Amount         557422.51         10430.79         20232.34         26046.97         18495.55         1 14135         2118.62         3444.93         55409.01           Trades         789         790         839         415         348         255         1280         1533           Perc         1.871         3.630         4.673         3.318         2.536         3.801         7.794         9.940           2006 IV         Market         GR0006         IT0173         IT0187         IT0193         1T0242         IT0265         IT0269         IT0279           Rate         3.363         3.352         3.382         3.359         3.431         3.355         3.354           Std Dev         0.0151         0.148         0.0144         0.140         0.164         0.181         0.151         0.146           Amount         496636.84         14159.7         11520         12451.2         9023.71         7264.4         14336         40279.56         3633.889           Std Dev         2.851         2.320         2.567         1.817         1.463<	2006 III	Market	IT0193	IT0258	IT0259	IT0261	IT0263	IT0265	IT0269	IT0279
Amount Trades         57422.51         10430.79         20232.34         26046.97         18495.55         14135         21187.62         43444.93         55409.01           Trades         789         790         839         415         348         2.55         1280         1533           Perc         1.871         3.630         4.673         3.318         2.556         3.801         7.794         9.940           2006 IV         Market         GR0006         IT0173         IT0187         IT0193         IT0242         IT0265         IT0269         IT0279           Rate         3.363         3.352         3.359         3.382         3.359         3.403         3.431         3.555         3.354           Amount         496636.84         14159.7         11520         12451.2         9023.71         7264.4         14336         40279.56         3638.88           Trades         266         522         810         812         494         240         1085         1311           Perc         2.851         1.230         170187         170261         170269         170279           Rate         3.601         3.614         3.604         3.605         3.619	Rate	2.927	2.941	2.887	2.928	2.919		2.916	2.924	2.916
Trades         789         790         839         415         348         255         1280         1533           Perc         1.871         3.630         4.673         3.318         2.536         3.801         7.794         9.940           2006 IV         Market         GR0006         IT0173         IT0187         IT0193         IT0242         IT0265         IT0269         IT0279           Rate         3.363         3.352         3.359         3.382         3.359         3.403         3.431         3.355         3.354           Std Dev         0.151         0.148         0.144         0.140         0.164         0.181         0.151         0.146           Amount         496636.84         14159.7         11520         12451.2         9023.71         7264.4         14336         40279.56         36338.89           Trades         2.666         522         810         812         494         240         1085         1311           Perc         2.851         2.302         2.507         1.817         1.463         2.887         8.110         7.317           2007 I         Market         170187         170193         17026         170261 <td< td=""><td>Std Dev</td><td></td><td>0.135</td><td>0.118</td><td>0.134</td><td>0.129</td><td>0.141</td><td>0.140</td><td>0.132</td><td>0.137</td></td<>	Std Dev		0.135	0.118	0.134	0.129	0.141	0.140	0.132	0.137
Perc         1.871         3.630         4.673         3.318         2.536         3.801         7.794         9.940           2006 IV         Market         GR0006         IT0173         IT0187         IT10193         IT0242         IT0265         IT0269         IT0279           Rate         3.363         3.352         3.359         3.382         3.403         3.411         3.355         3.354           Std Dev         0.151         0.148         0.144         0.140         0.164         0.181         0.151         0.146           Amount         496636.84         14159.7         11520         12451.2         9023.71         7264.4         14336         40279.56         36338.89           Perc         2.851         2.320         2.507         1.817         1.463         2.887         8.110         7.317           2007 I         Market         IT0187         IT0193         IT0198         IT0257         IT0261         IT0269         IT0279           Rate         3.601         3.614         3.604         3.605         3.619         3.642         3.602         3.583           Std Dev         0.129         0.182         0.156         0.132         0.128	Amount	557422.51	10430.79	20232.34	26046.97	18495.55	14135	21187.62	43444.93	55409.01
2006 IV         Market         GR0006         IT0173         IT0187         IT0193         IT0242         IT0265         IT0269         IT0279           Rate         3.363         3.352         3.359         3.382         3.359         3.403         3.431         3.355         3.354           Std Dev         0.151         0.148         0.144         0.140         0.164         0.181         0.151         0.146           Amount         496636.84         14159.7         11520         12451.2         9023.71         7264.4         14336         40279.56         36338.89           Trades         266         522         810         812         494         240         1085         1311           Perc         2.851         2.320         2.507         1.817         1.463         2.887         8.110         7.317           2007 I         Market         IT0187         IT0193         IT0257         IT0261         IT0269         IT0279           Rate         3.601         3.614         3.604         3.605         3.619         3.642         3.602         3.583           Std Dev         0.129         0.182         0.156         0.132         0.128         0.156<	Trades		789	790	839	415	348	255	1280	1533
Rate Std Dev         3.363         3.352         3.359         3.382         3.359         3.403         3.431         3.355         3.354           Std Dev         0.151         0.148         0.144         0.140         0.164         0.181         0.151         0.146           Amount         496636.84         14159.7         11520         12451.2         9023.71         7264.4         14336         40279.56         36338.89           Trades         266         522         810         812         494         240         1085         1311           Perc         2.851         2.320         2.507         1.817         1.463         2.887         8.110         7.317           2007 I         Market         IT0187         IT0193         IT0198         IT0257         IT0261         IT0269         IT0279           Rate         3.601         3.614         3.604         3.605         3.619         3.642         3.602         3.583           Std Dev         0.129         0.182         0.156         0.132         0.128         0.156         0.137           Trades         21083         1073         830         559         1267         407         928	Perc		1.871	3.630	4.673	3.318	2.536	3.801	7.794	9.940
Std Dev         496636.84         0.151         0.148         0.144         0.140         0.164         0.181         0.151         0.146           Amount         496636.84         14159.7         11520         12451.2         9023.71         7264.4         14336         40279.56         3638.89           Trades         266         522         810         812         494         240         1085         1311           Perc         2.851         2.320         2.507         1.817         1.463         2.887         8.110         7.317           2007 I         Market         IT0187         IT0193         IT0198         IT0257         IT0261         IT0269         IT0279           Rate         3.601         3.614         3.604         3.605         3.619         3.642         3.602         3.583           Std Dev         0.129         0.182         0.156         0.132         0.128         0.156         0.137           Tmades         21083         1073         830         559         1267         407         928         1083           Perc         3.117         1.738         2.083         8.864         4.676         5.576         4.844	2006 IV	Market	GR0006	IT0173	IT0187	IT0193	IT0242	IT0265	IT0269	IT0279
Amount Trades         496636.84         14159.7         11520         12451.2         9023.71         7264.4         14336         40279.56         36338.89           Trades         266         522         810         812         494         240         1085         1311           Perc         2.851         2.320         2.507         1.817         1.463         2.887         8.110         7.317           2007 I         Market         1T0187         1T0193         1T0259         170261         1T0269         170279           Rate         3.601         3.614         3.604         3.605         3.619         3.602         3.583           Std Dev         0.129         0.182         0.156         0.132         0.128         0.156         0.137           Amount         489614.46         15263.6         8510.07         10197.8         43397.45         22892.45         27298.62         23717.37           Trades         21083         1073         830         559         1267         407         928         1083           Perc         3.817         1.738         2.083         8.864         4.676         5.576         4.844           2007 II         M	Rate	3.363	3.352	3.359	3.382	3.359	3.403	3.431	3.355	3.354
Trades Perc         266         522         810         812         494         240         1085         1311           Perc         2.851         2.320         2.507         1.817         1.463         2.887         8.110         7.317           2007 I         Market         IT0187         IT0193         IT0198         IT0257         IT0261         IT0269         IT0279           Rate         3.601         3.614         3.604         3.605         3.619         3.642         3.602         3.583           Std Dev         0.129         0.182         0.156         0.132         0.128         0.156         0.137           Amount         489614.46         15263.6         8510.07         10197.8         43397.45         22892.45         27298.62         23717.37           Trades         21083         1073         830         559         1267         407         928         1083           Perc         3.117         1.738         2.083         8.64         4.676         5.576         4.844           2007 II         Market         IT0185         IT0187         IT0208         IT0257         IT0261         IT0269         IT0279           Rate	Std Dev		0.151	0.148	0.144	0.140	0.164	0.181	0.151	0.146
Perc         2.851         2.320         2.507         1.817         1.463         2.887         8.110         7.317           2007 I         Market         IT0187         IT0193         IT0198         IT0257         IT0261         IT0269         IT0279           Rate         3.601         3.614         3.604         3.605         3.619         3.642         3.602         3.583           Std Dev         0.129         0.182         0.156         0.132         0.128         0.156         0.137           Amount         489614.46         15263.6         8510.07         10197.8         43397.45         22892.45         27298.62         23717.37           Trades         21083         1073         830         559         1267         407         928         1083           Perc         3.117         1.738         2.083         8.864         4.676         5.576         4.844           2007 II         Market         IT0185         IT0187         IT0208         IT0257         IT0261         IT0269         IT0279           Rate         3.849         3.876         3.858         3.853         3.858         3.877         3.824         3.807           Std D	Amount	496636.84	14159.7	11520	12451.2	9023.71	7264.4	14336	40279.56	36338.89
2007 I         Market         IT0187         IT0193         IT0198         IT0257         IT0261         IT0269         IT0279           Rate         3.601         3.614         3.604         3.605         3.619         3.642         3.602         3.583           Std Dev         0.129         0.182         0.156         0.132         0.128         0.156         0.137           Amount         489614.46         15263.6         8510.07         10197.8         43397.45         22892.45         27298.62         23717.37           Trades         21083         1073         830         559         1267         407         928         1083           Perc         3.117         1.738         2.083         8.864         4.676         5.576         4.844           2007 III         Market         IT0185         IT0187         IT0208         IT0257         IT0261         IT0269         IT0279           Rate         3.849         3.876         3.858         3.853         3.858         3.877         3.824         3.807           Std Dev         0.099         0.149         0.161         0.155         0.165         0.176         0.171           Amount	Trades		266	522	810	812	494	240	1085	1311
Rate Std Dev         3.601         3.614         3.604         3.605         3.619         3.642         3.602         3.583           Std Dev         0.129         0.182         0.156         0.132         0.128         0.156         0.137           Amount         489614.46         15263.6         8510.07         10197.8         43397.45         22892.45         27298.62         23717.37           Trades         21083         1073         830         559         1267         407         928         1083           Perc         3.117         1.738         2.083         8.864         4.676         5.576         4.844           2007 II         Market         1T0185         1T0187         1T0208         1T0257         1T0261         1T0269         1T0279           Rate         3.849         3.876         3.858         3.853         3.858         3.877         3.824         3.807           Std Dev         0.099         0.149         0.161         0.155         0.165         0.176         0.171           Amount         459956.79         18727.5         16853.26         10922.8         43270.31         23833.94         23080         13118.2           Trades	Perc		2.851	2.320	2.507	1.817	1.463	2.887	8.110	7.317
Std Dev         0.129         0.182         0.156         0.132         0.128         0.156         0.137           Amount         489614.46         15263.6         8510.07         10197.8         43397.45         22892.45         27298.62         23717.37           Trades         21083         1073         830         559         1267         407         928         1083           Perc         3.117         1.738         2.083         8.864         4.676         5.576         4.844           2007 II         Market         IT0185         IT0187         IT0208         IT0257         IT0261         IT0269         IT0279           Rate         3.849         3.876         3.858         3.853         3.858         3.877         3.824         3.807           Std Dev         0.099         0.149         0.161         0.155         0.165         0.176         0.171           Amount         459956.79         18727.5         16853.26         10922.8         43270.31         23833.94         23080         13118.2           Trades         20047         428         1091         646         1221         538         807         612           Perc         4.	2007 I		IT0187	IT0193	IT0198	IT0257	IT0261	IT0269	IT0279	
Amount         489614.46         15263.6         8510.07         10197.8         43397.45         22892.45         27298.62         23717.37           Trades         21083         1073         830         559         1267         407         928         1083           Perc         3.117         1.738         2.083         8.864         4.676         5.576         4.844           2007 II         Market         IT0185         IT0187         IT0208         IT0257         IT0261         IT0269         IT0279           Rate         3.849         3.876         3.858         3.853         3.858         3.877         3.824         3.807           Std Dev         0.099         0.149         0.161         0.155         0.165         0.176         0.171           Amount         459956.79         18727.5         16853.26         10922.8         43270.31         23833.94         23080         13118.2           Trades         20047         428         1091         646         1221         538         807         612           Perc         4.072         3.664         2.375         9.407         5.182         5.018         2.852           2007 III         M	Rate	3.601	3.614	3.604	3.605	3.619	3.642	3.602	3.583	
Trades         21083         1073         830         559         1267         407         928         1083           Perc         3.117         1.738         2.083         8.864         4.676         5.576         4.844           2007 II         Market         IT0185         IT0187         IT0208         IT0257         IT0261         IT0269         IT0279           Rate         3.849         3.876         3.858         3.853         3.858         3.877         3.824         3.807           Std Dev         0.099         0.149         0.161         0.155         0.165         0.176         0.171           Amount         459956.79         18727.5         16853.26         10922.8         43270.31         23833.94         23080         13118.2           Trades         20047         428         1091         646         1221         538         807         612           Perc         4.072         3.664         2.375         9.407         5.182         5.018         2.852           2007 III         Market         IT0187         IT0193         IT0208         IT0224         IT0255         IT0261         IT0269         IT0279           Rate	Std Dev		0.129	0.182	0.156	0.132	0.128	0.156	0.137	
Perc         3.117         1.738         2.083         8.864         4.676         5.576         4.844           2007 II         Market         IT0185         IT0187         IT0208         IT0257         IT0261         IT0269         IT0279           Rate         3.849         3.876         3.858         3.853         3.858         3.877         3.824         3.807           Std Dev         0.099         0.149         0.161         0.155         0.165         0.176         0.171           Amount         459956.79         18727.5         16853.26         10922.8         43270.31         23833.94         23080         13118.2           Trades         20047         428         1091         646         1221         538         807         612           Perc         4.072         3.664         2.375         9.407         5.182         5.018         2.852           2007 III         Market         IT0187         IT0193         IT0208         IT0255         IT0261         IT0269         IT0279           Rate         4.077         4.107         4.087         4.087         4.049         4.073         4.060         4.014           Std Dev         0.190	Amount	489614.46	15263.6	8510.07	10197.8	43397.45	22892.45	27298.62	23717.37	
2007 II         Market         IT0185         IT0187         IT0208         IT0257         IT0261         IT0269         IT0279           Rate         3.849         3.876         3.858         3.853         3.858         3.877         3.824         3.807           Std Dev         0.099         0.149         0.161         0.155         0.165         0.176         0.171           Amount         459956.79         18727.5         16853.26         10922.8         43270.31         23833.94         23080         13118.2           Trades         20047         428         1091         646         1221         538         807         612           Perc         4.072         3.664         2.375         9.407         5.182         5.018         2.852           2007 III         Market         IT0187         IT0193         IT0208         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         4.077         4.107         4.087         4.087         4.049         4.073         4.060         4.014           Std Dev         0.190         0.226         0.264         0.212         0.161         0.160         0.223         0.243	Trades	21083	1073	830	559	1267	407	928	1083	
Rate         3.849         3.876         3.858         3.853         3.858         3.877         3.824         3.807           Std Dev         0.099         0.149         0.161         0.155         0.165         0.176         0.171           Amount         459956.79         18727.5         16853.26         10922.8         43270.31         23833.94         23080         13118.2           Trades         20047         428         1091         646         1221         538         807         612           Perc         4.072         3.664         2.375         9.407         5.182         5.018         2.852           2007 III         Market         IT0187         IT0193         IT0208         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         4.077         4.107         4.087         4.087         4.049         4.073         4.060         4.014           Std Dev         0.190         0.226         0.264         0.212         0.161         0.160         0.223         0.243           Amount         521465.09         16585.8         11237.1         10619.8         14523.97         13577.26         41724.16         29354	Perc		3.117	1.738	2.083	8.864	4.676	5.576	4.844	
Std Dev         0.099         0.149         0.161         0.155         0.165         0.176         0.171           Amount         459956.79         18727.5         16853.26         10922.8         43270.31         23833.94         23080         13118.2           Trades         20047         428         1091         646         1221         538         807         612           Perc         4.072         3.664         2.375         9.407         5.182         5.018         2.852           2007 III         Market         IT0187         IT0193         IT0208         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         4.077         4.107         4.107         4.087         4.087         4.049         4.073         4.060         4.014           Std Dev         0.190         0.226         0.264         0.212         0.161         0.160         0.223         0.243           Amount         521465.09         16585.8         11237.1         10619.8         14523.97         13577.26         41724.16         29354         15553.4           Trades         23738         1135         971         810         544         399	2007 II	Market	IT0185	IT0187	IT0208	IT0257	IT0261	IT0269	IT0279	
Amount         459956.79         18727.5         16853.26         10922.8         43270.31         23833.94         23080         13118.2           Trades         20047         428         1091         646         1221         538         807         612           Perc         4.072         3.664         2.375         9.407         5.182         5.018         2.852           2007 III         Market         IT0187         IT0193         IT0208         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         4.077         4.107         4.107         4.087         4.087         4.049         4.073         4.060         4.014           Std Dev         0.190         0.226         0.264         0.212         0.161         0.160         0.223         0.243           Amount         521465.09         16585.8         11237.1         10619.8         14523.97         13577.26         41724.16         29354         15553.4           Trades         23738         1135         971         810         544         399         1114         1223         763           Perc         3.181         2.155         2.037         2.785         2	Rate	3.849	3.876	3.858	3.853	3.858	3.877	3.824	3.807	
Trades         20047         428         1091         646         1221         538         807         612           Perc         4.072         3.664         2.375         9.407         5.182         5.018         2.852           2007 III         Market         IT0187         IT0193         IT0208         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         4.077         4.107         4.087         4.087         4.049         4.073         4.060         4.014           Std Dev         0.190         0.226         0.264         0.212         0.161         0.160         0.223         0.243           Amount         521465.09         16585.8         11237.1         10619.8         14523.97         13577.26         41724.16         29354         15553.4           Trades         23738         1135         971         810         544         399         1114         1223         763           Perc         3.181         2.155         2.037         2.785         2.604         8.001         5.629         2.983           Rate         3.943         3.970         3.963         3.938         3.950         3.982 <td< td=""><td>Std Dev</td><td></td><td>0.099</td><td>0.149</td><td>0.161</td><td>0.155</td><td>0.165</td><td>0.176</td><td>0.171</td><td></td></td<>	Std Dev		0.099	0.149	0.161	0.155	0.165	0.176	0.171	
Perc         4.072         3.664         2.375         9.407         5.182         5.018         2.852           2007 III         Market         IT0187         IT0193         IT0208         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         4.077         4.107         4.107         4.087         4.087         4.049         4.073         4.060         4.014           Std Dev         0.190         0.226         0.264         0.212         0.161         0.160         0.223         0.243           Amount         521465.09         16585.8         11237.1         10619.8         14523.97         13577.26         41724.16         29354         15553.4           Trades         23738         1135         971         810         544         399         1114         1223         763           Perc         3.181         2.155         2.037         2.785         2.604         8.001         5.629         2.983           2007 IV         Market         IT0187         IT0193         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         3.943         3.970         3.963         3.938         3	Amount	459956.79		16853.26	10922.8	43270.31	23833.94	23080	13118.2	
2007 III         Market         IT0187         IT0193         IT0208         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         4.077         4.107         4.107         4.087         4.087         4.049         4.073         4.060         4.014           Std Dev         0.190         0.226         0.264         0.212         0.161         0.160         0.223         0.243           Amount         521465.09         16585.8         11237.1         10619.8         14523.97         13577.26         41724.16         29354         15553.4           Trades         23738         1135         971         810         544         399         1114         1223         763           Perc         3.181         2.155         2.037         2.785         2.604         8.001         5.629         2.983           2007 IV         Market         IT0187         IT0193         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         3.943         3.970         3.963         3.938         3.950         3.982         3.923         3.898           Std Dev         0.139         0.154         0.198 <t< td=""><td>Trades</td><td>20047</td><td>428</td><td>1091</td><td>646</td><td></td><td>538</td><td>807</td><td>612</td><td></td></t<>	Trades	20047	428	1091	646		538	807	612	
Rate         4.077         4.107         4.107         4.087         4.087         4.049         4.073         4.060         4.014           Std Dev         0.190         0.226         0.264         0.212         0.161         0.160         0.223         0.243           Amount         521465.09         16585.8         11237.1         10619.8         14523.97         13577.26         41724.16         29354         15553.4           Trades         23738         1135         971         810         544         399         1114         1223         763           Perc         3.181         2.155         2.037         2.785         2.604         8.001         5.629         2.983           2007 IV         Market         IT0187         IT0193         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         3.943         3.970         3.963         3.938         3.950         3.982         3.923         3.898           Std Dev         0.139         0.154         0.198         0.166         0.151         0.183         0.165           Amount         437707.9         12469.1         11737.64         14362.63         15140.6				3.664	2.375		5.182	5.018		
Std Dev         0.190         0.226         0.264         0.212         0.161         0.160         0.223         0.243           Amount         521465.09         16585.8         11237.1         10619.8         14523.97         13577.26         41724.16         29354         15553.4           Trades         23738         1135         971         810         544         399         1114         1223         763           Perc         3.181         2.155         2.037         2.785         2.604         8.001         5.629         2.983           2007 IV         Market         IT0187         IT0193         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         3.943         3.970         3.963         3.938         3.950         3.982         3.923         3.898           Std Dev         0.139         0.154         0.198         0.166         0.151         0.183         0.165           Amount         437707.9         12469.1         11737.64         14362.63         15140.6         25628.34         26735.6         25187.11           Trades         21579         1021         1112         716         404         877	2007 III	Market	IT0187	IT0193	IT0208	IT0224	IT0255	IT0261	IT0269	IT0279
Amount         521465.09         16585.8         11237.1         10619.8         14523.97         13577.26         41724.16         29354         15553.4           Trades         23738         1135         971         810         544         399         1114         1223         763           Perc         3.181         2.155         2.037         2.785         2.604         8.001         5.629         2.983           2007 IV         Market         IT0187         IT0193         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         3.943         3.970         3.963         3.938         3.950         3.982         3.923         3.898           Std Dev         0.139         0.154         0.198         0.166         0.151         0.183         0.165           Amount         437707.9         12469.1         11737.64         14362.63         15140.6         25628.34         26735.6         25187.11           Trades         21579         1021         1112         716         404         877         1047         1080	Rate	4.077	4.107	4.107	4.087	4.087	4.049	4.073	4.060	4.014
Trades         23738         1135         971         810         544         399         1114         1223         763           Perc         3.181         2.155         2.037         2.785         2.604         8.001         5.629         2.983           2007 IV         Market         IT0187         IT0193         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         3.943         3.970         3.963         3.938         3.950         3.982         3.923         3.898           Std Dev         0.139         0.154         0.198         0.166         0.151         0.183         0.165           Amount         437707.9         12469.1         11737.64         14362.63         15140.6         25628.34         26735.6         25187.11           Trades         21579         1021         1112         716         404         877         1047         1080	Std Dev		0.190	0.226	0.264	0.212	0.161	0.160	0.223	0.243
Perc         3.181         2.155         2.037         2.785         2.604         8.001         5.629         2.983           2007 IV         Market         IT0187         IT0193         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         3.943         3.970         3.963         3.938         3.950         3.982         3.923         3.898           Std Dev         0.139         0.154         0.198         0.166         0.151         0.183         0.165           Amount         437707.9         12469.1         11737.64         14362.63         15140.6         25628.34         26735.6         25187.11           Trades         21579         1021         1112         716         404         877         1047         1080	Amount	521465.09	16585.8	11237.1	10619.8	14523.97	13577.26	41724.16	29354	15553.4
2007 IV         Market         IT0187         IT0193         IT0224         IT0255         IT0261         IT0269         IT0279           Rate         3.943         3.970         3.963         3.938         3.950         3.982         3.923         3.898           Std Dev         0.139         0.154         0.198         0.166         0.151         0.183         0.165           Amount         437707.9         12469.1         11737.64         14362.63         15140.6         25628.34         26735.6         25187.11           Trades         21579         1021         1112         716         404         877         1047         1080	Trades	23738	1135	971	810	544	399	1114	1223	763
Rate         3.943         3.970         3.963         3.938         3.950         3.982         3.923         3.898           Std Dev         0.139         0.154         0.198         0.166         0.151         0.183         0.165           Amount         437707.9         12469.1         11737.64         14362.63         15140.6         25628.34         26735.6         25187.11           Trades         21579         1021         1112         716         404         877         1047         1080	Perc		3.181	2.155	2.037	2.785	2.604	8.001	5.629	2.983
Std Dev     0.139     0.154     0.198     0.166     0.151     0.183     0.165       Amount     437707.9     12469.1     11737.64     14362.63     15140.6     25628.34     26735.6     25187.11       Trades     21579     1021     1112     716     404     877     1047     1080	2007 IV	Market	IT0187	IT0193	IT0224	IT0255	IT0261	IT0269	IT0279	
Amount 437707.9 12469.1 11737.64 14362.63 15140.6 25628.34 26735.6 25187.11 Trades 21579 1021 1112 716 404 877 1047 1080	Rate	3.943	3.970	3.963	3.938	3.950	3.982	3.923	3.898	
Trades 21579 1021 1112 716 404 877 1047 1080	Std Dev		0.139		0.198	0.166		0.183	0.165	
	Amount	437707.9	12469.1	11737.64	14362.63	15140.6	25628.34	26735.6	25187.11	
Perc 2.849 2.682 3.281 3.459 5.855 6.108 5.754	Trades	21579	1021	1112	716	404	877	1047	1080	
	Perc		2.849	2.682	3.281	3.459	5.855	6.108	5.754	

Legend: Rate: mean rate; Std dev: standard deviation of interest rate; Amount: total amount lent; Perc: market share of total amount traded; Trades: number of trades.

	Table 10	: Descript	ive statist	ics for the	big lende	ers for 200	8-2009	
2008 I	Market	IT0193	IT0224	IT0255	IT0264	IT0269	IT0279	
Rate	4.04	4.042	4.039	4.030	4.041	4.036	4.002	
Std Dev		0.097	0.087	0.083	0.088	0.109	0.110	
Amount	405109.34	10300	16614.19	21132.39	21185	14031.21	25890.26	
Trades		1012	729	517	332	612	992	
Perc		2.543	4.101	5.216	5.229	3.464	6.391	
2008 II	Market	IT0193	IT0198	IT0224	IT0255	IT0261	IT0269	IT0279
Rate	3.971	3.977	3.958	3.975	3.991	3.978	3.947	3.962
Std Dev		0.111	0.150	0.101	0.101	0.113	0.149	0.139
Amount	430543.410	10396.07	18608.55	19576.1	31479.4	21037.39	18635.8	23607.4
Trades		864	776	741	402	430	668	850
$\operatorname{Perc}$		2.415	4.322	4.547	7.312	4.886	4.328	5.483
2008 III	Market	IT0164	IT0186	IT0193	IT0224	IT0242	IT0255	IT0264
Rate	4.218	4.234	4.211	4.245	4.247	4.227	4.205	4.205
Std Dev		0.212	0.200	0.173	0.189	0.201	0.168	0.206
Amount	373334.62	11000.6	11859.85	12843.8	20315.65	7512.4	23743.4	14840.7
Trades		607	454	1059	631	534	519	294
Perc		2.947	3.177	3.440	5.442	2.012	6.360	3.975
2008 IV	Market	IT0164	IT0175	IT0224	IT0255	IT0269	IT0279	
Rate	3.061	3.043	3.105	3.157	2.923	3.024	2.852	
Std Dev		0.680	0.580	0.617	0.547	0.379	0.585	
Amount	301774.06	7350.9	6135.4	10358.1	12520	9165.5	9972.85	
Trades		353	410	378	236	309	486	
Perc		2.436	2.033	3.432	4.149	3.037	3.305	
2009 I	Market	IT0173	IT0190	IT0193	IT0203	IT0208	IT0224	
Rate	1.234	1.332	1.269	1.154	1.116	1.203	1.159	
Std Dev	1.201	0.400	0.409	0.241	0.295	0.454	0.333	
Amount	236035.41	7710.5	7582.6	5605.81	19758.5	7993.2	10263.25	
Trades	200000.11	376	361	490	500	681	367	
Perc		3.267	3.212	2.375	8.371	3.386	4.348	
2009 II	Market	IT0175	IT0193	IT0224	IT0260	IT0261	IT0279	
Rate	0.668	0.653	0.656	0.660	0.762	0.714	0.649	
Std Dev	0.000	0.224	0.234	0.234	0.247	0.179	0.244	
Amount	263223.96	6146.1	6740.4	14973.45	13034.8	15428.81	13050.3	
Trades	_000.00	404	554	603	502	217	574	
Perc		2.335	2.561	5.688	4.952	5.861	4.958	
2009 III	Market	IT0175	IT0193	IT0197	IT0224	IT0279	1.000	
Rate	0.329	0.330	0.323	0.296	0.335	0.340		
Std Dev	0.023	0.050	0.065	0.230	0.056	0.069		
Amount	193894.12	4600.65	6898.7	9605	12577.7	8897.45		
Trades	100001.12	357	660	434	635	454		
Perc		2.373	3.558	4.954	6.487	4.589		
2009 IV	Market	IT0193	IT0197	IT0208	IT0224	IT0260		
Rate	0.295	0.298	0.277	0.274	0.307	0.310		
Std Dev	0.233	0.298 $0.053$	0.211	0.274	0.044	0.063		
Amount	224112.92	5025.95	17201.5	5390.9	10915.23	11945.75		
Trades	44 <del>1</del> 114.74	473	601	380	413	497		
Perc		2.243	7.675	2.405	4.870	5.330		

Legend: Rate: mean rate; Std dev: standard deviation of interest rate; Amount: total amount lent; Perc: market share of total amount traded; Trades: number of trades.

Table 11: Descriptive statistics for the big borrowers for 2006-2007

		ii. Descrip	tive statist	ics for the	516 5011011	CIB 101 2000			
2006 I	Market	IT0180	IT0188	IT0210	IT0267	IT0268	IT0270	IT0271	IT0272
Rate	2.398	2.395	2.397	2.422	2.391	2.413	2.444	2.379	2.401
Std dev		0.116	0.120	0.114	0.153	0.116	0.137	0.115	0.113
Amount	579586.34	49602.47	26287.85	29987.04	26762.21	36694.67	30992.74	55214.2	53024.21
Trades		863	1071	1545	1169	1541	1504	1175	1765
Perc		8.558	4.536	5.174	4.617	6.331	5.347	9.526	9.149
2006 II	Market	IT0162	IT0203	IT0210	IT0267	IT0268	IT0270	IT0271	IT0272
Rate	2.628	2.630	2.601	2.634	2.613	2.647	2.619	2.654	2.649
Std dev		0.110	0.122	0.107	0.142	0.110	0.107	0.137	0.124
Amount	594392.460	28374.29	24189.91	26445.09	35761.08	39204.62	40115.99	54166.11	48513.01
Trades		1709	689	1335	1356	1748	1812	1161	1495
Perc		4.774	4.070	4.449	6.016	6.596	6.749	9.113	8.162
2006 III	Market	IT0168	IT0210	IT0214	IT0267	IT0268	IT0270	IT0271	IT0272
Rate	2.927	2.925	2.957	2.907	2.907	2.958	2.930	2.920	2.936
Std dev		0.137	0.122	0.128	0.150	0.123	0.128	0.126	0.130
Amount	557422.51	10218.6	31080.3	9886.04	33489.87	29186.21	50346.43	65052.01	71152.12
Trades		407	1726	425	1215	1370	2084	1244	1990
Perc		1.833	5.576	1.774	6.008	5.236	9.032	11.670	12.764
2006 IV	Market	IT0162	IT0168	IT0203	IT0210	IT0268	IT0270	IT0271	IT0272
Rate	3.363	3.411	3.370	3.365	3.360	3.340	3.304	3.361	3.402
Std dev	0.000	0.182	0.138	0.162	0.146	0.106	0.096	0.166	0.175
Amount	496636.84	15382.900	11688.080	19959.300	31729.700	37916.490	25219.950	37406.380	51845.820
Trades	100000.01	854	539	784	1804	1550	1231	935	1681
Perc		3.097	2.353	4.019	6.389	7.635	5.078	7.532	10.439
2007 I	Market	IT0162	IT0168	IT0210	IT0254	IT0256	IT0271	IT0272	10.100
Rate	3.601	3.587	3.593	3.618	3.538	3.586	3.571	3.613	
Std dev	0.001	0.129	0.158	0.114	0.257	0.172	0.119	0.115	
Amount	489614.46	15146.100	17888.600	30702.350	23333.530	20877.510	23503.700	67870.250	
Trades	100011110	880.000	643.000	1440.000	598.000	731.000	534.000	1999.000	
Perc				6.271	4.766	4.264	4.800		
2007 II		3.093	3.654					13.862	
	Market	3.093 IT0162	3.654 IT0165					13.862 IT0272	
Rate	Market 3 849	IT0162	IT0165	IT0168	IT0210	IT0256	IT0270	IT0272	
Rate Std dev	Market 3.849	IT0162 3.896	IT0165 3.855	IT0168 3.857	IT0210 3.879	IT0256 3.860	IT0270 3.853	IT0272 3.875	
Std dev	3.849	3.896 0.126	IT0165 3.855 0.137	IT0168 3.857 0.202	3.879 0.132	3.860 0.125	3.853 0.154	3.875 0.148	
Std dev Amount		3.896 0.126 19146.45	IT0165 3.855 0.137 19445.89	IT0168 3.857 0.202 10356.25	IT0210 3.879 0.132 27724.92	IT0256 3.860 0.125 14389.2	IT0270 3.853 0.154 36803.91	1T0272 3.875 0.148 48250.03	
Std dev Amount Trades	3.849	3.896 0.126 19146.45 815	IT0165 3.855 0.137 19445.89 1035	3.857 0.202 10356.25 382	3.879 0.132 27724.92 1312	IT0256 3.860 0.125 14389.2 511	3.853 0.154 36803.91 1592	3.875 0.148 48250.03 1549	
Std dev Amount Trades Perc	3.849 459956.79	3.896 0.126 19146.45 815 4.163	3.855 0.137 19445.89 1035 4.228	3.857 0.202 10356.25 382 2.252	3.879 0.132 27724.92 1312 6.028	IT0256 3.860 0.125 14389.2 511 3.128	3.853 0.154 36803.91 1592 8.002	3.875 0.148 48250.03 1549 10.490	IT0278
Std dev Amount Trades Perc 2007 III	3.849 459956.79 Market	IT0162 3.896 0.126 19146.45 815 4.163 IT0162	IT0165 3.855 0.137 19445.89 1035 4.228 IT0165	IT0168 3.857 0.202 10356.25 382 2.252 IT0210	IT0210 3.879 0.132 27724.92 1312 6.028 IT0258	IT0256 3.860 0.125 14389.2 511 3.128 IT0267	IT0270 3.853 0.154 36803.91 1592 8.002 IT0270	3.875 0.148 48250.03 1549 10.490 IT0272	IT0278 4 043
Std dev Amount Trades Perc 2007 III Rate	3.849 459956.79	IT0162 3.896 0.126 19146.45 815 4.163 IT0162 4.093	IT0165 3.855 0.137 19445.89 1035 4.228 IT0165 4.105	IT0168 3.857 0.202 10356.25 382 2.252 IT0210 4.128	IT0210 3.879 0.132 27724.92 1312 6.028 IT0258 4.056	IT0256 3.860 0.125 14389.2 511 3.128 IT0267 4.057	IT0270 3.853 0.154 36803.91 1592 8.002 IT0270 4.075	IT0272 3.875 0.148 48250.03 1549 10.490 IT0272 4.037	4.043
Std dev Amount Trades Perc 2007 III Rate Std dev	3.849 459956.79 Market 4.077	IT0162 3.896 0.126 19146.45 815 4.163 IT0162 4.093 0.219	IT0165 3.855 0.137 19445.89 1035 4.228 IT0165 4.105 0.208	IT0168 3.857 0.202 10356.25 382 2.252 IT0210 4.128 0.191	IT0210 3.879 0.132 27724.92 1312 6.028 IT0258 4.056 0.216	IT0256 3.860 0.125 14389.2 511 3.128 IT0267 4.057 0.237	IT0270 3.853 0.154 36803.91 1592 8.002 IT0270 4.075 0.132	IT0272 3.875 0.148 48250.03 1549 10.490 IT0272 4.037 0.170	4.043 0.216
Std dev Amount Trades Perc 2007 III Rate Std dev Amount	3.849 459956.79 Market	IT0162 3.896 0.126 19146.45 815 4.163 IT0162 4.093 0.219 23595.8	IT0165 3.855 0.137 19445.89 1035 4.228 IT0165 4.105 0.208 16739.7	IT0168 3.857 0.202 10356.25 382 2.252 IT0210 4.128 0.191 36265.25	IT0210 3.879 0.132 27724.92 1312 6.028 IT0258 4.056 0.216 17083.42	IT0256 3.860 0.125 14389.2 511 3.128 IT0267 4.057 0.237 27062.44	IT0270 3.853 0.154 36803.91 1592 8.002 IT0270 4.075 0.132 39790.34	IT0272 3.875 0.148 48250.03 1549 10.490 IT0272 4.037 0.170 46643.64	4.043 0.216 25206.78
Std dev Amount Trades Perc 2007 III Rate Std dev Amount Trades	3.849 459956.79 Market 4.077	IT0162 3.896 0.126 19146.45 815 4.163 IT0162 4.093 0.219 23595.8 1273	IT0165 3.855 0.137 19445.89 1035 4.228 IT0165 4.105 0.208 16739.7 1002	IT0168 3.857 0.202 10356.25 382 2.252 IT0210 4.128 0.191 36265.25 1605	IT0210 3.879 0.132 27724.92 1312 6.028 IT0258 4.056 0.216 17083.42 643	IT0256 3.860 0.125 14389.2 511 3.128 IT0267 4.057 0.237 27062.44 1055	IT0270 3.853 0.154 36803.91 1592 8.002 IT0270 4.075 0.132 39790.34 1755	IT0272 3.875 0.148 48250.03 1549 10.490 IT0272 4.037 0.170 46643.64 1286	4.043 0.216 25206.78 1071
Std dev Amount Trades Perc 2007 III Rate Std dev Amount Trades Perc	3.849 459956.79  Market 4.077 521465.09	IT0162 3.896 0.126 19146.45 815 4.163 IT0162 4.093 0.219 23595.8 1273 4.525	IT0165 3.855 0.137 19445.89 1035 4.228 IT0165 4.105 0.208 16739.7 1002 3.210	IT0168 3.857 0.202 10356.25 382 2.252 IT0210 4.128 0.191 36265.25 1605 6.954	IT0210 3.879 0.132 27724.92 1312 6.028 IT0258 4.056 0.216 17083.42 643 3.276	IT0256 3.860 0.125 14389.2 511 3.128 IT0267 4.057 0.237 27062.44 1055 5.190	IT0270 3.853 0.154 36803.91 1592 8.002 IT0270 4.075 0.132 39790.34 1755 7.630	IT0272 3.875 0.148 48250.03 1549 10.490 IT0272 4.037 0.170 46643.64 1286 8.945	4.043 0.216 25206.78
Std dev Amount Trades Perc 2007 III Rate Std dev Amount Trades Perc 2007 IV	3.849 459956.79  Market 4.077 521465.09  Market	IT0162 3.896 0.126 19146.45 815 4.163 IT0162 4.093 0.219 23595.8 1273 4.525 IT0160	IT0165 3.855 0.137 19445.89 1035 4.228 IT0165 4.105 0.208 16739.7 1002 3.210 IT0162	IT0168 3.857 0.202 10356.25 382 2.252 IT0210 4.128 0.191 36265.25 1605 6.954 IT0165	IT0210 3.879 0.132 27724.92 1312 6.028 IT0258 4.056 0.216 17083.42 643 3.276 IT0210	IT0256 3.860 0.125 14389.2 511 3.128 IT0267 4.057 0.237 27062.44 1055 5.190 IT0267	IT0270 3.853 0.154 36803.91 1592 8.002 IT0270 4.075 0.132 39790.34 1755 7.630 IT0272	IT0272 3.875 0.148 48250.03 1549 10.490 IT0272 4.037 0.170 46643.64 1286 8.945 IT0278	4.043 0.216 25206.78 1071
Std dev Amount Trades Perc 2007 III Rate Std dev Amount Trades Perc 2007 IV Rate	3.849 459956.79  Market 4.077 521465.09	IT0162 3.896 0.126 19146.45 815 4.163 IT0162 4.093 0.219 23595.8 1273 4.525 IT0160 3.908	IT0165 3.855 0.137 19445.89 1035 4.228 IT0165 4.105 0.208 16739.7 1002 3.210 IT0162 3.972	IT0168 3.857 0.202 10356.25 382 2.252 IT0210 4.128 0.191 36265.25 1605 6.954 IT0165 3.966	IT0210 3.879 0.132 27724.92 1312 6.028 IT0258 4.056 0.216 17083.42 643 3.276 IT0210 3.978	IT0256 3.860 0.125 14389.2 511 3.128 IT0267 4.057 0.237 27062.44 1055 5.190 IT0267 3.846	IT0270 3.853 0.154 36803.91 1592 8.002 IT0270 4.075 0.132 39790.34 1755 7.630 IT0272 3.852	IT0272 3.875 0.148 48250.03 1549 10.490 IT0272 4.037 0.170 46643.64 1286 8.945 IT0278 3.942	4.043 0.216 25206.78 1071
Std dev Amount Trades Perc 2007 III Rate Std dev Amount Trades Perc 2007 IV Rate Std dev	3.849 459956.79  Market 4.077 521465.09  Market 3.943	IT0162 3.896 0.126 19146.45 815 4.163 IT0162 4.093 0.219 23595.8 1273 4.525 IT0160 3.908 0.207	IT0165 3.855 0.137 19445.89 1035 4.228 IT0165 4.105 0.208 16739.7 1002 3.210 IT0162 3.972 0.134	IT0168 3.857 0.202 10356.25 382 2.252 IT0210 4.128 0.191 36265.25 1605 6.954 IT0165 3.966 0.136	IT0210 3.879 0.132 27724.92 1312 6.028 IT0258 4.056 0.216 17083.42 643 3.276 IT0210 3.978 0.114	IT0256 3.860 0.125 14389.2 511 3.128 IT0267 4.057 0.237 27062.44 1055 5.190 IT0267 3.846 0.230	IT0270 3.853 0.154 36803.91 1592 8.002 IT0270 4.075 0.132 39790.34 1755 7.630 IT0272 3.852 0.169	IT0272 3.875 0.148 48250.03 1549 10.490 IT0272 4.037 0.170 46643.64 1286 8.945 IT0278 3.942 0.157	4.043 0.216 25206.78 1071
Std dev Amount Trades Perc 2007 III Rate Std dev Amount Trades Perc 2007 IV Rate Std dev Amount	3.849 459956.79  Market 4.077 521465.09  Market	IT0162 3.896 0.126 19146.45 815 4.163 IT0162 4.093 0.219 23595.8 1273 4.525 IT0160 3.908 0.207 24076.25	IT0165  3.855 0.137 19445.89 1035 4.228 IT0165 4.105 0.208 16739.7 1002 3.210 IT0162 3.972 0.134 24700.15	IT0168  3.857 0.202 10356.25 382 2.252 IT0210 4.128 0.191 36265.25 1605 6.954 IT0165 3.966 0.136 23738.45	IT0210 3.879 0.132 27724.92 1312 6.028 IT0258 4.056 0.216 17083.42 643 3.276 IT0210 3.978 0.114 28452.1	IT0256 3.860 0.125 14389.2 511 3.128 IT0267 4.057 0.237 27062.44 1055 5.190 IT0267 3.846 0.230 18018.68	IT0270 3.853 0.154 36803.91 1592 8.002 IT0270 4.075 0.132 39790.34 1755 7.630 IT0272 3.852 0.169 21080.15	IT0272 3.875 0.148 48250.03 1549 10.490 IT0272 4.037 0.170 46643.64 1286 8.945 IT0278 3.942 0.157 26273.19	4.043 0.216 25206.78 1071
Std dev Amount Trades Perc 2007 III Rate Std dev Amount Trades Perc 2007 IV Rate Std dev	3.849 459956.79  Market 4.077 521465.09  Market 3.943	IT0162 3.896 0.126 19146.45 815 4.163 IT0162 4.093 0.219 23595.8 1273 4.525 IT0160 3.908 0.207	IT0165 3.855 0.137 19445.89 1035 4.228 IT0165 4.105 0.208 16739.7 1002 3.210 IT0162 3.972 0.134	IT0168 3.857 0.202 10356.25 382 2.252 IT0210 4.128 0.191 36265.25 1605 6.954 IT0165 3.966 0.136	IT0210 3.879 0.132 27724.92 1312 6.028 IT0258 4.056 0.216 17083.42 643 3.276 IT0210 3.978 0.114	IT0256 3.860 0.125 14389.2 511 3.128 IT0267 4.057 0.237 27062.44 1055 5.190 IT0267 3.846 0.230	IT0270 3.853 0.154 36803.91 1592 8.002 IT0270 4.075 0.132 39790.34 1755 7.630 IT0272 3.852 0.169	IT0272 3.875 0.148 48250.03 1549 10.490 IT0272 4.037 0.170 46643.64 1286 8.945 IT0278 3.942 0.157	4.043 0.216 25206.78 1071

Legend: Rate: mean rate; Std dev: standard deviation of interest rates; Amount: total amount borrowed; Perc: market share of total amount traded; Trades: number of trades.

	Table 12		ive statist	ics for the	big borr	owers for	2008-2009	
2008 I	Market	IT0162	IT0165	IT0168	IT0210	IT0258	IT0270	IT0278
Rate	4.04	4.046	4.058	4.036	4.042	4.061	4.022	4.039
Std dev		0.080	0.079	0.100	0.080	0.104	0.082	0.084
Amount	405109.34	31604.6	27394.5	24446	18487.7	31544.49	22178.71	22094.95
Trades		1369	1837	848	902	1446	943	963
Perc		7.801	6.762	6.034	4.564	7.787	5.475	5.454
2008 II	Market	IT0159	IT0160	IT0165	IT0253	IT0258	IT0267	IT0278
Rate	3.971	3.940	3.972	3.994	3.946	3.970	3.959	3.987
Std dev		0.146	0.130	0.088	0.133	0.107	0.149	0.105
Amount	430543.410	37007.06	22068.7	22238.7	39070	19124.52	19769.45	34495.2
Trades		1169	853	1353	883	873	947	1559
Perc		8.595	5.126	5.165	9.075	4.442	4.592	8.012
2008 III	Market	IT0162	IT0165	IT0253	IT0258	IT0267	IT0270	IT0278
Rate	4.218	4.214	4.262	4.117	4.233	4.199	4.163	4.262
Std dev		0.172	0.156	0.291	0.134	0.233	0.229	0.149
Amount	373334.62	18738.7	15024.4	15395.85	17053	33971.9	19721.8	51083.3
Trades		956	972	307	748	822	885	2316
Perc		5.019	4.024	4.124	4.568	9.100	5.283	13.683
2008 IV	Market	IT0159	IT0160	IT0165	IT0237	IT0253	IT0267	
Rate	3.061	3.061	3.044	3.097	3.984	3.146	3.268	
Std dev		0.484	0.618	0.571	0.394	0.389	0.615	
Amount	301774.06	22376.42	17426.3	19842.6	15735.3	15705.9	41928.21	
Trades		608	924	1257	418	404	562	
Perc		7.415	5.775	6.575	5.214	5.205	13.894	
2009 I	Market	IT0160	IT0165	IT0168	IT0265	IT0270	IT0284	
Rate	1.234	1.370	1.276	1.040	1.150	1.023	1.072	
Std dev		0.435	0.421	0.224	0.354	0.298	0.255	
Amount	236035.41	26875.4	16260.9	27433.3	21942.9	12048.7	16597.7	
Trades		1146	1116	1155	974	629	798	
Perc		11.386	6.889	11.623	9.296	5.105	7.032	
2009 II	Market	IT0159	IT0160	IT0165	IT0168	IT0265	IT0284	
Rate	0.668	0.585	0.719	0.660	0.666	0.603	0.584	
Std dev		0.198	0.239	0.210	0.170	0.226	0.211	
Amount	263223.96	16566	19573.9	16596.95	32762.1	22318.04	28710.7	
Trades		552	792	1034	1274	939	1151	
Perc		6.294	7.436	6.305	12.446	8.479	10.907	
2009 III	Market	IT0160	IT0165	IT0168	IT0223	IT0265		
Rate	0.329	0.356	0.312	0.296	0.355	0.291		
$\operatorname{Std} \operatorname{dev}$		0.061	0.050	0.050	0.070	0.044		
Amount	193894.12	19757.3	9132.7	31526.19	6739.2	14031.09		
Trades		643	669	1405	729	639		
Perc		10.190	4.710	16.259	3.476	7.236		
2009 IV	Market	IT0159	IT0160	IT0168	IT0265	IT0284		
Rate	0.295	0.276	0.342	0.296	0.281	0.281		
Std dev		0.048	0.067	0.066	0.040	0.044		
Amount	224112.92	26045.08	26743.25	38465.7	16226.9	17045		
Trades		922	967	1718	736	664		
Perc		11.621	11.933	17.164	7.241	7.606		

Legend: Rate: mean rate; Std dev: standard deviation of interest rates; Amount: total amount borrowed; Perc: market share of total amount traded; Trades: number of trades.

Table 13: Average lending rates offered by the big lenders to 4 groups of borrowers (2006-2007)

ie 15. Average ie								
2006 I	GR0006	IT0185	IT0187	IT0257	IT0258	IT0259	IT0269	IT0278
F	0.270	3.176	2.951	1.636	2.094	4.290	5.868	1.076
Pvalue	0.847	0.024	0.032	0.179	0.099	0.005	0.001	0.358
Rate Group 1		2.397	2.375		2.390	2.376	2.389	
Rate Group 2		2.411	2.393		2.385	2.449	2.380	
Rate Group 3		2.460	2.402		2.411	2.423	2.432	
Rate Group 4		2.430	2.416		2.410	2.411	2.420	
2006 II	IT0185	IT0187	IT0258	IT0259	IT0261	IT0265	IT0269	IT0279
F	1.797	3.098	11.665	4.209	1.329	0.393	2.426	8.433
Pvalue	0.147	0.026	0.000	0.006	0.264	0.758	0.064	0.000
Rate Group 1		2.670	2.609	2.656			2.622	2.634
Rate Group 2		2.622	2.672	2.688			2.599	2.715
Rate Group 3		2.613	2.628	2.672			2.608	2.653
Rate Group 4		2.630	2.601	2.638			2.622	2.658
2006 III	IT0193	IT0258	IT0259	IT0261	IT0263	IT0265	IT0269	IT0279
F	2.244	0.269	0.326	0.580	0.754	2.654	5.112	10.613
Pvalue	0.082	0.848	0.807	0.628	0.521	0.049	0.002	0.000
Rate Group 1	2.979					2.906	2.949	2.828
Rate Group 2	2.921					2.812	2.940	2.927
Rate Group 3	2.956					2.921	2.894	2.918
Rate Group 4	2.937					2.923	2.927	2.917
2006 IV	GR0006	IT0173	IT0187	IT0193	IT0242	IT0265	IT0269	IT0279
F	0.689	0.756	2.035	0.447	5.942	1.127	2.963	1.190
Pvalue	0.559	0.519	0.108	0.719	0.001	0.339	0.031	0.312
Rate Group 1	0.000	0.010	3.324	0.110	3.407	0.000	3.419	0.012
Rate Group 2			3.401		3.452		3.372	
Rate Group 3			3.381		3.437		3.352	
Rate Group 4			3.384		3.377		3.350	
2007 I	IT0187	IT0193	IT0198	IT0257	IT0261	IT0269	IT0279	
F	2.158	3.494	1.189	1.117	0.273	0.324	1.234	
Pvalue	0.091	0.015	0.313	0.341	0.845	0.808	0.296	
Rate Group 1	3.578	3.601	0.010	0.011	0.010	0.000	0.200	
Rate Group 2	3.616	3.581						
Rate Group 3	3.623	3.581						
Rate Group 4	3.612	3.623						
2007 II	IT0185	IT0187	IT0208	IT0257	IT0261	IT0269	IT0279	
F	2.249	1.731	6.314	5.444	0.327	3.956	0.397	
Pvalue	0.082	0.159	0.000	0.001	0.806	0.008	0.756	
Rate Group 1	3.917	0.103	3.952	3.857	0.000	3.907	0.100	
Rate Group 2	3.867		3.873	3.870		3.814		
Rate Group 3	3.878		3.869	3.876		3.837		
Rate Group 4	3.871		3.831	3.837		3.816		
2007 III	IT0187	IT0193	IT0208	IT0224	IT0255	IT0261	IT0269	IT0279
F	1.720	1.184	3.722	4.969	0.492	1.118	3.844	1.673
Pvalue	0.161	0.315	0.011	0.002	0.688	0.341	0.009	0.171
Rate Group 1	0.101	0.010	4.191	3.980	0.000	0.011	4.081	0.111
Rate Group 2			4.121	4.078			4.093	
Rate Group 3			4.070	4.065			4.074	
Rate Group 4			4.070 $4.073$	4.005 $4.116$			4.040	
2007 IV	IT0187	IT0193	IT0224	IT0255	IT0261	IT0269	IT0279	
F	7.792	1.968	0.659	$\frac{110233}{2.227}$	1.414	5.411	0.286	
Pvalue	0.000	0.117	0.639 $0.577$	0.084	0.237	0.001	0.280 $0.836$	
Rate Group 1	3.858	0.111	0.011	3.984	0.201	3.996	0.000	
Rate Group 1 Rate Group 2	3.972			3.964 $3.978$		3.956		
Rate Group 3	3.980			3.970		3.920		
Rate Group 3 Rate Group 4	3.980 $3.971$			3.970 $3.932$		3.920 $3.909$		
Trace Group 4	0.311			0.304		0.000		

Legend: F: test of the Analysis of Variance. Pvalue: Probability of the F test. Rate Group 1–Rate Group 4: average rates of the 4 group of borrowers.

Table 14: Average lending rates offered by the big lenders to 4 groups of borrowers (2008-2009).

Average lendin							rowers (2
2008 I	IT0193	IT0224	IT0255	IT0264	IT0269	IT0279	
F	0.857	1.539	2.389	0.955	0.774	0.971	
Pvalue	0.463	0.203	0.068	0.414	0.509	0.406	
Rate Group 1			4.032				
Rate Group 2			4.045				
Rate Group 3			4.016				
Rate Group 4	TTT0100	T/T/0100	4.033	ITTOOFF	ITTOOC1	TTTOOCO	ITTOOTO
2008 II F	IT0193	IT0198	IT0224	IT0255	IT0261	IT0269	IT0279
	0.628	6.515	1.136	1.132	8.453	1.763	0.379
Pvalue	0.597	0.000	0.334	0.336	0.000	0.153	0.768
Rate Group 1 Rate Group 2		$3.994 \\ 3.974$			$3.876 \\ 3.987$		
Rate Group 3		3.984			3.977		
Rate Group 4		3.936			3.987		
2008 III	IT0164	IT0186	IT0193	IT0224	IT0242	IT0255	IT0264
F	1.146	5.000	6.424	4.807	0.045	1.738	0.570
PROB	0.330	0.002	0.000	0.003	0.043 $0.987$	0.158	0.635
Rate Group 1	0.550	4.004	4.286	4.150	0.501	0.100	0.050
Rate Group 2		4.230	4.257	4.217			
Rate Group 3		4.235	4.271	4.240			
Rate Group 4		4.215	4.223	4.268			
2008 IV	IT0164	IT0175	IT0224	IT0255	IT0269	IT0279	
F	8.847	3.826	2.092	1.183	0.717	1.867	
Pvalue	0.000	0.010	0.101	0.317	0.543	0.134	
Rate Group 1	2.595	2.923	2.870	0.01.	0.010	0.101	
Rate Group 2	3.029	3.032	3.156				
Rate Group 3	2.830	3.239	3.212				
Rate Group 4	3.186	3.066	3.165				
2009 I	IT0173	IT0190	IT0193	IT0203	IT0208	IT0224	
F	8.482	2.895	1.700	4.211	3.355	6.745	
Pvalue	0.000	0.035	0.166	0.006	0.019	0.000	
Rate Group 1	1.136	1.500		1.122	1.154	1.228	
Rate Group 2	1.392	1.229		1.091	1.210	0.992	
Rate Group 3	1.469	1.216		1.043	1.271	1.087	
Rate Group 4	1.255	1.269		1.153	1.149	1.209	
2009 II	IT0175	IT0193	IT0224	IT0260	IT0261	IT0279	
F	4.294	1.223	0.954	3.549	5.067	5.780	
Pvalue	0.005	0.301	0.414	0.014	0.002	0.001	
Rate Group 1	0.562			0.823	0.798	0.614	
Rate Group 2	0.643			0.743	0.823	0.580	
Rate Group 3	0.576			0.696	0.706	0.614	
Rate Group 4	0.673			0.784	0.689	0.685	
2009 III	IT0175	IT0193	IT0197	IT0224	IT0279		
F	1.069	0.064	1.375	3.530	14.975		
Pvalue	0.362	0.979	0.250	0.015	0.000		
Rate Group 1				0.330	0.301		
Rate Group 2				0.342	0.327		
Rate Group 3				0.322	0.312		
Rate Group 4				0.339	0.356		
2009 IV	IT0193	IT0197	IT0208	IT0224	IT0260		
F	0.748	1.221	9.103	1.299	15.070		
Pvalue	0.524	0.301	0.000	0.274	0.000		
Rate Group 1			0.250		0.386		
Rate Group 2			0.314		0.334		
Rate Group 3			0.271		0.290		
Rate Group 4			0.270		0.310		

 $\label{lem:eq:cond} \mbox{Legend: F: test of the Analysis of Variance. Pvalue: Probability of the F test. Rate Group 1-Rate Group 4: average rates of the 4 group of borrowers.}$ 

Table 15: Average interest rates paid by the big borrowers on loans from 4 groups of lenders (2006-2007)

-2007)								
2006 I	IT0180	IT0188	IT0210	IT0267	IT0268	IT0270	IT0271	IT0272
F	5.778	1.021	2.255	10.832	4.321	6.456	0.887	1.446
Pvalue	0.001	0.382	0.080	0.000	0.005	0.000	0.447	0.228
Rate Group 1	2.407		2.397	2.300	2.378	2.422		
Rate Group 2	2.345		2.410	2.356	2.406	2.482		
Rate Group 3	2.409		2.430	2.376	2.427	2.434		
Rate Group 4	2.395		2.422	2.406	2.409	2.442		
2006 II	IT0162	IT0203	IT0210	IT0267	IT0268	IT0270	IT0271	IT0272
F	1.375	5.226	4.604	6.083	4.582	1.811	1.291	0.712
Pvalue	0.249	0.001	0.003	0.000	0.003	0.143	0.276	0.545
Rate Group 1		2.519	2.659	2.559	2.646			
Rate Group 2		2.610	2.630	2.592	2.640			
Rate Group 3		2.600	2.617	2.596	2.632			
Rate Group 4		2.606	2.640	2.623	2.654			
2006 III	IT0168	IT0210	IT0214	IT0267	IT0268	IT0270	IT0271	IT0272
F	2.455	11.990	3.713	8.992	4.046	1.608	0.260	0.151
Pvalue	0.063	0.000	0.012	0.000	0.007	0.186	0.854	0.929
Rate Group 1	2.850	2.978	2.913	2.798	2.962			
Rate Group 2	2.932	3.001	2.942	2.904	2.979			
Rate Group 3	2.937	2.956	2.926	2.910	2.974			
Rate Group 4	2.926	2.947	2.890	2.913	2.950			
2006 IV	IT0162	IT0168	IT0203	IT0210	IT0268	IT0270	IT0271	IT0272
F	6.314	0.195	3.494	6.158	2.395	3.389	1.596	5.531
Pvalue	0.000	0.900	0.015	0.000	0.067	0.017	0.189	0.001
Rate Group 1	3.350		3.303	3.337				3.385
Rate Group 2	3.386		3.380	3.353				3.405
Rate Group 3	3.451		3.349	3.344				3.433
Rate Group 4	3.402		3.372	3.375				3.391
2007 I	IT0162	IT0168	IT0210	IT0254	IT0256	IT0271	IT0272	
F	5.937	4.060	4.188	6.667	2.373	1.376	2.204	
Pvalue	0.001	0.007	0.006	0.000	0.069	0.249	0.086	
Rate Group 1	3.540	3.499	3.604	3.415	3.554		3.617	
Rate Group 2	3.568	3.598	3.593	3.460	3.543		3.611	
Rate Group 3	3.576	3.593	3.625	$3.533 \\ 3.568$	3.595		3.624 $3.608$	
Rate Group 4				3.308			3 008	
0007 II	3.602	3.599	3.621		3.592	ITTOOTO		
2007 II	IT0162	IT0165	IT0168	IT0210	IT0256	IT0270	IT0272	
F	IT0162 0.797	IT0165 0.952	IT0168 1.700	IT0210 3.805	IT0256 3.818	0.695	IT0272 0.539	
F Pvalue	IT0162	IT0165	IT0168	3.805 0.010	3.818 0.010		IT0272	
F Pvalue Rate Group 1	IT0162 0.797	IT0165 0.952	IT0168 1.700	3.805 0.010 3.850	3.818 0.010 3.786	0.695	IT0272 0.539	
F Pvalue Rate Group 1 Rate Group 2	IT0162 0.797	IT0165 0.952	IT0168 1.700	3.805 0.010 3.850 3.911	3.818 0.010 3.786 3.884	0.695	IT0272 0.539	
F Pvalue Rate Group 1 Rate Group 2 Rate Group 3	IT0162 0.797	IT0165 0.952	IT0168 1.700	3.805 0.010 3.850 3.911 3.871	3.818 0.010 3.786 3.884 3.870	0.695	IT0272 0.539	
F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 4	0.797 0.496	IT0165 0.952 0.415	1.700 0.166	3.805 0.010 3.850 3.911 3.871 3.879	3.818 0.010 3.786 3.884 3.870 3.856	0.695 0.555	1T0272 0.539 0.656	IT0279
F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 4 2007 III	IT0162 0.797 0.496 IT0162	IT0165 0.952 0.415 IT0165	1.700 0.166 IT0210	TT0210 3.805 0.010 3.850 3.911 3.871 3.879 IT0258	3.818 0.010 3.786 3.884 3.870 3.856 IT0267	0.695 0.555 IT0270	IT0272 0.539 0.656 IT0272	IT0278
F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 4 2007 III F	IT0162 0.797 0.496 IT0162 1.403	IT0165 0.952 0.415 IT0165 2.145	IT0168 1.700 0.166 IT0210 1.019	3.805 0.010 3.850 3.911 3.871 3.879 IT0258 0.505	3.818 0.010 3.786 3.884 3.870 3.856 IT0267 2.089	0.695 0.555 IT0270 0.458	IT0272 0.539 0.656 IT0272 0.691	5.262
F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 4 2007 III F Pvalue	IT0162 0.797 0.496 IT0162	IT0165 0.952 0.415 IT0165 2.145 0.093	1.700 0.166 IT0210	TT0210 3.805 0.010 3.850 3.911 3.871 3.879 IT0258	3.818 0.010 3.786 3.884 3.870 3.856 IT0267 2.089 0.100	0.695 0.555 IT0270	IT0272 0.539 0.656 IT0272	
F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 4 2007 III F Pvalue Rate Group 1	IT0162 0.797 0.496 IT0162 1.403	IT0165 0.952 0.415 IT0165 2.145 0.093 4.146	IT0168 1.700 0.166 IT0210 1.019	3.805 0.010 3.850 3.911 3.871 3.879 IT0258 0.505	3.818 0.010 3.786 3.884 3.870 3.856 IT0267 2.089 0.100 4.041	0.695 0.555 IT0270 0.458	IT0272 0.539 0.656 IT0272 0.691	5.262
F Pvalue Rate Group 1 Rate Group 3 Rate Group 4 2007 III F Pvalue Rate Group 1 Rate Group 2	IT0162 0.797 0.496 IT0162 1.403	IT0165 0.952 0.415 IT0165 2.145 0.093 4.146 4.127	IT0168 1.700 0.166 IT0210 1.019	3.805 0.010 3.850 3.911 3.871 3.879 IT0258 0.505	IT0256 3.818 0.010 3.786 3.884 3.870 3.856 IT0267 2.089 0.100 4.041 4.090	0.695 0.555 IT0270 0.458	IT0272 0.539 0.656 IT0272 0.691	5.262
F Pvalue Rate Group 1 Rate Group 3 Rate Group 4 2007 III F Pvalue Rate Group 1 Rate Group 2 Rate Group 3	IT0162 0.797 0.496 IT0162 1.403	IT0165 0.952 0.415 IT0165 2.145 0.093 4.146 4.127 4.088	IT0168 1.700 0.166 IT0210 1.019	3.805 0.010 3.850 3.911 3.871 3.879 IT0258 0.505	IT0256 3.818 0.010 3.786 3.884 3.870 3.856 IT0267 2.089 0.100 4.041 4.090 4.029	0.695 0.555 IT0270 0.458	IT0272 0.539 0.656 IT0272 0.691	5.262
F Pvalue Rate Group 1 Rate Group 3 Rate Group 4 2007 III F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 4	IT0162 0.797 0.496 IT0162 1.403 0.240	IT0165 0.952 0.415 IT0165 2.145 0.093 4.146 4.127 4.088 4.102	IT0168 1.700 0.166 IT0210 1.019 0.383	3.805 0.010 3.850 3.911 3.871 3.879 IT0258 0.505 0.679	IT0256 3.818 0.010 3.786 3.884 3.870 3.856 IT0267 2.089 0.100 4.041 4.090 4.029 4.064	0.695 0.555 IT0270 0.458 0.712	IT0272 0.539 0.656 IT0272 0.691 0.558	5.262
F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 4 2007 III F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 3 Rate Group 4 2007 IV	IT0162 0.797 0.496 IT0162 1.403 0.240	IT0165 0.952 0.415 IT0165 2.145 0.093 4.146 4.127 4.088 4.102 IT0162	IT0168 1.700 0.166 IT0210 1.019 0.383	IT0210 3.805 0.010 3.850 3.911 3.871 3.879 IT0258 0.505 0.679	IT0256 3.818 0.010 3.786 3.884 3.870 3.856 IT0267 2.089 0.100 4.041 4.090 4.029 4.064 IT0267	0.695 0.555 IT0270 0.458 0.712	IT0272 0.539 0.656 IT0272 0.691 0.558	5.262
F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 4 2007 III F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 3 Rate Group 4 2007 IV F	IT0162 0.797 0.496 IT0162 1.403 0.240 IT0160 9.271	IT0165 0.952 0.415 IT0165 2.145 0.093 4.146 4.127 4.088 4.102 IT0162 0.064	IT0168 1.700 0.166 IT0210 1.019 0.383 IT0165 4.086	IT0210 3.805 0.010 3.850 3.911 3.871 3.879 IT0258 0.505 0.679  IT0210 3.394	IT0256 3.818 0.010 3.786 3.884 3.870 3.856 IT0267 2.089 0.100 4.041 4.090 4.029 4.064 IT0267 20.041	0.695 0.555 IT0270 0.458 0.712 IT0272 4.578	IT0272 0.539 0.656 IT0272 0.691 0.558 IT0278 2.703	5.262
F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 4 2007 III F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 3 Rate Group 4 2007 IV F Pvalue	IT0162 0.797 0.496 IT0162 1.403 0.240 IT0160 9.271 0.000	IT0165 0.952 0.415 IT0165 2.145 0.093 4.146 4.127 4.088 4.102 IT0162	IT0168 1.700 0.166 IT0210 1.019 0.383 IT0165 4.086 0.007	IT0210 3.805 0.010 3.850 3.911 3.871 3.879 IT0258 0.505 0.679  IT0210 3.394 0.017	IT0256 3.818 0.010 3.786 3.884 3.870 3.856 IT0267 2.089 0.100 4.041 4.090 4.029 4.064 IT0267 20.041 0.000	0.695 0.555 IT0270 0.458 0.712 IT0272 4.578 0.004	IT0272 0.539 0.656 IT0272 0.691 0.558 IT0278 2.703 0.044	5.262
F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 4 2007 III F Pvalue Rate Group 1 Rate Group 2 Rate Group 2 Rate Group 3 Rate Group 4 2007 IV F Pvalue Rate Group 1	IT0162 0.797 0.496 IT0162 1.403 0.240 IT0160 9.271 0.000 3.739	IT0165 0.952 0.415 IT0165 2.145 0.093 4.146 4.127 4.088 4.102 IT0162 0.064	IT0168 1.700 0.166 IT0210 1.019 0.383 IT0165 4.086 0.007 3.920	IT0210 3.805 0.010 3.850 3.911 3.871 3.879 IT0258 0.505 0.679  IT0210 3.394 0.017 3.945	IT0256 3.818 0.010 3.786 3.884 3.870 3.856 IT0267 2.089 0.100 4.041 4.090 4.029 4.064 IT0267 20.041 0.000 3.615	0.695 0.555 IT0270 0.458 0.712 IT0272 4.578 0.004 3.751	IT0272 0.539 0.656 IT0272 0.691 0.558 IT0278 2.703 0.044 3.921	5.262
F Pvalue Rate Group 1 Rate Group 2 Rate Group 4 2007 III F Pvalue Rate Group 1 Rate Group 1 Rate Group 3 Rate Group 3 Rate Group 4 2007 IV F Pvalue Rate Group 1 Rate Group 1 Rate Group 2	IT0162 0.797 0.496 IT0162 1.403 0.240 IT0160 9.271 0.000 3.739 3.902	IT0165 0.952 0.415 IT0165 2.145 0.093 4.146 4.127 4.088 4.102 IT0162 0.064	IT0168 1.700 0.166 IT0210 1.019 0.383 IT0165 4.086 0.007 3.920 3.946	IT0210 3.805 0.010 3.850 3.911 3.871 3.879 IT0258 0.505 0.679  IT0210 3.394 0.017 3.945 3.966	IT0256 3.818 0.010 3.786 3.884 3.870 3.856 IT0267 2.089 0.100 4.041 4.090 4.029 4.064 IT0267 20.041 0.000 3.615 3.749	0.695 0.555 1T0270 0.458 0.712 1T0272 4.578 0.004 3.751 3.816	IT0272 0.539 0.656 IT0272 0.691 0.558 IT0278 2.703 0.044 3.921 3.915	5.262
F Pvalue Rate Group 1 Rate Group 2 Rate Group 3 Rate Group 4 2007 III F Pvalue Rate Group 1 Rate Group 2 Rate Group 2 Rate Group 3 Rate Group 4 2007 IV F Pvalue Rate Group 1	IT0162 0.797 0.496 IT0162 1.403 0.240 IT0160 9.271 0.000 3.739	IT0165 0.952 0.415 IT0165 2.145 0.093 4.146 4.127 4.088 4.102 IT0162 0.064	IT0168 1.700 0.166 IT0210 1.019 0.383 IT0165 4.086 0.007 3.920	IT0210 3.805 0.010 3.850 3.911 3.871 3.879 IT0258 0.505 0.679  IT0210 3.394 0.017 3.945	IT0256 3.818 0.010 3.786 3.884 3.870 3.856 IT0267 2.089 0.100 4.041 4.090 4.029 4.064 IT0267 20.041 0.000 3.615	0.695 0.555 IT0270 0.458 0.712 IT0272 4.578 0.004 3.751	IT0272 0.539 0.656 IT0272 0.691 0.558 IT0278 2.703 0.044 3.921	5.262

Legend: F: test of the Analysis of Variance. Pvalue: Probability of the F test. Rate Group 1–Rate Group 4: average rates of the 4 group of lenders. 45

Table 16: Average interest rates paid by the big borrowers on loans from 4 groups of lenders (2008-2009)

9)							
2008 I	IT0162	IT0165	IT0168	IT0210	IT0258	IT0270	IT0278
F	3.695	3.142	2.537	0.995	6.547	1.302	0.585
Pvalue	0.011	0.024	0.055	0.395	0.000	0.273	0.625
Rate Group 1	4.011	4.074	4.030		4.107		
Rate Group 2	4.056	4.049	4.051		4.076		
Rate Group 3	4.046	4.057	4.049		4.057		
Rate Group 4	4.046	4.060	4.030		4.055		
2008 II	IT0159	IT0160	IT0165	IT0253	IT0258	IT0267	IT0278
F	2.163	1.844	1.945	3.245	1.104	4.565	1.513
Pvalue	0.091	0.138	0.120	0.021	0.347	0.003	0.209
Rate Group 1	3.903			3.920		3.878	
Rate Group 2	3.956			3.912		3.956	
Rate Group 3	3.944			3.953		3.959	
Rate Group 4	3.937	ITTO16F	ITTOOTO	3.952	ITTOOC7	3.966	ITT0070
2008 III F	IT0162	IT0165	IT0253	IT0258	IT0267	IT0270	IT0278
	5.757	1.336	0.453	3.204	3.095	3.811	1.846
Pvalue	0.001	0.261	0.715	0.023	0.026	0.010	0.137
Rate Group 1	4.128			4.238	4.118	4.057	
Rate Group 2 Rate Group 3	4.173 $4.209$			4.193 $4.245$	4.181 $4.172$	4.158 $4.146$	
Rate Group 3 Rate Group 4	4.209 $4.227$			$\frac{4.245}{4.236}$	$\frac{4.172}{4.216}$	4.146 $4.179$	
2008 IV	IT0159	IT0160	IT0165	IT0237	IT0253	IT0267	
F	1.315	3.015	3.599	8.018	1.676	30.908	
Pvalue	0.268	0.029	0.013	0.000	0.172	0.000	
Rate Group 1	0.200	3.288	3.046	3.813	0.172	3.783	
Rate Group 2		3.266 $3.047$	3.212	3.901		3.755	
Rate Group 3		2.980	3.070	3.946		3.848	
Rate Group 4		3.076	3.079	4.082		3.167	
2009 I	IT0160	IT0165	IT0168	IT0265	IT0270	IT0284	
F	23.238	3.509	2.676	3.901	2.603	0.966	
Pvalue	0.000	0.015	0.046	0.009	0.051	0.408	
Rate Group 1	1.654	1.435	1.119	1.257	1.107		
Rate Group 2	1.245	1.293	1.060	1.218	0.971		
Rate Group 3	1.318	1.296	1.037	1.133	0.995		
Rate Group 4	1.439	1.243	1.032	1.129	1.044		
2009 II	IT0159	IT0160	IT0165	IT0168	IT0265	IT0284	
F	1.623	1.498	1.918	0.597	0.552	7.034	
Pvalue	0.183	0.214	0.125	0.617	0.647	0.000	
Rate Group 1						0.622	
Rate Group 2						0.533	
Rate Group 3						0.570	
Rate Group 4						0.607	
2009 III	IT0160	IT0165	IT0168	IT0223	IT0265		
F	4.934	2.657	2.761	7.834	2.693		
Pvalue	0.002	0.047	0.041	0.000	0.045		
Rate Group 1	0.344	0.319	0.293	0.363	0.281		
Rate Group 2	0.363	0.299	0.293	0.357	0.282		
Rate Group 3	0.369	0.317	0.292	0.338	0.290		
Rate Group 4	0.349	0.312	0.300	0.366	0.294		
2009 IV	IT0160	IT0165	IT0168	IT0223	IT0265		
T-1	1.694	6.406	1.678	1.418	0.068		
F		_		0.000	0.077		
Pvalue	0.167	0.000	0.170	0.238	0.977		
Pvalue Rate Group 1		0.321	0.170	0.238	0.977		
Pvalue Rate Group 1 Rate Group 2		$0.321 \\ 0.323$	0.170	0.238	0.977		
Pvalue Rate Group 1		0.321	0.170	0.238	0.977		