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LENDING OF MONEY AND SHARES THROUGH THE *RIPORTI* MARKET OF THE MILAN STOCK EXCHANGE

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SUMMARY

Riporti contracts defer obligations to deliver or pay for shares from one monthly clearing to the next. Through what amount to double loans of lire against shares, the *riporti* market makes possible short selling and the buying of shares on credit. About 1,000 billion lire is lent monthly to long speculators by banks, brokers, or short sellers, through a dealer network and a public auction on the Exchange floor. Detailed data on one month's transactions reveal the degree of specialization and concentration among banks and brokers. Regressions with the auction's rates for six years reveal the circumstances under which short sellers pay a premium to borrow shares.

CONTENTS

1. INTRODUCTION

One morning in the middle of every month in Milan, before the main trading session begins, some thirty brokers gather round one of the rings on the floor of the Stock Exchange to arrange *riporti* contracts. An auctioneer, taking each issue in turn, calls out interest rates, trying lower ones until reaching equilibrium. This auction is the most visible part of a larger market, in which these and other brokers negotiate *riporti* contracts directly with clients or with banks. The participants, as is typical, see nothing novel in the day's procedures; to outsiders, the significance of the *riporti* market is far from obvious.

The purpose of *riporti* contracts, a formal legal category, is to "carry over" or postpone commitments for delivery of shares from one of the Exchange's monthly clearings to the next. In effect, they arrange double loans: one party lends the shares while borrowing money; the other party borrows the shares while lending money. Consequently, the *riporti* market as a whole is an important source - some $800 million monthly - of secure short-term credit, ultimately provided by Italian banks. It simultaneously comprises loan markets for each of the more than 250 listed issues, loan markets where short sellers obtain the shares needed to cover their positions.

Functioning loan markets for goods other than money are intrinsically interesting because they force one to rethink the reasons interest is willingly paid. Along this line, the final section of this paper examines the public auctions for six years for the frequency of and reasons for *riporti* rates on individual issues below the prevailing rate for lire, circumstances that correspond to a positive interest rate for the shares. In any given month some 9% of all listed issues are sufficiently scarce to induce such a positive share-specific interest rate.

This paper also analyzes all trades in the *riporti* market for September 1986, data collected by the Consob (the Italian SEC) from brokers and banks. Besides providing the first estimates of the actual use of *riporti* contracts, these data offer rare insights into the concentration and degree of specialization among financial intermediaries.

Based on reforms during the time of Napoleon I, the equivalent of the *riporti* market is also found on the stock exchanges of France, Belgium and Spain, although in Paris a spot trading system without it exists as well, mainly for thinly traded shares.[1] The *riporti* market of these Continental exchanges is a close relative to the contango market of the London stock exchange and to the brokers' call money market in the U.S.[2] Although the *riporti*, contango, and call money markets make possible short selling and the buying of shares on credit, their economic and legal bases have been virtually unstudied. Among them the *riporti* market is most intertwined with other exchange procedures and is the most deserving of study.

In England relatively little long speculation is supported by short-term credit. The call money market is impaired by the restrictions against short selling.[3] Call money contracts, even if routinely renewed, mature in only one day and can be negotiated any business day, whereas those in the Italian market have a maturity of one month and are negotiated once a month. This concentration of trading and longer maturity make the pricing differentials in the *riporti* market more obvious and more reliable. Moreover, a greater interaction among dealers occurs in the *riporti* market, as exemplified in the public auction on the floor of the exchange.

Many of the differences between the *riporti* market and the call money market can be traced to the fundamentally different systems of settlement and clearing on the Milan and New York stock exchanges. The next section, accordingly, describes the organization of trading in Milan, after which another section explains *riporti* contracts more precisely.

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[1] The Napoleonic system had its origins in 17th century Dutch practices. According to de Pietri-Tonelli (1928, p. 157), in the 2nd century of the Roman Empire similar practices for carryovers were in use.

[2] Another relative is a loan market for gold, part of the Chinese Gold and Silver Society of Hong Kong and described by Gehr (1988).

[3] Meeker (1932) describes the call money market in its heyday.

2. THE CALENDAR OF THE MILAN STOCK EXCHANGE

In Milan, shares are traded for future delivery. Ordinary shares cannot be held in bearer form in Italy, and registration and transferal of title is relatively cumbersome. A long interval between clearing of trades minimizes deliveries of certificates, although the number of transactions to be processed at one clearing grows apace. In New York trades within the same day can offset one another; in London within the same fortnight; in Milan within the same month.

Milan's "exchange month" goes from the middle of the earlier calendar month to the middle of the nominal month, because the exchange reserves the last half of a calendar month for its settlement process. As the settlement process begins digesting on, say, January 15 the bargains for January delivery, trading advances to February delivery. Never do the operators trade the two different delivery months simultaneously under regular circumstances. *Riporti* contracts make that bridge. They are generally negotiated on or close to the last trading day of the expiring exchange month, known as "*riporti* day."

2.1 Effects on prices and trading

This monthly cycle has a strong effect on prices and volume of trading, visible in even the most aggregate statistics. Spot prices for shares should rise, on average, at a rate equal to the opportunity cost of the investment. In Milan all the movement for one month is concentrated into the shift from trading one delivery month to trading the next.

Figure 1 shows the average percentage change in the market index for the days before and after the first day of the exchange month for the sixteen years 1975-1990. [Also see Barone (1987, 1990)]. The average change on the first day stands far above the others,[4] by an amount comparable to the monthly portion of the annualized interest rates prevailing over those years.[5]

Market observers recognize the higher volume during the last days of the stock exchange month, namely the day when options expire and the *riporti* day. Yet the monthly cycle's effect on volume is ubiquitous. The event study in Figure 2, relating the total turnover divided by the market price index (a share quantity index) to the number of days before and after *riporti* day, reveals a pronounced peaked shape. Volume begins to increase before the last two days of the exchange month. Further, transactions at the start of the exchange month are also more numerous, some 50 per cent more frequent than during the middle of the month.

A plausible explanation of this peaked shape in volume is that some speculators, those who might have in mind taking a position for three or four weeks, might do so more often at the start of the monthly cycle so that they would not have to take (or make) delivery. Those operators wanting to maintain a position might close it out at the end of the exchange month and re-open it at the start of trading for the next delivery cycle, at the cost of two brokerage fees. More likely they use *riporti* contracts.

3. TERMS OF *RIPORTI* CONTRACTS

In the Italian civil code, Articles 1548-1551 define *riporti* contracts and detail their special status in law. Fundamentally, one party assumes a commitment made previously by the other party. For example, a bank will assume for one month an operator's commitment to pay for some shares in, say, Fiat. Because the bank, called the *riportatore*, has assumed the obligation to pay for the shares, strictly speaking it becomes the legal owner, enjoying the right to vote at any stockholders' meetings.[6] By the strict definition of the law, the operator, in the role called the *riportato*, has not a debt but the obligation to buy a like number of Fiat shares from the bank the following month.

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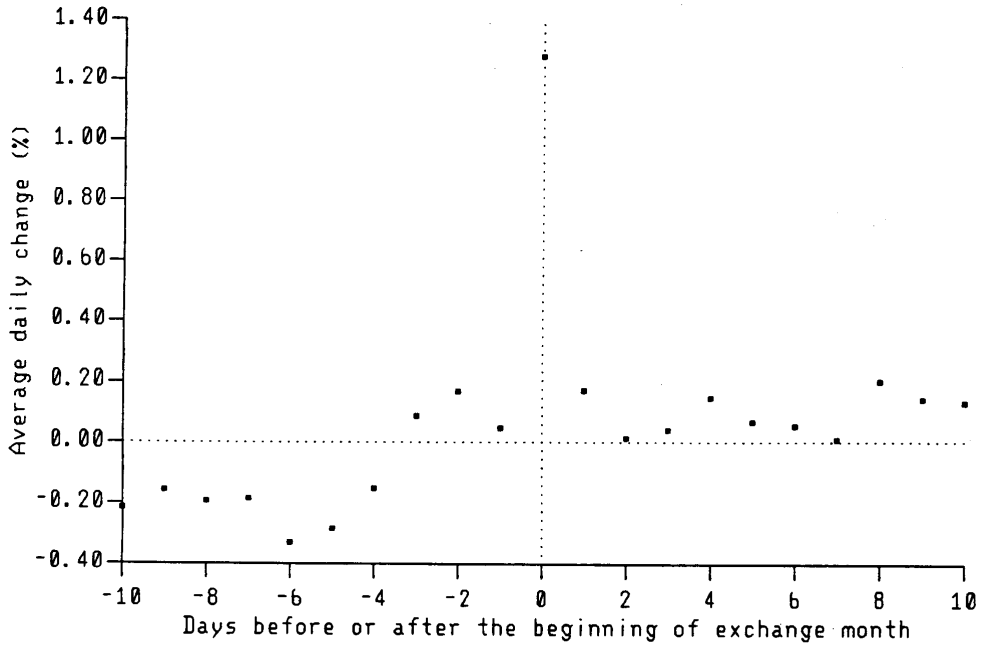
[4] The *MIB storico* index is not corrected for dividends. Because shares are generally first quoted *ex dividend* on the first day of an exchange month, correction of the index would increase the jump. The increase is statistically significant.

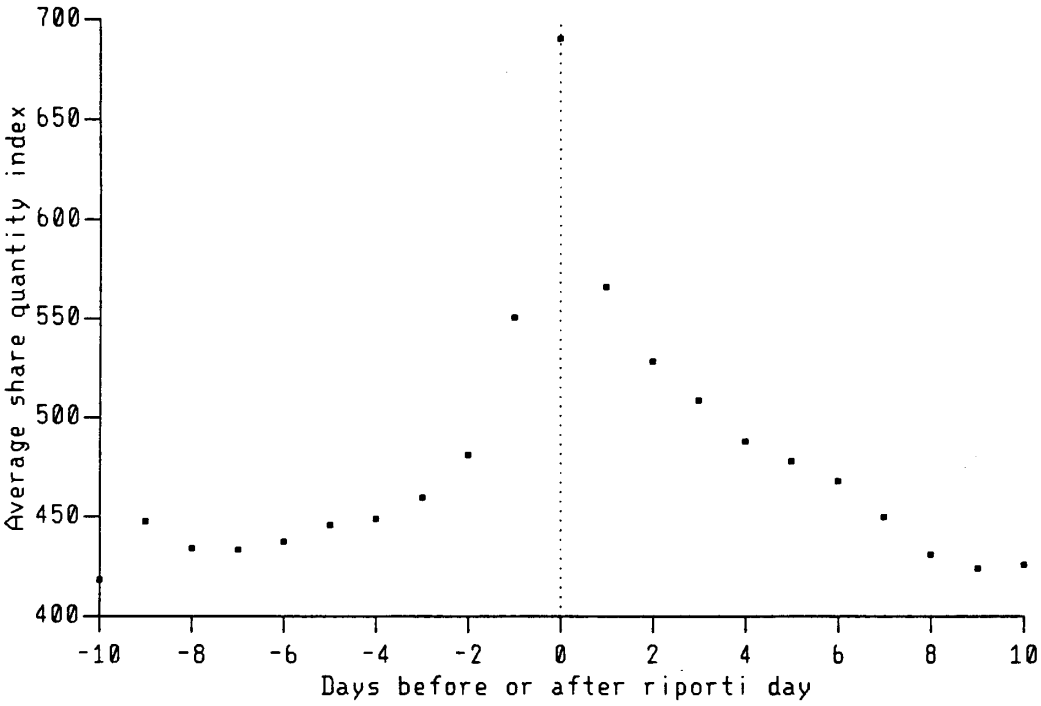
[5] Similar patterns have been found by Solnik (1990) for the Paris market and by Jaffe and Westerfield (1985) for the London market.

[6] Likewise, any dividends are paid to the *riportatore*, although these it must reimburse to the operator.



N. B.: The changes are equal to the logarithms of the ratios between subsequent observations of the index.

Figure 1 Average daily percentage change of share price index (1975-1990)



N. B.: the index is obtained dividing the value of daily trading by the share price index.

Figure 2 Average daily values of share quantity index (1981-1990)

3.1 Double loans

The more precise the contracts' legal status, the more opaque become their economic consequences. As has been argued by, among others, Aquafredda (1948), *riporti* contracts amount to double loans.[7] In the single transaction made possible by a *riporto* contract, the *riportato* lends shares in Fiat while borrowing lire and the *riportatore* borrows Fiat while lending lire. The rate in the contract is therefore the difference between the interest rate on lire and the interest rate on Fiat. A *riporti* rate less than the prevailing rate for money indicates a positive interest rate for Fiat shares. Should the *riportatore* be the one to pay the net rate, a situation known as a *deporto* ("backwardation" in London), it simply means that the share-specific interest rate is higher than the money interest rate.

For several reasons some operators might want a double loan and its effect through a *riporto* contract. Because an operator who needs money in order to buy shares will have the shares to lend, a double loan offers lower transactions costs than two separate loans. A double loan also offers collateral part and parcel. The *riportatore*'s loan of money is protected to the extent he borrows shares, while the *riportato*'s loan of shares is protected by the amount of money he borrows.

Even more important, each can use that collateral. The *riportatore* does not have to return the exact certificates any more than the *riportato* must return the same money. Finally, the legal standing of a *riporto* contract is better than an explicit double loan if one of them defaults. If the *riportato* does not have the money to buy back the shares, the *riportatore* can sell the shares without waiting years for a court to grant him full title to the collateral and without dividing the proceeds with the defaulter's other creditors.[8]

3.2 Riporti rates and scarti di garanzia

Legal considerations also influence how the net interest rate is paid. Because only banks are allowed to charge interest, a *riportatore* who is a stockbroker expresses the interest due as a service charge.[9] However expressed, interest payable by a *riportato* is calculated as simple interest for the 360-day commercial year applied to the number of days the money is outstanding. It is due at the end of the double loan. Different conventions apply when the net interest rate on the double loan is such that the *riportatore* pays. A *deporto* is expressed in lire per share and is due at the start of the double loan.

The Consob regulates the amount of money that individuals can borrow against the value of their counterloan of shares. For example, during the stock market boom of early 1986, the Consob lowered the percentage (of the official price on *riporti* day) from seventy to fifty, hoping the change would dampen speculation. (Brokers can borrow from banks 100% of the value of the shares).

For clients this is surely an unnecessarily low percentage. Because *riporti* contracts run for just six weeks, the remaining 50 per cent (or 30 per cent previously), called the *scarto di garanzia*, offers extraordinary security for the loan of money.[10] For that matter, the clients, and the stock market as a whole, are not free from the risk that the banks and brokers will not return their shares. Clients' loss from a default and the market-wide disruption from it would be the greater the larger the *scarto di garanzia* required by the Consob.

That is not to imply that the natural rate of the *scarto di garanzia* is 0 per cent. Surely the clients are poorer credit risks than the banks and brokers, and only between equals would the rate be 0 per cent. Indeed, some brokers, when they lend shares to individual short sellers, a transaction left

[7] "Swap" transactions are another instance of double loans, despite their outward appearances of two trades in foreign exchange. Williams (1986, Chapter 2) gives yet more examples of double loan markets.

[8] In this respect they are similar to the sale-repurchase agreements through which money is lent against a counterloan of U.S. Treasury securities. When in 1982 a perceptive judge decided to treat repos as explicit loans and to include them in the full bankruptcy proceedings of a dealer in government securities, legislation similar to that defining the special status of *riporti* contracts was quickly passed [see Stigum (1989, pp. 327-329)].

[9] Brokers routinely charge clients 1 per cent above their (annualized) cost of funds from banks. The banks seem to charge their direct clients slightly more, say 1.5 per cent above their rate to brokers.

[10] Sometimes, several *riporti* contracts with one client are packaged together, which reinforces the security against a default.

TABLE 1 Aggregate Use of the Riporti Market from the Perspective of Units Reporting to the Consob (September 1986)

Value of shares (billions of lire):	*Total*	*Brokers**	*Banks*
Taken from clients	6,451	4,584	1,867
Taken from clients in *riporti* fittizi	3,098	2,535	563
Given to clients	290	271	19
Given to other reporting units	4,271	4,257	14
Taken from other reporting units	3,922	277	3,645
Taken through *riporti* staccati	41	41	0
Given through *riporti* staccati	0	0	0
In trades on the Exchange floor	19	19	0
Amount of Money (billions of lire):	*Total*	*Brokers**	*Banks*
Lent to clients	1,326	745	581
Borrowed from clients	134	132	2
Lent to other reporting units	789	133	656
Borrowed from other reporting units	806	806	0
Net lending according to the Consob	1,213	n.d.	n.d.

* Stock brokers and commission agents.

unregulated by the Consob, demand a negative *scarto di garanzia*, which is to say they demand a counterloan of money greater in value than the shares.

The size of the *scarto di garanzia* is the main difference between the basic *riporto* contract and two variations. The first variation is known informally as a *riporto fittizio* ("fictitious"), because the sum of money borrowed by clients against the counterloan of shares is nominal. These *riporti* contracts' sole purpose becomes the transferal of official ownership of the shares to the broker, much as do street accounts in the U.S.

The second variation, known as a *riporto staccato* ("detached"), is used to avoid the rules on the *scarto di garanzia*. With prices inferred from the true *riporti* market, the two parties announce two simultaneous transactions, one for delivery at the current clearing and one for delivery in the reverse direction at the subsequent clearing cycle.[11]

4. EXTENT OF THE USE OF *RIPORTI* CONTRACTS

4.1 Lending of money and shares: volume of trading

This section offers the first systematic evidence on the amounts of money and shares involved in the various types of *riporti* contracts, both in the aggregate and by individual securities and intermediaries.

Only in recent years have any data on quantities become available. Since January 1985 the Milan Exchange has published a record of all trades in its official *riporti* market. The transactions on the central exchange are, however, only the tip of the iceberg. Most clients deal directly with their brokers, commission agents, or banks.

Since late 1977 the Consob has required these brokers, commission agents, and banks to report their activity in the *riporti* market. The Consob made available the raw data for September 1986, after deleting the names of the 275 reporting units. Unfortunately, each entry does not necessarily correspond to a distinct transaction,[12] although on balance the figure of 84,417 entries is probably close to the number of transactions from the perspective of individual reporting units.[13]

[11] A *riporto staccato* functions like a "rollover" on U.S. futures markets.

[12] Reporting units were instructed to combine all transactions for the same issue at the same interest rate at the same *scarto di garanzia*. On the other hand, transactions involving several different issues would have been broken apart.

[13] Some 5,000 of these 84,417 were for suspended issues or those not traded in Milan. They have been excluded from the following analysis. Nine of the reporting units, all of them small, disappear in this way.

Table 1 consolidates these many transactions, first from the perspective of the shares involved and then from the perspective of the money involved. The first figure (on line 1), 6,451 billion lire, is the total market value of the shares the reporting units took from their clients in September 1986. That amount represents some 6 per cent of the market value of all listed shares (taking into account the myriad holdings by Italian companies of other Italian companies). The proportion is even higher as a percentage of shares not locked away in controlling blocks,

Of this 6,451 billion lire, some 3,098 billion can be classified, without much doubt, as *riporti fittizi*. The remaining 3,353 billion lire worth of shares are those truly involved in the *riporti* market. In contrast, the value of shares given to clients is relatively small. This number, 290 billion lire, is a good estimate of the total short selling, because banks and other intermediaries almost never sell short on their own account.

The reporting units do give and take shares from one another, however. These amounts primarily represent the shares, obtained from clients, given by brokers to banks to receive money for the loans needed by the clients.[14]

From the perspective of the monetary authorities, the rows 9, 10, 11, and 12 on the amount of lire involved are of primary interest. The gross amount lent to clients, 1,326 billion lire, (about $1 billion) overstates the credit provided by the banking sector by the amount, 134 billion lire, that individuals lent in order to obtain shares. Perplexing is that clients lend only 134 billion lire to receive shares with a value of 290 billion lire. No doubt some brokers judge such clients to be minimum risks, perhaps because their accounts have other positions.

4.2 Market evolution

The Consob issues a monthly report based on these same data. Unfortunately, it combines clients and reporting units in such a way that its figures for net and gross lending are not exactly what one normally means by them, although, judging from Table 1, the discrepancies are not too large.

Because the Consob's monthly reports go back to 1978, one can study the evolution of the aggregate use of the *riporti* market. The time series for the Consob's definition of net lending is plotted in Figure 3, along with series for the share price index as of the end of the exchange month and a short-term interest rate.

The series for net lending through *riporti* (*NL*) is well summarized by this AR(1) regression on the share index (*SI*), the interest rate (*IR*) and a trend variable (*TR*) (with *t*-statistics in parentheses):

$$\begin{array}{rcccccccccc} NL_t & = & -46{,}1 & + & 0{,}0809\ SI_t & + & 6{,}68\ IR_t & + & 1{,}96\ TR_t & + & u_t \\ & & (-0{,}53) & & (10{,}0) & & (1{,}34) & & (2{,}66) & & \end{array} \tag{1}$$

$$\begin{array}{rcccc} u_t & = & 0{,}67\ u_{t-1} & + & e_t \\ & & (9{,}63) & & \end{array}$$

These relationships are similar to those Bottazzi (1980) found for the period 1978-1980.

4.3 Degree of concentration

In September 1986 some 50 per cent of the total lire lent was against just five securities: Generali (19 per cent), Fiat *ordinarie* (13), Montedison (8), Fiat *privilegiate* (7), and Ras (3). But these percentages are close to these five issues' part of the total capitalization of listed shares. Nearly all issues, with the exceptions being some *risparmio* (savings) shares (which are similar to preferred stock), were used by clients to obtain loans of lire.

The concentration among issues was higher for shares given to clients. The same five issues encompassed 64 per cent of the total, and some one-sixth of the issues were not lent at all. This concentration accords with the idea that short sellers hesitate to venture into any market not deep and liquid.

[14] Were all transactions included in the data and all were reported perfectly, the value of the shares taken from other reporting units would equal the value of the shares given to other reporting units, as would the rows for the amount of lire borrowed from and lent to other reporting units be equal.

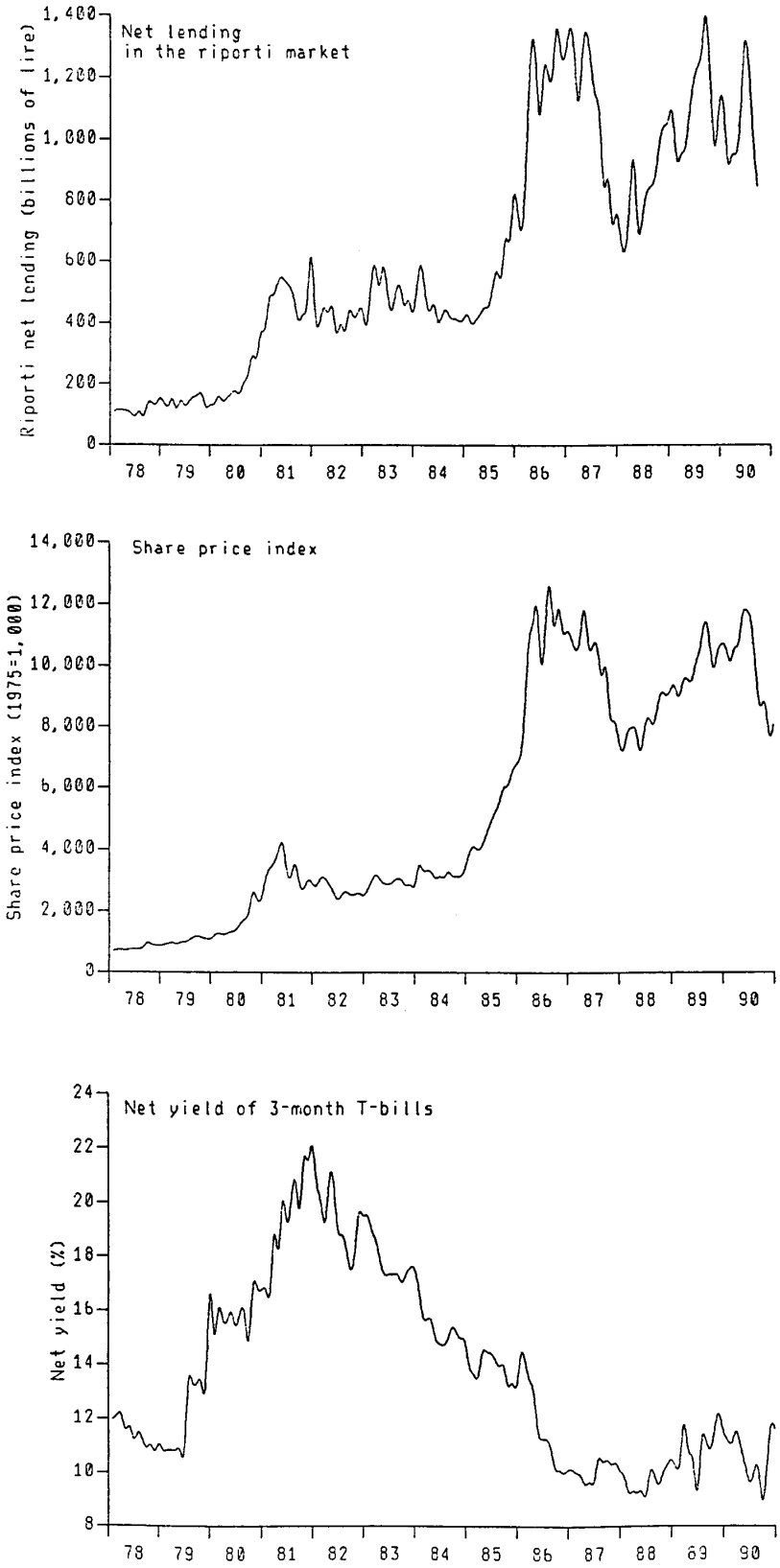


Figure 3 Net lending in the *riporti* market, share price index and net yield of 3-month T-bills (1978-1990)

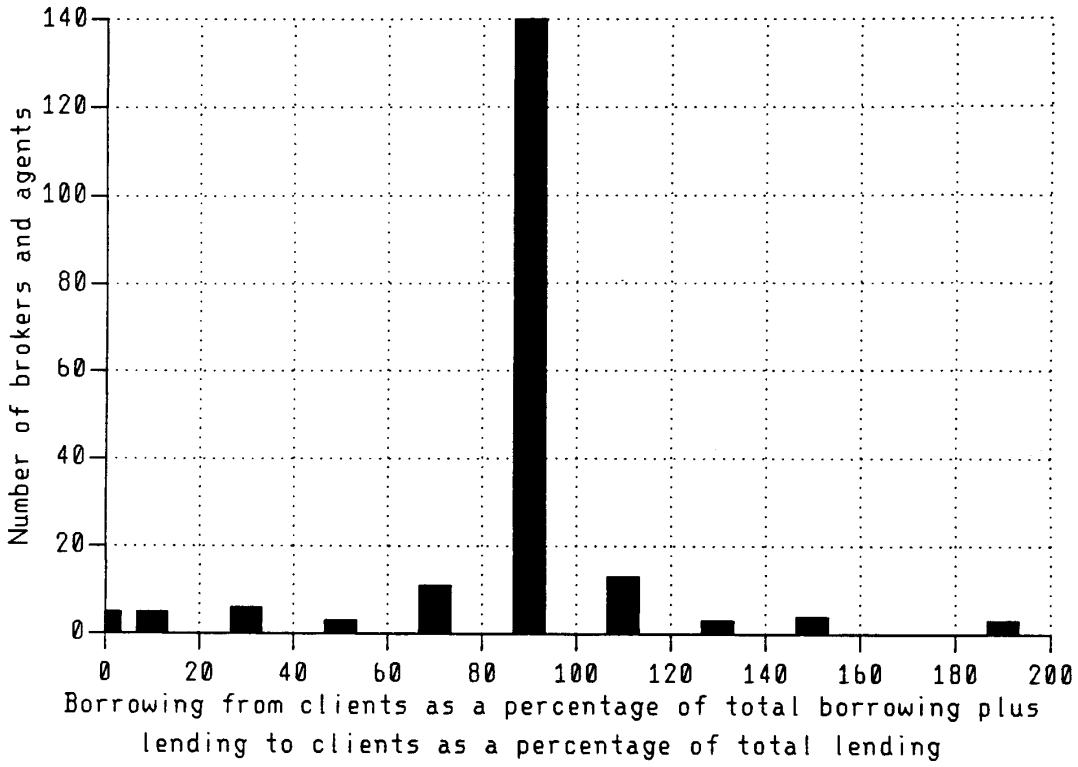


Figure 4 Distribution of balance index for brokers and agents (September 1986)

5. THE STRUCTURE OF THE *RIPORTI* MARKET

The detailed data for September 1986 also reveal much about the operations of individual reporting units. The reporting units fall into two distinct classes: brokers together with commission agents versus banks. In September 1986 there were 195 agents and seventy-one banks.

A broker or commission agent would take no positions on his own account, serving as the *riportatore* for some transactions and the *riportato* for others. In contrast banks almost always are in the market as a *riportatore*, lending money and taking shares. First, as a group they provide a large part of the net lending of money. Second, most of them have an unofficial policy of not lending shares to short sellers.

5.1 Stock brokers and commission agents

The brokers and commission agents show considerable diversity in the source and use of funds. In the histogram in Figure 4, these agents are grouped by an index equal to (1) the percentage of total lire borrowed from clients plus (2) the percentage of the lire relent to clients. If agents do not deal with other reporting units at all but instead pass funds and shares from one client to another, the index has a value of 200. As can be seen in Figure 4, three agents deal only in house.

More interesting are those on the other end of the scale, where the index has a value of 0. Those five agents deal on both sides of the market only with other reporting units. The presence of such brokers' brokers is usually taken as a sign of a sophisticated market.

In the aggregate, most of the brokers' funds come from banks and all end up in the hands of clients. Thus, aggregate behavior would have an index of 98.9 per cent,[15] and indeed many of the

[15] [132/(132 + 806) + 745/(745 + 133)] × 100, from Table 1.

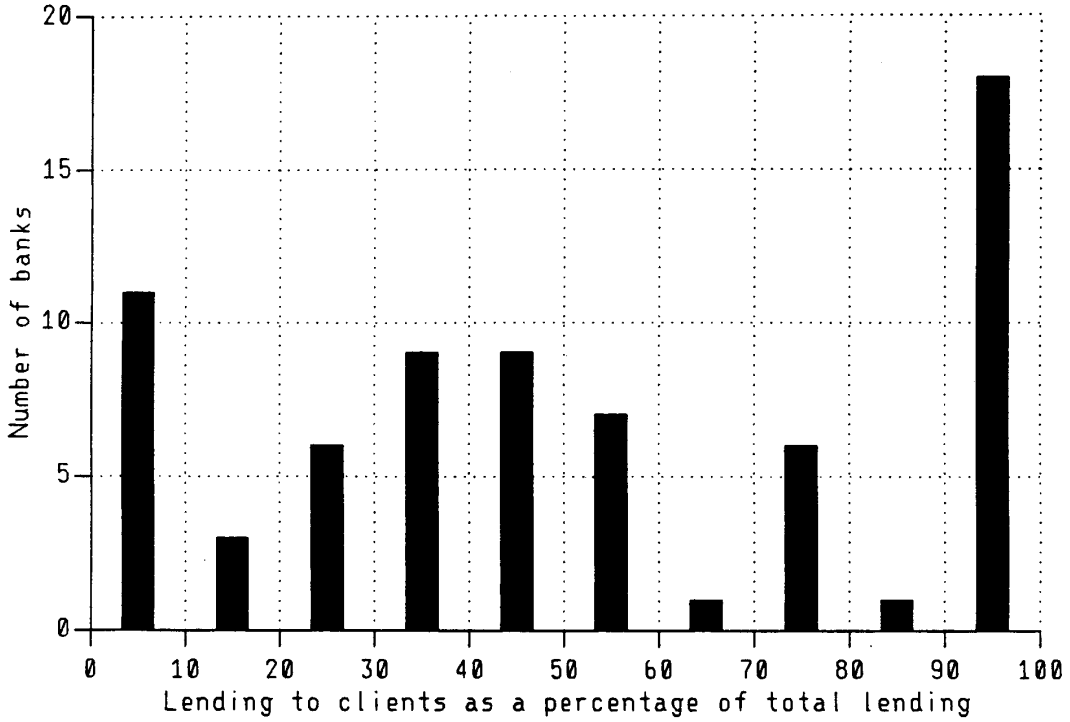


Figure 5 Bank lending patterns (September 1986)

195 agents fall close to that level. A few of these balanced agents have taken all their funds from clients and have lent them to other agents. These are specialists in serving short sellers.

5.2 Banks

Banks also range widely in the way they lend money in the *riporti* market. In the aggregate they lend some 47 per cent directly to clients, the remainder reaching individuals through the agents. Yet some banks deal only with clients, while others deal only with brokers, as can be seen in the histogram in Figure 5.

Bank lending in the *riporti* market is relatively concentrated. In September 1986 four banks provided 39 per cent of the lending in the *riporti* market, and the top eight, 61 per cent. Although this level of concentration is higher than for bank lending in all its forms, where the top four and top eight firms hold 19 per cent and 33 per cent of the market, it mainly reflects the degree of specialization.

Several small banks, with headquarters in Milan, are major participants in the *riporti* market. According to market participants, banks, depending on their supply of loanable funds, sometimes aggressively solicit *riporti* contracts while at other times refuse business brought to them. Brokers also report the need to package securities together, for quantity and degree of risk, in order to approach banks.

5.3 The *riporti* auction

The segment of the *riporti* market conducted on the floor of the Milan Stock Exchange before the opening of trading on *riporti* day is the epitome of an integrated market. From the interest rate on money, which either is an integer or ends in .5, the auctioneer works downward in ticks at the integers. Finer gradations involve too little money to be worth the trouble. If a disequilibrium between the quantity of shares offered and wanted for loans remains after several of these ticks, the auction-

eer jumps to an interest rate of 0 per cent, known as *alla pari* (comparable to "flat" in London). Although the rate can be readjusted upwards from there if the change was too great or can be moved downwards into the range of *deporto*, *alla pari* tends is a focal point. A *deporto* is usually a round number of lire per share, on a scale appropriate to the current price of the issue.

Because of these shortcuts, the whole auction takes merely thirty minutes. Some forty out of the total of about 250 issues typically have a transaction, although in recent years the range has been from 4 in December 1981 to 136 in November 1990. Since statistics were first kept in 1985, the total amount of money lent through the public auction has been as low as 3 billion to as high as 45 billion lire.

Table 2 lists the results for the *riporti* auction in March 1988, which was a relatively active month as 49 issues had a transaction. For some issues the value of the shares was merely 5 or 6 million lire, while for Alleanza it was 2.45 billion lire. As is obvious from the many 11.5 per cent's in the column headed "*Riporti* Rate," money was available at 11.5 per cent. With that rate for lire and the *riporti* rate, the share- specific interest rates, given in the last column, are calculated.[16]

6. POSITIVE INTEREST RATES ON SPECIFIC SHARES

For 33 issues in March 1988 someone was willing to pay a premium to have shares at that clearing compared to the one following. Among such premiums the most famous case in recent memory is Bi-Invest in August 1985. Because a group, by acquiring shares on the open market, was close to wresting control from the dominant shareholders, the many short sellers had difficulty borrowing shares. The auction arrived at a *deporto* of 1,000 lire, against a share price of 8,200 lire. That *deporto* corresponds to an annualized interest rate for the shares of 162 per cent.

Although the *deporto* on Bi-Invest has received the most attention in the financial press,[17] it is by no means the only issue to have had a high share interest rate. Note in Table 2 share interest rates for Acqua Marcia, Acqua Marcia risparmio, and Silos Genova risparmio.

From January 1981 through December 1990, there were 75 instances of interest rates on particular shares above 50 per cent an annual basis, and 2,820 instances above 0 per cent, or some 9 per cent of the possible issues.[18] Of these, 380 had a *deporto*.

It is easy to understand why someone would pay a positive interest rate to borrow shares of a specific issue. Although on an annualized basis the rates may be high, in terms of the cost for carrying over a position from one month to the next, many are on the order of the commission for closing a position. If someone is in the midst of a short selling operation because he knows something very bad no one else knows about the company's prospects, a small positive interest rate is no more than a nuisance. Likewise, if someone has spotted an opportunity to arbitrage by buying convertible bonds while shorting the shares a few months ahead of the conversion date, he would be willing to pay a fee to borrow the shares, although at some rate he would unwind his positions.

More difficult to understand is why the number of shares to be lent does not overwhelm the number wanted, because rarely is the amount of short selling of an issue above a few percent of the number of shares outstanding. The explanation must be that many holders of shares cannot release them or calculate that the return is not worth the bother. For example, mutual funds in Italy expressly refrain from lending shares, for fear of the ambiguity in their charters which prohibit lending without specifying whether just of money.[19]

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[16] To those schooled in the prices of U.S. futures markets, the share-specific interest rates are the extent, in annualized percentage terms, that prices for a particular issue are below full carrying charges.

[17] Il Sole-24 Ore, 20 August, 1985.

[18] Among the 196 issues listed for at least two years during the period 1981 through 1986, 110 had at least one occurrence of a positive interest rate. Further, a number of issues have had several months of positive interest rates in a row.

[19] Examples of shares being held despite the opportunity cost have physical analogues in the case of commodities like corn and cotton, where the constraints are the costs of transportation and processing and where the phenomenon of inventories in the face of a positive commodity-specific interest rate goes by the name of "convenience yield" [Wright and Williams (1989)].

TABLE 2 The *riporti* auction on March 15, 1988

Issue	*Number of traded shares*	*Value of shares (mil.)*	*Riporti rate (%, per year)*	*Interest rate for borrowing issue (%, per year)*
Perugina risparmio	5,000	10.2	9	2.5
Buitoni	70,000	700.4	8	3.5
Montedison	900,000	1,161.00	11.5	0
Lloyd Adriatico	35,000	497	11.5	0
Ras	7,000	311.5	11.5	0
Generali	5,000	439	11.5	0
Alleanza	50,000	2,450.00	10	1.5
Alleanza risparmio	400	20	8	3.5
Fondiaria	3,000	181.5	5	6.5
Olivetti	50,000	466.2	11.5	0
Teknecomp	5,000	5.6	5	6.5
Iniziativa ME.T.A.	6,000	57	11.5	0
Magneti Marelli	10,000	26.4	8	3.5
Espresso	4,500	94.5	25 deporto	12.9
Stet	53,000	163.8	8	3.5
Sme	60,000	125.4	11.5	0
Saipem	75,000	167.2	8	3.5
Dalmine	300,000	79.5	8	3.5
Cir	10,000	55.8	11.5	0
Pirelli S.p.A.	40,000	162	11	0.5
Acqua Marcia	1,800,000	891	35 deporto	97.2
Acqua Marcia risparmio	200,000	53.8	30 deporto	46.7
Camfin	4,000	7.2	7	4.5
Italcementi	1,000	104.5	11.5	0
Banca Naz. Agricoltura	2,000	13.7	11.5	0
Credito Varesino	5,000	18	8	3.5
Comit	30,000	64.2	11.5	0
Banca Mercantile	5,000	61.1	8	3.5
Mediobanca	2,200	405.9	11.5	0
Rinascente	55,000	223.6	8	3.5
Rinascente risparmio	50,000	39.6	10	1.5
Bastogi	2,100,000	583.8	10	1.5
Italmobiliare	1,800	181.8	11	0.5
Gemina	30,000	37.2	11.5	0
Cofide	95,000	490.2	11.5	0
Euromobiliare	8,000	56	8	3.5
Sabaudia	73,000	135.2	9	2.5
Benetton	5,000	51.5	10	1.5
Stefanel	35,000	214.6	8	3.5
Metanopoli	15,000	15.2	8	3.5
Silos Genova	115,000	53.5	9	2.5
Silos Genova risparmio	850,000	344.2	100 deporto	310.8
Assitalia	25,000	447.5	11.5	0
Ausonia	150,000	357	11	0.5
Italia Ass.	70,000	889	9	2.5
Latina	30,000	458.1	9	2.5
Mira Lanza	3,300	139.6	9	2.5
Montefibre	5,000	9.5	11.5	0
Europa Metalli	97,000	89.2	alla pari	11.5

6.1 Some explanatory variables

Without detailed information about each holder and short seller, it is impossible to estimate true structural equations for the demand and supply for loans of shares. Rather, one must be content with determining whether the share-specific interest rates are sensibly related to characteristics of the issues.

Such relationships are surely highly nonlinear; a double-log specification fits well. A double-log specification, however, runs up against the many observations with a share-specific interest rate of 0 per cent. More generally, the rounding to low integers causes a problem akin to a censored dependent variable, such as those discussed by Maddala (1983).

Under the assumption of normally distributed errors, these considerations suggest a log-likelihood function of the form:

$$
\begin{aligned}
L = & \prod_{0a}\left\{1-\Phi\left[\frac{\mathbf{X_j\beta}-\ln(0{,}25)}{\sigma}\right]\right\}\times\prod_{0b}\left\{1-\Phi\left[\frac{\mathbf{X_j\beta}-\ln(0{,}5)}{\sigma}\right]\right\}\times \\
& \times\prod_{0{,}5}\left\{\Phi\left[\frac{\mathbf{X_j\beta}-\ln(0{,}25)}{\sigma}\right]-\Phi\left[\frac{\mathbf{X_j\beta}-\ln(1{,}0)}{\sigma}\right]\right\}\times \\
& \times\prod_{1{,}0}\left\{\Phi\left[\frac{\mathbf{X_j\beta}-\ln(0{,}5)}{\sigma}\right]-\Phi\left[\frac{\mathbf{X_j\beta}-\ln(1{,}0)}{\sigma}\right]\right\}\times \\
& \times\prod_{1{,}5}\left\{\Phi\left[\frac{\mathbf{X_j\beta}-\ln(1{,}0)}{\sigma}\right]-\Phi\left[\frac{\mathbf{X_j\beta}-\ln(2{,}0)}{\sigma}\right]\right\}\times\ldots\times \\
& \times\prod_{\text{deporti}}\left\{\sigma^{-1}\varphi\left[\frac{\ln\left(i_j^s-\mathbf{X_j\beta}\right)}{\sigma}\right]\right\}.
\end{aligned}
\tag{2}
$$

where Π refers to those observations with a share interest rate, i^S, of 0,[20] 0.5, 1.0, 1.5 ... , $\mathbf{X_j}$ is a vector of right-hand side variables for the j^{th} observation in that class, $\boldsymbol{\beta}$ is a vector of coefficients, σ the standard deviation of the error term, $\Phi\{\cdot\}$ the cumulative standard normal density function and $\varphi\{\cdot\}$ the standard normal density function evaluated at $\{\cdot\}$.

Table 3 presents the estimated coefficients and asymptotic *t*-statistics for fourteen right-hand-side variables in a regression using the 1,571 instances of auction *riporti* rates among the 182 issues traded for at least 12 continuous months and with a minimum average monthly turnover of 200 million lire over the period 1981-1986.[21]

Those variables measuring liquidity and speculative activity emerge as strongly related to the incidence of positive interest rates on shares; those variables measuring voting rights or arbitrage possibilities are less clearly related.

The variable "average turnover" is the average monthly value of trading over 1981 through 1986. Ranked by this measure, those issues with low turnover, and by extension, low liquidity, are more likely to have a positive interest rate. (The coefficient is an elasticity.).

The variable "month's volume" is the value of an index for each issue representing the number of shares traded (accounting for splits) compared to the average over the months the issue was listed over the six years. According to Table 3, the lower is volume to its norm, the higher is the share interest rate.

As can be seen on the fourth line, the more price has increased during the month, the higher is the share interest rate. The percentage increase for the market as a whole is included to help standardize the changes on individual issues.

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[20] If the share-specific interest rate is null, the case of a *riporti* rate ending in 0.5 (a) has been treated separately from the case when the rate is an integer (b).

[21] During those months where no transaction occurred for a particular issue during the auction a natural inference is that i^s is 0 per cent. With such a greatly expanded sample, the estimated coefficient are not appreciably different, while the explanatory power of the regression drops from 0.19 to 0.03.

TABLE 3 Variables related to share interest rates

	Estimated coefficient	*t-statistic*
Constant	12,300	8,410
Ln(Average turnover)	-1,380	-14,800
Ln(Month's volume)	-0,710	-6,750
Month's change in price (%)	0,036	4,660
Month's change in market index (%)	0,015	1,040
Month's daily variability in market index (%)	0,043	5,120
Interest rate on lire (%)	-0,067	-1,020
Dummy for ordinary meeting	0,048	0,109
Dummy for extraordinary meeting	-0,256	-0,447
Dummy for *privilegiata* issue	-0,305	-0,604
Dummy for *risparmio* issue	-0,652	-1,350
Dummy for related rights issue	0,951	1,800
Dummy for related convertible bonds	-1,220	-1,420
Dummy for imminent extinction	2,160	2,850

Dependent variable = Ln(Share's interest rate); Number of observations = 1,571; $\hat{\sigma} = 3.55$

The variable measuring the within-month variability of the market index presumably represents those periods of exceptional speculative interest. Perhaps a higher interest rate on money also dampens speculation, although that variable's relationship to the share-specific interest rates is weak.

Based on the estimated coefficients for ordinary and extraordinary stockholders' meeting, share-specific interest rates do not systematically include the value of voting rights, perhaps because of the nature of Italian corporate control, the marginal value of a voting right is indeed miniscule. The dummy variables for the two versions of preferred shares, *privilegiate* or *risparmio*, although they have plausible signs, do not appear to be important. The dummy variables for sister securities in rights issues or convertible bonds are intended to represent the possibility of arbitrage operations during which a positive interest rate would be willingly paid. Although the coefficient on the existence of a related rights issue makes sense, that for convertible bonds does not. Perhaps these dummy variables, which ignore the size of the rights or bonds, are too crude to capture arbitrage operations. The variable "imminent extinction," which is a dummy variable with a value of 1 during the last four months of an issue's being listed (presumably a time during which the market knows of the demise), does, however, seem to explain some of the positive interest rates on shares

7. CONCLUSIONS

The *riporti* market in Milan serves an important but little known function as the interface between short-term money markets and speculation in stocks. Every month, with the help of some seventy banks and 200 brokers, a number of whom specialize in the *riporti* market, on the order of 1,000 billion lire pass to those who want to buy shares on credit while some 300 billion lire worth of shares passes to those who have sold shares short.

The *riporti* market determines the intertemporal structure of asset prices, with positive share-specific interest rates often emerging for issues with relatively low trading volume or recent price surges. It is integral to the liquidity of the stock market and provides the banking sector with highly secure, self-extinguishing loans

Although such a vibrant *riporti* market is distinctively Italian, since it arises from the clearing cycle of the Milan Stock Exchange and the contracts' special status in Italian law, it has parallels with the call money market in the U.S. and the contango market in the U.K., which themselves deserve much greater study to.

Like these related double loan markets, the *riporti* market has been little appreciated as integral to the local system for trading shares. Indeed, some proposals to move the Milan Stock Exchange towards a continuous spot market on the American model, threaten as an unintended consequence the functioning of the *riporti* market and by extension the stock market itself.

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