

# **The Impact of MiFID on the European Securities Industry: A Simulation of the Internalizer Behavior on the Italian Stock Market\***

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## **Abstract**

The European Union's Markets in Financial Instruments Directive (MiFID), expected to be implemented by October 2007, significantly modifies the regulation of the European securities industry. It will allow, among other things, investment firms to act as systematic internalizers. A systematic internalizer is an investment firm dealing on own account to execute client orders outside a regulated market or a multilateral trading facility (MTF). Specifically, systematic internalizers are required to publish firm quotes (i.e., to make a market) on liquid shares when dealing for retail quantities.

This paper uses unique audit trail order data in order to estimate the fraction of order flow internalized, to evaluate the potential profitability of systematic internalization activity, and to investigate the main factors affecting both the fraction of order flow internalized and the magnitude of systematic internalization profitability. We use actually observed order flow data to simulate the systematic internalization activity. Each order submitted to the market has been scrutinized in order to verify the possibility of internalization based on the joint presence of the following two requirements (expressly requested by the Level 1 law text). First, the quantity of the order is not greater than the estimated standard market size. Second, the price limit of the order is compatible with immediate execution by a systematic internalizer in respect of the best execution principle. Our results provide estimates of the fraction of internalized order flow and the internalization gross trading revenues. We find that the fraction of internalized orders is negatively related to the stock's daily turnover. We also decompose the gross trading revenues in positioning revenues and spread revenues. This decomposition allows us to identify the source of the size and variability of gross trading revenues. Spread revenues are statistically different from zero at 1 percent level, whereas positioning revenues are not statistically different from zero at ten percent level. The variability in the gross trading revenues is mainly driven by the large variability in the positioning revenues.

*Keywords:* MiFID; internalization; market making; Italian stock exchange

*JEL Classification:* G10; G14

*EFM Classification:* 360 – Market Microstructure

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# **The Impact of MiFID on the European Securities Industry: A Simulation of the Internalizer Behavior on the Italian Stock Market**

## **I. INTRODUCTION**

The European Union's Markets in Financial Instruments Directive (MiFID), due to be implemented by October 2007, significantly modifies the regulation of the European securities industry. It will allow, among other things, investment firms to act as systematic internalizers. A systematic internalizer is an investment firm executing client orders outside a regulated market or a multilateral trading facility (MTF). Specifically, systematic internalizers are required to publish firm quotes (i.e., to make a market) on liquid shares when dealing for retail quantities. In short, systematic internalizers are market makers on liquid stocks who execute small trades.<sup>1</sup>

This paper uses unique audit trail order data in order to estimate the fraction of order flow internalized, to evaluate the potential profitability of systematic internalization activity, and to investigate the main factors affecting both the fraction of order flow internalized and the magnitude of systematic internalization profitability on the Italian stock market.

Order flow internalization is an important issue for at least two reasons. First, the coming into force of the EU MiFID will explicitly assign a role to intermediaries wishing to make a market on liquid shares. Second, retail investors contribute for a large fraction of liquid shares trading volume.<sup>2</sup> This evidence is important for our paper since retail investors' orders normally do not carry information content and, therefore, are natural candidates for profitable market making.

The study of internalization based on Italian data is particularly relevant because of the striking contrast between the current market structure and the future one. EU

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<sup>1</sup> The internalization activity as designed by MiFID is not only a EU legislative definition, it can be also regarded as a business model resulting from an autonomous strategic decision. In United States, for example, Bernard L. Madoff Investment Securities provide liquidity primarily to retail clients, and primarily in the common stocks of large firms (Harris, 2003, page 290).

MiFID will fragment the marketplace as it will allow different trading venues to compete for order flow. By contrast, the current Italian market structure is based on a mandatory concentration rule.<sup>3</sup> This implies that order internalization is totally unknown. In short, the Italian stock market is therefore facing a transition from a purely concentrated market to a potentially fragmented market.

The analysis of the potential for order flow internalization based on data from a concentrated market is at the same time both an interesting feature and a limitation of our analysis. It could prove to be particularly interesting since we can infer the "natural" and "unconscious" portion of internalizable orders, as well as the gross profitability of the internalization business. On the other hand our analysis ignores any strategic deliberate behavior neither from market intermediaries nor from their customers.

Our paper differs from previous studies in three aspects. First, we look at the internalization activity, which per se raises "significant agency-principal problems" (SEC 1997), in a totally concentrated order driven market, and therefore in a market where there is no possibility of sending orders to multiple trading venues. To the best of our knowledge, there is no study dealing with the internalization activity in a concentrated market, being the existing literature focused on fragmented marketplaces. Additionally, the vast majority of previous papers study the internalization activity in quote driven (such as the London Stock Exchange, see Hansch *et al.* 1999) or hybrid order driven (such as NYSE, see Peterson and Sirri 2003), and not in a purely order driven market as the Italian stock market.

Second, we provide a direct test of the amount of capital required to perform a stock market making activity. Specifically, we estimate the share of the internalized order flow and the size of the inventory at the end of each trading day. We look at the dealer inventory level resulting from the empirically realized order arrival rate. In that sense our results can contribute to the measurement of the amount of capital

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<sup>2</sup> Franzosi *et al.* (2004) provide evidence on retail investors participation rates for Italian stocks.

<sup>3</sup> The concentration rule currently in place in Italy states that all trades, with the exception of block trades, must be executed in a regulated market. In principle, regulated markets could therefore compete for orders execution. As a matter of fact, virtually all trades are currently executed on Borsa Italiana.

required to finance the inventory position. This issue is also relevant for intermediaries planning to evaluate the economic merits of the internalization activity.

Third, we directly test the cream skimming hypothesis (Easley *et al.* 1996) since we estimate the adverse selection costs stemming from the internalization activity. Specifically, the difference between effective and realized spreads – which is a measure of adverse selection costs – enables us to test the cream skimming hypothesis.

Our paper could also be of interest for exchanges and regulators. The coming into force of the EU MiFID will make stock exchange in competition for order flow with other trading venues (i.e., multilateral trading facilities and intermediaries performing the internalization activity). The estimation of the fraction of order flow internalized is a direct measure of how fierce this competition could be. Additionally, this estimate can be helpful for regulators operating in a concentrated market (such as, e.g., in France, Germany or Italy) to infer the amount of disequilibrium that internalization could produce in a concentrated marketplace. For example, if intermediaries will internalize a large fraction of orders with low information content (e.g., retail orders), the central market will have to take care of the orders coming from informed traders, and this may alter market equilibrium. The level of disequilibrium depends on the fraction of uninformed order flow diverted from the central marketplace. This paper provides an estimate of this fraction<sup>4</sup>.

In order to simulate the systematic internalization activity we scrutinized each order submitted to the market in order to verify the possibility of internalization based on the joint presence of the following two requirements, expressly requested by the Level 1 law text of the EU Directive. First, the quantity of the order is not greater than the estimated standard market size. Second, the price limit of the order is

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<sup>4</sup> Further problems may arise in periods of adverse market conditions (e.g., when the market sharply declines, particularly when this decline is characterized by stocks moving together, as in time of panic, or when liquidity is scarce or volatility is very high). Amihud and Mendelson (2004) find that in periods of adverse market conditions and market under stress, the NYSE becomes the preferred venue to channel trading orders. Their results support the cream skimming hypothesis.

compatible with immediate execution by a systematic internalizer in respect of the best execution principle.

We find that about 9 percent of the order flow would be internalized according to the criteria set above and that the fraction of internalized orders is negatively related to the stock's daily turnover. We also decompose the gross trading revenues in positioning revenues and spread revenues. This decomposition allows us to identify the source of the size and variability of gross trading revenues. Spread revenues are statistically different from zero at 1 percent level, whereas positioning revenues are not statistically different from zero at ten percent level. The variability in the gross trading revenues is mainly driven by the large variability in the positioning revenues.

The rest of the paper is organized as follows. Section II describes the new regulatory regime that will come into effect upon implementation of the MiFID by October 2007, Section III discusses the data employed and the methodology adopted in this paper, Section IV shows the results of the empirical analysis, and Section V concludes.

## II. THE NEW REGULATORY REGIME FOR EQUITY TRADING IN EUROPE

The paradigm under which most of the European stock market are currently operating is going to change dramatically with the coming into force of the Markets in Financial Instruments Directive (MiFID).<sup>5</sup> The MiFID eliminates the possibility that a member state can impose that stocks admitted to trading on a regulated market have to be traded only on regulated markets (concentration rule), and allows the provision of trading services to a variety of trading venues, namely Regulated Markets (RMs), Multilateral Trading Facilities (MTFs) and Systematic Internalizers (SIs). MTFs are multilateral, exchange-like, trading venues, while SIs operate like market makers and represent a major innovation for concentrated markets, such as several European stock markets.<sup>6</sup>

An SI is an "investment firms which, on an organized, frequent and systematic basis, deals on own account by executing client orders outside a regulated market or an MTF" (Article 4(7) of the Directive). In addition, Article 27 of the MiFID states that SIs must publish firm quotes "on a regular and continuous basis during normal trading hours" in the shares admitted to trading on a RM (i.) for which they act as SIs, (ii.) for which "there is a liquid market",<sup>7</sup> and (iii.) for orders up to the a specific quantity.<sup>8</sup> Therefore, an SI is an intermediary executing client orders as direct trading counterpart with a special obligation to make a continuous market for retail quantities.

The MiFID also allows for price improvement. In fact, SIs may execute orders from professional clients at a price better than the posted quote "provided that the orders are of a size bigger than the size customarily undertaken by a retail investor".<sup>9</sup>

Investment firms, when executing client orders, must take all reasonable steps to obtain the "best possible result" for their client (best execution rule), taking into

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<sup>5</sup> Directive 2004/39/EC adopted by the European Council on April 21, 2004 following a second reading in the European Parliament in March 2004, and published on the Official Journal of the European Union on April 30, 2004.

<sup>6</sup> Köndgen and Theissen (2004) report that France and Germany, as Italy, have a mandatory concentration rule currently in place.

<sup>7</sup> For shares for which the market is not liquid, SIs disclose their quotes upon request.

<sup>8</sup> This quantity is known as standard market size (SMS).

<sup>9</sup> This quantity is known as customarily retail size (CRS).

account "price, costs, speed, likelihood of execution and settlement, size, nature or any other consideration relevant to the execution of the order". Relative to the current regime, the definition of best execution has shifted the focus from a purely price-based rule to a more general definition involving several dimensions of order execution quality.

If an intermediary receives a public limit order she can either execute it straight away (complying with the best execution rule) or she has to display it immediately on a RM or a MTF. In fact, client orders must be executed in a "prompt, fair and expeditious" way, relative to other client orders or the trading interests of the investment firm. A client limit order on shares admitted to trading on a RM, where not immediately executed under prevailing market conditions has to be immediately exposed on a RM or a MTF in order to maximize its likelihood of execution.<sup>10</sup>

Under the current regulatory regime – based on a mandatory concentration rule – the channeling of trading orders toward the marketplace is very simple and virtually identical for all orders. In fact, once a trader has placed a trading order, the order is electronically routed to the limit order book managed by Borsa Italiana, and then the order is displayed on the centralized book according to price and time priority.

Under the future regulatory regime – based on the coexistence of several trading venues – the path of trading orders is no more straightforward. In addition to the classical variables to be specified (price and quantity), each trader will also face the selection problem as where to route the order: a RM, a MTF or a SI.

An interesting and presumably frequent case is when the intermediary that collects the order also acts as a SI for that same share that is concerned in the client order.<sup>11</sup> In such a case, the intermediary may decide to offer to the customer an in-house execution service in competition with other trading venues. Given that the intermediary may decide upon the characteristics of the client order, it may easily happen that the intermediary will cream-skim the order flow, in compliance with the

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<sup>10</sup> This provision may not be applied to orders that are "large in scale compared with normal market size".

<sup>11</sup> A similar case arises when the order collecting intermediary is part of a financial conglomerate that also owns a SI. The order collecting intermediary will simply route the order flow to the affiliated SI.



MiFID rules. This paper tries to assess the potential magnitude and effects of such behavior.

### III. DATA DESCRIPTION AND METHODOLOGY

#### A. *Data Description*

SIs have to publish firm quotes in shares admitted to trading on a RM for which there is a liquid market. We collected the detailed audit trail order data for 57 liquid stocks traded at the Italian Stock Exchange for 15 trading days in the period ranging from October 6, 2005 to October 26, 2005. The stocks were selected applying the criteria set forth by level I MiFID rules and by preliminary drafts of level II rules that were available at the end of September 2005.<sup>12</sup> We identified the 64 most liquid shares admitted to trading on Borsa Italiana, and obtained the data for 57 of them<sup>13</sup>. Table 1 lists the stocks included in our sample.

The audit trail we employed provides a complete description of the order flow. Specifically, for each order the data set includes the following information: stock code, stock name, intermediary ID code, order arrival date and time (in the hhmmsscc format), buy or sell indicator, order type (limit order or market order) limit price (if applicable), other time-related parameters (e.g., when the order expires), other price-related parameters, and other quantity-related parameters. We matched each order with the state of the limit order book in effect when the order was sent to the market. The state of the book is composed by the best bid quote, the best ask quote, the quantity associated at the best bid quote, and the quantity associated at the best ask quote. The final data set consists of more than 4 million observations.

The availability of detailed order flow data allows us to estimate costs and benefits of trading strategies much more precisely than it would be possible using only standard quote and trade data. In fact, our data set includes information about the type of order and its direction (buy or sell). This implies that we do not need to infer order direction with the Lee and Ready (1991) algorithm.

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<sup>12</sup> Working document ESC/20/2005 rev3 on "Transparency and Admission to Trading", available at [http://europa.eu.int/comm/internal\\_market/securities/isd/index\\_en.htm](http://europa.eu.int/comm/internal_market/securities/isd/index_en.htm).

<sup>13</sup> Data were unavailable for 7 stocks for technical reasons (3 stocks) or because trading was suspended (4 stocks).

## *B. Methodology*

In this Section we illustrate the methodology employed to estimate the fraction of order flow internalized and the profitability of systematic internalization activity.

SIs are required to publish firm quotes (i.e., to make a market) on liquid shares when dealing for retail quantities. Specifically, Article 27 of the MiFID refers to sizes up to the "standard market size" (SMS). The SMS is "a size representative of the arithmetic average value of the orders executed" that will be determined by the member state Authority on financial markets. This information will be produced annually and made public to all market participants. However, it is currently not yet available, since the Directive will be implemented by October 2007. Therefore, our first step was to estimate the standard market size for each share included in the sample, as this is the upper limit for the obligation to publish firm quotes when operating as SI. Figure 1 and 2 report the estimated standard market size, along with the median of the actual order size, for each stock in the sample. The average order size is three times the median order size. This implies that the standard market size, which is based on an equally weighted average of all orders not larger than block trades, is much lower than the median order size: the standard market size is 2.3 times the median order size.

Next, we screen each order to verify if it could be internalized by the intermediary that has actually routed the order to the market. In our simulation the internalization only depends on the characteristics of the incoming order with respect to the state of the book at the time the order was sent the market. Specifically, to comply with the MiFID rules, an order is internalized when: (i.) the size is not larger than the standard market size (Article 27); and (ii.) the SI offers the best possible price with immediate and certain execution of the order (Article 21).

Those requirements imply that the only condition for the internalization of a market order is that the size of the order has not to be greater than the SMS. The intermediary would simply execute the order at current best quotes to comply with the best execution duty. By contrast, for a limit order the size requirement is complemented with the requisite that the limit price makes the order marketable. If

this condition is also satisfied, the intermediary could again execute the order at current best quotes complying with the best execution duty. Figure 3 provides a graphical representation of the internalization procedure for limit orders.

Based on the previously stated conditions, we are able to estimate the fraction of order flow internalized. Next, we move to the estimation of the profitability of the systematic internalization activity. We apply the revenues decomposition methodology developed by Sofianos (1995). In order to better understand the sources of specialist trading revenues, Sofianos splits gross trading revenues into two components: spread and positioning revenues. Spread revenues arise whenever the dealer buys at the bid quote and sells at the ask quote. Positioning revenues (or losses) arise whenever there is a change in quoted prices. If there is no change in the quoted bid and ask over the interval under consideration, then positioning revenues will be zero<sup>14</sup>.

The decomposition of gross trading revenues into spread and positioning revenues is complicated by the presence of unrealized inventory revenues. The unrealized inventory revenues reflect both the spread and positioning revenues that the dealer will earn when she eventually close the inventory position. Both the unrealized inventory and cash flow revenues must therefore be disaggregated into spread and positioning revenues resulting in a four-way decomposition of trading revenues.

Realized positioning revenues (RPR) equal the change in the dealer's cash position when trades are priced at the midquote instead of the trade price<sup>15</sup>:

$$RPR = \sum_{t=1}^N m_t \cdot q_t \quad [1]$$

Unrealized positioning revenues (UPR) equal the change in the value of the inventory positions when inventories are valued at the midquote:

$$UPR = m_N \cdot I_N - m_0 \cdot I_0 \quad [2]$$

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<sup>14</sup> Manaster and Mann (1999) define the profit component associated with selling immediacy as *execution* and the profit component due to price movements as *timing*.

<sup>15</sup> Pricing trades at the midquote effectively removes the spread component of the transaction.

Realized spread revenues (RSR) equal the number of shares traded by the dealer multiplied by the effective half spread<sup>16</sup>:

$$RSR = \sum_{t=1}^N (m_t - p_t) \cdot q_t \quad [3]$$

Unrealized spread revenues (USR) equal the change in the inventory position valued at half the spread:

$$USR = (m_N - p_N) \cdot I_N - (m_0 - p_0) \cdot I_0 \quad [4]$$

The gross trading revenue (GTR) over the time interval 0 to N is therefore the following<sup>17</sup>:

$$GTR = UPR - RPR + RSR - USR \quad [5]$$

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<sup>16</sup> Purchases are signed as positive and sales are signed as negative.

<sup>17</sup> Notice that we need to subtract RPR since purchases – which produce money outflows – are signed as positive and sales – which produce money inflows – are signed as negative. We also need to subtract USR in order to be consistent with the methodology used to value inventories (e.g., if inventories were valued at the midquote USR would be zero).

#### IV. MAIN RESULTS

The scope of the systematic internalization activity depends upon the requirements of the internalization procedure. According to the procedure described in Section III.B, and derived from the Level 1 law text of the EU Directive, an order is internalized when: (i.) the size of the order is not larger than the standard market size; and (ii.) the SI offers the best possible price with immediate and certain execution of the order (i.e., the order under consideration is a market order or a marketable limit order). Orders satisfying condition (i.) represent 18.8 percent of our sample, orders satisfying condition (ii.) represent 38.8 percent of our sample, orders satisfying conditions (i.) and (ii.) jointly represent 8.8% of our sample.

Figure 4 reports the estimates of the fraction of internalized orders for each stock in the sample. Figure 5 reports the estimates of the fraction of internalized orders separately for limit orders and market orders for each stock in the sample.

Regressing the share of internalized orders ( $\alpha_i$ ) on the average daily turnover ( $ADT_i$ ) yields the following result:

$$\begin{array}{rcl} \alpha_i & = & 9.44 - 0.014 \cdot ADT_i & [6] \\ & & (26.5) & (-3.24) \\ & & 0.00 & 0.00 & adj - R^2 = 0.15 \end{array}$$

The negative slope coefficient of ADT, which is statistically significant, means that the fraction of internalized orders is negatively related to the stock's daily turnover. That is, more liquid stocks display lower fractions of internalized orders.

More liquid stocks also exhibit lower bid-ask spread. Figure 6 reports the quoted bid-ask spread on each stock in the sample. The quoted bid-ask spread is a proxy of the profitability of the liquidity provision activity.

The overall spread revenues of the internalization activity for a SI depend on the fraction of the order flow that is internalized for each stock, the total volume of

order flow received by each intermediary on each stock,<sup>18</sup> the per unit revenue of the market making activity.

The fraction of internalized order flow is expressed as rate per period and computed as the value of internalized orders relative to the total value of orders for each stock in the sample ( $\alpha_i$ ). The per unit spread revenue of the internalization activity is estimated as the quoted bid-ask spread in percentage of the midquote ( $QPS_i$ )<sup>19</sup>.

The overall spread revenues from systematic internalization for stock  $i$  is

$$SISR_i = QPS_i \cdot ADT_i \cdot 252 \cdot \alpha_i \quad [7]$$

where

$SISR_i$  is the systematic internalization spread revenues for stock  $i$ ;

$QPS_i$  is the quoted bid-ask spread relative to the midquote for stock  $i$ ;

$ADT_i$  is the average (as a proxy for the expected) daily turnover for stock  $i$ ;

252 is the number of trading days in a year;

$\alpha_i$  is the ratio between the value of internalized orders and the total value of orders for stock  $i$ .

Albeit more liquid stocks have lower fractions of internalized orders (i.e.,  $\alpha_i$ s) and lower bid-ask spreads (i.e.,  $QPS_i$ s), most of the overall spread revenues from systematic internalization comes from liquid shares. Figure 7 reports the estimate of the overall spread revenues from systematic internalization activity for each stock in the sample. The systematic internalization market is significantly concentrated: the C3 measure (i.e., the sum of the market share for the three stocks with the larger spread revenues) equals 0.3 and the C5 measure equals 0.43.

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<sup>18</sup> The total volume of the order flow received by each intermediary positively affects the size of the internalization activity since it increases both the value of internalized orders, and the probability of in-house execution via agency crosses (and it also reduces the waiting time for crossing opposite orders).

<sup>19</sup> We consider the quoted version of the bid-ask spread since the Italian stock market operates via a totally electronic trading system that does not allow price improvement. Therefore, effective spread cannot be lower than quoted spread (Nimalendran and Petrella 2003).

Gross trading revenues for systematic internalizers originate from both spread and positioning revenues. For each stock and each intermediary in our sample, we use equations [1]-[5] to estimate daily gross trading revenues and the four components of trading revenues. We measure the gross trading revenues on a per stock per day basis and evaluate inventory positions using daily closing prices.

Table 2 shows that the estimated gross trading revenues average €329 per stock per day (which is equivalent to 0.052% of the internalized turnover). This estimate has a standard error of €159 and is statistically different from zero at 5 percent level (p-value equals 0.04). The median value is €21 per stock per day. Sofianos (1995) reports an average gross trading revenues of \$ 552 per stock per day for NYSE specialists.

The decomposition between positioning revenues and spread revenues allows us to identify the source of the size and variability of gross trading revenues. Spread revenues average €93 per stock per day and positioning revenues average €235 per stock per day. Therefore, positioning revenues make about 72 percent of the overall trading revenues and spread revenues constitute about 28 percent of the gross trading revenues. However, spread revenues are statistically different from zero at 1 percent level, whereas positioning revenues are not statistically different from zero at ten percent level.

The coefficient of variation – which is a dimensionless number that allows comparison of the variation of populations that have significantly different mean values – is equal to 4.9 for positioning revenues, and 1.3 for spread revenues. The variability in the gross trading revenues is mainly driven by the large variability in the positioning revenues.

The median value for positioning revenues equals *minus* €15 per stock per day, the median value for spread revenues is €49 per stock per day.

The amount of positioning revenues depend upon the joint interaction of two factors: the change in the inventory and the change in the stock price. If inventories increase when the stock price raises, then positioning revenues are positive. If inventories increase when the stock price drops, then positioning revenues are negative. The



correlation between positioning revenues and change in the midquote in our sample is -0.14 and is stable across different subsamples. This would imply negative positioning revenues<sup>20</sup>. And in fact this is what we find in median values. The average positioning revenues is positive only due to the effect of few large trades, and in fact it is not statistically different from zero.

We also provide an estimate of the inventory level associated to the systematic internalization activity. Table 3 shows summary statistics for the absolute value of the daily closing inventory position, the ratio of closing inventory to internalized order flow, the ratio of closing inventory to daily turnover. The last ratio is similar to the inventory/sales ratio of classic financial analysis. For the present purposes, it answers the question: if the dealer were the counterparty to all purchases (sales), how many days would it take to reduce the average positive (negative) inventory position to zero? This ratio averages 0.01, which is very small especially compared with the 0.13 found by Hasbrouck and Sofianos (1993) for the same ratio computed for the most liquid NYSE stocks.

Our estimate of the inventory level at the end of the day is extremely conservative and has to be interpreted as a very rough upper bound approximation of the actual SI capital exposure for at least three reasons. First, an actual SI will manage her quotes, whereas our purely passive SI does not change her quotes to attain her desired inventory position.<sup>21</sup> Second the our estimate of the inventory level is identified on a stock-by-stock basis, and not on a portfolio basis. The trading behavior of dealers should not be affected by stock-by-stock inventory, but by their portfolio-equivalent inventory. Third, our inventory series may not represent the true exposure to market risk because a given stock may be also traded in other markets or hedged in the construction of structured securities.

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<sup>20</sup> If market prices are informationally efficient and all market participants are equally informed, then on average positioning revenues should be zero. If the dealer trades with better informed market participants, then on average positioning revenues should be negative. If, on the other hand, it is the dealer that has superior information, then positioning revenues should on average be positive.

<sup>21</sup> Amihud et al. (1980) provide a model for market makers quotes management.

## V. SUMMARY AND CONCLUSIONS

This paper uses unique audit trail order data in order to estimate the fraction of order flow internalized, to evaluate the potential profitability of systematic internalization activity, and to investigate the main factors affecting both the fraction of order flow internalized and the magnitude of systematic internalization profitability. We use actually observed order flow data to simulate the systematic internalization activity.

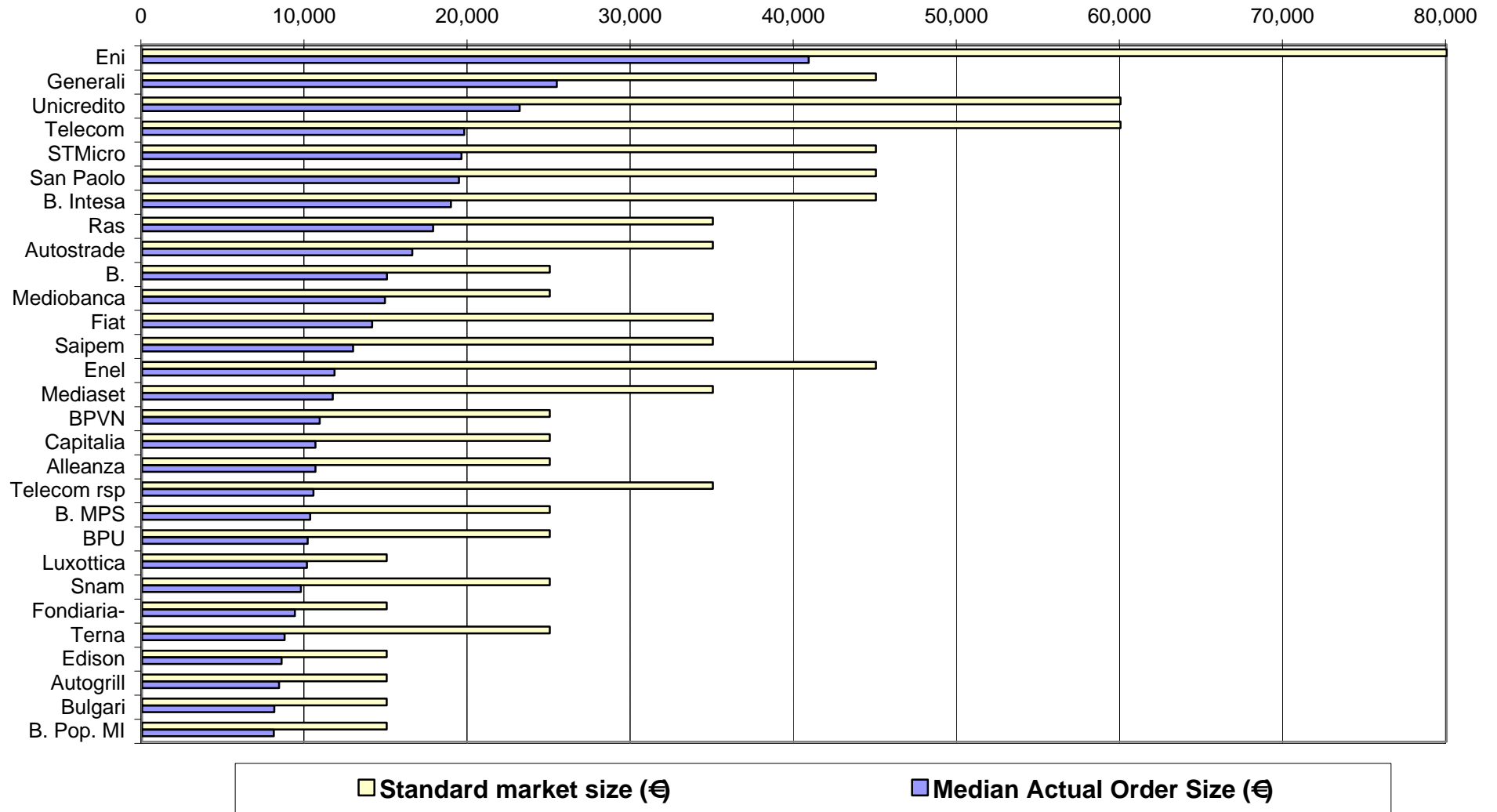
Our results provide estimates of the fraction of internalized order flow and the internalization gross trading revenues. We find that the fraction of internalized orders is negatively related to the stock's daily turnover. We also decompose the gross trading revenues in positioning revenues and spread revenues. This decomposition allows us to identify the source of the size and variability of gross trading revenues. Spread revenues are statistically different from zero at 1 percent level, whereas positioning revenues are not statistically different from zero at ten percent level. The variability in the gross trading revenues is mainly driven by the large variability in the positioning revenues.

The main limitation of this study is the fact that the simulation is based on historical data. That is, we apply the internalization procedure to the actually observed order flow. However, market equilibrium is the result of strategic interaction among traders. We are perfectly aware of the fact that the limit order book might well change in presence of order flow internalization, whereas we use the historical limit order book quotes resulting from the execution of all orders on the concentrated market.

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**Figure 1 - Standard Market Size (Part I)**



**Figure 2 - Standard Market Size (Part II)**

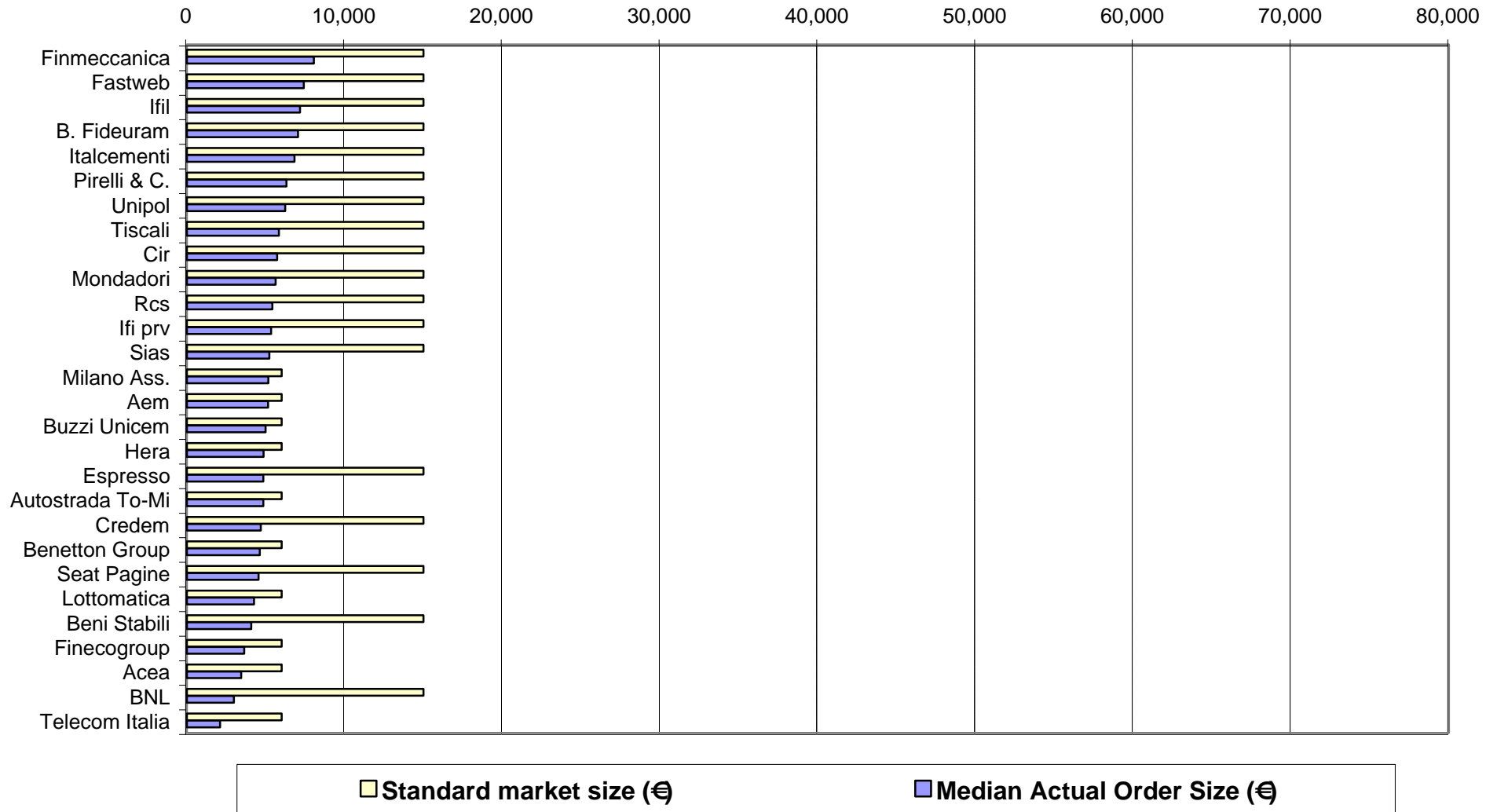


Figure 3 - Internalization Procedure for Limit Orders

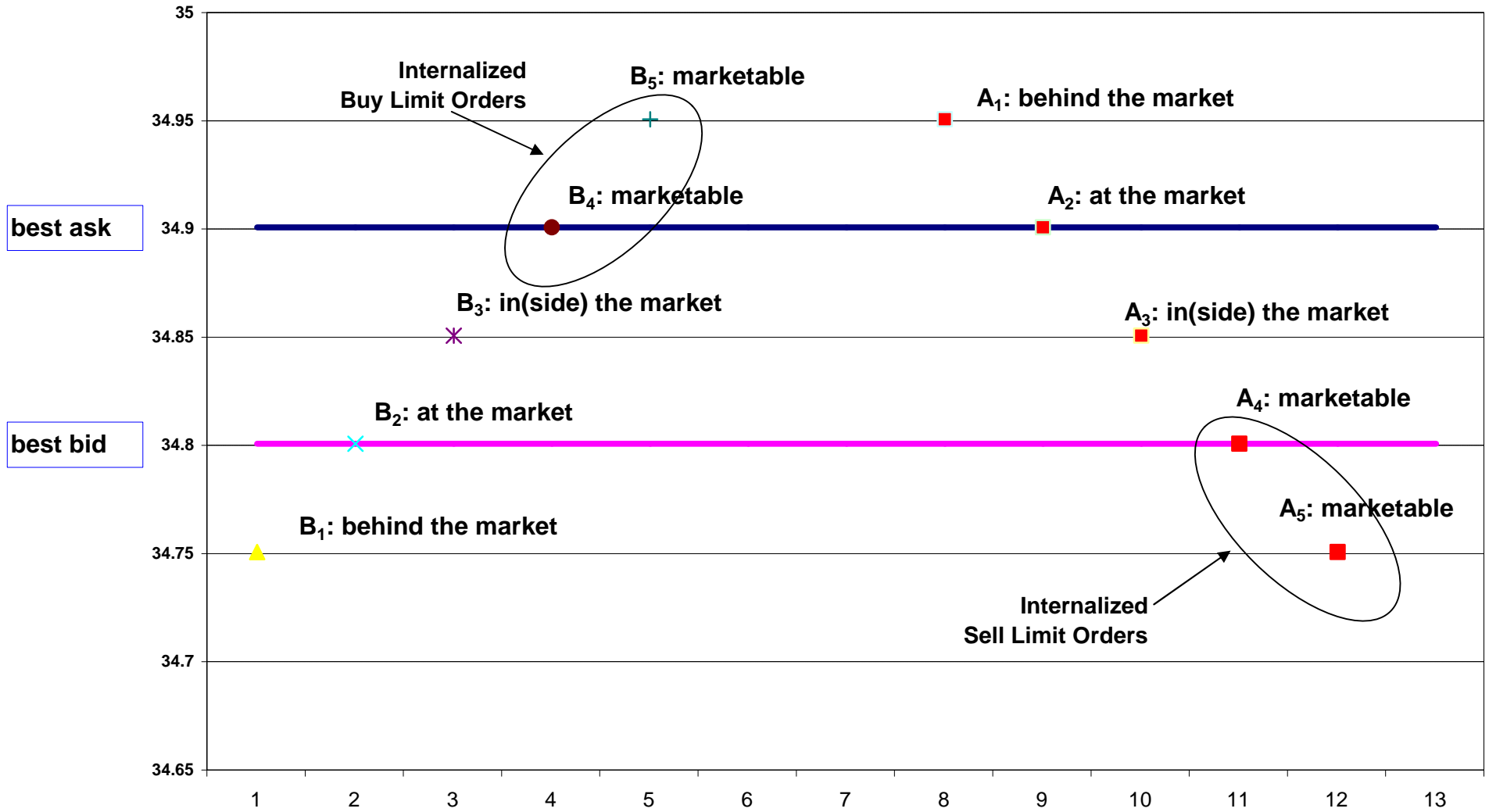


Figure 4 - Fraction of Internalized Orders

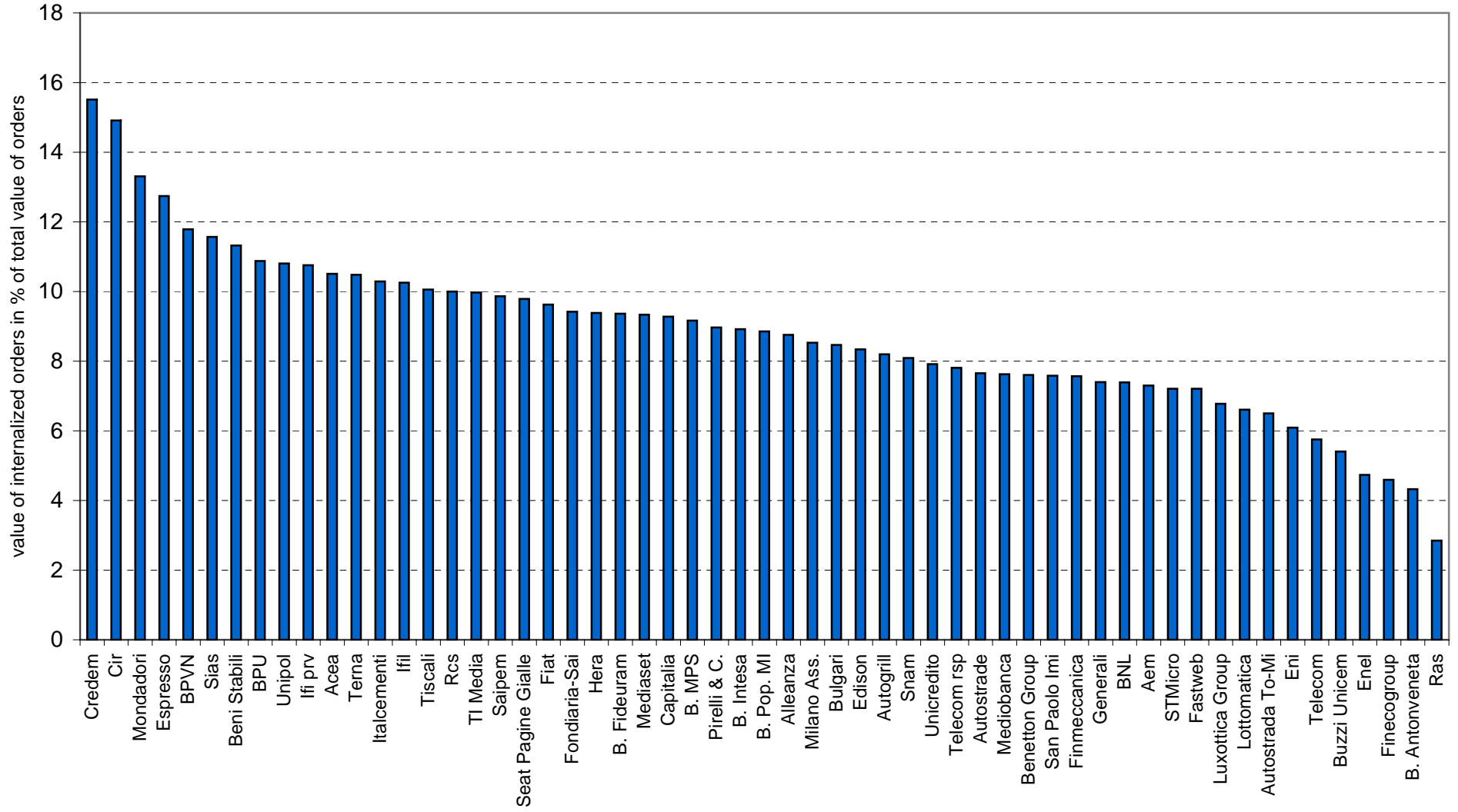


Figure 5 - Fraction of Internalized Limit Orders and Market Orders

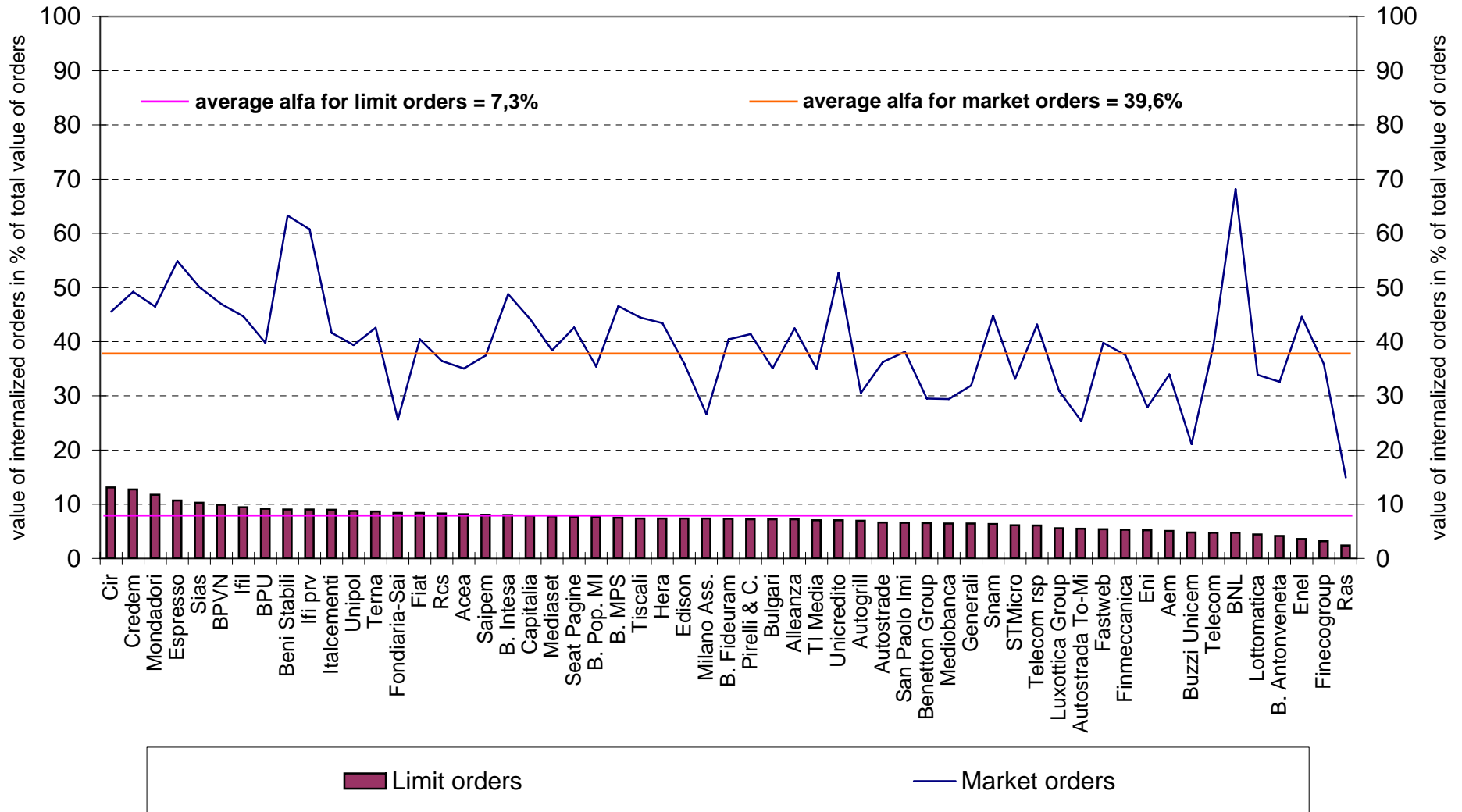




Figure 6 - Bid-Ask Spread

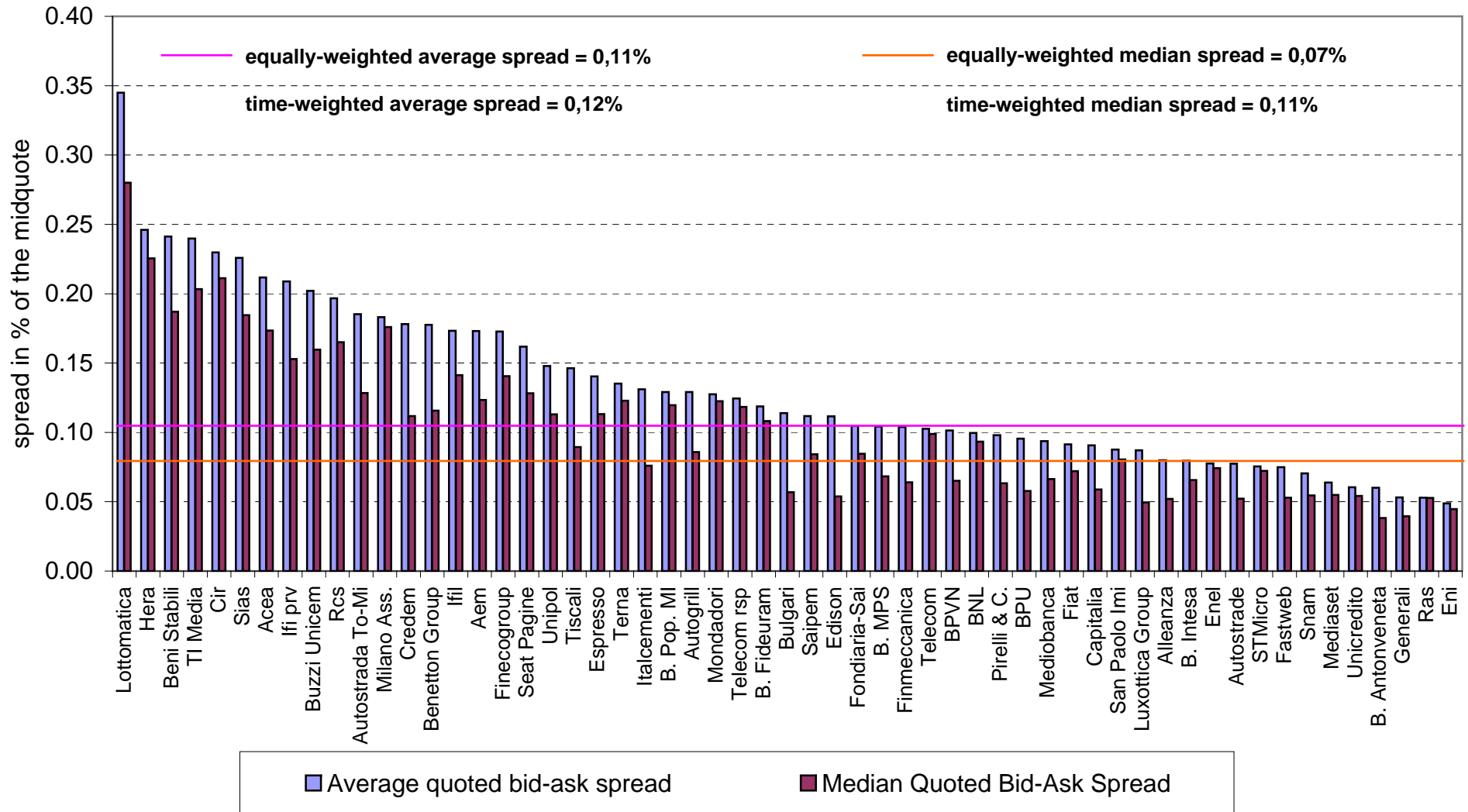
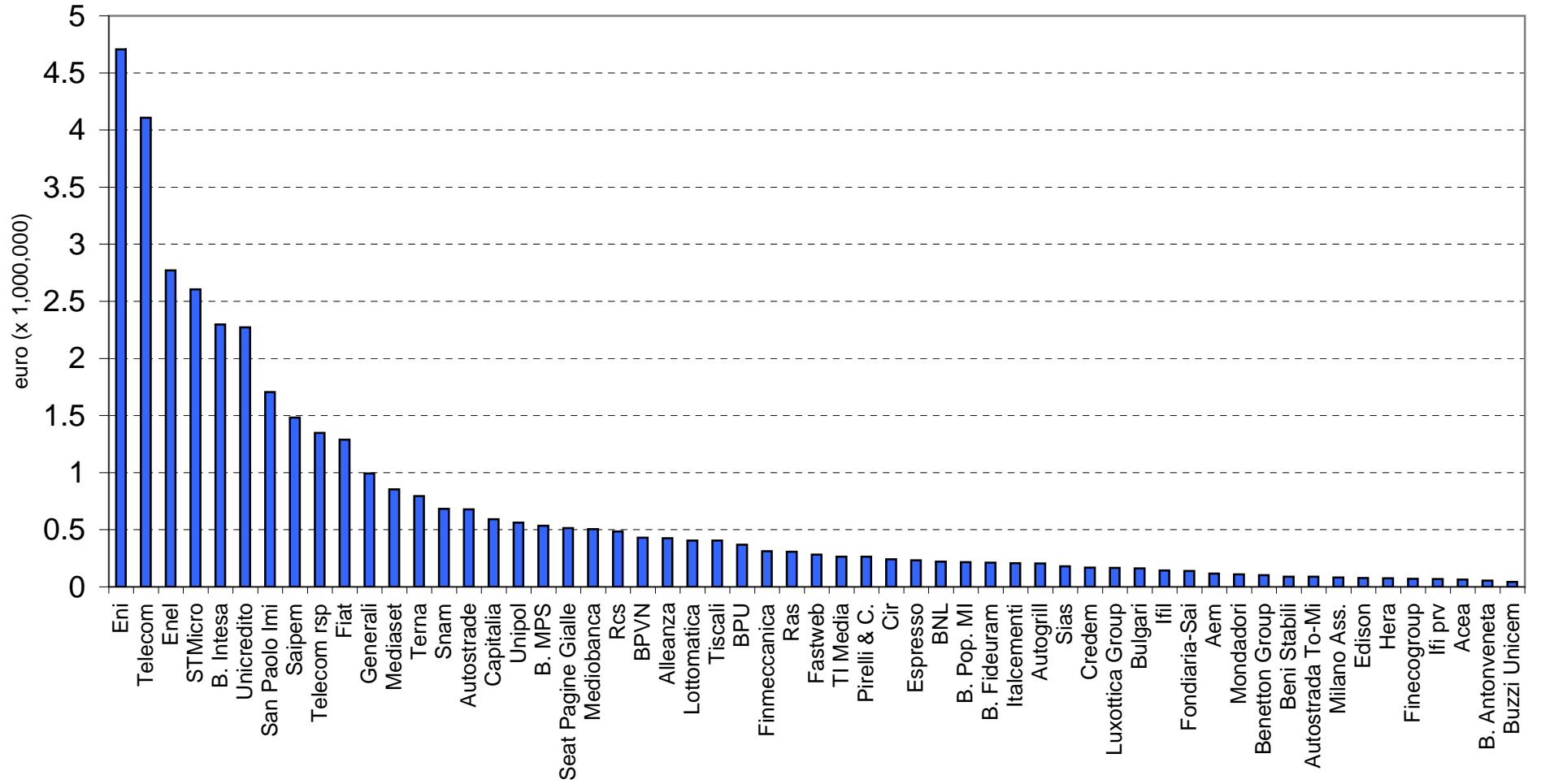


Figure 7 - Overall Spread Revenues from Systematic Internalization



**Table 1 - Sample**

# Stock	Liquid share	Sample	# Stock	Liquid share	Sample
1 ENI	x	x	33 BULGARI	x	x
2 TIM	x	x	34 BANCA INTESA RSP	x	
3 STMICROELECTRONICS	x	x	35 TERNA	x	x
4 ENEL	x	x	36 LUXOTTICA	x	x
5 UNICREDITO ITALIANO	x	x	37 EDISON	x	x
6 TELECOM ITALIA	x	x	38 BANCA POPOLARE MILANO	x	x
7 GENERALI	x	x	39 FINECOGROUP	x	x
8 BANCA INTESA	x	x	40 EDITORIALE L'ESPRESSO	x	x
9 SAN PAOLO IMI	x	x	41 FONDIARIA - SAI	x	x
10 FIAT	x	x	42 RCS MEDIAGROUP	x	x
11 TELECOM ITALIA RSP	x	x	43 IFIL	x	x
12 CAPITALIA	x	x	44 MONDADORI EDITORE	x	x
13 MEDIASET	x	x	45 BANCA POPOLARE LODI	x	
14 BANCA NAZ LAVORO	x	x	46 BENETTON GROUP	x	x
15 SNAM RETE GAS	x	x	47 LOTTOMATICA	x	x
16 TISCALI	x	x	48 AEM	x	x
17 RAS	x	x	49 ITALCEMENTI	x	x
18 AUTOSTRADE	x	x	50 MERLONI	x	
19 ALLEANZA	x	x	51 CIR	x	x
20 SAIPEM	x	x	52 TIM RSP	x	
21 MEDIOLANUM	x		53 SIAS	x	x
22 SEAT PAGINE GIALLE	x	x	54 BUZZI UNICEM	x	x
23 FINMECCANICA	x	x	55 ACEA	x	x
24 BANCA FIDEURAM	x	x	56 MILANO	x	x
25 FASTWEB	x	x	57 UNIPOL PRV	x	
26 MEDIOBANCA	x	x	58 AUTOSTRADA TO-MI	x	x
27 BANCA ANTONVENETA	x	x	59 TELECOM ITALIA MEDIA	x	x
28 BANCO POPOLARE VR E NO	x	x	60 HERA	x	x
29 BANCA MONTE PASCHI SIENA	x	x	61 IFI PRV	x	x
30 BANCHE POPOLARI UNITE	x	x	62 BENI STABILI	x	x
31 PIRELLI & C	x	x	63 CREDITO EMILIANO	x	x
32 AUTOGRILL	x	x	64 FINMATICA	x	

**Table 2 - Gross Trading Revenues per Stock per Day**

This table presents the results of the gross trading revenues decomposition based on the methodology described in Section III.B. Inventories are valued using the daily closing prices. Summary statistics are computed using daily average revenues per stock. The coefficient of variation is the ratio of the standard deviation to the mean. Statistical significance figures refer to a t-test for the null hypothesis that the mean is zero.

	# obs	Average	t-stat	p-value	Standard Error	Standard Deviation	Coefficient of Variation	Median	Min	Max
Gross Trading Revenues (GTR)	57	328.6	2.1	0.04	158.8	1198.7	3.6	20.9	-1346.7	7933.9
Decomposition:										
Positioning Revenues (RPR + UPR)	57	235.3	1.5	0.13	152.6	1151.8	4.9	-15.2	-1583.4	7506.7
Spread Revenues (RSR + USR)	57	93.2	5.9	0.00	15.8	119.2	1.3	49.0	-48.9	598.5

**Table 3 - Inventory Level per Stock per Day**

This table presents summary statistics for the end-of-the-day absolute value of the inventory.

	# obs	Average	t-stat	p-value	Standard Error	Standard Deviation	Coefficient of Variation	Median	Min	Max
Daily Closing Inventory	57	281,328	5.2	0.00	53,991	407,624	1.4	164,395	21,907	2,255,261
Inventory / Internalized Orders	57	2.64	10.7	0.00	0.246	1.859	0.704	2.096	0.696	11.343
Inventory / Daily Turnover	57	0.010	7.9	0.00	0.001	0.009	0.950	0.008	0.002	0.060