Bid-Ask Spreads Surrounding Earnings Announcements:

Evidence from the Italian Bourse

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Abstract

Studies of market reaction surrounding earnings announcements use bid-ask spreads to proxy for information asymmetry. We argue that the use of spreads posted by NYSE specialists or Nasdaq dealers clouds previous tests since dealer spreads confound a number of factors, including inventory holding costs and the market power of dealers. This study addresses this problem by examining bid-ask spreads surrounding earnings announcements for stocks listed on the Italian Bourse. Since the stocks examined trade in a purely order-driven environment, the problems encountered in previous studies are mitigated. This enables a cleaner test of information asymmetry surrounding earnings announcements. New evidence is provided that bid-ask spreads increase significantly around earnings announcements, in contrast to previous studies using daily data.

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1. Introduction

The study of market reaction surrounding earnings announcements raises questions concerning information asymmetry and the relationship between private and public information in securities markets. Arguing the two are substitutes, Morse and Ushman (1983) and Bushman et al. (1997) suggest that if public announcements discourage private information gathering, earnings announcements could coincide with lower information asymmetry. However, if some investors can acquire private information by processing public announcements, private and public information could be complementary, increasing information asymmetry surrounding earnings announcements (see Indjejikian, 1991; Harris and Raviv, 1993; Kim and Verrecchia, 1991, 1994).

Empirical research has focused on this issue directly by examining bid-ask spreads surrounding earnings announcements. Spreads are commonly considered a proxy for information asymmetry (see Glosten and Milgrom, 1985), with increased spreads surrounding earnings announcements consistent with an increase in information asymmetry. The evidence from empirical studies is inconclusive. Most studies find no evidence of significant changes in bid-ask spreads surrounding earnings announcements, despite evidence that the adverse selection component of the spread widens significantly surrounding earnings announcements (see Morse and Ushman, 1983; Venkatesh and Chiang, 1986; Lee et al., 1993; Brooks, 1994; Krinsky and Lee, 1996; Affleck-Graves et al., 2002).

In this study, it is argued that the inconclusive evidence is related to the use of spreads posted by NYSE specialists or Nasdaq dealers in prior studies. Dealer spreads

confound a number of factors, potentially clouding the examination of information asymmetry surrounding earnings announcements. This study addresses this problem by examining bid-ask spreads surrounding earnings announcements for stocks listed on the Borsa Italiana . Since the stocks examined trade in a purely order-driven environment, the problems encountered by previous studies are mitigated. This enables a cleaner test of information asymmetry surrounding earnings announcements. New evidence is provided that bid-ask spreads do increase significantly around earnings announcements, in contrast to previous studies using daily data.

The remainder of this paper is organized as follows. Section 2 reviews prior literature on market reaction surrounding earnings announcements and discusses the problems with dealer spreads. Section 3 describes the institutional detail of the BORSA ITALIANA and the data used. Section 4 details the experimental design used, and Section 5 reports empirical results. The final section provides a conclusion and summary, and provides directions for future research.

2. Previous Literature

2.1. Market reaction surrounding earnings announcements

Market reaction surrounding earnings announcements has been studied extensively in the finance literature. Empirical tests were pioneered by Ball and Brown (1968), who introduced the event study methodology for analyzing abnormal returns. They report significant abnormal returns around earnings surprises. Early studies also report abnormal trading volume surrounding earnings announcements (Beaver, 1968; Kiger, 1972; Morse; 1981). More recent empirical work has confirmed that the market reactions documented are robust to controlling for firm size and changes in systematic

risk (Ball and Kothari, 1991; Chopra et al., 1992). These findings suggest that earnings announcements have information content which is impounded into stock prices when information is released publicly. Information in earnings reports also appears to be impounded before public announcements, suggesting the existence of privately informed traders.

With the availability of quote data, a number of empirical studies have focused on bid-ask spreads as a proxy for information asymmetry. Morse and Ushman (1983) report no significant increase in spreads of over-the-counter securities surrounding earnings announcements. Venkatesh and Chiang (1986) corroborate this for NYSE securities, finding no evidence of an increase in spreads surrounding regular earnings announcements. However, Lee et al. (1993) find to the contrary using intraday data, reporting that spreads increase significantly surrounding earnings announcements. Further examination of the issue through the study of bid-ask spread components may provide some explanation. Brooks (1994), Krinsky and Lee (1996) and Affleck-Graves et al. (2002) all report significant increases in the asymmetric information component of spreads surrounding announcements. Krinsky and Lee (1996) also report significantly reduced inventory holding and order processing components, potentially explaining the insignificant reaction in posted spreads despite increased information asymmetry.

2.2. Problems with dealer spreads

The inconclusive evidence from prior studies is unsurprising given the focus on spreads posted by dealers on the NYSE and Nasdaq. The dealer spreads used in these studies confound a number of factors, potentially clouding the examination of information asymmetry surrounding earnings announcements. Dealer spreads are widely

known to reflect order processing and inventory holding costs as well as adverse selection risk (which derives from information asymmetry).[1] Misuse of market power by dealers, for example by avoiding odd-eighth quotes, has been shown to artificially inflate posted spreads (see Harris, 1991; Christie and Schultz, 1994). Therefore, dealer spreads may also be contaminated by the market power of dealers. Studies examining the components of the bid-ask spread mitigate this problem by focusing on the adverse selection component. However, doubt remains as to the accuracy of spread decomposition methods (see Van Ness et al., 2001).

Other institutional features of US markets provide additional reasons why examining dealer spreads may confound tests of asymmetric information. McInish and Wood (1992) document that almost half the limit orders that improve the best quotes are not displayed by specialists. Data on specialist quotes may therefore not necessarily reflect all spread changes, potentially resulting in measurement error. Petersen and Fialkowski (1994) report that, due to price improvement, fifty percent of orders execute at an effective spread of approximately half the posted spread, casting doubt on how closely posted spreads represent actual trading costs.

This study addresses these issues by examining bid-ask spreads surrounding earnings announcements for a sample of stocks listed on the BORSA ITALIANA. The problems outlined above are mitigated as the stocks examined trade in a purely order-driven environment. Given the absence of official dealers or liquidity providers, order processing, inventory and market power effects are less relevant in this market. This

[1] For inventory models see Garman (1976), Stoll (1978a, b) Amihud and Mendelson (1980, 1982), Ho and Stoll (1981) and O'Hara and Oldfield (1986). Asymmetric information models include Copeland and Galai (1983), Glosten and Milgrom (1985), Kyle (1985), Easley and O'Hara (1987) and Admati and Pfleiderer (1988).

means that bid-ask spreads are more likely to reflect changes in information asymmetry, facilitating a cleaner test. Issues relating to measurement error are avoided because the BORSA ITALIANA order book displays all bid and ask orders, enabling accurate observation of spreads. Further, the impossibility of price improvement on the BORSA ITALIANA implies that observed spreads more accurately represent actual trading costs faced by market participants.

3. Data and Institutional Detail

Since 1991, equity trading on the Italian Bourse has taken place on the Mercato Telematico Azionario (MTA). MTA is an electronic trading system, which enables brokers to trade all securities in real-time from computer terminals linked to the Italian Bourse. Similar to other European markets such as Euronext, Deutsche Börse and the London Stock Exchange, the Italian Bourse uses a segmented market structure. Stocks are grouped according to market capitalization, each group using a different trading mechanism within MTA. The Blue Chip segment comprises the largest stocks, with market capitalization greater than €800 million. Mid-cap stocks trade in the Segmento Titoli con Alti Requesti (STAR) segment. Technology stocks trade in the New Market (NM). All other stocks trade in the Ordinary segment.

This study focuses on the stocks in the Blue Chip segment. Blue Chip stocks are traded in a continuous auction from 9:10 a.m. to 5:25 p.m. each trading day, using an electronic open limit order book. Liquidity is supplied by public limit orders without any official market makers. For reasons discussed above, this enables a cleaner test of

asymmetric information surrounding earnings announcements.[2] The procedures that companies must follow when releasing earnings information are described in regulations set by the Italian corporate regulator, CONSOB.[3] These regulations provide a framework for the timely release of price-sensitive information to the market. Blue Chip companies must transmit price-sensitive information to CONSOB, the Italian Bourse (which reports the announcement through MTA and its web site) at least two international press agencies.

Earnings announcement data for this study were obtained from the Italian Bourse. The earnings announcement file describes the stock code, announcement date and the announcement type. Announcements are recorded as quarterly, half-yearly or annual earnings reports. There are 104 stocks in the earnings announcement file, and eight announcements per stock from February 14, 2000 to October 29, 2003, comprising 568[4] separate announcements. Daily price and volume data for each stock in the earnings announcement file were gathered from Bloomberg. The Bloomberg file describes the last transaction price, last bid price, last ask price and daily volume for each stock on each trading day. Data were captured for each stock from 50 trading days prior to the first announcement date (December 2, 1999) to 50 days after the last announcement date (February 19, 2004).

A daily time-series was created for each stock on each trading day. The following variables were recorded using the Bloomberg data:

[2] The STAR segment uses a hybrid trading system combining an order book with liquidity providers who disseminate bid-ask quotes to the market. Stocks in the NM segment use a similar trading mechanism to the STAR segment, but must be technology stocks. The Ordinary segment contains many small-cap stocks that trade in a series of call auctions throughout the day.

[3] See CONSOB regulation number 11971/99.

[4] The original sample should be composed of 832 separate earnings announcements, but, because of missing reporting data, I collected all the stocks with 8 earnings announcements (two per year from 2000 to 2003), reaching a sample size of 568.

$$BAS_{i,t} = ASK_{i,t} - BID_{i.t}$$

$$PBAS_{i,t} = \frac{BAS_{i.t}}{MIDQUOTE_{i.t}}$$

$$VOLATILITY_{i.t} = \ln\left(\frac{HIGH_{i,t}}{LOW_{i.t}}\right)$$

$$SVOL_{i.t} = \frac{VOLUME_{i,t}}{SHARES_{i}}$$

These variables are defined as follows: $BAS_{i,t}$ is the observed bid-ask spread (in Euro) for stock *i* on day *t*, measured as the difference between the respective end-of-day ask and bid prices. $PBAS_{i,t}$ is the proportional bid-ask spread for stock *i* on day *t*. This is defined as $BAS_{i,t}$ divided by the midquote, $\left(ASK_{i,t} + BID_{i.t}\right)/2$. The volatility metric used is the log difference between the high price and low price for stock *i* on day *t*. A volume metric referred to as $SVOL_{i.t}$ is also constructed, measured as daily volume in shares for stock *i* on day *t* divided by the number of shares on issue for stock *i* as at December 1, 1999. Shares on issue data were obtained from Datastream.

If on a given day, the bid-ask spread for a stock was negative or the stock did not trade, missing values are recorded for the stock on that day. Equally-weighted cross-sectional averages of individual stock, volume and volatility measures were constructed each day to proxy for market-wide measures. Missing values for some stocks on certain days causes the number of stocks included in the sample to vary each day, however the average daily variation is only one percent.

A time-series around each announcement was constructed by linking the time-series data to the earnings announcement file. A date relative variable indicating the position of an observation from its respective announcement date was added. The number zero is attached to all observations that were recorded on an announcement date. All non-announcement days are then expressed relative to the relevant announcement day. For example, -25 is attached all observations that were recorded 25 days prior to an announcement date. The final sample consists of a daily time-series for each announcement that records the measures outlined above for the announcement stock, as well as contemporaneous market-wide measures, from -50 to +50 days around each announcement.

4. Method

4.1. Control and experimental samples

The method outlined in Morse and Ushman (1983) is used to construct experimental and control samples for the bid-ask spread measures, to test for significant changes in bid-ask spreads surrounding earnings announcements. Increased bid-ask spreads surrounding earnings announcements would be consistent with increased information asymmetry. The volume and volatility measures are also examined using the same method, to test whether trading activity and price informativeness change surrounding earnings announcements.

The experimental sample consists of all observations that are within -25 to +25 days surrounding each announcement date (denoted as day zero). Within the experimental sample, cross-sectional averages of individual stock measures are constructed for each day. For example, all observations on proportional spreads on day -

25 were pooled, and the average of these computed. This process was repeated each day, with the time-series of cross-sectional averages forming the experimental sample. To construct the control sample, time-series for each stock from days -50 to -26 and from days +26 to +50 are joined and a cross-sectional average is constructed for each day, similar to the experimental sample. The time-series average of these cross-sectional measures is then computed, to arrive at a single number which represents the control.

4.2. Statistical tests

To examine whether bid-ask spreads, volume and volatility are significantly different surrounding earnings announcements relative to the control period, a difference of means test is used. A Student *t*-statistic is calculated for each metric on each day in the experimental sample to test whether the experimental value for that day is greater than the control value. The difference of means test assumes that the variance of the experimental sample is not necessarily equal to the variance of the control sample. Significance of *t*-statistics is assessed using one-tailed critical values. To gauge the prevalence of increases in bid-ask spreads, volume and volatility across the sample of earnings announcements, the frequency of increases in each metric on each is recorded for each day (from -25 to +25). Relative frequencies are then calculated by dividing the frequency of increases by the total number of observations on that day. Significance of the relative frequency of increases on each day is assessed using a binomial test of whether the sample proportion exceeds fifty percent.

5. Results

5.1. Bid-ask spreads

Table 1 reports the results for bid-ask spreads surrounding earnings announcements. Figure 1 shows that bid-ask spreads are generally higher than the control throughout the experimental window, with the exception of a few days. The *t*-statistics reported in Table 1 indicate that the difference is statistically significant at the 5% level on days -5, 0 (the announcement day) and +14.[5] These results suggest increased information asymmetry surrounding earnings announcements in contrast to previous studies that examine dealer spreads (Morsh and Ushman, 1983; Venkatesh and Chiang, 1986). The results are consistent with the proposition that public earnings announcements are associated with private information gathering, and that market participants anticipate informed trading before earnings announcements. In summary, the results support the argument that private and public information are complements (see Indjejikian, 1991; Harris and Raviv, 1993; Kim and Verrecchia, 1991, 1994).

[Insert Table 1 here]

[Insert Figure 1 here]

The results for proportional bid-ask spreads are reported in Table 2 and Figure 2, corroborating the results reported in Table 1. A number of additional days both before and after announcements also exhibit significantly higher proportional spreads relative to the control period. This is consistent with increased information asymmetry on a greater number of days when spreads are expressed in proportional terms. However, this result could also be driven by larger price movements surrounding the announcement of

[5] Due to a lack of significant results further away from the announcement date, only days -10 to +20 are included in each table.

earnings information, which would impact proportional spread calculations. The results for stock price volatility tend to suggest that this may be the case.

[Insert Table 2 here]

[Insert Figure 2 here]

5.2. Volume and volatility

The results for volume divided by number of shares on issue are reported in Table 3. Volume is significantly higher from day 0 to day +8, suggesting increased trading activity at the time of and after the announcement of earnings. This is evident in Figure 3, which shows a large spike in volume at the time of the announcement.

[Insert Table 3 here]

[Insert Figure 3 here]

Stock price volatility surrounding earnings announcements is reported in Table 4. As Figure 4 shows, volatility is higher at the time of and immediately following the announcement. The *t*-statistics reported in Table 3 indicate that volatility is significantly higher than the control from day -4 (the announcement day) to day +7. Given that volatility is a proxy for stock price informativeness, the results for volatility and volume are consistent with informed trading on earnings information at announcement, and up to seven trading days after the announcement.

[Insert Table 4 here]

[Insert Figure 4 here]

6. Conclusion

This study provides new evidence that bid-ask spreads increase significantly surrounding earnings announcements, in contrast to prior evidence from US markets which is inconclusive. The use of bid-ask spreads from a purely order-driven environment mitigates the problems inherent to prior studies that use dealer spreads, enabling a cleaner test of information asymmetry surrounding earnings announcements. The results are consistent with an increase in information surrounding earnings announcements, suggesting that private and public information are complements. Future research using data from the Italian Bourse could extend the method used in this paper. For example, the liquidity 'market model' of Chordia et al. (2000) could be used to control for market-wide movements in bid-ask spreads surrounding earnings announcements.

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Table 1

Bid-ask spreads surrounding earnings announcements

This table reports bid-ask spreads surrounding earnings announcements for a sample of ninety-five stocks listed on the Italian Bourse Blue Chip segment. 570 individual earnings announcements are examined for the period from February 14, 2000 to October 29, 2003. Bid-ask spreads are the difference between end-of-day ask and bid prices. The experimental sample comprises a time-series of cross-sectional average bid-ask spreads from -25 to +25 days surrounding each announcement. Days -50 to -26 and +26 to +50 are used to construct the control sample using a similar procedure. A control value is calculated as the time-series average across the control sample. Significance of experimental values is assessed using a one-tailed *t*-test of whether the experimental value is greater than the control. The number of increases in bid-ask spreads each day is also reported, with a p-value from a binomial test of whether the proportion of increases each day exceeds fifty percent.

Day	Sample Size	Experimental	Control	*t*-statistic	Increases	p-value
- 10	568	0.0573	0.0561	0.2422	243	0.531
- 9	568	0.0582	0.0561	0.4368	240	0.630
- 8	568	0.0613	0.0561	0.9807	243	0.531
- 7	568	0.0684	0.0561	1.0945	244	0.497
- 6	568	0.0673	0.0561	1.6386	256	0.154
- 5	568	0.0700	0.0561	2.0465*	225	0.946
- 4	568	0.0581	0.0561	0.4151	249	0.334
- 3	568	0.0619	0.0561	0.9084	246	0.430
- 2	568	0.0631	0.0561	1.2083	235	0.775
- 1	568	0.0624	0.0561	1.0569	248	0.365
0	568	0.0843	0.0561	1.91*	239	0.661
+ 1	568	0.0683	0.0561	1.8923	239	0.661
+ 2	568	0.0706	0.0561	1.6102	241	0.598
+ 3	568	0.0680	0.0561	1.8507	238	0.692
+ 4	568	0.0608	0.0561	0.8329	268	0.021
+ 5	568	0.0684	0.0561	1.8626	244	0.497
+ 6	568	0.0671	0.0561	1.7754	238	0.692
+ 7	568	0.0623	0.0561	1.1395	210	0.998
+ 8	568	0.0554	0.0561	-0.1084	261	0.075
+ 9	568	0.0656	0.0561	1.4489	258	0.117
+ 10	568	0.0701	0.0561	1.7627	264	0.045
+ 11	568	0.0602	0.0561	0.7789	236	0.749
+ 12	568	0.0568	0.0561	0.153	247	0.397
+ 13	568	0.0617	0.0561	0.9794	260	0.087
+ 14	568	0.0682	0.0561	1.908*	240	0.630
+ 15	568	0.0625	0.0561	0.6795	227	0.925
+ 16	568	0.0597	0.0561	0.7089	236	0.749
+ 17	568	0.0575	0.0561	0.2838	242	0.564
+ 18	568	0.0598	0.0561	0.6702	249	0.334
+ 19	568	0.0618	0.0561	0.9981	253	0.221
+ 20	568	0.0569	0.0561	0.1773	232	0.844

* Significant at the 5% level

Table 2

Proportional bid-ask spreads surrounding earnings announcements

This table reports proportional bid-ask spreads surrounding earnings announcements for a sample of ninety-five stocks listed on the Italian Bourse Blue Chip segment. 570 individual earnings announcements are examined for the period from February 14, 2000 to October 29, 2003. Proportional bid-ask spreads are the difference between end-of-day ask and bid prices, dividend by the bid-ask midpoint price. The experimental sample comprises a time-series of cross-sectional average bid-ask spreads from -25 to +25 days surrounding each announcement. Days -50 to -26 and +26 to +50 are used to construct the control sample using a similar procedure. A control value is calculated as the time-series average across the control sample. Significance of experimental values is assessed using a one-tailed *t*-test of whether the experimental value is greater than the control. The number of increases in proportional bid-ask spreads each day is also reported, with a p-value from a binomial test of whether the proportion of increases each day exceeds fifty percent.

Day	Sample Size	Experimental	Control	*t*-statistic	Increases	p-value
- 10	568	0.0064	0.0062	0.333	273	0.484
- 9	568	0.0066	0.0062	0.714	270	0.584
- 8	568	0.0065	0.0062	0.691	267	0.679
- 7	568	0.0065	0.0062	0.094	270	0.584
- 6	568	0.0068	0.0062	1.172	295	0.030
- 5	568	0.0076	0.0062	2.756*	262	0.812
- 4	568	0.0063	0.0062	0.272	289	0.084
- 3	568	0.0067	0.0062	1.09	276	0.386
- 2	568	0.0079	0.0062	2.46*	270	0.584
- 1	568	0.0073	0.0062	1.997*	281	0.239
0	568	0.0079	0.0062	2.772*	273	0.484
+ 1	568	0.0081	0.0062	2.648*	284	0.168
+ 2	568	0.0084	0.0062	2.532*	253	0.949
+ 3	568	0.0071	0.0062	1.767	268	0.648
+ 4	568	0.0070	0.0062	1.656	294	0.036
+ 5	568	0.0076	0.0062	2.171*	294	0.036
+ 6	568	0.0080	0.0062	2.694*	253	0.949
+ 7	568	0.0076	0.0062	2.646*	237	0.999
+ 8	568	0.0066	0.0062	0.666	286	0.130
+ 9	568	0.0072	0.0062	2.115*	276	0.386
+ 10	568	0.0076	0.0062	2.247*	300	0.011
+ 11	568	0.0070	0.0062	1.663	258	0.889
+ 12	568	0.0070	0.0062	1.772	273	0.484
+ 13	568	0.0073	0.0062	1.918	263	0.788
+ 14	568	0.0077	0.0062	2.908*	260	0.853
+ 15	568	0.0074	0.0062	1.48	258	0.889
+ 16	568	0.0071	0.0062	2.053*	258	0.889
+ 17	568	0.0066	0.0062	0.881	265	0.736
+ 18	568	0.0065	0.0062	0.546	284	0.168
+ 19	568	0.0066	0.0062	0.929	276	0.386
+ 20	568	0.0066	0.0062	0.937	263	0.788

* Significant at the 5% level

Table 3

Volume divided by shares on issue surrounding earnings announcements

This table reports volume divided by shares on issue surrounding earnings announcements for a sample of ninety-five stocks listed on the Italian Bourse Blue Chip segment. 570 individual earnings announcements are examined for the period from February 14, 2000 to October 29, 2003. The experimental sample comprises a time-series of cross-sectional average bid-ask spreads from -25 to +25 days surrounding each announcement. Days -50 to -26 and +26 to +50 are used to construct the control sample using a similar procedure. A control value is calculated as the time-series average across the control sample. Significance of experimental values is assessed using a one-tailed *t*-test of whether the experimental value is greater than the control. The number of increases in volume each day is also reported, with a p-value from a binomial test of whether the proportion of increases each day exceeds fifty percent.

Day	Sample Size	Experimental	Control	*t*-statistic	Increases	p-value
- 10	568	2.9723	3.2395	-1.55	338	0.040
- 9	568	3.0848	3.2395	-0.76	317	0.508
- 8	568	3.2335	3.2395	-0.03	359	0.000
- 7	568	3.5402	3.2395	1.24	317	0.508
- 6	568	3.4761	3.2395	0.94	322	0.344
- 5	568	3.3384	3.2395	0.43	327	0.205
- 4	568	3.2175	3.2395	-0.12	332	0.106
- 3	568	3.2470	3.2395	0.04	331	0.122
- 2	568	3.5954	3.2395	0.98	332	0.106
- 1	568	3.4241	3.2395	0.81	380	0.000
0	568	4.4698	3.2395	2.36*	366	0.000
+ 1	568	4.8074	3.2395	4.37*	251	1.000
+ 2	568	4.2131	3.2395	3.06*	298	0.947
+ 3	568	4.0801	3.2395	2.57*	309	0.756
+ 4	568	3.9688	3.2395	2.97*	322	0.344
+ 5	568	3.7421	3.2395	2.62*	336	0.056
+ 6	568	3.8625	3.2395	2.54*	303	0.885
+ 7	568	3.7480	3.2395	2.61*	325	0.256
+ 8	568	3.7928	3.2395	2.34*	281	0.999
+ 9	568	3.7348	3.2395	1.77	303	0.885
+ 10	568	3.5410	3.2395	1.25	312	0.671
+ 11	568	3.6738	3.2395	1.3	300	0.927
+ 12	568	3.3889	3.2395	0.57	324	0.284
+ 13	568	3.5719	3.2395	1.18	314	0.608
+ 14	568	3.5742	3.2395	1.1	307	0.806
+ 15	568	3.1866	3.2395	-0.25	308	0.782
+ 16	568	3.0851	3.2395	-0.69	286	0.996
+ 17	568	3.1906	3.2395	-0.23	309	0.756
+ 18	568	3.0162	3.2395	-1.18	300	0.927
+ 19	568	3.2357	3.2395	-0.02	341	0.022
+ 20	568	2.9723	3.2395	0.64	317	0.508

* Significant at the 5% level

Table 4

Stock price volatility surrounding earnings announcements

This table reports stock price volatility surrounding earnings announcements for a sample of ninety-five stocks listed on the BORSA ITALIANA Blue Chip segment. 570 individual earnings announcements are examined for the period from February 14, 2000 to October 29, 2003. Stock price volatility is the log difference between high and low prices on a trading day. The experimental sample comprises a time-series of cross-sectional average bid-ask spreads from -25 to +25 days surrounding each announcement. Days -50 to -26 and +26 to +50 are used to construct the control sample using a similar procedure. A control value is calculated as the time-series average across the control sample. Significance of experimental values is assessed using a one-tailed *t*-test of whether the experimental value is greater than the control. The number of increases in volatility each day is also reported, with a p-value from a binomial test of whether the proportion of increases each day exceeds fifty percent.

Day	Sample Size	Experimental	Control	*t*-statistic	Increases	p-value
- 10	568	2.9723	3.2395	-1.551	338	0.223
- 9	568	3.0848	3.2395	-0.764	317	0.463
- 8	568	3.2335	3.2395	-0.028	359	0.596
- 7	568	3.5402	3.2395	1.2435	317	0.398
- 6	568	3.4761	3.2395	0.942	322	0.596
- 5	568	3.3384	3.2395	0.4324	327	0.076
- 4	568	3.2175	3.2395	-0.121*	332	0.596
- 3	568	3.2470	3.2395	0.0404*	331	0.009
- 2	568	3.5954	3.2395	0.9832*	332	0.773
- 1	568	3.4241	3.2395	0.8087*	380	0.719
0	568	4.4698	3.2395	2.3642*	366	0.176
+ 1	568	4.8074	3.2395	4.3679*	251	0.820
+ 2	568	4.2131	3.2395	3.0574*	298	0.176
+ 3	568	4.0801	3.2395	2.5668*	309	0.136
+ 4	568	3.9688	3.2395	2.9656*	322	0.276
+ 5	568	3.7421	3.2395	2.6166*	336	0.366
+ 6	568	3.8625	3.2395	2.5445*	303	0.176
+ 7	568	3.7480	3.2395	2.6078*	325	0.690
+ 8	568	3.7928	3.2395	2.3412*	281	0.923
+ 9	568	3.7348	3.2395	1.7722	303	0.934
+ 10	568	3.5410	3.2395	1.2466	312	0.879
+ 11	568	3.6738	3.2395	1.2956	300	0.463
+ 12	568	3.3889	3.2395	0.5739	324	0.305
+ 13	568	3.5719	3.2395	1.1768	314	0.773
+ 14	568	3.5742	3.2395	1.103	307	0.961
+ 15	568	3.1866	3.2395	-0.255	308	0.305
+ 16	568	3.0851	3.2395	-0.692	286	0.430
+ 17	568	3.1906	3.2395	-0.23	309	0.335
+ 18	568	3.0162	3.2395	-1.179	300	0.998
+ 19	568	3.2357	3.2395	-0.017	341	0.012
+ 20	568	2.9723	3.2395	0.6404	317	0.953

* Significant at the 5% level

Figure 1

Bid-ask spreads surrounding earnings announcements

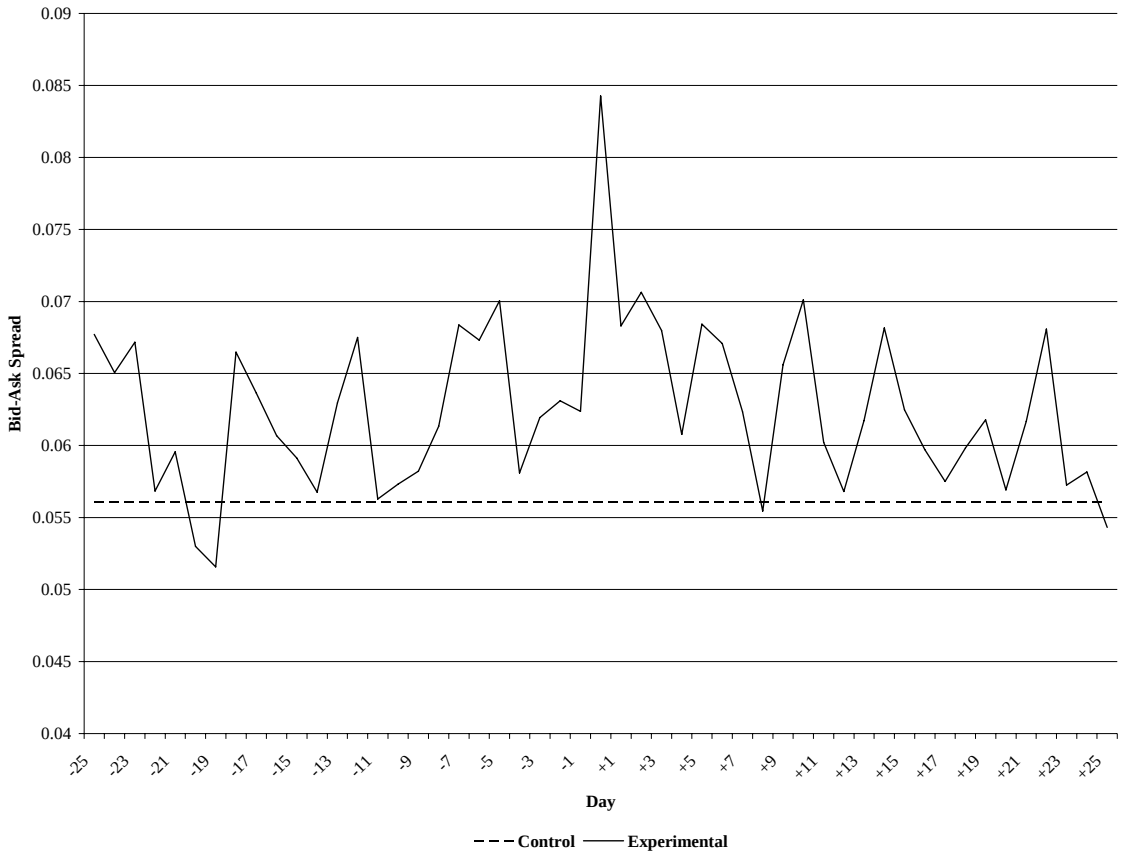

Figure 2

Proportional bid-ask spreads surrounding earnings announcements

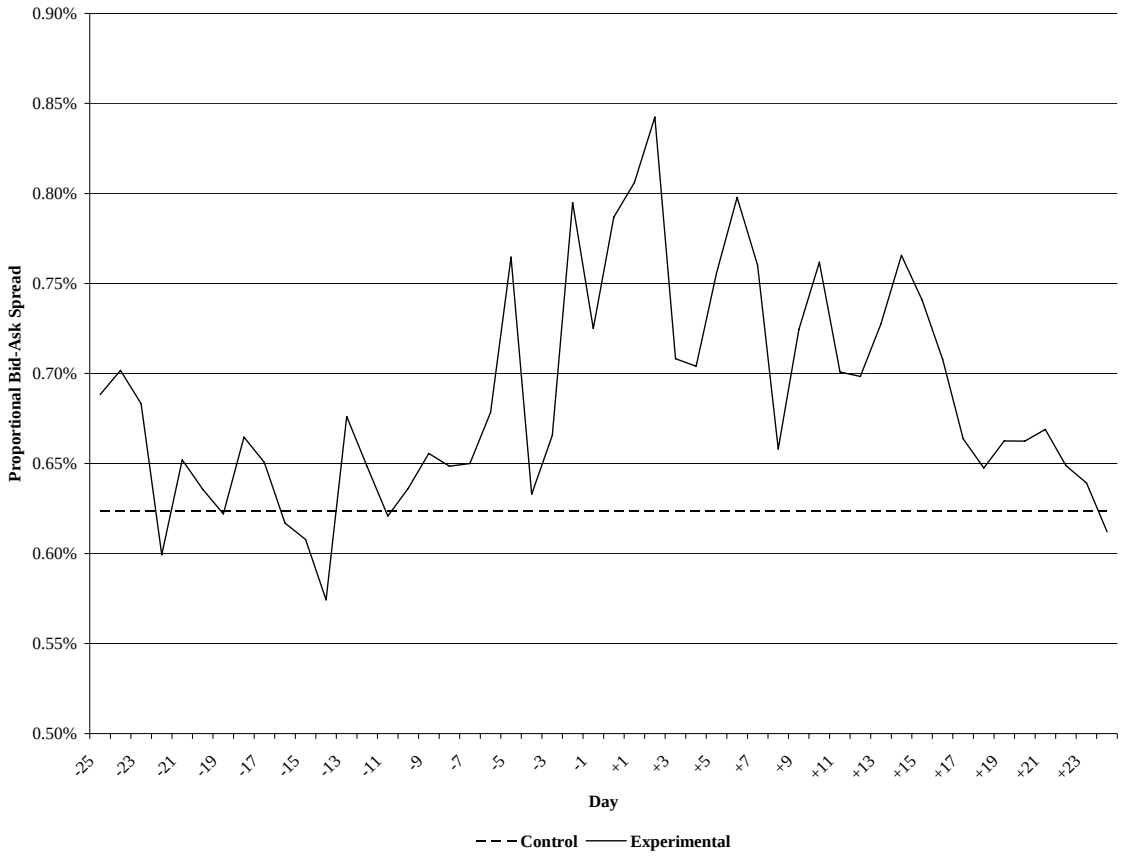

Figure 3

Volume divided by shares on issue surrounding earnings announcements

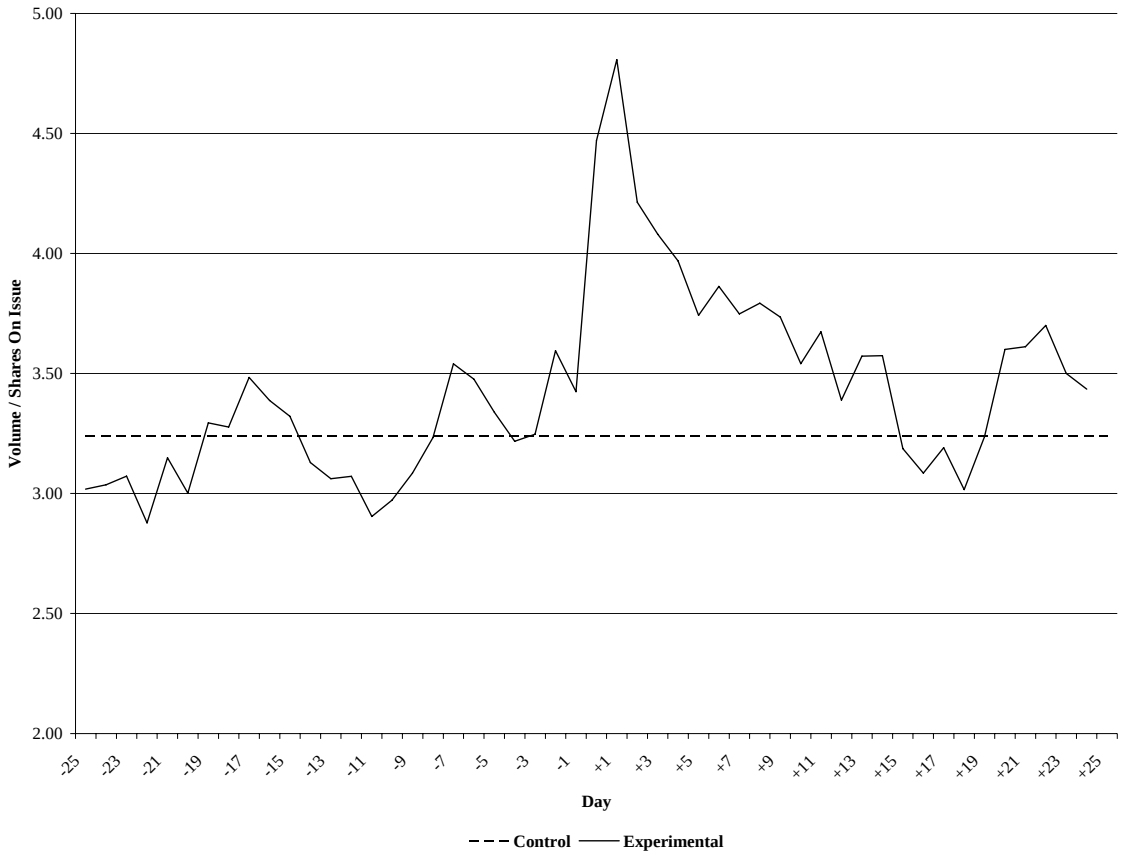

Figure 4

Stock price volatility surrounding earnings announcements