Market Response to Earnings Announcements and Interim Reports: An Analysis of SBF120 Companies

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ABSTRACT. – Starting in 1995, we follow for three years the 120 most important companies listed on the Paris Bourse and examine the link between stock trading characteristics and different measures of earnings' *surprises* during annual and semi-annual public disclosures. After a short discussion of market organization and the regulation of financial disclosure in France, we assess intraday data to find analysts are overly optimistic of EPS and small companies are less analyzed than large ones. Studying further the evolution of portfolios sorted according to various unexpected earnings' criteria we find that, in some cases, there is a small pre-announcement drift. This study further reveals that there is a strong negative drift in prices before a negative EPS announcement and bad news agitate markets more than good news. More importantly, we find the market responds to a hierarchy of announcement surprises: a positive EPS is not enough to make investors bullish if it is decreasing. Even an increasing EPS is not enough if analysts' expectations are not met. Finally, prices adjust very quickly to public information but there is an imbalance between volume and trading intensity for the time necessary to settle back to their normal levels. This suggests institutional investors follow news more closely than small investors.

La réaction de la Bourse aux annonces de résultats des entreprises françaises : le cas des membres du SBF120

RÉSUMÉ. – Nous suivons les 120 plus grosses capitalisations de la Bourse de Paris depuis 1995 afin d'examiner les liens entre les caractéristiques boursières de leurs actions et l'effet de surprise créé par les annonces de leurs chiffres annuels et semestriels. Nous présentons brièvement l'organisation du marché et la réglementation financière en France avant d'étudier des données *intraday*. Nos résultats montrent que les analystes sont ouvertement optimistes sur l'avenir des compagnies et qu'ils suivent plus les grosses capitalisations que les petites. En plus, l'évolution des portefeuilles assortis par leur mesure de « *surprise* » pendant la période autour de l'annonce montre que, dans certains cas, il existe un mouvement du prix avant l'annonce publique. Celui-ci devient plus clair pour les cas d'une annonce de pertes. Les mauvaises nouvelles agitent le marché bien plus que les bonnes. De surcroît, nous trouvons que le marché utilise une hiérarchie de critères avant de donner un avis positif sur un titre : la présence seule des bénéfices ne suffit pas, ni même une croissance des bénéfices par action. Ce n'est que dans le cas où les anticipations des analystes sont satisfaites que le marché réagit positivement. Enfin, alors que les prix s'adaptent très rapidement, l'ajustement du volume et, en particulier, du nombre de transactions est plus lent. Ceci peut indiquer une participation plus active des investisseurs institutionnels autour de l'annonce.

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1 Introduction

Most of the work on the impact of earnings announcements on stock prices pertains to the US market. Relatively little is known about other parts of the world, more so about the French stock market.[1] As a partial remedy we follow over the years '95, '96, and '97 the 120 most important companies listed on this market and empirically examine the link between intraday trading characteristics of the stock and different measures of unexpected earnings and company characteristics.

We first provide an update of the seminal paper by BIAIS, HILLION, and SPATT [1995] on how the Paris Bourse is organised and discuss the financial disclosure requirements of French companies which are quite different from the US ones. To empirically investigate the market's response to announcements, we construct a database of intraday data, announcement dates and measures of surprises. We focus here on a window of 8 days (*i.e.* of 56 trading hours) around the official public disclosure and compare market variables' reaction to their control sample behavior. A further contribution of this work, but certainly not its main one, is the assessment of data originating from various sources.

Since this study is, to our knowledge, the first one of this kind for France on intraday data, it is necessary, sometimes, to look at issues not directly central to our research.[2] By and large, the data moves as economic intuition predicts. We find, for instance, that analysts in France, as in the US, are overly optimistic of earnings per share (EPS) and that small companies are less followed than larger ones.

Our first main investigation follows PATELL and WOLFSON [1984] and addresses the issue of speed of incorporation of news. We find that prices react significantly to news over a 2 hour window on the announcement day, and then again several hours after the announcement. By studying cumulative abnormal returns where earnings surprises are sorted according to various criteria, we find that, in some cases, there is a small pre-announcement price drift. After the announcement we find a drift which is sufficiently small and fast to be compatible with semi-strong market efficiency.

We also ask whether investors react more to changes in earnings per share (EPS) from year to year than to EPS "*surprises*", measured in various ways. Given that rewards of executives are linked to their firm's earnings (HEALY [1985]), there are incentives for them to manage earnings. DEGEORGE, PATEL, and ZECKHAUSER [1999] develop a behavioural model of earnings management by executives manipulating earnings numbers in order to exceed a hierarchy of thresholds. They argue that managers first consider the sign of the EPS number

1. Some rare exceptions with international comparisons are FROST [1998], ALFORD *et al.* [1993] but none addresses the issue of speed of news integration measured with intraday data.

2. For a summary on event studies involving the French market, see HAMON and JACQUILLAT [1992]. They report that a strategy based on monthly revisions of consensus forecasts yields significant abnormal returns.

announced, then the change in the EPS from last year and, lastly, the sign of the "*earnings surprise,*" *i.e.*, the difference between the analysts' forecast and the earnings disclosed. We find that the French market responds to such a hierarchy of announcement surprises and there is a strong negative drift in prices before a negative EPS report, suggesting some bad news leakage. In a similar spirit, KRISHNAN, SANKARAGURUSWAMY, and SHIN [1996] develop a model in which, under manipulations, company characteristic variables will behave in particular ways, and successfully test it using US data.

Using volume data, we reject the assumption that markets do not react significantly *before* the official announcement. This result is compatible either with rumours hitting the market before the public disclosure or with pure information leakage. An immediate post-announcement drift is also present but its short duration suggests semi-strong efficiency. When considering the impact of news on volatility, volume and trading intensity we find that prices react significantly during two hours only after the announcement. On the other hand, volume is excessively high for several hours suggesting that more time is required before investors rebalance their position. Thus, our findings are compatible with theories and US results on the volume-trading intensity relation such as given by BEAVER [1968], MORSE [1981], KARPOFF [1986,1987], JAIN [1988], HOLTHAUSEN and VERRECCHIA [1988], ZIEBART [1990].

When focusing on trading intensity we find that the number of transactions is abnormally high for longer periods than volume suggesting small, individual investors rather lag behind large institutional ones in their market analysis. Those findings are compatible either with the view that institutional investors follow news more closely than small ones or that the latter do not have fair access to information. See LEE [1992] for the USA.

As does LEE [1992] in his Table 3, we find that bad news agitate markets more than good news. Focusing on capitalisation, we find that annual earnings disclosures (AE) have a greater impact than interim half-yearly reports (IR).

In order not to overburden the paper, we do not study the post-announcement drift widely documented in the literature (BALL and BROWN [1968], BERNARD and THOMAS [1989], BROWN [1997] and the references therein), since this would require the use of a sophisticated market model for which we have no data presently. For the same reason, and since we consider this research as foundational, we decided not to involve structural models nor complicated data structures such as the entire order-book around the announcement.[3]

The paper is organised as follows. The next section briefly describes the French financial and accounting regulation environment and the dataset used. Section 3 presents an assessment of descriptive statistics concerning earnings of French companies. Section 4 presents results pertaining to stock price response to announcements. Section 5 deals with the behaviour of volatility, hourly trade intensity, and volume. Section 6 discusses issues on information leakage, the asymmetry in market response to bad news and good ones, and the effects of market capitalisation. Section 7 concludes.

3. Such as the one by MADHAVAN, RICHARDSON, and ROOMANS [1997] for the US market.

2 Description of the Financial and Accounting Environment

2.1 The Paris Bourse

The Paris Bourse is a continuous, centralised auction market organised as an electronic limit order book. Since the BIAIS, HILLION and SPATT [1995] seminal article on the Paris Bourse, some characteristics of its trading structure have changed.[4] The "*Nouveau Système de Cotation*" (NSC), better known as Super-CAC, is the new computerised system of the Bourse, operative since June 1995. It remains a centralised fully automated system in all four of the usual transaction steps: the routing and the execution of orders, the payment and delivery (RELIT) and the information diffusion of transactions. Trading opens by a uniform price batch auction at 10:00 am and closes at 5:00 pm[5] From 8:30 am up to the opening call auction, investors can place and modify orders and follow an indicative market-clearing price in order to favour price discovery. During the day, a transaction is made when a buy and a sell order meet at the same price and the execution algorithm enforces the usual pure price and time priority rules.

The minimum number of shares that can be traded in any stock (the *quotité*) is now unity for all listed stocks. New types of orders are now allowed, beside the traditional "*market*" and limit ones.[6] Investors can now submit orders *at best* (*à tout prix*) which guarantee total execution of the order by walking up (down) the book; they are equivalent to a standard market order. They can also submit *all-or-nothing* limit orders (*tout ou rien*) and *classic* or *maxi/mini stop* orders (*à seuil ou à plage de déclenchement*). The latter allow buying (selling) from a given price upwards (downwards). Once the limit price is reached, the classic stop behaves as an at best order and is totally executed. The maxi/mini stop defines a maximum (minimum) buy (sell) price and is converted to a limit order once the stop is hit. They both allow investors to get in or out of the market once a price trend has been set. The latter control nevertheless the execution price.

The "*désintéressement*" obligation for block trades has also been eliminated. An agent trading a block at a negotiated price outside the correct spread on the book does not have anymore to satisfy all opposite side orders on the book whose limit is between the block price and the best bid or ask. The negotiated block price, however, has to lie inside a wider Weighted Average Spread (*Fourchette Moyenne Pondérée*). Despite this change of regulation, the

4. See BIAIS, FOUCAULT and HILLION [1997] for an extensive and detailed presentation (in French) of the structure and trading process of the Paris Bourse.

5. In May 1996, the Bourse authorities have introduced a closing call auction for average liquidity stocks, in the *Continu B* list. They have now extended it to all listed stocks.

6. "*Market*" sell (buy) orders in the Paris Bourse are automatically converted into limit orders at the highest (lowest) bid (ask) quote available in the book at the time the order is submitted.

number of such pre-arranged trades (*applications*) remains low and it seems traders prefer splitting such block trades into smaller pieces and channelling them through the electronic order book.

2.2 Financial Disclosure in France

As in most European countries, financial disclosure of companies is regulated at the state level. We should already point out that accounting practices in France are totally different from those in the USA. As FROST [1998] argues, "*the regulation climate in France [...] is also considered to be not stringent*". For companies listed on the *"Premier Marché"* (*Cote Officielle*), law 537 of 1966 (L) and government decree 236 of 1967 (D) define the obligations in terms of both periodic and permanent financial information.[7] Accounting disclosure can be divided into three groups, according to the corresponding time period:

1. **Annual disclosure of the company's accounts.** They must be presented to the public in the forty-five days following the General Shareholder Meeting (*AGO*) (Art. D296). This includes the consolidated balance sheet for the last financial year and the definitive earnings numbers. All disclosed information must be published in the *Bulletin d'Annonces Légales Obligatoires* (BALO) which defines the exact standards that must be followed.[8] Many large firms choose, however, to disclose provisional earnings in January. Such discretionary disclosure must be made, if at all, in the four months following the end of the financial year and at least 15 days before the AGO (Art. L340 and D295).
2. **Half-yearly disclosure.** Companies must provide a general commentary on their activity during the first semester of the financial year, including data on sales and earnings (Art. L341-1 and D295). In addition, some firms choose to give details on the geographical or sectorial distribution of these numbers. Such a publication must be made, at the latest, four months after the end of the first semester.
3. **Quarterly disclosure**. This is limited to the amount of net sales for the last quarter and must be published 45 days after the end of the quarter (Art. D297).

Nowadays, there is a heated debate in France particularly about the content of the last two disclosures. As GUIMARD [1998] indicates, many companies fear being submitted to the "*dictatorship (sic) of quarterly announcements of the American market*" and those listed on American stock exchanges follow the same disclosure practices in the US as in their domestic market. Even though French firms are bound by law to give some financial and accounting information, anecdotal evidence suggests that very few have chosen to offer more to the market. For example, for semi-annual announcements, companies

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7. In French, the term *information permanente* refers to all non recurrent, irregular events in the life of a listed company, whereas *information périodique* is the usual periodic disclosure of accounting data.
8. This bulletin is costly, has no equivalent in other countries and is a very slow means of information dissemination. The fiscal authorities are now considering to abandon it.

are required to provide an indicative table of net income (*tableau d'activités et de résultats*) which is not comparable to their annual counterpart, since the latter takes into account dilution, goodwill amortisation, EPS, and number of shares outstanding. The large majority chooses simply to comply with the legal rules. This started changing in the last two years, mainly due to the arrival of corporate governance in France.

The *Commission des Opérations de Bourse (COB)* is the French equivalent to the American SEC. It defines the ways and means of financial disclosure. As a general rule, it requires information to be published "*as soon as possible and outside trading hours*". Given this vague requirement, almost all companies choose to publish their earnings either very early in the morning, in time for analysts to treat them (and publish their recommendations) before the opening of the market at 10:00 am, or, after market closing at 5:00 pm. Only exceptionally, they choose to announce during trading hours since such an operation results in an immediate suspension of trading at the Bourse for at least an hour.

Furthermore, the underlying means of communication remains the choice of the company, the fax being the most widely used. The COB specifies that "*the disclosure must be entirely, clearly, completely and precisely communicated, must include any and all information liable to have a significant impact on the price of the stock affected*". Since there is no equivalent of the New York Broad Tape, company executives may choose to send information to a press agency, a broker, or a financial analyst who will then diffuse it to the public.

2.3 The Dataset

We study the impact on financial markets of financial disclosure for the years 1995 to 1997 (fiscal years 1994 to 1996) by members of the SBF120 index of the Paris Bourse.[9] This includes the 40 largest capitalisations of the Bourse, forming the well-known CAC40 index. All of them trade in the First Market monthly settlement compartment of the Bourse, known as the "*Règlement Mensuel*".

Intraday transaction data is found in the BDM database of the *Société de Bourses Françaises* (SBF). Out of CD-ROMs, we extract information on the price and volume of each transaction as well as on the state of the order book level prevailing at the time of the transaction for the years 1995 to 1997. In keep with the continuous transactions data, we choose to discard the opening transaction which is organised as a call auction in the Paris Bourse.

For accounting data, we use the I/B/E/S International database. Besides a consistent measure of capitalisation, it contains monthly information on analysts' forecasts for the present years' EPS. The mean and median of the forecasts, the numbers of upward or downward revisions since the last forecast as well as the number of analysts questioned are provided. Forecasts cover a three-year horizon from the current year up to 2 years in the future.

9. Since some companies entered the index while others left the index there is the issue of selection bias. To avoid this problem we actually gathered for each year information for all companies that have been in the index. We also gathered information on those companies that had merged. This implies that, for each year, we start with a sample of more than 120 companies.

The database also contains the actual EPS disclosed for the previous fiscal year.[10] Given the specific French accounting standards, French analysts usually add goodwill amortisation expenses back to earnings before the calculation of the EPS. In the I/B/E/S database, consensus of forecasts follow this rule but analyst-by-analyst forecasts are given *before* goodwill amortisation. Extraordinary items are not included in earnings but dilution is not taken into account.

As for the exact date of the earnings announcement, an equivalent of the NYSE Broad tape does not exist for France.[11] We instead use the Reuters Business Briefing (RBB) service to obtain the day the announcement was made. RBB reports news on a 24 hour basis. Unfortunately, no history of the exact announcement hour is kept by RBB and there is neither a compulsory procedure nor a generally followed practice across firms that would allow us to determine the exact time. As noted above, French companies announce their results either before the opening or after the closing of the market. From a tentative announcement calendar for 1995, published on RBB, it emerges that roughly 10 % of companies report in the morning. Since, however, we lack the exact time of the announcement, it is possible to get a price reaction either *on the announcement day* (report done in the morning) or on the *following day* (evening disclosure).[12]

In order to test the impact of news on market characteristics, we construct a control interval around each company's earnings announcement date as follows: We take two consecutive dates and split the six month period between them in three (two-month) subperiods. We then centre a 20-day window in the middle (second) subperiod and estimate trade intensity, volume and volatility for that specific stock.[13] For some companies, we were unable to obtain the date of both the annual result as well as of the interim report. For such cases we constructed the control period using a twenty-day window either 55 days before the IR one or 65 days after the AE date.

Despite having more than 120 companies, we had to exclude a significant number of them due to several reasons: First, we were unable to locate some SBF120 companies in the I/B/E/S International database for France that covers some 655 French firms. We decided to leave these out rather than

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10. Consideration of the month when the I/B/E/S "*actual*" EPS changed provides corroborating information about the moment an annual or interim report is released.

11. Since late 1996, the SBF publishes a tentative schedule of announcement dates for the SBF120 companies but these dates are not binding for the companies and many choose not to communicate any date at all. It remains, however, a useful device for verifying the dates given by RBB. Often, there is a one or two day difference between the two.

12. We decided to stick, for the time being, to the only information we have, namely the day the announcement is made. We sent a questionnaire to the CFOs of all SBF120 companies, requesting information on their individual reporting practices. Data emanating from this questionnaire will be incorporated in a further revision.

13. This is one of several ways to construct control intervals. We decided to use a new one for each announcement date to avoid biases due to changes in capitalisation, stock splits or mergers and acquisitions. In addition, if we had chosen to construct a control period before, say, the Spring announcement of annual results, often made in January, it would have been necessary to substantially decrease the sample since we lacked high frequency data for 1994. Nonetheless, we performed various experiments such as using for a company the same control interval (chosen either for a given year or as an average over years) to find qualitatively the same results. We wish to report, however, that results change substantially if the control interval is chosen closer to the event period.

mixing with data from alternative databases (DAFSA, Datastream or Disclosure). Second, for a number of companies we did not have tick-by-tick transaction data for 1995. These were companies listed in the First Market listing category of the Bourse but not being traded continuously until 1996. They belonged to the *Fixing A* trading compartment where orders are matched just twice daily. We decided to drop the 1994 fiscal year AE dates for such companies. Third, a certain number of companies have an insufficient history of intraday data to construct a control sample, for instance, because they were not listed until 1997 (*France Télécom*). Finally, there are some firms for which we do not have all annual earnings (AE) or half-yearly reports (IR) dates and times for the three years.

Once I/B/E/S and transaction data and announcements dates have been matched, a sample of 276 and 261 firm-dates remained for AE and IR respectively. Those total sums come from 89, 95, and 92 AE and 85, 92, and 84 IR over the years. In terms of capitalisation, the smallest (largest) company has a stock market value of 824 million Francs (97 billion Francs). The median (mean) firm size is 6.7 (15) billion Francs.

3 A First Approach to the Data

Given the objectives of this study, outlined in the introduction, it is necessary for us to create measures of *unexpected earnings*. We now turn to their definition and provide some descriptive statistics.

3.1 Constructing Measures of Earnings Surprises

It is necessary for us to construct proxy variables for whether an announcement is good news or bad news. The first obvious candidate is the sign of reported EPS: positive (negative) earnings would be qualified as good (bad) news.[14] An other candidate is the increase of current earnings to those from a year ago: Positive (negative) EPS changes are labelled good (bad) news. In a growing economy, and especially since we do not correct for inflation, we expect such a measure to have a positive mean. Finally, according to the Efficient Market Hypothesis, only unanticipated news move markets. Therefore, a third relevant measure is the analyst's forecast error, which equals the reported EPS minus the analysts' consensus forecast of that year's EPS. Good (bad) news occur when analysts' expectations are (not) met. The overnight price reaction is used as a fourth variable. It is an *ex-post* earnings

14. This is the most natural threshold of DEGEORGE *et al.* [1999] since it answers the most basic of all shareholder questions: is the firm profitable?

surprise, since it can only be calculated after the announcement has been made. To summarise, we construct four measures of earnings surprises:

$$SM_0 = EPS_t \tag{1}$$

$$SM_1 = \frac{EPS_t - EPS_{t-1}}{P_{t-1}} \tag{2}$$

$$SM_2 = \frac{EPS_t - FY1_{t-1}}{P_{t-1}} \tag{3}$$

$$SM_3 = 100 * \ln(S_\tau / S_{\tau-1}) \tag{4}$$

where t is an index of the month the announcement took place. $FY1_{t-1}$ is the analysts' consensus forecast for annual EPS made during month $t-1$, calculated by I/B/E/S as the median of forecasts.[15] P_{t-1} is an average monthly price provided by I/B/E/S and used to normalise earnings' surprises.[16] τ represents the time index of the first trade after an announcement (the opening trade at the Bourse) and S_τ represents the transaction price of this trade.

SM_0 can be used to sort out profitable firms and condition on the "*positive profits*" threshold of DEGEORGE *et al.* [1999], the other earnings surprise measures. Though SM_1 is clearly a very crude measure of surprises since additional information may have been released since last year's reported EPS, it helps us to classify market reactions as the "*sustain-recent-performance*" threshold. SM_2 is a classic unexpected earnings measure (BERNARD and THOMAS [1989]) but is not the usual Standardised Unexpected Earnings (SUE) metric that uses the standard deviation of EPS_t for normalisation. We, instead, choose to normalise EPS changes by dividing by last month's average price rather than the dispersion of reported EPS since we only had a short history of EPS. We do not use a percentage metric since the latter is not defined for zero EPS. SM_3 represents a measure of price response overnight *i.e.*, between the last transaction price before the public disclosure time and the first one after it.[17]

3.2 Some Descriptive Statistics

Table 1 presents some summary statistics concerning these different measures of "*earnings surprises*". We observe that more than two thirds of the companies presented an increase in reported EPS for (fiscal years) 1994 to 1996 with the median adjusted for price being around 0.5 % of the price. We notice better results for 1994 before the French recession began.

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15. This measure is usually published before the 18th of each month. To assure that there is no hindsight bias in the study we always choose the announcement of the preceding month.
16. This is not an average net price calculated using transaction prices during the month but a gross one taking into account stock splits and other adjustments.
17. SM_3 can be easily extended for longer horizons.

TABLE 1
Descriptive Statistics of Earnings Surprises

Years	95	96	97
Nbr. of cies with surprise data	106	112	113
Percent of positive SM_0 changes	71.70	66.07	76.99
Median changes in SM_0	0.71	0.39	0.56
Percent of positive SM_2 surprises	31.30	24.11	30.09
Median of SM_2 surprises	– 0.49	– 0.55	– 0.33
Median of $\|SM_2\|$ for...			
big capitalisation	0.58	0.54	0.44
small capitalisation	0.94	1.10	0.89
Mann-Whitney *p*-level	0.01	0.04	0.00

Note: Table 1 displays for the three years elementary statistics concerning the surprise measures as well as a test if small cap stocks are associated with a larger forecast error.

TABLE 2
Price Reaction Conditional on Surprises

Number of Annual Earnings Firm-Dates 267	
positive returns 149	negative returns 118
good surprises 67	bad surprises 65
positive returns conditional on good surprise 46	positive returns conditional on bad surprise 30
negative returns conditional on good surprise 21	negative returns conditional on bad surprise 35

Note: Table 2 represents a cross-tabulation of surprises vs. price changes on announcement. Good and bad surprises are defined as the standardised analyst's forecast measure, SM_2, belonging to the upper or lower quartile. Returns are taken over a two days post-announcement window.

Turning to SM_2 we notice, most interestingly, only one third of the companies met analysts' forecasts; the SM_2 median is negative for all three years in a row and fluctuates slightly around – 0.4 %. This comes in agreement with previous studies on overoptimistic analysts' forecasts. A further sorting on capitalisation indicates this bias is stronger for smaller companies. The median absolute percentage bias is around 1 % for small companies (in the lower size quartile), but fluctuates around 0.55 % for large companies (those in the upper size quartile).[18] The Mann-Whitney one sided nonparametric test

18. For US companies, ATIASE [1985] and GRANT [1980] suggest that for larger firms there is more information available.

shows the latter bias is statistically larger for all years.[19] This is due to analysts not following smaller companies as closely as larger ones and we later verified it by considering the number of analysts following each company.

Given these observations, it is wise to further check whether our diverse definitions of good or bad news are indeed consistent with the market perception of such events. To do so, in Table 2 we cross-tabulate the *post*-event returns over two trading-days with the SM_2 surprise measures. We classify as "*very good (bad) surprises*" the top (bottom) quartile of SM_2 and, thus, abstain from using the sign of SM_2 since Table 1 shows there is an inherent optimistic analysts' bias. We find that, conditional on very good earnings' surprises, positive returns are more frequent, whereas there is a less significant difference in frequency between positive and negative returns when we condition on very bad surprises.

4 Price Response around Announcements

We now continue investigating the coherence of the data by studying whether, during the short window of time chosen, a *pre*-announcement drift (hinting at information leaks) or a *post*-announcement one can be detected in the price series. Then we investigate, in the spirit of DEGEORGE *et al.* [1999], how the market reacts to earnings' surprises using a hierarchy of various surprise measures.

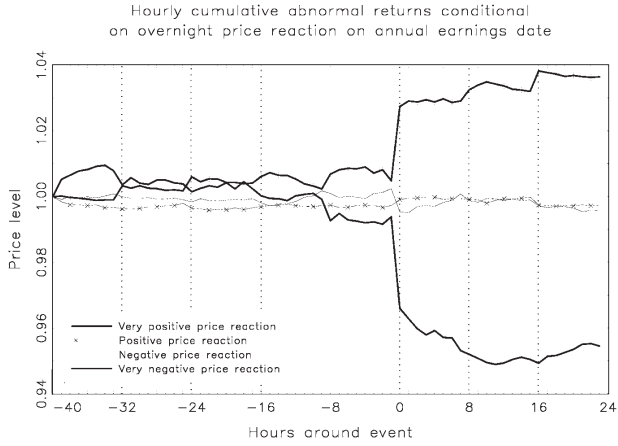
4.1 Returns around Event Dates

We divide each trading day in seven hourly subperiods and remove the first and last transaction of each subperiod, calculating hourly gross returns. If, for a given company, there exist a number of trades on a given hour, we construct log returns, with prices taken as close as possible to the beginning and to the end of the hour. If only one trade occurred during a given hour, we let the return equal to the log price difference between this traded price and the previous traded price on the same day. Furthermore, we add an "*eighth trading hour*" *overnight* return for each day, calculated from the previous closing to the morning's first transaction.[20]

19. All tests reported in this study are nonparametric. For a description of the tests the reader is referred to excellent books such as HOLLANDER and WOLFE [1998] or MARITZ [1995].

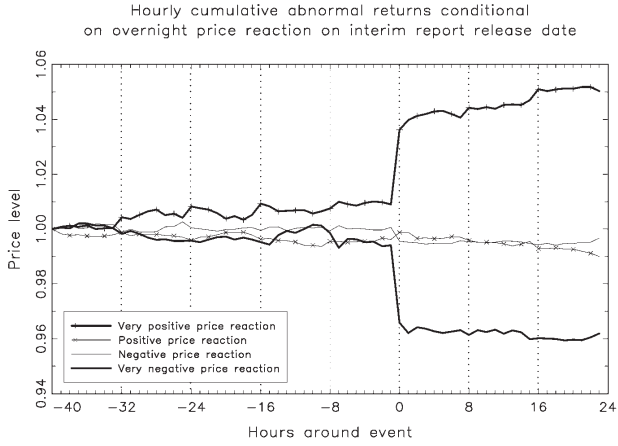
20. AMIHUD and MENDELSOHN [1987] suggest that overnight returns are likely to come from a different distribution since there is a different mechanism, namely a batch auction, employed at the open. In our case, this critique is not valid since overnight returns use the first transactions in the continuous market *and not* the opening price.

FIGURE 1A



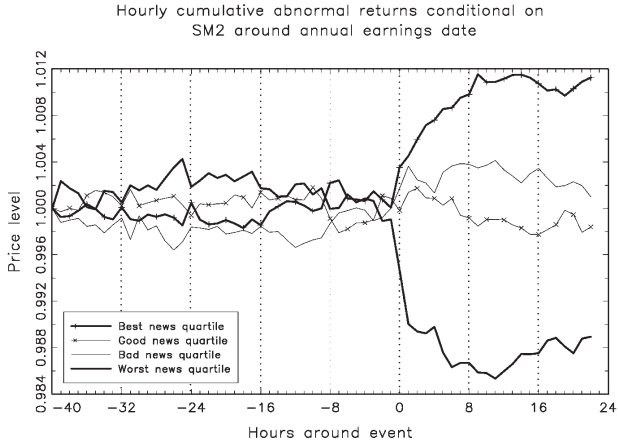
Note: **Figure 1A** traces for earnings announcement dates the hourly price levels for portfolios constructed as an equally weighted combination of stocks whose overnight returns (SM_3 for hour – 1 to 0) belong to the upper, 3rd, 2nd, and lower quartile of returns. The dotted vertical lines separate the various days; hence, the opening price will belong to those lines. For all figures we measure abnormal returns as the deviation of an hourly return from its corresponding control interval return.

FIGURE 1B



Note: **Figure 1B** same as Figure 1A but for interim report releases.

FIGURE 2



Note: **Figure 2** traces for earnings announcement dates the hourly price levels for portfolios constructed as an equally weighted combination of stocks where the classification of stocks is conditional on analysts' forecast errors standardised by prices (the SM_2 measure) belonging to the upper, 3rd, 2nd, and lower quartile. The dotted vertical lines separate the various days; hence, the opening price will belong to those lines.

We then check whether markets react **before** news is actually released. Our first question is whether, in the very short period following the earnings disclosure, a simple strategy of "*buy now and sell later*" can yield positive returns over and above those made during the same time length for the control interval.[21] Ideally, one would follow PATEL and WOLFSON [1984] and condition price responses on an analysts forecast error. Such an information is, however, not available for the interim (semi-annual) report. An alternative conditioning, in the spirit of FOSTER, OLSEN, and SHEVLIN [1984] Model 3, is to use SM_3 since it is supposed to reflect the response to news. The detection of a significant price drift *before* the announcement for companies with exceptionally large absolute price variations could signal that information (or rumours) are spreading before the announcement. If, on the contrary, for the same companies, we detect a price drift after the public news and *only for a very short time period*, it would indicate some consensus change in beliefs caused by the disclosure, as in MORSE [1981]. Given a high speed of integration of public information, we could then safely argue for market semi-strong efficiency.

In Figures 1a and 1b, we present the evolution through time of the value of portfolios constructed with stocks, conditional on overnight returns, SM_3 in the upper or lower quartile. We notice a slight preannouncement drift of less than 0.7 %, both for AE and IR dates. In particular, prices react somewhat the night before the announcement date (hour -8). By construction, the price response is very strong for the overnight return when the announcement occurs (hour 0). There is also a post-announcement drift of about 1.1 % in the 2 days following the AE, with particular overnight price increases (hours 8 and 16). This is suggestive of investors needing some time before they fully interpret the news, an observation corroborating the findings of PATEL and WOLFSON [1984]. MORSE [1981] notes the existence of an information processing period, which causes a re-examination of earnings numbers and subsequent price changes after an initial unbiased price response. We further notice an asymmetry in the price response: the market reacts more strongly to bad than to good AE news, with an average drift of -2.2 % after bad news.

For the semi-annual disclosure dates, there is a similar positive drift (1.1 %) for good news, but no negative drift at all following bad news of comparable magnitude. A possible reason is that short run price reactions following interim reports are faster. POWNALL *et al.* [1993] argue that interim forecasts may be significantly more informative than annual ones. This, at first, seems at odd with our previous discussion on the coherence and comparability of semi-annual and yearly disclosure practices in France. However, it can be reconciled if actual information released during IR dates is richer though less structured.[22] This latest observation remains, however, at variance with anecdotal evidence as discussed in section 2.2.

In Figure 2, we focus on the price response around AE when the conditioning is done with the forecast error SM_2. We find no significant preannouncement drift. On the other hand, going long best news companies and shorting worst news ones yields an important overnight price response of

21. We should point out this is only an indication of efficiency, not a rigorous test of it.

22. A further study could investigate what exactly is contained in the interim report.

about 0.4 % as expected given Table 1. Conditional on bad news, the price response is faster. The average price drop is 0.4 % in the first trading hour of the business day after the announcement, followed by a 0.2 % decrease over the next 15 trading hours. Overall, in the 2 business days after the announcement, prices drop by about 0.6 % for bad SM_2 surprises. On the contrary, following good surprises, prices increase gradually over all 16 trading hours by about 0.7 %. Including the overnight returns, pushes up the total price increase to about 1.1 % for good news and the price decrease to -2.5 % for the worst news quartile of the SM_2 distribution. This must be linked to Table 2, where we observed that, conditional on these same "*worst news*" firm-dates, the number of times we have *positive* returns over two days following public disclosure is about equal to that of negative ones. Since the conditional mean daily return is significantly negative, it must be the case that the absolute value of negative returns is much larger. In other words, when the market reacts to some bad news by selling the stock, it really does so in an intense manner.

To summarise, our findings suggest that a strategy based on I/B/E/S SM_2 surprises is not as powerful as a strategy based purely on overnight returns (SM_3). The market appears semi-strong efficient since the observed short-term post-announcement drift does not seem profitable after transaction costs. Furthermore, we find weak evidence of some information leakage into the prices before the announcement and an asymmetry in the reaction after bad news. We will later turn to a formal test of this observation.

4.2 How does the Bourse react to Earnings Management?

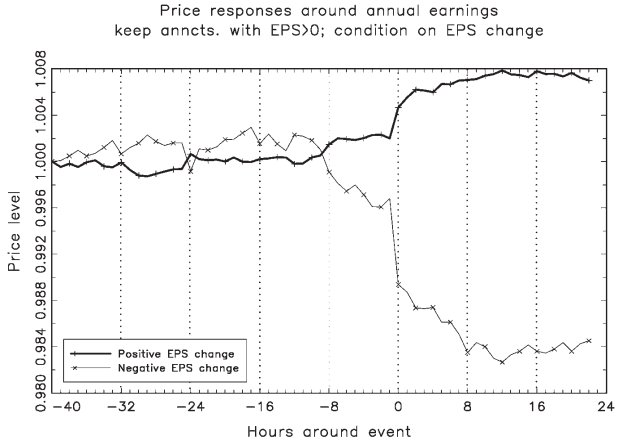
HEALY [1985], and SCHIPPER [1989] among others, notice that managers may exercise some discretion in the quality of the earnings figures reported since their compensation is tightly linked to the firm's profitability. KRISHNAN *et al.* [1996] develop an econometric model concerning earnings skewness under the assumption of earnings manipulation and they successfully test on US data. DEGEORGE *et al.* [1999] develop a simple theoretical model where executives monitored by investors face incentives to manage earnings numbers in order to satisfy certain behavioural or institutional thresholds. They argue managers try to exceed three thresholds that are hierarchically ranked, from highest to lowest priority, as follows: first, report positive EPS, then report increasing EPS (sustain recent performance) and, finally, "*meet market expectations*" *i.e.*, do better than analysts expected. Using US quarterly data, they find empirical support for such a version of earnings management.

Their findings only look at managers' efforts to exceed thresholds in a certain way. We take their argument one step further by looking at whether the market respects this hierarchy of thresholds in its reaction. In other words, we should expect no significant price reaction to a positive reported EPS (since they include companies who have or have not met the other two thresholds) but a large sell reaction (and a large fall in price) to a negative earnings number. If a company exceeds the first limit of positive profits, then the market would nonetheless penalise it (but to a lesser degree) if it failed to

FIGURE 3A

Note: **Figure 3A** traces for earnings announcement dates the hourly price levels for portfolios constructed as an equally weighted combination of stocks where the classification of stocks is conditional on EPS (the SM_0 measure) being positive or not. This stratification corresponds to firms being profitable or not. The dotted vertical lines separate the various days; hence, the opening price will belong to those lines.

FIGURE 3B



Note: **Figure 3B** pushes the stratification of Figure 3A one step further by conditioning those firms with positive EPS on the changes of EPS (the SM_1 measure) being positive or not. The thick line, thus, corresponds to an equally weighted portfolio of companies with EPS > 0 and changes in EPS > 0. The thin line corresponds to a portfolio with EPS > 0 but changes in EPS < 0. This stratification corresponds to sustaining-recent-performance. The dotted vertical lines separate the various days; hence, the opening price will belong to those lines.

FIGURE 3C

Note: **Figure 3C** is similar to Figure 3B but the portfolio-prices represented with thick or thin lines are constructed with stocks where both EPS and changes in EPS are positive. They differ in their analyst's forecast error. Firms in the portfolio with the thick line are having SM_2 surprises in the upper quartile and those for the thin line have their SM_2 in the lowest quartile. The dotted vertical lines separate the various days; hence, the opening price will belong to those lines.

sustain recent performance. The market would still not be too enthusiastic for companies just reporting a positive change in EPS. It would only go one level higher in its assessment and see whether these same companies met analysts' expectations or not. If they did, it would then really favour their stock; if not, it would penalise them. In case such a sequential application of criteria is in use in the French market, we would expect to find penalties to depend on the priority of the threshold, as documented by DEGEORGE *et al.* [1999] in their US study. This means that the negative price impact of reported losses must be larger (in absolute value) than the price reaction to a falling but positive EPS. Similarly, the latter must be larger in absolute value than the reaction to the stock of a company not meeting analysts forecasts ($SM2$) but showing solid performance nevertheless.

Figures 3a to 3c show a very strong support for this hypothesis. All of them are based on cumulative returns in the same 8-day window around AE dates. In Figure 3a, the price reaction to companies reporting positive profits ($SM_0 \geqslant 0$) is insignificant while there is a pronounced price plunge for those reporting losses.[23] This heavy penalising starts before the announcement date (!) and yields a mean return of -2.4 % over the 8-day period. Keeping the subsample of companies with positive SM_0 and conditioning further on the sign of SM_1, we get Figure 3b. Now a positive EPS change is moderately applauded by the market (mean return of 0.06 % from AE to AE + 3) but a negative SM_1 is penalised by a significant negative return of -1.2 % over the 5-day period from AE-1 to AE + 3. It should be noticed that there is no significant pre-announcement drift for this latter case. Finally, keeping only the subsample of companies that sustained recent performance, we condition on $SM2$ to get Figure 3c. This yields exactly the same pattern as Figure 2 with only a weak price reaction before the AE date but with lower absolute returns, both for stocks that met analysts' expectations (+ 1.0 %) and for those that did not (-0.8 %).

It seems, therefore, that the Bourse is not fooled by earnings management by company executives, at least at the level of large and liquid firms. The invisible hand follows a sequence of decision criteria before penalising or acclaiming a company's stock for bad or good performance. It rarely forgives bad performance and is very hard to convince of a good one.[24]

5 Market Adjustment

One final measure of market efficiency is the speed and variability of price reaction to news. We, therefore, further investigate price volatility around AE

23. We have 21 announcements with negative EPS. Moreover, among the 246 announcements with positive EPS, 60 have negative changes and 186 positive ones.

24. The observed hierarchy is related only to price, not to other measures such as volume or trading intensity. Conditioning cumulative excess trading intensity on positive or negative EPS yields insignificant nonparametric test statistics.

and IR dates.[25] Hourly volatility is measured as the absolute price change occurring in a given hour and not standard deviation of hourly price returns since this last metric risks to be a biased one given the different durations between transactions for different stocks. The absolute value of a return as a proxy for a stock's volatility can be found in the ARCH literature.[26]

KIM and VERRECCHIA [1991] point out that the absolute price change reflects the average change in traders' beliefs due to the announcement. Thus, it provides a good measure of the revision of beliefs of market participants. Volatility behaves very similarly to the bid-ask spread. Models of asymmetric information such as GLOSTEN and MILGROM [1985] or COPELAND and GALAI [1983] suggest that an order from liquidity providers (market-makers or limit order traders) causes a revision of market expectations on the stock. Consequently, in periods of public information arrival, market-makers are more likely to increase their spread to face the increased probability of dealing with an informed trader. As differences in information die out after the public disclosure, the consensus in belief increases by the exchange of information through trading and the bid-ask spread falls.

In the contrary, BEAVER [1968] argues that trading volume reflects traders' "*idiosyncratic reactions*" and measures the sum of differences in such reactions.[27] Once new public information arrives to the market, traders with less accurate information (or, simply, uninformed traders) use it to revise their beliefs. The more they revise them, the longer it takes for volume to settle back to its pre-announcement normal levels. Since it is mostly private investors who are uninformed, we expect the *value* of trades to go back to its normal level faster than the *number* of trades. For this reason, we should see a faster reversion to normal for excess volume than for excess trade intensity. We find the pattern of trades to be very similar for AE and IR dates and we choose, therefore, to only report the results for annual earnings.

5.1 Intraday Volatility

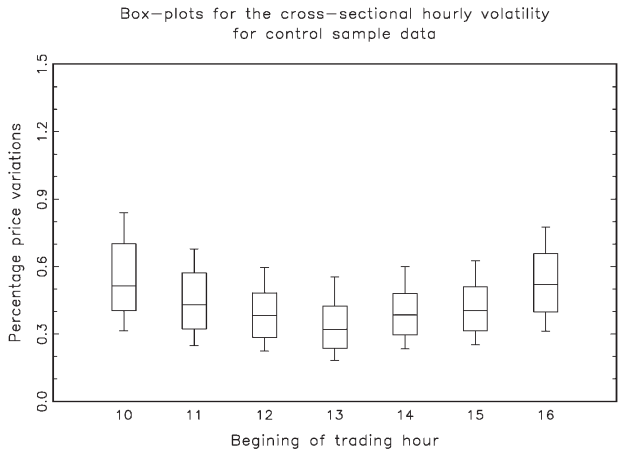
In Figure 4a, we present box-plots of the mean hourly volatility for the control interval. We notice a U-shaped pattern, also characteristic of other markets (for the US market, see for instance, Table 1 in MADHAVAN *et al.* [1997]). In the next two Figures 4b and 4c, we present the mean excess hourly volatility in percent terms in the event window around AE and IR. We notice that volatility is significantly higher, both for AE and IR dates. On the announcement day, we find significant excess volatility for the overnight period as well as for the first and second trading hour, but not later. This result suggests that the Paris Bourse reacts faster to news than the US market where PATEL and WOLFSON [1984] found that excess volatility lasted for 4 hours after the announcement. Interestingly, for AE there is also a significant (at the 5 % level) excess volatility in the *last* hour of the announcement day. It is

25. We also examined the bid-ask spread and found that changes in it are highly correlated to changes in volatility. Hence, we will concentrate below only on volatility.

26. See, for instance, BOLLERSLEV *et al.* [1994].

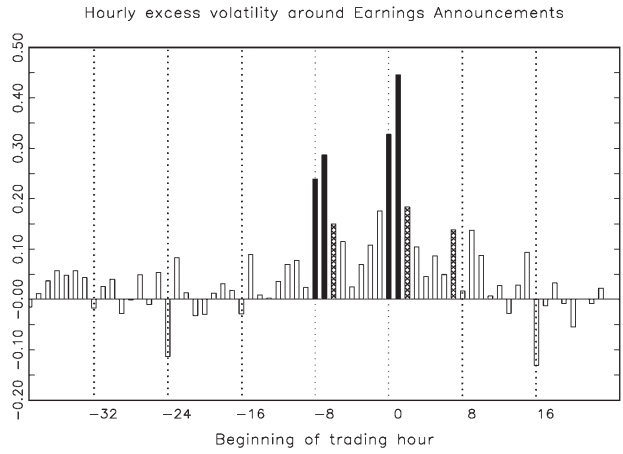
27. Further works in this area are MORSE [1981], JAIN [1988], JAIN and JOH [1988], HOLTHAUSEN and VERRECCHIA [1988], KARPOFF [1986,1987], ZIEBART [1990].

FIGURE 4A



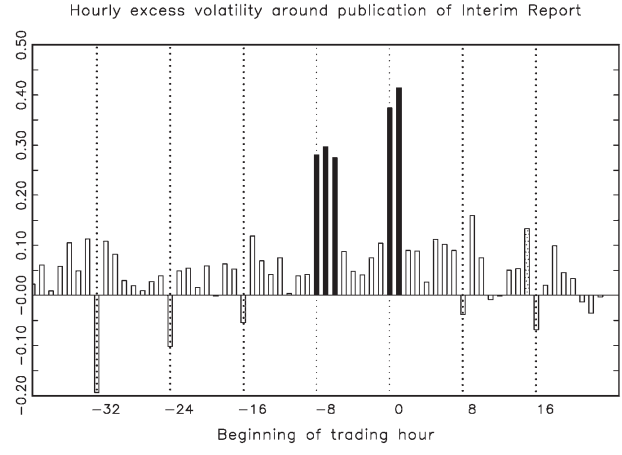
Note: **Figure 4A** represents box-plots for the control-sample cross-sectional hourly volatility. Volatility is defined as the absolute value of an hourly price change. If no trade occurred during an hour that hour would not be included in our computations. For the 20 days in the control sample we compute averages of volatility over all trading hours. The lower (upper) bound of the whiskers is set to the 10 (90) percentile of the cross sectional distribution. The lower (upper) bound of the box corresponds to the 25 (75) percentile and the bar in the box corresponds to the median.

FIGURE 4B



Note: **Figure 4B** represents the hourly excess volatility in the event window chosen here as an annual earnings announcement. Excess volatility is measured as the difference between volatility during the event window minus the average control sample volatility. Black boxes represent hours where the difference is significant at the 1% level. Levels of significance for the nonparametric test between 1 and 5 % (5 to 10 % or above 10 %) are crossed (dotted or blank respectively). The dotted lines separate various trading days.

FIGURE 4C



Note: **Figure 4C** is similar to Figure 4B but for the interim report.

hence possible that overseas investors adjust their portfolios later since the opening of the NYSE corresponds to the 6th trading hour in France. We do not find anything similar for IR dates, possibly because the interim reports are not of comparable structure to the AE and/or because traders adjust their portfolio essentially during the AE.

On the contrary, we cannot find any excess volatility in the pre-announcement period. This is consistent with a lack of changes in traders' beliefs before the information is released. In case some informed traders are present in the market before public disclosure, the announcement does not push up price informativeness and volatility because, most probably, insiders will have specific firm information and will enter the market for specific firms but at different times. Such behaviour can only be detected with a cumulative abnormal volatility test, like the one in Section 6.

5.2 Volume and Trading Intensity

Volume and trading intensity are definitely related, however the comparison of both series can reveal interesting patterns about investor categories. Small, private investors are likely to trade small volumes, on the contrary, as suggested by LEE [1992], institutional investors are likely to trade large volumes. An imbalance in the time before volume on one hand and trading intensity on the other reverts to normal is suggestive that large traders rebalance their portfolios more actively than small investors.

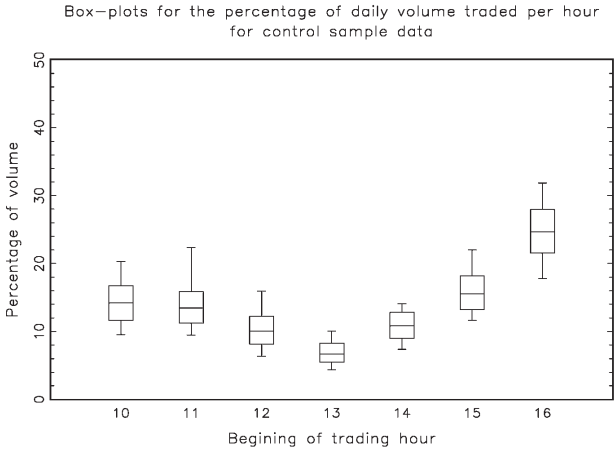
In Figure 5a we trace a box-plot of the hourly distribution of volume.[28] Unlike the US, volume in the French market tends to be higher in the evening than in the morning.[29] In Figures 5b and 5c, we present the percentage deviation for volume and trading intensity respectively. We notice that, in the first trading hour after the announcement, excess volume is huge. On the announcement day, all trading hours exhibit significant excess volume. As opposed to JAIN [1988], who looked at trading volume response to economic news (money supply, CPI, unemployment rates), market participants interpret differently the signal released. Such a result is consistent with the hypothesis detailed above, where additional trading serves learning and consensus finding. On the day following the announcement, the first and last trading hours exhibit once more significant excess volume. The hours in between are only significant at the 10 % level. Comparison with volatility suggests that, even though prices change rather rapidly, investors need several days before they have readjusted their opinions and rebalanced their portfolios.[30] This picture is corroborated by the study of Figure 5c which shows significant excess trading intensity, not only for the trading hours which showed excess volume, but for several trading periods beyond the *second* post-announcement day. This suggests that, after an announcement, large investors are the first to rebalance their portfolios. Private ones take more time before doing so: the

28. For the US, see again Table 1 in MADHAVAN *et al.* [1997].

29. A possible explanation is the impact of the opening of the US market and the closing of the London Stock Exchange in the late afternoon.

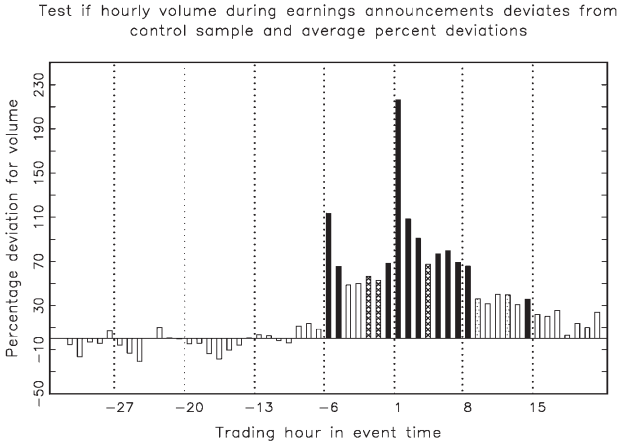
30. Volume is positively correlated to absolute price changes (volatility) as predicted by KIM and VERRECCHIA [1991]. The results for interim announcement dates are qualitatively similar.

FIGURE 5A



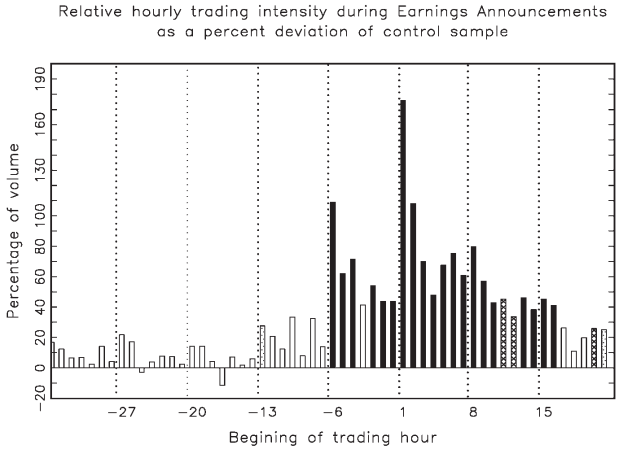
Note: **Figure 5A** represents box-plots of hourly volume constructed in the following way: For each firm and each hour of the 20 days control period we compute the volume. Next, we average for each firm the volumes by considering only hours where some transaction occurred. Last, we compute for each company to what percentage out of daily volume each hour corresponds. The box plots are constructed as in Figure 4A.

FIGURE 5B



Note: **Figure 5B** represents bar diagrams as a test if there is a significant abnormal volume during an hour in the event window as compared to the average hourly volume in the control sample. We represent here percentage differences of volume. The meaning of the hatches is as in Figure 4B. The dotted lines separate various trading days.

FIGURE 5C



Note: **Figure 5C** represents bar diagrams as a test if there is a significant abnormal trading intensity measured as the number of trades occurring in a given hour. To do so we compare hours in the event window with the average hourly intensity in the control sample. We represent here percentage differences of intensity. The meaning of the hatches is as in Figure 4B. The dotted lines separate various trading days.

impact of public information is much stronger on them. Institutional investors probably use the services of specialised analysts and have a more precise prior on the news to be disclosed. Private investors either have no prior information at all or follow the news in the economic press, clearly less precise and detailed than an analyst's report.

6 Further Tests

The following issues are still to be answered: First, is there evidence of pre-announcement information leakage? Do bad news generate more market response than good news? And, last but not least, do investors treat small capitalisations differently than large ones? To address them, we compute cumulated excess volume, trading intensity and volatility for each company. By using a two sample Mann-Whitney single sided nonparametric test, it is possible to formally test the hypothesis for any given point in time and, in particular, exactly after the pre-announcement period, or for the entire 8 day window.

Table 3 summarises the results of those tests. In the pre-announcement period and for IR dates, there is a significant excess trading intensity (at the 5 % level) and excess cumulative volatility (at the 1 % level) for firms where announcement day returns (the SM_3 measure) are in absolute value larger than the median. For AE dates, only volatility is significant at the 1 % level. There is only weak evidence (at the 10 % level) for cumulative trade intensity and no significance at all for volume. Such a finding suggests there is a widespread impression in the market that the proportion of informed traders is higher before the public disclosure. This leads to excess volatility, as market participants become more nervous. But since informed traders will try to hide behind uninformed ones, no excess volume is observed. For interim reports,

TABLE 3
Testing Various Hypothesis

	Annual Earnings			Interim Report		
	CE Volume	CE Trading	CE Volat.	CE Volume	CE Trading	CE Volat.
H_1	– 1.90	1.45^c	2.81^a	– 1.60	1.98^b	3.50^a
H_2	– 1.28	2.10^a	1.82^b	– 0.27	1.41^c	2.75^a
H_3	3.19^a	1.51b	0.64	– 1.52	– 0.32	0.56

Note: Table 3 displays the significance levels for the following tests: H_1: there are preannouncement leaks; H_2: bad news generate more trading activity than good news; H_3: news hit small companies more than large ones. All nonparametric tests are done for cumulative excess variables. For H_1 we use cumulative excess volume and trading intensity up to the 28th hour. For volatility we use up to the 31st hour. For H_2 and H_3 we use the entire event window. (Levels of significance are a = 1 %, b = 5 %, c = 10 %.)

however, we observe stronger trade intensity before the announcements as traders try to "*test the market*"' by submitting small orders which do not have a large price impact. The poorer structure of accounting information in IR makes such games profitable since it permits traders to distinguish between well-founded fears and simple rumours. For AE news, which are of higher quality, such behaviour is not necessary, since all investors will wait for the official announcement either to rebalance their portfolios (the larger ones) or to learn fundamental information (the smaller ones).

Whether bad news generates greater news than good news has attracted lots of interests within the ARCH literature, see BOLLERSLEV *et al.* [1994]. A possible interpretation going back to BLACK [1976] is the so called *leverage hypothesis*: a firm with debt and equity becomes more leveraged when its equity value falls. It follows then that its stock price should become more volatile. CHRISTIE [1982], however, has shown that the usual price impact is too large to be explained by this leverage hypothesis. This leaves the field open for explanations of loss aversion of the behavioural type such as ODEAN [1998]. In this spirit, we wish to investigate whether the announcement of bad news generates more volatility than good news. To do so, we test whether the companies with the lowest quartile SM_3 metric (very low overnight returns) have significantly higher cumulated excess volume, trading intensity or volatility than those companies in the highest quartile. As Table 3 shows, we find no significant difference in volume but indeed for trading intensity and volatility. The results for IR are qualitatively similar to AE. This finding is compatible with the idea that investors react more nervously after bad news than after good news.

Last, we address the question of capitalisation effects. As shown in Table 1, large companies are highly analysed and, hence, surprises are unlikely to be as large as for small cap companies. Consequently, these less analysed, smaller companies, will be subject to the largest surprises and will generate more trading activity. The last line in Table 3 displays that, for AE dates, both cumulative volume and trading intensity are excessively large. On the other hand, no excess cumulative volatility is observed. This seems to point that the private investors' reaction to announcements has a larger idiosyncratic component for smaller companies than for large ones. When we turn to IR announcements, we find none of the tests to be significant. A possible interpretation is, since half-yearly reports are inherently less accurate and less easy to use than annual earnings numbers, the market reacts in a similar way both to large and small firms.

7 Conclusion

We study earnings announcements in the French market, looking at price, volume and volatility reactions following annual and semi-annual accounting disclosures. The methodology is similar to numerous US studies in that we look at price drifts and belief revisions as manifested by excess volume and volatility. It differs in the non parametric nature of the tests conducted and the high frequency, tick-by-tick data used.

There is some evidence of excess trading intensity and excess price volatility **before** the official announcement either of annual earnings or interim period announcements. This is compatible with either rumours spreading or some information leakage. We further find that firms with negative EPS have a strong negative pre-announcement price drift, which could be consistent with managers leaking particularly bad news to investors. In so doing, they can possibly "*bribe*"' the market by allowing large institutional investors to possibly "*dress their windows*". This is, of course, just a conjecture that requires further research.

Considering the impact of news on volatility, volume and trading intensity we find prices move significantly during a short time period only. Volume, on the contrary, is excessively high for several hours, suggesting more time is required before investors are able to rebalance their positions. Looking at the number of transactions, we find it is excessive for a longer period than trade volume meaning small investors particularly lag behind in their market-analysis and consequent learning.

We also find bad news, in the form of unsatisfied analysts' thresholds, generate higher volatility than good news. The number of analysts following a firm and the extent of unexpected earnings' price impact are proportionally related.

Conditioning on various earnings surprise measures suggests the market in France behaves as suggested by DEGEORGE *et al.* [1999], namely investors rank the EPS number using a given hierarchy. They first observe whether a company is profitable; a non-profitable company gets strongly punished. Positive earnings are, however, insufficient to guarantee stock price increases. Investors then rationally observe the growth rate of EPS: if it is not positive, markets again react badly. Finally, a positive EPS growth rate seems to be insufficient to guarantee a positive price response if analysts' forecasts are not met.

Several topics for future research emerge from this first study. First, a better understanding of the behaviour of small and large trades as in LEE [1992] would be welcome. Second, we have difficulties reconciling the behavior of characteristic variables around interim reports with anecdotal evidence. Further work directly involving company reports could prove valuable. Last, from a theoretical point of view, it would be important to have a model of the components of the bid-ask spread for the French market and to investigate how those components vary around announcements.

Moreover, several policy recommendations emerge from this study. The authors of this research report great difficulties in obtaining information on the exact time of the announcement, especially since there is no precise regulation on it. The information published is scarce and difficult to interpret for the small investor. We recommend companies should be compelled to report the date and hour of their announcement, well in advance, to a central authority such as the COB. We also recommend the supervising organism implement filters, possibly based on econometric tests, to find companies leaking information prior to the official disclosure date and strictly enforce the law. ■

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