Share price and trading volume behaviour around trading suspensions

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Abstract

This paper examines daily share price and daily trading volume behaviour associated with a sample of trading suspensions on the Amsterdam Stock Exchange. Our results indicate that suspensions are associated with significant price changes, and are neither preceded by any anticipatory price-behaviour, nor followed by significant abnormal returns. These suggest that new information is disclosed during the suspension period, and the nearly complete impact of information release takes place instantaneously. We also observe an increase in trading volume with the occurrence of suspension. This reinforces the evidence of significant information release during trading suspensions on the Amsterdam Stock Exchange.

1 Introduction

Trading suspension is an important event on a stock exchange as a number of parties like firms, investors and market makers are affected. The important reasons for suspension include a forthcoming corporate news announcement, the possibility of a merger or takeover, suspicion on a firm's financial and business operations, and the possibility of insider trading. The objective of this paper is to examine the behaviour of daily share prices as well as trading volumes around trading suspensions on the Amsterdam Stock Exchange (ASE).[1]

The paper is organised in the following manner. Section two presents a brief discussion on trading suspension, and illustrates two examples. The next section outlines the research design as well as the working sample. The share price results of this study are presented in section four, and those of trading volume are presented in section five. The paper ends with some concluding remarks.

2.1 Suspension of trading

The reasons to suspend trading have one thing in common: the emergence of a situation where insufficient disclosure of actual information prevails. The act of suspension, irrespective of the reason, produces a common effect: making all concerned alert of something unusual. Once the suspension is over, the follow-up effect depends on stock market's evaluation of the new information released during the suspension period. If the market evaluates the released information as favourable, then we would see an increase in share price. If the released information is interpreted as unfavourable, then a decrease in share price takes place. The stock market, if it is efficient in the semi-strong form, would adjust share prices instantaneously to the newly released information during trading suspension. (See Kabir (1991) for an elaborate analysis of theoretical issues related with suspensions).

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2.2 Two examples of trading suspension

In this section, two trading suspensions are selected to illustrate possible patterns in share price movements around the suspended period. Figures 1 and 2 depict daily closing prices of two suspended stocks: Amev and Hoogovens. Figure 1 corresponds to the price of Amev shares the trading of which was suspended on March 9, 1989. We can see that prices for the five days preceding trading suspension were fluctuating within a narrow range of f 55 – f 56. During the suspension period, no trading was allowed. Normal trading of the share started again on the following day. Comparing day +1 price with day -1 price, we see that price has dropped by about f 3 a clear response to new unfavourable information (decrease in expected profit) released during the suspended period. Looking at Amev share prices for the five days following suspension we find that the share price remained close to its new level throughout the period. The stock market seemed to react in an efficient way.

Let us turn to the second example. The trading of Hoogovens shares was suspended on February 17, 1989. Closing prices for five days around suspension are shown in figure 2. Here, we see that the share was fluctuating around f 81 during the pre-suspension period. On the day before suspension, the price of the Hoogovens share went up by two guilders to f 82,60 , and at that price the Stock Exchange announced suspension. Share trading was reinstated on the following trading day with the opening price at f 87,50, up by almost five guilders from prior to the suspension. Once again, we can observe that the stock was clearly responding to new information released during the suspension period, and in this case, the information (consolidating equity through divestiture) is favourable. Looking at the increase in share price just before suspension, it seems that the Exchange was rather late in taking its action. The closing price of a Hoogovens share on the first day following suspension was f 86,70. Afterwards, a gradual decline in Hoogovens share price took place suggesting perhaps a re-evaluation over time of information released during the suspension period. These two examples of trad-

Figure 1: Daily Closing Prices of AMEV Shares Around the Trading Suspension on March 9, 1989
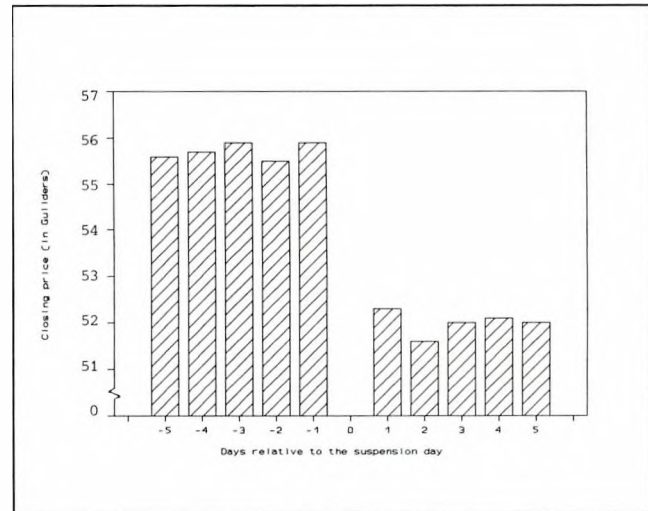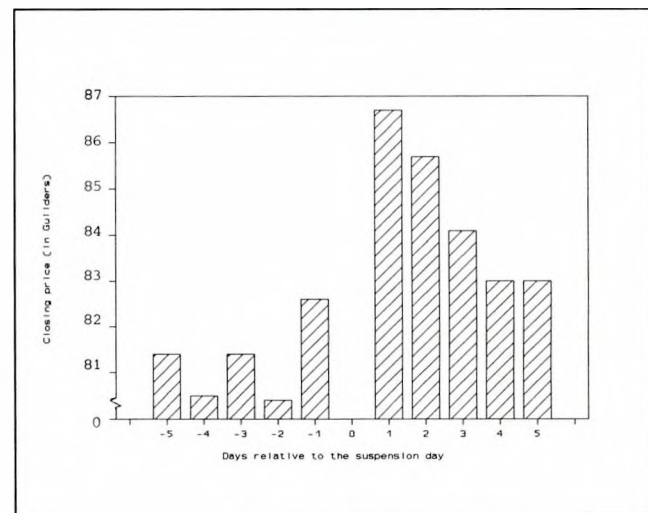

Figure 2: Daily Closing Prices of HOOGOVENS Shares Around the Trading Suspension on February 17, 1989

ing suspension illustrate only two out of many different possible patterns of share price movements associated with suspensions.

3 Research design

3.1 Methodology

In order to investigate the effects of trading suspension, we follow the event study methodology

using alternative model specifications. We start with the Market Model which posits that returns of stocks tend to go up and down together with returns of the market. The relationship is written as:

$$R_{it} = a_i + b_i R_{mt} + e_{it} \qquad (1)$$

where
R_{it} = the rate of return on stock i in period t
R_{mt} = the market rate of return in period t
a_i , b_i = stock-i-specific and time-independent parameters
e_{it} = random disturbance term for stock i in period t.

If suspension of trading of a stock is associated with some sort of unusual behaviour, then this would be reflected in the disturbance term during the period surrounding suspension. The estimate for the abnormal return (AR) for i in t will be

$$AR_{it} = R_{it} - (\hat{a}_i + \hat{b}_i R_{mt}) \qquad (2)$$

where $\hat{a}_i$ and $\hat{b}_i$ are the estimated coefficients obtained from data which exclude observations surrounding suspension, and t is a time-index covering the period surrounding suspension. Here, it is assumed that the coefficients remain unchanged in period t. The estimate AR_{it} is interpreted as the deviation in period t of the return of suspended stock i from its normal relationship with the market. The accuracy of this estimated deviation obviously depends on the validity of the model used as well as the parameter estimates. In order to determine the estimates of the Market Model parameters, we use the ordinary least square regression technique. The estimation period is from trading day – 100 through trading day – 21 with respect to the suspension day.[2]

Besides finding abnormal returns using the Market Model, another approach is also used in this study. This is done in order to test whether the model specification could improperly influence the results. Here, we estimate the market-adjusted abnormal return for each stock. This is obtained in the following manner:

$$AR_{it} = R_{it} - R_{mt} \qquad (3)$$

In this approach, there is no special risk adjustment. We move on from the assumption that each stock is of average risk.

In each of the alternative model specifications, the average abnormal returns (AAR) are calculated by

$$AAR_t = (1/n) \sum_{i=1}^{n} AR_{it} \qquad (4)$$

where AR_{it} is the abnormal return for stock i in period t, and n is the number of suspensions in the sample. The estimate AAR gives us an indication of average abnormal return realised by stockholders of suspended firms. In order to see whether these abnormal returns are statistically significantly different from zero, we perform the t-test by dividing the average abnormal return by the standard deviation of average abnormal returns computed from the estimation period.

We are also interested to examine the cumulative reaction of stock prices to trading suspensions. Therefore, the above averages are cumulated over a period of time surrounding the suspension event in order to obtain the Cumulative Average Abnormal Return (CAAR).

$$CAAR = \sum_{t=k}^{j} AAR_t \qquad (5)$$

3.2 Sample Selection and Data
In this study, we examine the share price response of 59 trading suspensions on the Amsterdam Stock Exchange taking place between January 1983 and March 1989. These suspensions meet only two selection criteria. First, share prices of the suspended firms are available in Datastream. Second, the absence of successive suspensions within the estimation and the event period (this criterion permits us to evaluate the impact of one suspension only). These 59 trading suspensions consist of

38 single-day suspensions and 21 multi-day suspensions. A total of 24 suspensions were associated with merger and takeover possibilities, 14 were associated with publication of company results, six were associated with company reorganisations and security issues, and four were associated with the possiblility of insider trading.

Daily stock returns are calculated as the continuously compounded returns, adjusted for cash dividends and capital structure changes. We use the CBS total return index (a value-weighted index for all stocks officially listed on the Amsterdam Stock Exchange, those of the Parallel Market excluded) developed by the Central Bureau of Statistics as the proxy for market return.[3] Wijmenga (1990) points out that the use of alternative stock market indices does not result in a different conclusion.

While share price data were available for 59 suspensions, daily trading volume data were available for 29 trading suspensions only. Volume data were collected from Stockdata and, when necessary, from the daily newspaper 'Het Financieële Dagblad'. To make trading volume comparable over time, the actual number of shares traded in each day was divided by the number of shares outstanding on that day.[4] This series was collected from Datastream.

4 Empirical results

4.1 Market Model
The findings obtained from using the Market Model for a sample of 59 trading suspensions are presented in table 1. Column one of the table presents days relative to the suspension period. Columns 2 and 3 show the average abnormal returns (AAR) and the corresponding t-values. The cumulative average abnormal returns (CAAR) are presented in column 4 of the table. The returns data are also presented graphically in figures 3 and 4.

We observe that in the ten day period preceding trading suspension the stocks experience some-

times positive and sometimes negative abnormal returns of small magnitudes. These returns appear to reflect quite normal activities of the stock market. The cumulative average abnormal return obtained from these ten days in the pre-suspension period is almost equal to zero. There seems to be no anticipation at all of any trading suspension.

But, as trading suspension occurs, a significant change in stock price takes place. The average

Figure 3: Average Abnormal Returns Around Trading Suspension (Market Model)
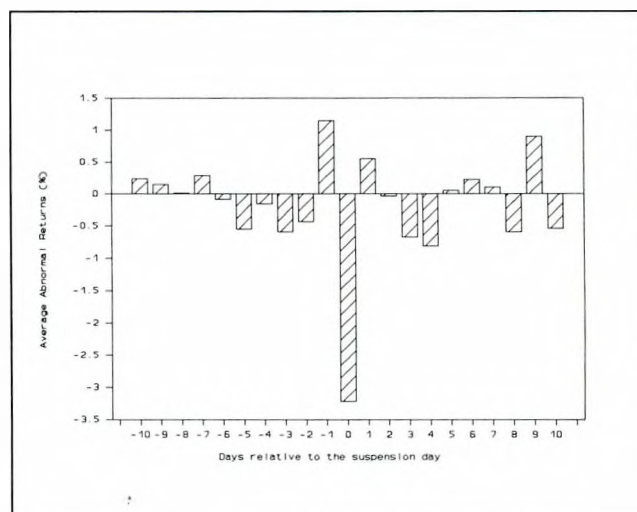

Figure 4: Cumulative Average Abnormal Returns Around Trading Suspension (Market Model)
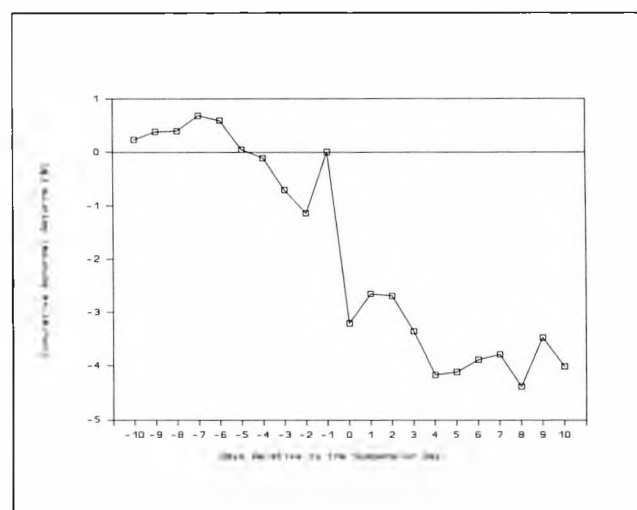
MAB

Table 1: Average Abnormal Returns Around Trading Suspensions; (Market Model, figures in percent)

Day	AAR	t-Statistic	CAAR
– 10	0.235	0.599	0.235
– 9	0.150	0.383	0.385
– 8	0.013	0.033	0.398
– 7	0.287	0.732	0.685
– 6	– 0.088	– 0.224	0.597
– 5	– 0.549	– 1.401	0.048
– 4	– 0.156	– 0.398	– 0.108
– 3	– 0.593	– 1.513	– 0.701
– 2	– 0.435	– 1.110	– 1.136
– 1	1.142	2.913*	0.006
0	– 3.217	– 8.207*	– 3.211
+ 1	0.556	1.418	– 2.655
+ 2	– 0.036	– 0.092	– 2.691
+ 3	– 0.669	– 1.707	– 3.360
+ 4	– 0.808	– 2.061*	– 4.168
+ 5	0.050	0.128	– 4.118
+ 6	0.226	0.577	– 3.892
+ 7	0.102	0.260	– 3.790
+ 8	– 0.592	– 1.510	– 4.382
+ 9	0.901	2.298*	– 3.481
+ 10	– 0.536	– 1.367	– 4.017

*Significant at the 5 percent level.

abnormal return from all 59 suspensions over the suspended period is -3.22 percent, and this downward drift is statistically significant. It can be undoubtedly argued that trading suspension on the Amsterdam Stock Exchange is associated with significant informational content.

Once the suspension period is over, share prices do not follow any particular pattern. There are again cases of both positive and negative abnormal returns. An efficient adjustment of newly released information appears to have taken place. Although there is a rebound of abnormal return in day +1 this increase falls short of the large decline over the suspension period. The ten day cumulative post-suspension abnormal return is -0.81 percent. This post-suspension behaviour suggests complete adjustment to the information disseminated during the suspended period.

The above results indicate that, on average, share price behaviour prior to and subsequent to trading suspension on the Amsterdam Stock Exchange does not exhibit any systematic pattern. Trading suspension appears to take place without any anticipation from the stock market; and share price behaviour after resumption of trading does not indicate any possibility of abnormal profit-making. However, we find that a significant change in share price takes place over the suspension period. It suggests that trading suspension is associated with disclosure of material information, and the Amsterdam Stock Exchange was successful in doing that. The action of the Exchange was not expected by market participants and share price adjustments after suspension do not provide any superior profit opportunities. It also appears from the study that share price decline during trading suspension dominates the total results of our sample.

4.2 Market Adjusted Model

We now examine the sensitivity of the above mentioned empirical findings to the choice of a particular methodology (in our case, the Market Model). So, the above analysis is repeated using the Market Adjusted Model (in which $\alpha = 0, \beta = 1$). Table 2 reports the results around ten days of trading suspensions. Our conclusion is that the average abnormal returns are largely insensitive to the choice of the Market Model. For our sample of trading suspensions on the Amsterdam Stock Exchange, there seems to be no evidence of large abnormal performance both before or after suspension. However, there is a large share price reaction associated with the suspension itself – an indication of the fact that new information is disclosed to the market.

The results of this study can be compared to results obtained from other stock markets. We observe that a diversity of empirical results exists which can perhaps be explained by the diversity of stock markets with respect to size, institutional practices, regulation, etc. Hopewell and Schwartz (1978) reported that on the New York Stock Exchange trading suspensions are associated with substantial price adjustments, and these adjustments are rapid and virtually complete at the end of the suspension. But, Howe and Schlarbaum (1986) and Kryzanowski (1979) found

Table 2: Average Abnormal Returns Around Trading Suspensions; (Market Adjusted Model, figures in percent)

Day	AAR	t-Statistic	CAAR
− 10	0.138	0.345	0.138
− 9	− 0.065	− 0.162	0.073
− 8	0.028	0.070	0.101
− 7	0.099	0.247	0.200
− 6	− 0.143	− 0.357	0.057
− 5	− 0.549	− 1.372	− 0.492
− 4	− 0.155	− 0.387	− 0.647
− 3	− 0.609	− 1.522	− 1.256
− 2	− 0.498	− 1.245	− 1.754
− 1	1.150	2.875*	− 0.604
0	− 3.225	− 8.062*	− 3.829
+ 1	0.498	1.245	− 3.331
+ 2	− 0.072	− 0.180	− 3.403
+ 3	− 0.563	− 1.407	− 3.966
+ 4	− 0.860	− 2.150*	− 4.826
+ 5	0.063	0.157	− 4.763
+ 6	0.006	0.015	− 4.757
+ 7	0.137	0.342	− 4.620
+ 8	− 0.581	− 1.452	− 5.201
+ 9	1.174	2.935*	− 4.027
+ 10	− 0.480	− 1.200	− 4.507

*Significant at the 5 percent level.

evidence of US and Canadian stock markets reacting slowly to unfavourable information released during trading suspension. De Ridder (1990) studying the Swedish stock market, again provided evidence of no departures from market efficiency. And, the results of trading suspensions on the London StockExchange, as reported by Kabir (1990), show that trading suspensions are preceded by an increase in share price.

5 Trading volume analysis

Besides investigating share price performance around trading suspensions on the Amsterdam Stock Exchange, the behaviour of trading volume is also analysed in this study. If relatively large trading volumes are associated with trading suspensions, then these suspensions have information content. As pointed by Holthausen and Verrecchia (1990), both price and volume studies are equally relevant means of assessing the informa-

tion content of a news announcement. Jang and Ro (1989) also argue that a price effect study alone is not sufficient to accurately assess the information content of an event; a simultaneous volume effect study is necessary. Surveying the relationship between price changes and trading volume, Karpoff (1987) observes that simultaneous large volumes and large price changes can be traced to the flow of information. In another paper, Karpoff (1986) argues that unusually high volumes can result from heterogeneous reactions to information, but it does not necessarily reflect disagreement among traders; it can reflect consensus with diverse prior expectations. Evidence of information releases being associated with higher trading volume has been provided by Beaver (1968) and Morse (1981).

Table 3 documents the evidence regarding the trading volume behaviour around suspensions. The first column of the table lists the 29 trading suspensions included in the sample; the second column shows the normal trading volume of each suspended stock (here normal is defined as the average trading volume in the estimation period which is from day -100 through day -21 with respect to the suspension day); the third column presents the mean trading volume around ten days of each suspension; the fourth and the fifth columns of the table contain the percentages of average trading volume in ten days before and ten days after trading suspensions, respectively.

Our results suggest that higher than normal trading volume is associated with the event of trading suspension. While on a normal trading day, on average, 0.31 percent of shares are traded on the Amsterdam Stock Exchange, a trading day immediately around suspension is associated with a trading volume of, on average, 0.77 percent. This more than doubling of trading volume figure reflects arrival of new information to the stock market through trading suspension.

When we split the period around trading suspension into ten days each of pre- and post-suspension periods, we observe that trading activity is, on average, higher in the post-suspension period.

*Table 3: Average Daily Trading Volume of
Suspended Shares (Figures in percent)*

No	Normal	Around	Pre	Post
1	0.312	0.490	0.248	0.999
2	0.178	0.492	0.456	0.328
3	0.215	0.257	0.185	0.293
4	0.270	1.542	2.103	2.010
5	0.174	0.235	0.112	0.301
6	0.732	0.642	0.263	0.688
7	0.378	1.139	0.608	0.978
8	0.695	0.189	0.267	0.161
9	0.241	0.441	0.422	0.342
10	0.387	0.591	0.316	0.637
11	0.415	1.196	0.421	1.164
12	0.164	0.304	0.140	0.403
13	0.141	0.346	0.237	0.253
14	0.196	0.602	0.523	0.432
15	0.254	0.728	0.593	0.656
16	0.456	0.452	0.181	0.662
17	0.157	0.556	0.062	0.740
18	0.319	0.518	0.504	0.856
19	0.403	0.554	0.108	0.848
20	0.259	0.702	0.033	0.755
21	0.250	0.658	0.269	0.627
22	0.282	0.360	0.165	0.435
23	0.155	0.187	0.072	0.226
24	0.250	0.750	0.650	0.944
25	0.393	0.563	0.202	0.751
26	0.304	6.627	2.841	5.221
27	0.616	0.983	1.041	0.777
28	0.088	0.192	0.120	0.203
29	0.213	0.216	0.195	0.177
Average	0.307	0.776	0.460	0.789

The average trading volume in the ten day period following suspension is 0.79 percent per day compared to that of 0.46 percent per day in the pre-suspension period.

We also analyse the cross-sectional behaviour (average trading volume on each day across the 29 suspensions) of trading volume around trading suspension. The results, reported in table 4, reinforce our previous findings. The days after suspension are associated with a greater than normal trading volume. Day +1 witnesses the largest volume, with 1.58 percent of common shares traded. It suggests that new information was indeed released during the suspension period.

This higher than normal trading volume has a decreasing trend as can be seen from the numbers in table 4 from day +1 through day +10. Normal market activity appears to occur once the suspension period is over. These results from trading volume analysis do confirm our findings from share price data.

*Table 4: Average Daily Trading Volume Around
Suspension (Figures in percent)*

Day	Volume	St. Dev.
– 10	0.434	0.691
– 9	0.306	0.453
– 8	0.683	1.267
– 7	0.362	0.561
– 6	0.288	0.412
– 5	0.314	0.426
– 4	0.371	0.414
– 3	0.500	0.746
– 2	0.803	2.034
– 1	0.538	0.685
0	0.000	0.000
+ 1	1.580	2.212
+ 2	1.102	1.342
+ 3	1.240	3.204
+ 4	0.718	0.929
+ 5	0.597	0.838
+ 6	0.531	0.600
+ 7	0.530	0.525
+ 8	0.692	1.482
+ 9	0.427	0.640
+ 10	0.470	0.556
Average	0.624	

6 Conclusions

In this paper, we analysed daily share price and trading volume behaviour associated with a sample of trading suspensions on the Amsterdam Stock Exchange. This regulatory measure is usually taken when it is believed that a stock is being traded with inadequate information. The results obtained from the study lead to the following conclusions. First, trading suspensions are associated with significant price changes, thus reflecting arrival of new information to the stock market. In our sample, share price decline dominates the

average performance over the suspended period. Second, no anticipatory price behaviour is present during the pre-suspension period. Third, the post-suspension price behaviour does not show any particular trend, thus supporting the hypothesis that the Amsterdam stock market is efficient in the semi-strong form.[5] Fourth, an increase in trading volume takes place with the occurrence of trading suspension. This can be interpreted as further evidence of material information release during suspension. Trading volume goes back gradually to its normal level once the suspension is over.

It is worth mentioning that, in this paper, no attempt was made to analyse the costs and the benefits of trading suspension due to lack of operational criteria. The finding that efficient adjustment to newly released information takes place after trading suspension does not mean that suspension is always warranted.

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Notes

1 Kabir (1991) provides an empirical analysis of trading suspensions on the Amsterdam Stock Exchange.
2 There exists no a priori consensus among researchers as to the choice of the estimation period. Jarrell and Poulsen (1989), Linn and Pinegar (1988), and Kalay and Shimrat (1987) use 150, 110, and 60 trading days, respectively to estimate the model parameters.
3 See the 1988 Annual Report of the Amsterdam Stock Exchange for the details on this index.
4 Since the published trading volume data count both buy and sell transactions of the same share as separate trades, we adjusted the series to calculate the actual number of shares traded.
5 The semi-strong form of efficiency of the Amsterdam stock market has also been examined by Dorsman and Post (1989), and Wijmenga (1990).