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Trading Costs and Exchange Delisting: The Case of Firms that Voluntarily Move from the American Stock Exchange to the Nasdaq

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ABSTRACT

We examine 47 stocks that voluntarily left the American Stock Exchange from 1992 through 1995 and listed on the Nasdaq. We find that both effective and quoted spreads increase by about 100 percent after listing on the Nasdaq. These spread changes are consistent across stocks. In contrast, excess returns are positive when firms announce a switch from The American Stock Exchange to the Nasdaq. We are unable to explain this apparent contradiction.

IN THIS ARTICLE, we examine a group of securities that switched from the American Stock Exchange (AMEX) to the Nasdaq, focusing on the effect of the switch on stock prices and the bid-ask spread. There are least two benefits that may be derived from such a study: 1) insight into the relative efficiency of the two types of market structures, and 2) a more complete understanding of the information that can be gained from exchange switch studies in general, which have focused on switches away from the Nasdaq market up to this point.

The Christie and Schultz (1994) article showing a paucity of odd-eighth quotes in a number of active Nasdaq securities precipitated private lawsuits, a Securities and Exchange Commission (SEC) investigation, and a Department of Justice investigation; it also triggered numerous studies on the relative efficiency of the two market structures. Huang and Stoll (1996), for instance, compare samples of 175 New York Stock Exchange (NYSE) and 175 Nasdaq securities that are matched on price, shares outstanding, long-term debt, Standard Industrial Classification (SIC) code, and book value. They find that quoted spreads and effective spreads are about twice as wide for the Nasdaq sample as for the NYSE sample. Other cross-sectional comparisons,

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such as Marsh and Rock (1986), Hasbrouck and Schwartz (1986), and Booth *et al.* (1995), compare the Nasdaq to other agency-auction markets and arrive at similar conclusions. Christie and Huang (1995) and Barclay (1996) adopt a different approach. They compare spreads on the Nasdaq and the exchanges before and after firms list on either AMEX or NYSE. Both studies find a significant decline in spreads after the securities list.

Critics provide three reasons why none of these studies of the relative trading costs of the two types of securities markets is conclusive. First, both types of studies suffer from an inability to quantify all components of trading costs. Kleidon and Willig (1995), for instance, argue that quality components of transaction costs such as market depth are greater on the Nasdaq. In contrast, LaPlante and Muscarella (1996) find that block trades for the largest Nasdaq stocks appear to be more expensive than similar block trades for NYSE stocks. Huang and Stoll (1996) recognize that market depth may differ between the Nasdaq and the exchanges; however, they conclude that it is unlikely to account for the spread difference they observe. Second, any cross-sectional comparison suffers from an inability to identify and completely control for all characteristics of the securities that trade in the different markets. Observed differences in spreads may therefore be a consequence of unidentified or unobserved differences in security characteristics. Finally, comparisons of trading costs may suffer from a selection bias; the firms that choose to list do so because they expect to benefit from listing.¹ This bias exists in both the cross-sectional comparisons and in the studies of stocks that list. Thus, extrapolating the findings from stocks that list on the exchanges to stocks that remain on the Nasdaq is difficult. In contrast, we examine stocks that left the AMEX to list on Nasdaq. Examination of the firms' delisting announcements and conversations with AMEX officials indicates that all of the moves to Nasdaq were voluntary.

Another method of comparing the trading costs in the two environments is to examine the stock price effect of the announcement of a switch from one security market to another. Numerous studies have examined the stock price effect when firms announce they are moving to either the AMEX or the NYSE. These studies find either a significant positive stock price effect for their sample or some portion of their sample (Ying *et al.* (1977), Sanger and McConnell (1986), and Grammatikos and Papaioannou (1986)), or an insignificant stock price effect for the sample or some portion of their sample (Sanger and McConnell (1986), Grammatikos and Papaioannou (1986), and Baker and Edelman (1993)). Conclusions on the relative efficiency of the two types of markets based on these studies are also limited due to the selection bias and the possibility that the stock price reaction reflects other information that becomes available at the time that a listing is announced.

¹ Consistent with this, Cowan *et al.* (1992) find that the securities that choose to move from Nasdaq tend to have characteristics that suggest they will benefit more from a switch—they have fewer shareholders, wider spreads, fewer market makers, etc.—than a control group of firms that opt to stay on the Nasdaq.

This study of stocks that switch from the AMEX to the Nasdaq complements studies on securities that switch from the Nasdaq by presenting data for which the selection bias acts in the other direction: stocks that choose to move from the AMEX to the Nasdaq presumably believe they will benefit from moving to the Nasdaq. We find two apparently contradictory results. First, we find that quoted and effective spreads increase dramatically when stocks delist. On average, effective spreads double after stocks move from the AMEX to the Nasdaq. This suggests that Christie and Huang's results cannot be explained by a selection bias. Second, despite the large increase in spreads, we observe mean abnormal returns that are positive and statistically significant when the delisting is announced.

The remainder of the article is organized as follows. In Section I we describe our data. In Section II we present evidence that spreads increase when stocks move from AMEX to Nasdaq. In Section III we examine the stock price changes around delisting announcements. Section IV provides a summary of our findings.

I. Sample and Data

We obtain a sample of 51 securities that moved voluntarily from AMEX to Nasdaq during the period 1992–1995.² Two firms were excluded because of another announcement that was made at the date of the switch announcement;³ one firm was excluded from the calculations because quote and trade data before the switch were unavailable;⁴ and one firm delisted two classes of stock, only one of which was used for this study. This leaves 47 securities in the sample. Intraday trade and quote data are obtained from The Institute for the Study of Securities Markets (ISSM) for 1992 and from the New York Stock Exchange's Trade and Quote database (TAQ) for 1993–1995. Closing price data used in the event study are from The Center for Research in Securities Prices (CRSP), except for 1995 prices, which are obtained from TAQ.

Table I contains summary statistics for the 47 firms in our sample. The first column lists the stocks and their ticker symbol while on Nasdaq. The second column of the table gives the closing prices of sample stocks just prior to delisting. Stock prices for this sample are very low. Of the 47 stocks we study, 26 have prices of \$10 or less and 10 have prices below \$5. This implies that a small increase in dollar spreads provides a large increase in the percentage spread of our sample stocks. The third column lists the market value of each

² We are unaware of any firms that have voluntarily switched from the NYSE. This could be explained by a supermajority provision of the NYSE that requires two-thirds of the total shares outstanding (not just voting) to approve the change. The NYSE also requires that less than 10 percent disapprove.

³ Carrington Labs announced expected losses of \$400,000 to \$500,000 for the first quarter of 1995 on the day they announced the switch. Raven Industries announced expected record earnings for the third quarter on the day after the switch was announced.

⁴ ISSM data were not available for Ocean Optique Distributors when it traded on AMEX. The stock price results are not qualitatively altered when it is included.

Table I
The Sample Stocks

The sample consists of 47 stocks that moved from the American Stock Exchange to Nasdaq from 1992 through 1995.

Stock Ticker and Firm Name	Last AMEX Price	Market Value of Equity (\$ millions)	Last Date on AMEX
ABMD (Abiomed)	\$11.625	74.7	8/28/92
AEIC (Air Express)	21.375	246.6	4/4/94
AIRM (Air Methods)	6.125	27.8	8/ /93
ARKR (ARK Restaurants)	7.50	23.4	12/13/94
BNTN (Benton Oil)	7.875	139.4	9/8/93
BSSI (Biosafety Systems)	4.625	16.3	9/8/93
CHTR (Charter Power)	27.000	160.9	10/26/95
COHU (Coho, Inc.)	17.875	78.3	9/13/94
COLL (Collins Industries)	6.625	32.2	3/24/92
CTYA (Century Comm.)	7.625	178.4	1/4/95
DSGT (Designatronics)	4.250	12.2	6/28/94
ECGOF (American Echo)	3.625	24.7	11/16/95
EGCF (Eagle Financial)	22.000	68.2	9/12/94
FACE (Facelifters, Inc.)	6.625	21.0	8/5/94
FFEX (Frozen Food Express)	16.500	152.9	5/24/93
GGTI (G T I Corp)	12.375	93.2	5/15/92
GRXR (Ground Round)	6.750	74.7	6/23/93
HMII (Health Mor)	15.875	77.1	12/19/94
HOWT (Howtek)	10.250	81.2	7/12/95
HUBC (Hubco)	20.375	128.1	2/26/93
IVBK (Intervisual Books)	4.625	22.1	2/8/93
MAVK (Maverick Tube)	10.000	74.4	10/4/94
MIDD (Middleby Corp.)	8.000	67.1	11/27/95
MONE (Money Store)	13.125	105.4	9/22/92
MURXF (International Murex)	3.500	58.7	5/31/95
NCEB (North Coast Energy)	1.750	9.1	4/7/93
NKID (Noodle Kidoodle)	13.250	70.9	12/13/95
NUHC (Nu Horizons Elctrs)	6.250	29.6	12/14/92
NUMD (Nu Med)	3.875	8.0	1/17/95
ODETA (Odetics A)	9.375	40.7	1/3/94
PHCC (Preferred Health)	14.875	176.5	3/22/93
RCAP (RE Capital)	14.375	90.99	6/22/93
RDIC (Readicare)	3.09375	25.4	12/5/95
ROIX (Response Technology)	3.750	131.0	10/25/95
SMTc (Semtech)	12.750	58.0	3/27/95
SSPIF (Spectrum Signal Processing)	10.625	69.8	6/9/93
STER (Sterling Health)	14.625	82.5	8/3/95
SUST (Sunstates Corp)	7.500	8.4	5/2/94
TENXF (Tee Com Electronic)	3.1875	53.8	10/13/93
TIH (T I I Industries)	6.500	24.7	8/2/94
TRDX (Tridex)	7.750	28.5	8/8/95
TSXX (TSX Corp)	19.000	178.4	5/1/95
VCAI (Veterinary Centers of America)	5.125	26.2	3/18/92
VISX (VISX, Inc.)	16.375	163.2	11/3/93
WABC (Westamerica)	28.500	230.3	4/25/94
WEDC (Wedco Technology)	9.375	28.4	5/11/92
WINEA (Canandaiga Wine)	23.375	121.8	5/4/92

stock at the time that it delisted from the AMEX. Sample firms are small, with market capitalizations ranging from \$8 million to \$247 million. Only 13 of the 47 stocks that we study have market capitalizations greater than \$100 million. The small market capitalizations are more typical of stocks that trade on Nasdaq than on the AMEX. The fourth column lists the stocks' last date on the exchanges. Moves to Nasdaq are evenly distributed over the sample period, with eight stocks delisting during 1992, 13 in 1993, 12 in 1994, and 14 in 1995.

II. The Effect of Delisting on Spreads

In this section, we consider the effect of moving from AMEX to Nasdaq on two measures of trading costs: quoted spreads and effective spreads. The quoted spread at any time is the difference between the inside ask and the inside bid. Quoted spreads have the advantage of being available on days with no trades. They represent a price at which the public is guaranteed to be able to trade at least small amounts without bearing negotiation costs. Daily mean quoted spreads are obtained for each security for a period of 20 days before and after the switch.

The effective spread for each trade is two times the absolute difference between the transaction price and the contemporaneous bid-ask midpoint. Effective spreads have been used by Petersen and Fialkowski (1994), Blume and Goldstein (1993), and others because they provide a measure of transaction costs that explicitly incorporates price improvement obtained from negotiation or crossing of orders.

The second and third columns of Table II show the mean spread for each security in the sample for its last 20 days on the AMEX and first 20 days on Nasdaq. The sample's average spread over the 20 day period just prior to the delisting is \$0.22. This doubles to \$0.44 when the stock begins to trade on Nasdaq (again, calculated over a 20-day period). The difference in spreads is statistically significant with a *p*-value of less than 0.01. Moreover, this result is unusually consistent across stocks; 45 of the 47 securities in the sample experience a spread increase after delisting. In some cases the change in spreads is very large. For example, for ARK Restaurants (ARKR), the mean spread increases from \$0.22 to \$0.87, while for Coho Inc. (COHU) mean spreads increased from \$0.24 to \$0.73. Our results for quoted spreads suggest that the findings of Barclay (1996) and Christie and Huang (1996) are not a result of the bias in the sample of firms.

The results for effective spreads, presented in the 5th and 6th columns of Table II, tell a similar story. The average effective spread calculated for the 20-day period before the delisting and the 20-day period after the delisting increases from about 9 cents to 17 cents. We also calculated effective spreads separately for trades larger and smaller than 1000 shares (not shown). Both trade sizes experienced similar effective spread changes.

Figure 1 shows the average, across stocks, of the quoted and effective spreads from 20 days before the move to 20 days after the move. The change in both quoted and effective spreads occurs suddenly and dramatically exactly

Table II
Mean Quoted and Effective Spreads for Sample Stocks

Spreads are calculated using all intraday quotes and trade prices for the twenty days prior to and after the switch from the American Stock Exchange to Nasdaq. Effective spreads are measured as twice the absolute value of the difference between the trade price and the contemporaneous bid-ask midpoint.

Nasdaq Ticker	Quoted Spread on AMEX	Quoted Spread on Nasdaq	<i>t</i> -statistic for Difference	Effective Spread on AMEX	Effective Spread on Nasdaq	<i>t</i> -statistic for Difference
ABMD	\$0.24	\$0.53	14.00	\$0.10	\$0.20	12.50
AEIC	0.23	0.35	11.71	0.09	0.15	9.58
AIRM	0.19	0.25	8.54	0.07	0.09	7.50
ARKR	0.22	0.87	21.03	0.10	0.31	6.61
BNTN	0.17	0.24	10.12	0.07	0.08	3.19
BSSI	0.20	0.32	10.46	0.10	0.13	4.36
CHTR	0.30	0.61	15.49	0.10	0.25	30.06
COHU	0.24	0.73	21.36	0.12	0.22	8.16
COLL	0.17	0.37	11.16	0.07	0.13	10.97
CTYA	0.18	0.27	11.17	0.07	0.09	3.58
DSGT	0.19	0.48	22.71	0.06	0.19	6.25
ECGOF	0.11	0.16	7.80	0.04	0.05	5.71
EGFC	0.34	0.66	11.43	0.11	0.22	8.29
FACE	0.24	0.20	-4.67	0.08	0.08	-0.23
FFEX	0.21	0.49	16.20	0.07	0.19	16.95
GGTI	0.21	0.44	21.31	0.08	0.18	19.61
GRXR	0.19	0.26	6.88	0.07	0.08	1.53
HMI	0.34	0.85	21.08	0.13	0.29	5.20
HOWT	0.17	0.26	14.50	0.07	0.09	9.20
HUBC	0.26	0.60	17.79	0.13	0.24	16.94
IVBK	0.26	0.40	7.89	0.10	0.18	17.17
MAVK	0.22	0.31	4.90	0.11	0.10	-1.74
MIDD	0.21	0.39	20.91	0.37	0.14	-2.55
MONE	0.23	0.50	12.61	0.08	0.15	10.16
MURXF	0.11	0.19	8.94	0.04	0.08	19.75
NCEB	0.29	0.14	-9.39	0.06	0.05	-0.62
NKID	0.25	0.65	38.99	0.09	0.25	32.12
NUHC	0.16	0.27	15.40	0.07	0.10	9.05
NUMD	0.20	0.28	4.74	0.10	0.08	-1.04
ODETA	0.21	0.46	14.05	0.08	0.15	10.39
PHCC	0.24	0.40	12.66	0.09	0.15	12.99
RCAP	0.26	0.77	16.07	0.08	0.17	5.70
RDIC	0.16	0.23	8.74	0.07	0.08	3.72
ROIX	0.13	0.82	20.92	0.05	0.31	20.81
SMTc	0.19	0.40	21.07	0.07	0.15	26.16
SSPIF	0.18	0.29	20.77	0.07	0.11	20.97
STER	0.26	0.46	14.74	0.09	0.15	9.56
SUST	0.20	0.64	27.61	0.07	0.31	16.01
TENXF	0.12	0.21	7.20	0.05	0.08	6.13
TIH	0.22	0.33	10.64	0.08	0.12	5.53
TRDX	0.16	0.29	18.03	0.06	0.11	17.92
TSXX	0.21	0.65	35.71	0.09	0.25	26.59
VCAI	0.19	0.38	11.71	0.07	0.14	14.16
VISX	0.19	0.42	19.54	0.07	0.18	31.74
WABC	0.28	0.53	12.32	0.10	0.20	9.69
WEDC	0.21	0.59	16.02	0.07	0.21	6.12
WINEA	0.29	0.48	8.64	0.13	0.16	2.95

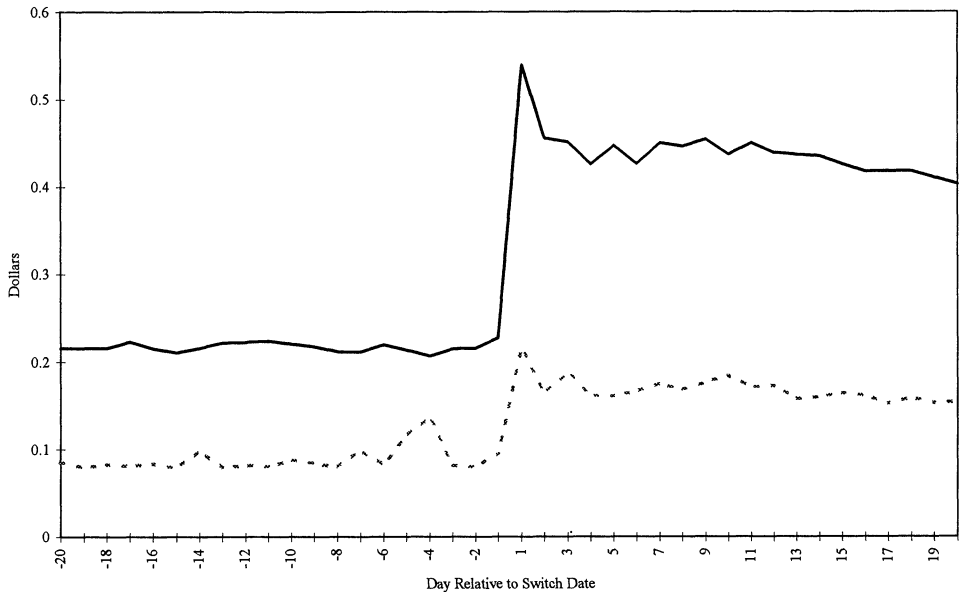


Figure 1. Mean effective and quoted spreads for the 40 days surrounding a move from the American Stock Exchange to Nasdaq. The mean effective spread is shown with the dashed line. Quoted spreads are depicted by the solid line.

when stocks move from AMEX to Nasdaq. Both changes appear to be permanent.

III. The Stock Price Effect of the Announcement

When a firm decides to delist from the AMEX, it must write a letter to the AMEX stating its decision and then file with the SEC to delist. The board meeting itself is not public information and the correspondence with the AMEX is not public. After the firm files with the SEC, the SEC publishes a notice in the federal register soliciting comments. The SEC is highly unlikely to disapprove of the switch. The first public announcement is therefore the date the switch is announced by the firm. The announcement date was found from a Lexis/Nexis search. In all but four cases, an announcement that preceded the switch itself was found. Since the announcement could have been made either before or after trading hours, the stock price reaction could be observed either on the announcement date or the day after. Consequently we test for a price reaction to the announcement using the interval $[0, 1]$. In calculating abnormal returns, we discard the four stocks for which no announcement was found.⁵

⁵ In an earlier version of the article these stocks were included using the switch date for the announcement date. Results were not materially different from those reported here.

All stock returns are calculated using closing bid-ask midpoints. Closing prices and market indices from CRSP are used. Excess returns are market adjusted, that is,

$$\overline{AR}_t = \sum_{i=1}^N \frac{R_{i,t} - R_{m,t}}{N} \quad (1)$$

where $R_{i,t}$ = the return of stock i on day t

$R_{m,t}$ = the return of the market index on day t .

We tried two different indices: the CRSP Nasdaq equally-weighted and the S&P 500. The results are unaffected by the index that we use. The standard deviation of the portfolio's market adjusted returns is estimated using the returns from 150 days to 26 days before the announcement. That is,

$$\sigma_{AR} = \sqrt{\frac{\sum_{t=-150}^{t=-26} (\overline{AR}_t - \overline{AR})^2}{125 - 1}} \quad (2)$$

The t -statistics are calculated using the standard deviation of mean market-adjusted returns for the days -150 to -26 . This gives us 125 degrees of freedom.

Table III shows the results for each of the days beginning 10 days before the announcement date and ending ten days after. For both indices, the stock price effects on the day of the announcement and the following day are positive with t -statistics between 1.49 and 1.87. The total abnormal return over the interval $[0, 1]$ is 2.04 percent when the CRSP Nasdaq index is used to compute excess returns and 2.03 percent when returns are compared against the S&P 500. The t -statistic for the two-day interval is 2.41 when the Nasdaq index is used to calculate abnormal returns and 2.32 when the S&P 500 is used. The stock price effect is positive for 51 percent of the securities in the sample on day 0, and for 63 percent on day 1. These abnormal returns, while not large, are robust. In addition to market-adjusted returns, we estimate market model excess returns (not shown) and get almost identical results. Also as we have seen, the excess returns are unaffected by the choice of the market index.

We are unable to find any events that occur around the time of a switch to Nasdaq that could explain the positive price reaction. About one-third of the firms in our sample issue equity around the time they move to Nasdaq, but this compounds the puzzle. Previous research shows that stock prices *decline* when equity offerings are announced. Further, we split our sample into stocks that did and did not issue equity, and find that both groups exhibited positive returns at the announcement of a move to Nasdaq (not shown).

Most listing announcements occur within a few days of the beginning of Nasdaq trading. Hence it is also possible that the positive abnormal returns at the announcement are the result of purchasing by prospective market makers

Table III

Excess Returns Around the Announcement of a Switch from the American Stock Exchange to Nasdaq

Excess returns are calculated for each stock by subtracting the market return from the return of the stock around the announcement date. Two market indices are used: the Nasdaq composite index and the S&P 500. The *t*-statistics are calculated using the standard deviation of the portfolio return for days -150 through -25 relative to the announcement.

Event Date	Mean Nasdaq Composite Excess Returns (<i>t</i> -statistics)		Mean S&P 500 Excess Returns (<i>t</i> -statistics)		Number of Positive (Negative) Excess Returns
-10	-0.0015	(-0.26)	-0.0013	(-0.21)	20 (23)
-9	-0.0029	(-0.49)	-0.0032	(-0.52)	19 (24)
-8	0.0075	(1.26)	0.0040	(0.65)	20 (23)
-7	-0.0069	(-1.16)	-0.0050	(-0.80)	11 (32)
-6	0.0091	(1.52)	0.0081	(1.32)	25 (18)
-5	0.0018	(0.30)	0.0039	(0.62)	20 (23)
-4	0.0031	(0.51)	0.0015	(0.24)	25 (18)
-3	-0.0041	(-0.68)	-0.0039	(-0.64)	15 (28)
-2	-0.0015	(-0.24)	-0.0004	(-0.06)	23 (20)
-1	-0.0000	(-0.00)	-0.0001	(-0.01)	23 (20)
0	0.0091	(1.53)	0.0092	(1.49)	22 (21)
1	0.0112	(1.87)	0.0110	(1.77)	27 (16)
2	0.0025	(0.43)	0.0037	(0.59)	22 (21)
3	0.0002	(0.04)	-0.0004	(-0.07)	20 (23)
4	0.0067	(1.13)	0.0063	(1.03)	23 (20)
5	-0.0001	(-0.01)	0.0005	(0.08)	19 (24)
6	0.0048	(0.81)	0.0042	(0.68)	23 (20)
7	0.0078	(1.30)	0.0073	(1.18)	26 (17)
8	-0.0044	(-0.74)	-0.0028	(-0.45)	16 (27)
9	0.0024	(0.40)	0.0036	(0.58)	21 (22)
10	-0.0085	(-1.41)	-0.0081	(-1.31)	16 (27)

who want to acquire an inventory of a stock prior to its Nasdaq listing. It could be that this temporary price boost is reversed over time, but the dissipation is too slow to be observed.⁶

IV. Conclusion

This study examines the effect of a switch from the AMEX to Nasdaq on trading costs and stock prices for 47 stocks that switched between 1992 and 1995. We find that: 1) spreads increased for these firms as a result of the switch to Nasdaq, and 2) despite the effect of the switch on spreads, there is a positive stock price effect that results from announcing a move to Nasdaq for these securities. We are unable to reconcile these apparently contradictory results.

⁶ We thank René Stulz for suggesting this explanation.

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