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Does the Medium Matter? The Relations among Bankruptcy Petition Filings, Broadtape Disclosure, and the Timing of Price Reactions

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ABSTRACT

Drawing on a comprehensive sample of 330 bankruptcy petition filings from 1980 to 1993, we find that most of the market reaction does not occur on the bankruptcy petition filing date when the information becomes publicly available. Rather, most of the reaction occurs when news of the bankruptcy filing is more widely disseminated via the Broadtape. This "Broadtape announcement effect" persists after controlling for firm size, exchange listing, and predisclosure information. These are primarily timing differences since abnormal returns cumulated over an 11-day window centered on the filing date do not differ significantly across Broadtape disclosure date classifications.

DOES IT MATTER WHETHER INFORMATION is broadly disseminated by media such as the Broadtape, if that information is otherwise publicly available? In other words, is information impounded into prices when that information becomes publicly available, or when the information is disclosed via widely disseminated media? Prior research has provided little evidence on these questions because announcement through a broadly disseminated medium is a necessary condition for inclusion in most event studies.

Bankruptcy petition filing information is publicly available on the filing date. However, broad-based announcement of the news of these bankruptcy filings can appear later, or not at all, in more widely disseminated media. Thus, bankruptcy filings provide an excellent opportunity to examine the relations among (1) public availability of the information on the bankruptcy petition filing date, (2) announcement of bankruptcy filing news through

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more widely disseminated media such as the Broadtape, and (3) the pattern of the market's response to the bankruptcy information.

Given the economic significance of bankruptcy, if any class of information is likely to be quickly impounded in prices as soon as that information becomes publicly available, it is likely to be bankruptcy filings. However, existing research on information that is publicly available but announced later (if at all) in more widely disseminated media focuses on information that is typically of less significance than bankruptcy filings: earnings news and qualified audit opinions. The limited evidence from that research suggests that most of the market reaction occurs when the information is more broadly disseminated, rather than when the information first becomes publicly available. For example, Stice (1991) reports that when the firm's (publicly available) 10-Q or 10-K is filed with the SEC before the *Wall Street Journal* earnings announcement date, the market reaction occurs at the (later) *Wall Street Journal* announcement date rather than the (earlier) 10-Q or 10-K filing date. Similarly, although Dodd et al. (1984) find no evidence of market reactions to qualified audit opinions in general, Dopuch, Holthausen, and Leftwich (1986) document a negative price reaction to that subset of qualified audit opinions that are more broadly disseminated through the *Wall Street Journal* (*WSJ*, hereafter).

This evidence raises the following questions. For information as significant as bankruptcy filings, does the market react when the bankruptcy filing information becomes publicly available on the bankruptcy petition filing date? Or does most of the reaction occur when news of the filing is more widely disseminated by major news media? Our analysis focuses on the Broadtape disclosure medium, which is more comprehensive and timely than newspapers such as the *WSJ*, and more comprehensive and at least equally timely as newswire services.

This study extends prior research that documents a negative market reaction to bankruptcy filings. Aharony, Jones, and Swary (1980) present evidence that even shortly before the filing, the market did not fully anticipate bankruptcy filings of 45 firms identified from the COMPUSTAT Research tape. Clark and Weinstein (1983) investigate bankruptcy filings of New York and American Stock Exchange (NYSE and AMEX) firms from 1938 to 1979, and they report average cumulative abnormal returns of −47 percent over the three days centered on the filing date. However, by day +1 their sample declines to only six firms. In a more recent study of intraindustry effects of bankruptcy announcements, Lang and Stulz (1992) report that for firms filing for bankruptcy, abnormal returns cumulated over the day before and the day of the *WSJ* announcement average −21.7 percent. Given their focus on intraindustry information transfers, Lang and Stulz limit their examination to bankruptcies that are announced in the *WSJ* and are filed by large firms with over $120 million in liabilities. Applying these criteria over the period 1970 to 1989 yields a filing date sample of 40 firms.

Our study differs from prior research in several respects. We are the first to examine the relations among (1) the public availability of bankruptcy petition filing information on the filing date, (2) the existence and timing of more broadly disseminated disclosures of bankruptcy filing information via news media, and (3) the timing of the associated price reaction. Second, because we investigate whether the existence and timing of broader-based disclosure is associated with the pattern of the market's reaction, we examine the reaction to bankruptcy filings regardless of whether the filings are announced on the Broadtape or in the *WSJ*. Thus, we investigate the market's reaction to a set of 330 bankruptcy filings, a more comprehensive sample relative to prior studies that typically investigated less than 50 bankruptcy filings (generally issued by large firms). Third, most prior research investigates filings before the Bankruptcy Reform Act of 1978; we investigate filings over the period 1980 to 1993, which is subsequent to the October 1979 effective date of the 1978 Act. Prior to the Bankruptcy Reform Act, most firms filing for bankruptcy stopped trading on or before the filing date. This limited the ability of prior research to provide evidence on market reactions to bankruptcy filings.

For the total sample of 330 filings, we find that the average abnormal return is −12.24 percent on the filing date and −15.97 percent on the following day. More importantly, our results suggest that the timing of the market's reaction depends on whether and when an announcement concerning the bankruptcy petition filing appears on the Broadtape. When the Broadtape announces news of the filing on the same day that the bankruptcy petition is filed, most of the adverse reaction occurs on the filing date. The abnormal return is −21.79 percent on the filing date, and −11.69 percent on the day after the filing date. (Even though these are the largest firms with the most predisclosure information, the bankruptcy filing still has incremental information content since the filing date reaction is highly significant.) However, when news of the bankruptcy does not appear on the Broadtape until after the filing date, most of the price reaction occurs on the later Broadtape disclosure date, rather than the earlier bankruptcy petition filing date. For filings not announced on the Broadtape until the day after the bankruptcy filing date, the average return on the filing date is only −4.59 percent, but the return on the following (Broadtape disclosure) day averages −21.50 percent. For filings that are not announced on the Broadtape until two days after the filing date, the average returns on the filing date and the next day are insignificant (1.98 percent and −1.27 percent, respectively), and the significantly negative market reaction (averaging −16.64 percent) does not occur until the Broadtape disclosure date—even though this is two days after the information became available on the bankruptcy filing date.

We find that the Broadtape is more likely to announce bankruptcy filings of larger, exchange-listed firms, and its announcements of such firms' filings are likely to be more timely; therefore, we conduct additional analyses that control for firm size, exchange listing, and predisclosure information. Our

results remain robust after controlling for these variables. Further investigation reveals that abnormal returns cumulated over an 11-day window centered on the bankruptcy filing date do not differ systematically across Broadtape disclosure classifications, which further suggests that our results are attributable to differences in the timing of the broadly disseminated information.[1]

The remainder of this paper is organized as follows. Section I describes the data and research method. Section II presents the empirical results, and Section III provides concluding comments.

I. Sample and Research Method

A. Sample

We identify bankrupt firms and their bankruptcy petition filing dates from three sources: (1) Prentice-Hall's *Capital Adjustments* (1980–1989 edition, plus addenda for 1990–1992), (2) Predicast's *F&S Index of Corporate Changes*, and (3) LEXIS. Firms are retained in the sample if (1) CRSP returns are available for at least 80 percent of the 60-day period used to compute expected returns, (2) the security is publicly traded after the bankruptcy filing date, (3) the bankruptcy filing is disclosed on the Broadtape within two days after the filing date, or else the filing is not announced on the Broadtape, and (4) no other potentially contaminating events (e.g., stock splits, stock dividends, mergers or acquisitions, earnings) are announced within one week of the bankruptcy filing date.[2] These sample selection criteria yield a sample of 330 bankruptcy petition filings over the period 1980 to 1993.

Table I reveals that the majority of our sample of bankrupt firms are traded on the Nasdaq (209 of the 330 firms, or 63.3 percent). Another 81 firms (24.6 percent) are listed on the NYSE, and the remaining 40 (12.1 percent) are traded on AMEX. Additional analysis (not shown) reveals little evidence of clustering in any industry—the 330 sample firms span 206 four-digit SIC codes, the maximum number of firms in any single code is 10 (3.0 percent), and there are no more than 8 (2.4 percent) sample firms in any other four-digit SIC code.

[1] As would be expected given that the Broadtape is a more comprehensive and timely medium than the *WSJ*, additional empirical analysis (not reported here) reveals that the Broadtape effect dominates the *WSJ* effect. In analyses allowing for both effects, we find an incremental Broadtape effect after controlling for the *WSJ* effect, but we observe no incremental *WSJ* effect after controlling for the Broadtape effect. We also conduct an analogous investigation of bankruptcy filing disclosures via newswires. As with the *WSJ* effect, the Broadtape effect dominates the "first newswire" effect. We find an incremental Broadtape effect after controlling for the newswire effect, but we observe no incremental first newswire effect after controlling for the Broadtape effect. Because the Broadtape effect dominates both the *WSJ* effect and the first newswire effect, the analysis reported here focuses only on the Broadtape effect.

[2] Only six firms meeting criteria 1, 2, and 4 are eliminated because the Broadtape announcement appears three or more trading days after the filing date (i.e., criterion 3). As there are too few of these firms to support a separate analysis, we eliminated these observations from the analysis.

Table I

Broadtape Disclosure Category, Exchange Listing, and Median Market Value of Equity for Firms Filing Bankruptcy Petitions

The sample includes 330 firms that filed bankruptcy petitions between 1980 and 1993, inclusive. Firms are retained in the sample if CRSP returns data are available for 48 of the 60 days in the parameter estimation period, the security is publicly traded after the bankruptcy filing date, no other potentially confounding events are announced within ±1 week of the bankruptcy filing date, and the bankruptcy is disclosed on the Broadtape within two days of the filing date, or else it is not disclosed on the Broadtape. The percentages of each exchange's total bankruptcy petition filings that are classified in each disclosure category appear in parentheses. The median market value of equity is in millions.

	Exchange Listing				
	NYSE	AMEX	Nasdaq	Total Filings	Median Market Value of Equity
Broadtape disclosure date					
On filing date	53 (65.5%)	19 (47.5%)	69 (33.0%)	141 (42.7%)	$40.6
1 day after filing date	27 (33.3%)	17 (42.5%)	103 (49.3%)	147 (44.6%)	$26.6
2 days after filing date	0 (0%)	2 (5.0%)	10 (4.8%)	12 (3.6%)	$6.9
Total Broadtape disclosure	80 (98.8%)	38 (95.0%)	182 (87.1%)	300 (90.9%)	$33.4
No Broadtape disclosure	1 (1.2%)	2 (5.0%)	27 (12.9%)	30 (9.1%)	$8.2
Total	81	40	209	330	$29.2

B. Disclosure of Bankruptcy Petition Filings

Bankruptcy petitions become a matter of public record when they are filed with the courts. However, investors who do not find it cost effective to monitor various jurisdictions for news of bankruptcy filings may remain unaware of a filing unless it is announced through a widely disseminated medium such as the Broadtape.

NYSE, AMEX, and National Association of Securities Dealers (NASD) guidelines generally encourage firms to disseminate news of major developments.[3] NYSE and AMEX guidelines stipulate that public disclosures of material information must be distributed to the wire services and the press (*New York Stock Exchange Listed Company Manual*, Sections 202.06(A) at

[3] For example, the *New York Stock Exchange Listed Company Manual* requires companies to disclose unfavorable developments or news as "promptly and candidly" as more favorable developments (Section 202.06(A) at 2-5). AMEX has similar disclosure requirements (*American Stock Exchange Company Guide*, Section 401(a)). Finally, the *NASD Manual* (Section 1754 at 1573-74) requires companies to promptly disclose "any material information which may affect the value of its securities or influence investors' decisions."

2-4 and 202.06(C); *American Stock Exchange Company Guide*, Section 401b), but the NASD does not provide specific guidelines concerning disclosure medium. Firms listed by either NYSE or AMEX enjoy limited discretion to delay or avoid disclosure "where disclosure would endanger the company's goals or provide information helpful to a competitor" (*New York Stock Exchange Listed Company Manual*, Section 202.06(A) at 2-5). Moreover, although the NYSE, AMEX, and NASD guidelines encourage rapid disclosure of material information, they are not rigorously enforced. The institutional environment therefore allows firms to exercise some discretion over the timing and medium through which their bankruptcy petition filing is announced.[4] This discretion allows cross-sectional differences in whether or not news of the bankruptcy filing appears on the Broadtape, and differences in timing of any Broadtape disclosures.

C. *Measurement of Abnormal Returns*

Reported results are based on mean-adjusted returns.[5] We employ a 60-day parameter estimation period, from day −80 to day −21, relative to the bankruptcy petition filing date. For inclusion in the sample, we require data for 48 of the 60 estimation period days. The test period is the 11 days centered on the bankruptcy petition filing date (days −5 to +5). Abnormal returns are computed as the difference between actual and expected returns, and analysis is confined to test period firm-days with actual trades. Cross-sectional average daily returns are computed as the sum of the day's abnormal returns across the firms, divided by the number of firms.

We present cross-sectional average daily abnormal returns and the associated t-statistics for the total sample, as well as for each of four disclosure groups: (1) bankruptcy filings that are announced on the Broadtape on the same day the bankruptcy petition is filed (day 0), (2) bankruptcy filings that are not announced on the Broadtape until the day after the filing date (day +1), (3) bankruptcy filings that are not announced on the Broadtape until two days after the filing date (day +2), and (4) bankruptcy filings that are not announced on the Broadtape. Reported t-statistics are based on cross-sectional variances (Morse and Shaw 1988). For each disclosure group, only members of that group are used in computing the group-specific cross-sectional daily abnormal returns and variances.

[4] Broadtape editors estimated that more than 95 percent of the bankruptcy filing announcements appearing on the Broadtape originate from firm-initiated disclosures. The editors also indicate that bankruptcy filings of publicly traded firms are so newsworthy that they are reported on the Broadtape as soon as the Broadtape staff becomes aware of the filing. Thus, the existence and timing of Broadtape bankruptcy filing disclosures largely reflect the existence and timing of firm-initiated disclosures.

[5] Brown and Warner (1980, 1985) conclude that the mean-adjusted returns approach is roughly as powerful as the market model approach in detecting abnormal price movements associated with events that are not clustered in calendar time. Clustering is not a problem in our sample because each of our filings occurs on a different calendar day. Market-adjusted returns and market model prediction errors yield inferences identical to those based on mean-adjusted returns.

II. Empirical Results

A. Incidence and Timing of Broadtape Disclosures of Bankruptcy Petition Filings

Table I presents descriptive evidence on the incidence and timing of Broadtape disclosures of bankruptcy filings. The table also yields insight into the relation between these Broadtape disclosures and firm-specific characteristics, including exchange listing and firm size.

Table I shows that news of the bankruptcy filings appears on the Broadtape for 90.9 percent of our sample firms. NYSE and AMEX firms are more likely to have their filings disclosed via the Broadtape than are firms traded on the Nasdaq. Nearly 99 percent of the NYSE and 95 percent of the AMEX firms' bankruptcy filings are announced on the Broadtape; 87 percent of the Nasdaq firms' filings are announced on the Broadtape. As might be expected, Broadtape announcements of bankruptcy petition filings are most timely for NYSE firms (with 65.5 percent of the Broadtape announcements appearing on the filing date) and least timely for the Nasdaq firms (with only 33 percent of the Broadtape announcements appearing on the filing date).

Table I also indicates that news of larger firms' filings is more likely to appear on the Broadtape. The median market value of equity for firms whose filing is disclosed on the Broadtape is more than four times that of firms whose filing is not disclosed on the Broadtape ($33.4 million versus $8.2 million). Broadtape disclosures are on average more timely for larger firms. For firms whose filing is announced on the Broadtape on the same day that the bankruptcy petition is filed, the median market value of equity ($40.6 million) is more than five times larger than that of firms whose filing is not announced on the Broadtape until two days after the bankruptcy petition filing date ($6.9 million).

In sum, Table I shows that bankruptcy filings announced on the Broadtape tend to be from larger, exchange-listed firms. Broadtape announcements of bankruptcy filings are on average also more timely for larger, exchange-listed firms. Prior research has shown that more predisclosure information is available for such firms (e.g., Grant (1980) and Atiase (1987)). This will tend to preempt the informativeness of these firms' filings, and will work against finding significant market reactions to bankruptcy filings that are announced on the Broadtape in a timely fashion.

B. Market Reaction to Bankruptcy Petition Filings in the Total Sample

Table II reports mean-adjusted abnormal returns and associated t-statistics for the total sample, and for each of the four Broadtape disclosure categories.[6] The left-hand side of the table presents results for the total sample. Abnormal returns are significantly negative on each of the five days imme-

[6] Reported results are based on abnormal returns after winsorizing at 1 percent and 99 percent. Unwinsorized data yield qualitatively similar inferences.

Table II

Abnormal Returns around Bankruptcy Petition Filing Dates: Total Sample and by Broadtape Disclosure Date

Panel A presents daily security abnormal returns (AR) calculated as mean-adjusted returns based on closing transaction prices. Analysis is confined to firm-days with trades. Cross-sectional mean daily abnormal returns are presented, along with *t*-statistics based on cross-sectional variances. Day 0 is the bankruptcy filing date. For regressions reported in Panel B, the dependent variable is the mean-adjusted abnormal return on (1) the bankruptcy petition filing date (Model 1), (2) the day after the bankruptcy petition filing date (Model 2), or (3) 2 days after the bankruptcy petition filing date (Model 3). These abnormal returns are regressed on (1) the Broadtape disclosure date dummy (in Model 1 BT0 = 1 if the Broadtape disclosure is on the filing date; in Model 2 BT1 = 1 if the Broadtape disclosure is on the day after the filing date; in Model 3 BT2 = 1 if the Broadtape disclosure is two days after the filing date), (2) firm size, measured as the natural log of the market value of common equity (SIZE), (3) firm exchange listing (EXCHANGE = 1 if the firm is listed on the NYSE), and (4) a proxy for predisclosure information, measured as the cumulative (mean-adjusted) abnormal return computed from day −240 to day −2 relative to the bankruptcy petition filing date (PDI). Coefficients are presented with *t*-statistics based on White's (1980) heteroskedasticity-consistent standard errors in parentheses, and two-tailed significance levels in square brackets.

Panel A: Daily Abnormal Returns

	Total Sample		Broadtape Disclosure on Filing Date		Broadtape Disclosure 1 Day after Filing Date		Broadtape Disclosure 2 Days after Filing Date		No Broadtape Disclosure	
	AR	*t*	AR	*t*	AR	*t*	AR	*t*	AR	*t*
Day Relative to Bankruptcy Filing Date										
−5	−1.71	−2.45	−0.14	−0.13	−4.02	−4.03	−1.30	−1.17	1.57	0.57
−4	−1.30	−1.76	−2.32	−2.84	−0.20	−0.15	−7.53	−1.61	1.03	0.36
−3	−2.27	−2.44	−4.52	−3.55	0.51	0.35	−5.58	−0.68	−3.55	−1.46
−2	−3.04	−2.74	−2.93	−2.05	−4.50	−2.43	14.78	1.57	−2.24	−1.29
−1	−3.31	−3.48	−5.10	−3.43	−0.91	−0.66	−10.22	−1.69	−3.62	−1.39
0	−12.24	−7.77	−21.79[a,b]	−9.43	−4.59	−2.14	1.98	0.26	−8.07	−1.43
+1	−15.97	−9.90	−11.69	−4.34	−21.50[a]	−9.95	−1.27	−0.29	−14.82	−3.15
+2	2.66	1.80	6.75	2.74	0.82	0.42	−16.64[a,b]	−2.09	−0.40	−0.11
+3	1.50	1.29	3.31	2.19	0.94	0.48	2.99	0.34	−6.16[c]	−1.99
+4	2.44	1.66	3.40	1.75	−0.36	−0.16	16.67	0.99	6.32	1.62
+5	−0.64	−0.62	0.75	0.51	−1.13	−0.67	−6.17	−0.92	−3.24	−1.20

Cumulative Abnormal Returns										
Days −5 to 0	−22.79	−10.54	−34.57	−12.26	−12.50	−3.93	−16.27	−1.26	−14.47	−1.49
Days −5 to +5	−28.86	−11.55	−27.11	−7.60	−32.16	−8.16	−29.00	−1.95	−20.23	−2.28

Panel B: Incremental Broadtape Disclosure Date Effects on Bankruptcy Filing Period Daily Abnormal Returns

Model 1: $AR0 = a_1 + a_2\ BT0 + a_3\ SIZE + a_4\ EXCHANGE + a_5\ PDI + \epsilon$

Model 2: $AR1 = b_1 + b_2\ BT1 + b_3\ SIZE + b_4\ EXCHANGE + b_5\ PDI + \epsilon'$

Model 3: $AR2 = c_1 + c_2\ BT2 + c_3\ SIZE + c_4\ EXCHANGE + c_5\ PDI + \epsilon''$

Abnormal Return on:	BT0	BT1	BT2	SIZE	EXCHANGE	PDI	Adjusted R^2
Model 1: Day 0	−0.173			0.004	0.002	−0.021	12.65%
	(−5.66)			(0.42)	(0.06)	(−2.17)	
	[0.0001]			[0.64]	[0.96]	[0.03]	
Model 2: Day +1		−0.113		0.016	−0.039	0.008	3.81%
		(−3.62)		(1.43)	(−0.94)	(0.97)	
		[0.0001]		[0.16]	[0.34]	[0.33]	
Model 3: Day +2			−0.180	0.022	−0.030	−0.009	2.74%
			(−2.21)	(2.17)	(−0.80)	(−1.06)	
			[0.03]	[0.03]	[0.22]	[0.28]	

[a] Daily abnormal returns for this Broadtape disclosure category are significantly lower than the daily abnormal returns in each of the other two Broadtape disclosure categories, at $\alpha \leq 0.01$.

[b] Daily abnormal returns for this Broadtape disclosure category are significantly lower than the daily abnormal returns for the No Broadtape Disclosure category, at $\alpha \leq 0.05$.

[c] Daily abnormal returns for the No Broadtape Disclosure category are significantly lower than the daily abnormal returns for each of the three Broadtape disclosure categories, at $\alpha \leq 0.05$.

diately prior to the filing date, indicating that the market impounds adverse information into these securities' prices before the bankruptcy filing. Nevertheless, evidence from this more comprehensive sample confirms prior research's conclusion that the market does not fully anticipate bankruptcy filings—there is a significantly negative market reaction on the filing date (−12.24 percent). Interestingly, however, the most negative average abnormal returns occur on the day after the filing (−15.97 percent). This is consistent with the notion that it is not the public availability of the bankruptcy petition filing per se, but rather the disclosure of the bankruptcy news through some more broadly disseminated disclosure medium that stimulates the most extensive reaction. A more detailed analysis of the market reaction by Broadtape disclosure category yields insights into this issue.

C. Market Reaction to Bankruptcy Petition Filings— By Broadtape Disclosure Category

We first consider bankruptcy filings that are announced on the Broadtape on the same day that the bankruptcy petition is filed. Inspection of the daily average abnormal returns reported in columns 3 and 4 of Table II, Panel A, reveals that the market reacts most quickly to those bankruptcy filings that are announced on the Broadtape on the same day that the bankruptcy petition is filed. Despite the fact that the market has impounded adverse information into these securities' prices before the bankruptcy filing (as evidenced by significantly negative prefiling abnormal returns), there is nonetheless a sharply negative reaction on the bankruptcy filing date. Most of the price reaction occurs on the filing date (−21.79 percent), but significantly negative abnormal returns also continue on the day after the filing (−11.69 percent).

In contrast, columns 5 through 10 of Panel A show that the average filing date (day 0) abnormal returns are much smaller in magnitude when news of the bankruptcy filing does not appear on the Broadtape until after the filing date (−4.59 percent for filings disclosed on the Broadtape on day +1, and 1.98 percent for filings disclosed on the Broadtape on day +2), or when the Broadtape does not disclose the filing at all (−8.07 percent). In sum, on the date the bankruptcy petition is filed: (1) prices decline more than twice as steeply when news of that bankruptcy filing also appears on the Broadtape, and (2) these differences between bankruptcy filings that are disclosed on the Broadtape on day 0, versus those that are disclosed later or not at all, are statistically significant at $\alpha \leq 0.03$ (two-tailed).

Perhaps the most interesting insight from Table II is evidence that when news of the bankruptcy is not disclosed on the Broadtape until after the filing date, most of the reaction occurs on the later Broadtape announcement date, rather than the earlier bankruptcy petition filing date. Panel A (columns 5 and 6) of Table II shows that when the Broadtape disclosure occurs on the day after the filing date, the average abnormal return on the filing date (day 0) is only −4.59 percent. The average abnormal return on the day after the filing date—when news of the bankruptcy appears on the Broadtape—

plummets to −21.50 percent. The day +1 abnormal return is significantly more negative for the "Broadtape disclosure one day after filing date" group than for the other two Broadtape disclosure groups ($\alpha \leq 0.01$).

Even more striking is that when the Broadtape disclosure does not occur until two days after the bankruptcy filing date (columns 7 and 8 of Panel A), the abnormal returns on the filing date and the day after are not significantly different from zero (1.98 percent and −1.27 percent, respectively). Instead, most of the negative market reaction (−16.64 percent) occurs on day +2, when news of the bankruptcy filing finally appears on the Broadtape. The day +2 abnormal return is significantly more negative for the "Broadtape disclosure two days after filing date group" relative to the two other Broadtape disclosure groups ($\alpha \leq 0.01$), and relative to the "No Broadtape disclosure group" ($\alpha = 0.04$). Thus, for filings announced on day +2, the reaction does not occur on the bankruptcy filing date when the information becomes publicly available, but instead occurs two days later when news of the bankruptcy is more widely disseminated via the Broadtape.

The two rightmost columns of Panel A display the daily average abnormal returns for bankruptcy filings that are not disclosed on the Broadtape. Most of the market reaction occurs on the day after the filing (−14.82 percent), but abnormal returns are also significantly negative on day +3 (−6.16 percent).[7] This "No Broadtape disclosure" group is the only group that exhibits significantly negative abnormal returns after day +2. The day +3 abnormal return is significantly lower for the "No Broadtape disclosure group" than for the "Broadtape disclosure on filing date" group ($\alpha = 0.01$) and the "Broadtape disclosure one day after filing date" group ($\alpha = 0.06$). These results are consistent with the market reacting in a less timely fashion to bankruptcy petition filings that are not disclosed via the Broadtape.

We perform additional analyses of the filings disclosed on the Broadtape on day +1. Our sources of bankruptcy filing data (Section I.A) record the date but not the exact time when bankruptcy petitions are filed, so it is possible that some of the bankruptcy petitions may have been filed at the courthouse after the market closed on day 0. If the information in such a bankruptcy petition filed in the late afternoon of day 0 (after the market closed but before the courthouse closed) is immediately incorporated into prices, it should be impounded in the opening price on day +1. To abstract from any effects of such "after-hours" filings and the associated returns, we examine open-to-close returns for the subsample of bankruptcy filings that have data available on the 1988–1992 Institute for the Study of Security

[7] Of the 30 bankruptcy filings that are not announced on the Broadtape, 18 had neither a *WSJ* announcement nor a newswire announcement. For these 18 firms, the most adverse reaction occurs on day +1 (−11.95 percent). Five of the remaining 12 "No Broadtape disclosure" firms have a bankruptcy filing newswire or *WSJ* announcement on day +1, and, not surprisingly, for these five firms the most adverse reaction also occurs on day +1 (−31.19 percent). This evidence suggests that the adverse day +1 reaction for the 30 "No Broadtape disclosure" firms is partially, but not completely, attributable to the five firms with newswire disclosures on day +1.

Markets (ISSM, hereafter) database.[8] Of the study's 147 bankruptcy filings that are disclosed on the Broadtape on the day after the filing date, 50 have ISSM data allowing us to compute open-to-close returns. For these 50 filings, the reaction still occurs on day +1, even using open-to-close returns. Specifically, the open-to-close returns are insignificant on the filing date (1.92 percent, $t = 0.50$), and significantly negative on day +1 (−12.76 percent, $t = -3.31$).[9] These results indicate that the significantly negative day +1 reaction reported in Table II for filings disclosed on the Broadtape on day +1 is not simply attributable to overnight returns triggered by any after-hours bankruptcy filings. Similarly, even after-hours bankruptcy filings on day 0 cannot explain Table II's evidence that the reaction to filings that are not announced on the Broadtape until day +2 does not occur until two days after the filing date.

The cumulative abnormal returns over the entire 11-day window from day −5 to day +5, reported at the end of Panel A in Table II, do not differ significantly across the four disclosure categories. Thus, the disclosure category-related differences in the patterns of the daily abnormal returns shown in Table II are largely timing differences. For example, the day −5 to 0 cumulative abnormal returns show that when the Broadtape announces the bankruptcy filing after the filing date, much of the total 11-day market reaction is not incorporated in prices until after the filing date.

D. Controlling for Effects of Firm Size, Exchange Listing, and Predisclosure Information on Cross-Sectional Differences in the Timing of the Market's Reaction to Bankruptcy Filings

The descriptive evidence presented in Table I reveals that the incidence and timing of the Broadtape's bankruptcy petition filing disclosures are associated with firm size and exchange listing. This suggests that the extent of predisclosure information is also likely to differ across the four Broadtape disclosure categories. Consequently, we conduct additional analyses designed to control for these potentially confounding effects.

Specifically, we regress daily abnormal returns on a Broadtape disclosure dummy and three control variables: firm size, exchange listing, and predisclosure information. Our purpose is to ascertain whether the market reaction on day t is more negative for those firms whose filing is also announced on the Broadtape on day t. We estimate three different models. In Model 1, the dependent variable is the abnormal return on the bankruptcy petition filing date (AR0), and the Broadtape disclosure dummy (BT0) equals one if

[8] 1988 was the first full year of ISSM's operations, and their data from 1988 to 1992 (after which ISSM stopped collecting data) are generally considered reliable and reasonably complete. ISSM reports data on NYSE and AMEX firms for the entire 1988 to 1992 period. Nasdaq firms are covered from 1990 to 1992.

[9] Of the study's 141 bankruptcy filings that are disclosed on the Broadtape on the same day they are filed (day 0), 62 have ISSM data that allow us to compute open-to-close returns. As expected, the open-to-close returns indicate that the market reacts to these filings on day 0 (−11.70 percent, $t = -4.03$), with insignificant returns on day +1 (−0.93 percent, $t = -0.26$).

news of the bankruptcy filing also appears on the Broadtape on day 0. In Model 2, the dependent variable is the abnormal return on day +1, and the Broadtape disclosure dummy equals one if the Broadtape also announces the bankruptcy filing on day +1. In Model 3, the dependent variable is the abnormal return on day +2, and the Broadtape disclosure dummy (BT2) equals one if the Broadtape also announces the bankruptcy filing on day +2. The resulting models are expressed as:

$$\text{Model 1:} \quad \text{AR0}_i = a_0 + a_1\text{BT0}_i + a_2\text{SIZE}_i + a_3\text{EXCHANGE}_i + a_4\text{PDI}_i + e_i', \tag{1}$$

$$\text{Model 2:} \quad \text{AR1}_i = b_0 + b_1\text{BT1}_i + b_2\text{SIZE}_i + b_3\text{EXCHANGE}_i + b_4\text{PDI}_i + e_i'', \tag{2}$$

$$\text{Model 3:} \quad \text{AR2}_i = c_0 + c_1\text{BT2}_i + c_2\text{SIZE}_i + c_3\text{EXCHANGE}_i + c_4\text{PDI}_i + e_i''', \tag{3}$$

where AR0_i, AR1_i, and AR2_i are security i's abnormal return on: the bankruptcy filing date (AR0), the day after the bankruptcy filing date (AR1), or two days after the bankruptcy filing date (AR2). BT0_i is the dummy variable equaling one if firm i's filing is announced on the Broadtape on the same day the bankruptcy petition is filed (i.e., day 0); BT1_i is the dummy variable equaling one if firm i's filing is not announced on the Broadtape until one day after the bankruptcy petition is filed (i.e., day +1); and BT2_i is the dummy variable equaling one if firm i's filing is not announced on the Broadtape until two days after the bankruptcy petition is filed (i.e., day +2). SIZE_i is firm size, measured as the natural log of the market value of firm i's equity; EXCHANGE_i is the dummy variable equaling 1 if firm i is listed on the NYSE; and PDI_i is the proxy for predisclosure information impounded in prices over the year before the bankruptcy filing, measured as security i's cumulative (mean-adjusted) abnormal return, computed over prefiling days −240 to −2, relative to the bankruptcy petition filing date.

Reported t-statistics are based on White's (1980) heteroskedasticity-consistent covariance matrix. If the coefficients of each of the three Broadtape disclosure dummies (BT0, BT1, BT2) are significantly negative, then the Broadtape announcement effect persists, and abnormal returns are significantly lower on the Broadtape announcement date, even after controlling for firm size, exchange listing, and predisclosure information.

Panel B of Table II reports the results of estimating Models 1, 2, and 3.[10] In Model 1, the significantly negative BT0 coefficient ($\alpha \leq 0.0001$; two-

[10] In estimating Models 1, 2, and 3, the variance inflation factors are all less than 1.5. This is well below Montgomery and Peck's (1982) benchmark that multicollinearity is unlikely to be a serious problem unless variance inflation factors exceed 5 to 10.

tailed) indicates that the filing date (day 0) abnormal returns are significantly more adverse for filings that are also disclosed on the Broadtape on the same day, even after controlling for firm size, exchange, and predisclosure information.[11] The significantly negative BT1 coefficient in Model 2 ($\alpha \leq 0.0001$) indicates that the day +1 abnormal returns are significantly more negative for those filings that are also announced on the Broadtape on day +1. Similarly, the significantly negative BT2 coefficient in Model 3 ($\alpha = 0.03$) indicates that the day +2 abnormal returns are significantly more negative for those filings that are not announced on the Broadtape until day +2.[12] These results indicate that even after controlling for firm size, exchange listing, and predisclosure information, on any given day (0, +1, or +2), the market reaction is significantly more negative for those firms whose filing is also announced on the Broadtape on that day. These results corroborate the earlier conclusion that price reaction to bankruptcy filings is most adverse on the Broadtape announcement date.

III. Conclusion

This study's results suggest that even for economically significant bankruptcy petition filing information that is publicly available on the filing date, the existence and timing of disclosure via broadly disseminated media is associated with the pattern of the market's reaction to information. Most of the market reaction to our comprehensive sample of 330 bankruptcy filings occurs on the Broadtape disclosure date rather than the bankruptcy petition filing date when the information became publicly available. This difference persists after controlling for firm size, exchange listing, and predisclosure information. Despite the economic significance of bankruptcy filings, disclosure of this information through media that are publicly available, but not necessarily widely disseminated (i.e., court records) is not necessarily sufficient to ensure that the information is quickly impounded into prices. This is consistent with investors finding that it is not cost-effective to closely monitor various jurisdictions for news of bankruptcy filings. The study's evidence also has implications for future research on the market's reaction to bankruptcy filings, in that the most appropriate event date is likely to be the Broadtape disclosure date, rather than the bankruptcy petition filing date or the *WSJ* announcement date. Finally, while we find that price reactions differ significantly in short windows around the bankruptcy filing date,

[11] The significantly negative PDI coefficient in Model 1 ($\alpha = 0.03$) can be explained as follows: The more adverse predisclosure information impounded into prices before the bankruptcy filing date, the more likely this predisclosure information preempts some of the information content of the bankruptcy petition filing, and the less negative the bankruptcy filing date price reaction should be. This suggests that the PDI coefficient should be negative.

[12] The significantly positive firm size coefficient in Model 3 indicates that day +2 abnormal returns are higher for larger firms, as would be expected if the adverse bankruptcy filing information is impounded into larger firms' prices more quickly (i.e., before day +2).

these are timing differences, since the cumulative abnormal returns over the 11 days centered on the bankruptcy filing date do not differ significantly across Broadtape disclosure date categories.

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