The Media and the Diffusion of Information in Financial Markets:

Evidence from Newspaper Strikes*

December 28, 2011

Joel Peress
INSEAD

Abstract

This paper investigates the *causal* impact of the media in financial markets by exploiting exogenous media blackouts resulting from national newspaper strikes in several countries. Trading volume falls 14% on strike days. Stock volatility is also reduced, especially within the day, during which it falls by 9%. These effects are stronger for small firms. Moreover, the power of lagged stock returns for predicting current returns of small firms vanishes on media strike days, consistent with newspapers propagating news from the previous day. These findings demonstrate that the media influence the stock market by increasing the speed with which information diffuses across investors, and is impounded into stock prices.

Keywords: Information diffusion; Media; Market efficiency.

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* I thank for helpful comments Denis Gromb, Urs Peyer, Gideon Saar, Daniel Schmidt, Carmen Stefanescu and seminar participants at INSEAD, Tilburg University, Stockholm School of Economics and the ESSEC-HEC-INSEAD-PSE workshop. Sina Khani Pour Roshan provided excellent research assistance. I am grateful to Terry Odean for providing the large discount brokerage data.

Introduction

What role do the media play in financial markets? Classical theory argues that there is none: information is incorporated into stock prices as soon as it is made public. Even if most investors do not pay attention to this information, the few who do will ensure, by trading on it, that it finds its way into stock prices immediately. Yet mounting evidence suggests that information diffuses gradually across the investor population and that this gradual diffusion affects prices. In particular, a large body of research documents many instances of underreaction to corporate events such as dividend initiations and omissions, stock splits, earnings announcements, changes in analyst recommendations, tender offers and seasoned equity offerings.[1] In addition, the pervasive return momentum phenomenon of Jegadeesh and Titman (1993) can be interpreted as evidence of investors' inattention, because it appears to weaken when trading volume is larger (Hou, Peng and Xiong (2006)). In this context, one may suspect the media to matter in financial markets.

Establishing a causal link from the media to financial markets is difficult. A simple correlation may reflect an omitted variable (both the media and the market respond to fundamental news without being directly related) or reverse causality (the media may report newsworthy market developments). In this paper, I exploit newspaper strikes to assess the *causal* impact of the media, and to shed light on the *mechanism* underlying this impact. I identify strikes in the print media that prevent readers from receiving news. Specifically, I search for strikes that 1) affect the press on a national scale, 2) involve the media sector only (i.e. I exclude general

[1] For dividend initiations and omissions, see Michaely et al. (1995); for stock splits, see Ikenberry and Ramnath (2002); for earnings announcements, see Bernard and Thomas (1990); for changes in analyst recommendations, see Womack (1996) and Michaely and Womack (1999); for tender offers, see Ikenberry (1995); for seasoned equity offerings, see Loughran and Ritter (1995). Chan (2003) studies underreaction to public news about a firm, identified by the presence of a newswire or a press article. For further evidence on investors' inattention, see Cohen and Frazzini (2008)), DellaVigna and Pollet (2009) and Hirshleifer et al. (2009).

strikes affecting multiple sectors), and 3) occur on days on which stock markets are open. Over the period 1989-2010, I find 52 eligible national newspaper strikes. They are concentrated in four countries: France, Greece, Italy and Norway. They are called by journalists, print or distribution workers in reaction to planned government policies. Most of the time, they have to do with their profession's economic conditions, such as employment, pay, pensions, tax breaks, state subsidies and other benefits. Sometimes, they are called to fight censorship and defend the freedom of the press. Therefore, these nationwide newspaper strikes are neither driven by (i.e. are exogenous to) stock market movements on the day of the strike or the preceding days.

I find that on the day a newspaper strike occurs, the share turnover on the country's stock market is on average 14% lower, while remaining unchanged on the days before and after. The statistical significance is remarkable given the relatively small number of events that serve to identify the impact of a strike –the significance level is between 0.5% and 1.2% depending on the type of statistical test. Moreover, when stocks are sorted into quintiles according to their market capitalization, the magnitude of the strike effect decreases monotonically from the bottom quintile –in which turnover drops by 24%– to the top quintile –in which it is indistinguishable from zero, remaining strongly significant in all but the top two quintiles. These findings are robust to many checks such as using event-study or panel regression estimation techniques, changing the way turnover is measured, and excluding any of the four sample countries. They demonstrate that the media have a causal impact in financial markets: the media stimulate trading of small and medium size stocks.

Does the influence of the media extend beyond trades and affect equilibrium prices? My empirical strategy based on country-wide media blackouts allows to investigate this question. I find that the volatility of the market return also falls on media strike days, but this effect is only

statistically significant within the day.[2] Specifically, the equally-weighted average price range, i.e. the ratio of the intra-day high to low prices, declines by 9% (1% significance level), while the variability of close-to-close market returns (i.e. the absolute value of the return on the market from the close on the strike eve to close on the strike day) is unchanged. The cross-sectional analysis reveals a pattern similar to that of turnover: the magnitude of the volatility reduction and its significance peak in the bottom size quintile, in which the volatility of close-to-close returns drops by 10% (10% significance level) and the price range by 16% (3% significance level). Interestingly, the range reduction is significant across most size groups while the volatility of close-to-close returns reduction is not distinguishable from zero outside the bottom quintile in which it is marginally significant. Thus, the media contribute to the variability of stock prices, but only for the smallest stock or within the day.

The discrepancy between the strike effect on the absolute value of close-to-close returns and the price range reported in both the aggregate and the cross-section (i.e. trades settle at less extreme prices within days without newspapers but closing prices on these days are nonetheless no closer to the preceding-day closing prices) suggests that the media attract less price-sensitive traders who transact at less favorable prices. Unless these transactions happen systematically at the end of the day, closing prices, unlike extreme prices, are not affected.[3] Evidence from the U.S. shows that individual investors tend not only to trade attention-grabbing stocks such as those in the news (Barber and Odean (2007)), but also to be overconfident and overlook other agents'

[2] Stock returns are unchanged on media strike days, in aggregate as well as within each size quintile.

[3] Suppose that daily low and high prices are determined on average by the transactions of less price-sensitive traders (often called "noise traders" in the literature) and that these traders arrive to the market at random times, uniformly distributed over the trading day. If fewer such traders arrive, then daily high and low prices will be less extreme but closing prices would not change much since there is only a small probability that closing prices result from their trades.

valuation of assets reflected in stock prices (Barber and Odean (2000, 2001, 2002)). These elements suggest an interpretation of the evidence, namely that news blackout deter these investors from trading, which leads to a truncation of the tails of the distribution of transaction prices.[4]

The impact of the media on small stocks – turnover, absolute value of close-to-close return and price range all drop on strike days– is particularly stunning. An explanation is that the media propagate information relevant to these stocks, thereby inducing trades and price movements. Compared to big stocks indeed, small stocks are expected to be more vulnerable to media strikes because they are held mostly by retail investors (who rely on the press for their access to news, unlike institutions which subscribe to professional news services such as Reuters or Bloomberg) and local investors (on strike days, foreign investors continue to receive information from media outlets located in their own country).[5] An examination of return autocorrelations and cross-autocorrelations support the information diffusion story. Daily returns are positively autocorrelated in the sample, which can be interpreted as a sign of the gradual capitalization of information (private and public) into stock prices (e.g. Lo and MacKinlay (1988) for the U.S. stock market). When a strike occurs, small firms see the predictive power of their lagged returns fall for their current returns but rise for their next-day returns. No such change in

[4] In the last section of the paper, I use data from a large U.S. discount broker to examine how retail investors trade in response to media strikes. I identify local newspaper strikes that hit U.S. cities between 1991 and 1996, the period over which the brokerage data is available. Over that period, three cities experienced local newspapers strikes: Pittsburgh (*Post-Gazette* and *The Pittsburgh Press*), San Francisco (*San Francisco Chronicle* and *San Francisco Examiner*), and Detroit (*Detroit Free Press* and *The Detroit News*). In all three instances, I find that investors located in the striking city trade less relative to other investors in the country on the first day of the strike. The average relative reduction in trading volume is 86%. While only suggestive, this evidence highlights how sensitive individual investors are to news blackouts. It also provides out-of-sample support for the effect documented in the cross-country study.

[5] For evidence of these stockholding patterns, see Lee, Shleifer, and Thaler (1991), Kang and Stulz (1997) and Dahlquist and Robertsson (2001).

autocorrelations is discernable for big stocks. This is consistent with the media helping news from the previous day find its way into current returns. Indeed the media cover news from the preceding day (the majority of newspapers are distributed in the morning), which is partially reflected in lagged returns. This news is incorporated into returns once it is reported by the press, so with a one-day delay when a strike occurs.

This interpretation is further confirmed by examining the "lead-lag effect", i.e. the tendency for the returns of small stocks to respond more slowly to marketwide news than the returns of large stocks (e.g. Lo and MacKinlay (1990), McQueen et al. (1996) for the U.S. stock market). I find that the predictive power of lagged returns of large firms for current returns of small firms vanishes on media strike days. There is no converse effect of media strikes on the predictive power of lagged returns on small firms for current returns on big firms. This suggests that marketwide news affects the return of large stocks immediately but only impacts the returns of small stocks once the news is reported in the media. Moreover, these shifts in autocorrelations and cross-autocorrelations are only present when the returns of small stocks and the strike are measured contemporaneously and vanish when the strike variable is lagged by one day. This confirms the information diffusion story since, again, the media cover news from the preceding day which enters the prices of large stocks immediately but enters the prices of small stocks with a lag. Together, the findings on return autocorrelations and cross-autocorrelations support the notion that the media help the prices of small stocks, and small stocks only, incorporate marketwide news.

To summarize, this paper demonstrates a causal impact of the media on stocks' trading intensity and the second moments of their returns –volatility and correlations. This impact is strong among individual investors who appear to abstain from trading on media strike days, and

is clearly visible in the stocks they predominately own, namely small stocks. These stocks see their turnover, the volatility of their close-to-close returns, their price range, the autocorrelation and cross-autocorrelation of their returns all fall on media strike days, consistent with trades and prices responding more slowly to news. The influence of the media extends beyond small stocks, though it is less pronounced. For medium-size and big stocks, the price range declines as less price-sensitive investors sit on the sidelines. For medium-size stocks, turnover additionally falls as individual investors account for a significant portion of trading in these stocks. But for neither medium-size stocks nor big stocks is the close-to-close volatility affected, indicating that arbitrageurs effectively impound news into these stocks' prices.[6]

This paper contributes to three streams of research. First, it belongs to the growing literature on the role of the media in financial markets. Several recent studies document an association between media activity and stock market activity (e.g. Klibanoff (1998), Huberman and Regev (2001), Tetlock (2007), Fang and Peress (2009)). This paper relates in particular to Engelberg and Parsons (2011) and Dougal et al. (2011), who are the first to establish unambiguously a causal systematic effect of the media. Engelberg and Parsons (2011) show that trades by individual investors located in various U.S. cities respond to business news coverage by local newspapers distributed in these cities. Dougal et al. (2011) find that the identity of *Wall Street Journal* columnists is a good predictor of the next-day return on the *Dow Jones Industrial Average*, a phenomenon they relate to the bullish or bearish sentiment conveyed by the column. I provide evidence of a causal effect of the media consistent with these papers, and add to them on

[6] For each stock, extreme prices are a function of the number of less-price sensitive traders, not of their proportion in the stock's investor base. Turnover and close-to-close volatility, in contrast, depend on their proportion not number, and behave similarly to value-weighted averages.

several dimensions.[7] First, I use an entirely different identification strategy and international data to document a media effect outside of the U.S. market, and establish its pervasiveness at the level of the market beyond that of individual stocks. Second, in contrast to these papers, I examine the impact of the media on both turnover and stock returns (their level, volatility and autocorrelations). This helps understand the channel through which the media exert their influence. My findings indicate that the media help propagate information.[8]

Second, the paper contributes to the debate on the determinants of trading volume in the stock market. Trading volume is extremely large across most developed stock markets. Several theories have been put forward to explain this high trading intensity.[9] The findings reported here are consistent with the gradual diffusion of information being a cause of the large observed turnover, and with the media contributing to this diffusion. They suggest that trading is, to some extent, disconnected from pricing. Indeed, I find that for medium-size stocks (size quintiles 2 and 3), turnover falls strongly on media strike days, while the volatility of close-to-close returns is unchanged. In quintile 2 for example, turnover is 19% higher with no change in returns only because newspaper come out. Information about these stocks is incorporated immediately into stock prices thanks to arbitrageurs, but propagates gradually among investors thanks to the media, triggering trades.

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[7] As an out-of-sample test of the impact of media strikes on turnover, I conduct an analysis similar to that in Engelberg & Parson (2011) in which I study the impact on retail trades of local newspaper strikes that hit U.S. cities.

[8] Engelberg and Parsons (2011) who rely on local trades cannot investigate returns, while Dougal et al. (2011) do not consider trading volumes. In contrast to the information-based explanation offered here, Dougal et al. (2011) argue for a sentiment story, given that journalists are unlikely to possess superior information about the stock market.

[9] Explanations include heterogeneous beliefs, the gradual diffusion of information and attention limitations among investors (see Hong and Stein (2007) for a review). In my sample, the ratio of the value of all shares traded in a stock market to its capitalization (the average value-weighted turnover) equals on average 0.32% per day or 75% per year. This means that the entire market value of a typical firm changes hands every 16 months.

Third, the paper relates to the important literature on return predictability. Evidence of predictability and cross-predictability has long been reported (e.g. Lo and MacKinlay (1988) and Campbell et al. (1993) for return autocorrelations, and Lo and MacKinlay (1990) and McQueen et al. (1996) for return cross-autocorrelations). Several studies show this predictability to weaken when stocks' information environment improves. For example, cross-autocorrelations decline for stocks held by more analysts (Brennan, Jegadeesh, and Swaminathan (1993)) and more institutional investors (Badrinath, Kale, and Noe (1995)), and generally for stocks better recognized by investors (Hou and Moskowitz (2005)). I show that returns become more predictable when a source of public information is switched off. This phenomenon is particularly pronounced for stocks held predominantly by investors dependent on this source for access to information, such as for small stocks held by individuals who rely on the press.

The balance of the paper is organized as follows. Section 1 describes the methodology and the data. Section 2 presents the main results of the paper, namely how newspaper strikes affect stock market activity, in aggregate and across stocks. Section 3 investigates how media strikes alter patterns of return autocorrelations and cross-autocorrelations. Section 4 conducts a series of robustness checks, including two out-of-sample tests. Section 5 concludes.

1. Methodology and Data

1.1. Empirical Design

Assessing the causal effect of the media on the stock market raises difficult identification issues. A simple association between media activity and stock market activity (e.g. trading volume, stock returns, volatility) may result from unobserved news shocks which create an omitted variable bias. Indeed, if such shocks generate an unusual market reaction and are

simultaneously reported in the press, then the market reaction and the media reports are correlated but the media does not cause the unusual reaction. Even in the absence of news shocks, the press may report on the market activity itself, thereby inducing a correlation between the media and the market's response.

To resolve these issues, I exploit variations in media coverage that are exogenous to stock market activity. Specifically, I examine whether stock market activity is different on days with media blackouts resulting from newspaper strikes. I use an event-study approach which compares the behavior of the stock market on a newspaper strike day to the average behavior observed over a 100-day window centered on the strike day. Two kinds of tests are performed: the Patell (1978) parametric test, which assumes errors to be normally distributed, and the Corrado (1989) non-parametric test which relies only on the ranking of variables. Given the fairly small number of events which serve to identify the impact of a strike – between 30 and 52 so the standard error on the magnitude of the strike effect will be relatively large, 10% would seem an appropriate level of significance for these tests. Nonetheless, most results are significant at the 1% level.

1.2. National Newspaper Strikes

I collect data on newspaper strikes that prevent readers from receiving news, either because newspapers are not written (a journalists' strike), not printed (a printers' strike) or not distributed (a distributors' strike). I focus on nationwide strikes affecting a large number of newspapers. I search for such events across OECD countries over the period 1989-2010. I start in 1989 because trading volume data becomes available in many countries in the early 1990's. I exclude from the sample strikes that occur on non-business days because market activity cannot be measured (e.g. a journalists' strikes on Friday that prevents newspapers from coming out on

the Saturday). I also eliminate strikes that are not specific to the media sector, i.e. strikes that are part of general action affecting all sectors, to ensure I do not attribute to a media blackout the impact of a general strike.

Detailed data on industrial actions in media outlets are difficult to obtain. I search Factiva, an aggregator of information from a large number of sources around the world, for national newspaper strikes.[10] Over the sample period, the strikes I have found which fulfill my requirements are concentrated in four countries: France, Greece, Italy and Norway. Unions in these countries are powerful and capable of mobilizing the workforce beyond a firm, at the level of an entire sector.

These nationwide newspaper strikes are not driven by (i.e. are exogenous to) stock market movements on the day of the strike or the preceding days. They are a reaction to government and planned policy changes. Most of the time, they have to do with economic conditions, such as employment, pay, pensions, tax breaks, state subsidies and other benefits. For example in January 2002, Italian printworkers halted production of Italy's newspapers to protest planned labor and pensions reforms by the government of Silvio Berlusconi; later in June, Norwegian journalists silenced the press for 9 days (7 business days) over disputed vacation benefits; in July 2004, Greek journalists went on strike for 48 hours following the breakdown of talks for a collective wage agreement. Disputes over technology are also a frequent source of unrest. In France for example, workers at the NMPP, a company (now relabeled Presstalis) in charge of newspaper deliveries in most of the country called strikes on numerous occasions over plans to adopt new technologies that would change work practices. Journalists also go on strike

[10] I search for the term “strike” and its translation in several languages in the full text of news stories, classified by Factiva as referring to the “media” industry and to the subject of “labor/personnel issues”.

to fight censorship and defend the freedom of the press. On June 10, 2003, Italian journalists went on strike to protest the concentration of media in the hands of Prime Minister Silvio Berlusconi, and on July 10, 2010, to challenge a proposed law that violates media freedom.

Organizing a strike on a national scale requires some coordination between newspapers so strikes are usually scheduled one to several days in advance. But print and distribution workers often use the element of surprise to prevent management from setting up substitute schemes. Strikes that are anticipated are less likely to affect the stock market to the extent that readers plan ahead their use of alternative sources of information (e.g. purchase foreign newspapers, listen to the radio or watch TV).

I find 52 eligible national newspaper strikes, lasting on average 1.7 business days and amounting to 88 strike-days in total. They are listed in Table 1. In the subsequent analysis, I eliminate strikes that affected the printing and distribution of papers after 1996 because some newspapers were available online from that date on. The year 1996 is chosen as a cutoff because these strikes occurred mostly in France and the French leading newspaper, *Le Monde*, started a free online version on December 19, 1995. Of course, other papers may have come online later. Moreover, it is not clear to what extent the online edition substitutes for the print edition. My strategy is conservative, to only retain strikes that undoubtedly lead to a drop in media access. Nonetheless, I check that increasing the cutoff for dropping print and distribution strikes to a later year, or retaining all of these strikes weakens the impact of strikes, as one would expect, without changing the conclusion of the paper (Section 4).

1.3. Stock Market Variables

To measure the extent to which trading activity is altered on media strike days, I compute, for each firm and day, the share turnover, which equals the ratio of the number of shares traded

in the firm on that day to the number of shares outstanding. I then average turnover across all firms in the country and take logs. I also investigate the impact of media strikes on stock return volatility, measured in two ways. The first is the natural logarithm of one plus the absolute value of daily stock market returns, denoted *Abs. Return*. The second is the price *Range*, namely the log of the ratio of the intra-day high price to the intra-day low price, averaged across all stocks in the country. The average turnover, market return and price range are computed using both equal weights and market-capitalization weights.[11]

I download individual stock data (price, return, number of shares outstanding and traded) on a daily frequency from *Compustat Global*. Stock return and price data are available from 1989 and trading volume data from approximately 1993 depending on countries. I winsorize turnover, market returns and the price range at the 1% level, and purge these variables from day-of-the-week effects by regressing them on 5 day-of-the-week dummy variables and taking residuals. Table 2 presents descriptive statistics on these variables computed over the 100-day estimation windows centered on strike days.

2. Impact of Newspaper Strikes on Trading Volume and Volatility

2.1. Impact on the Aggregate Stock Market

Results of the event-study for aggregate stock market variables are displayed in Table 3, on average in Panel A, and event by event in Panel B. To start with, it is worth noting that the market return is no different on strike days from other days. Indeed, the last column of Panel A shows that the return difference is not distinguishable from zero, be it equally or value-weighted

[11] The value-weighted average turnover equals the ratio of the value of all shares traded in a market to its capitalization.

(the *p*-values range from 0.45 to 0.68). Equally-weighted turnover, on the other hand, falls significantly on strike days compared to surrounding days. This is true both parametrically (at the 1.2% significance level) and non-parametrically (at the 0.4% level). The economic magnitude of the media strike effect is sizable: equally-weighted turnover falls on average by 14.2% on strike days. This effect is more modest (-1.7%) and no longer significant when market-capitalization weights are used to average turnover. The contrast between equally and value-weighted averages suggests that the media strike effect is concentrated among smaller firms.

Several studies document a positive association between trading volume and return volatility (e.g. Karpoff (1987), Gallant, Rossi, and Tauchen (1992)). I consider next whether the market volatility falls on media strike days in line with trading activity. Table 3 shows no evidence of a decline in the absolute value of close-to-close market returns. The impact on the price range in contrast is significant. When equally weighted, the price range falls by 8.6% on strike days, with a statistical significance of respectively 6% and 1% in the parametric and non-parametric tests. These effects become statistically insignificant when value-weights are used, even though their economic magnitude is only slightly reduced. As with turnover, this suggests that the impact of strikes is more prevalent among small stocks.

The discrepancy between the strike effect on close-to-close returns and the price range is noteworthy. It says that trades settle at less extreme prices within days without newspapers, but that closing prices on these days are nonetheless no closer to the preceding-day closing prices. An interpretation is that the media attract less price-sensitive traders who transact at less

favorable prices.[12] Unless these transactions happen systematically at the end of the day, closing prices are not affected. Individual investors are natural candidates. Barber and Odean (2000, 2001, 2002) show that they are overconfident, which leads them to overweight their own valuation of assets and to overlook other agents' beliefs reflected in stock prices, and hurts their investment performance. Barber and Odean (2007) show further that they are attracted to attention-grabbing stocks such as those in the news. It is plausible that news blackout deter these investors from trading, which leads to a truncation of the tails of the distribution of transaction prices.

To summarize, these findings indicate that, for the market as a whole, trading volume and volatility drop when newspapers go on strike but volatility is only reduced within the day.

2.2. Impact of Newspaper Strikes across Stocks

The contrast between equally and value-weighted averages in the aggregate market analysis suggest that the media strike effect is not uniform across stocks. In this section, I examine how it varies with firm size. It is not entirely straightforward for which stocks the strike effect should be stronger. On one hand, newspapers tend to cover larger firms (e.g. Fang and Peress (2009)), suggesting that a media strike is likely to penalize large firms more than small firms. On the other hand, large stocks are mostly owned by investors who do not rely on the domestic press for their access to economic news, namely institutions and foreigners. For example, Lee, Shleifer, and Thaler (1991) document that small stocks are disproportionately held by individual investors in the U.S., while Kang and Stulz (1997) and Dahlquist and Robertsson

[12] Such traders are often referred to as "noise traders" because their trades tend to be unrelated to asset prices and to the information they reveal. They can be motivated by liquidity shocks, the need to hedge or rebalance their portfolio, private investment opportunities, or irrationality such as overconfidence.

(2001) that they are underweighted by foreign investors in Japan and Sweden. Institutions subscribe to professional news services (e.g. Bloomberg, Reuters), and foreign investors continue to receive information on strike days from media outlets located in their home country. For retail and local investors in contrast, the domestic press is the primary source of marketwide news. Therefore, I expect the media strike effect to be strong among small stocks and to weaken as firm size increases.

On each day and in each country, I sort stocks into 5 groups based on their market capitalization. I estimate the (equally-weighted) average turnover, absolute return, price range and return within each quintile, and perform an event-study as in Table 3 separately for each size group. The results are displayed in Table 4. In the top table which deals with turnover, the mean and the median effects are always negative and monotonically decreasing across size groups (i.e. they are less negative). The newspaper strike effect is statistically significant in the bottom three quintiles, and non-distinguishable from zero in the top two. The drop in turnover reaches 24% in the bottom quintile. These results are consistent with the findings reported in Table 3, in which the media strike effect is strong when turnover is equally weighted and insignificant when it is value-weighted. They confirm that the impact of newspaper strikes declines with firm size.

Table 4 also shows the impact of newspaper strikes on stock volatility across size groups. It reveals that the absolute value of close-to-close returns is reduced in the bottom three quintiles, though this reduction is only statistically significant at the 10% level in the bottom quintile, in which it falls by 10% on average. The effect on the price range is more pervasive as it is negative across all size groups, with low *p*-values in most quintiles. It peaks in the bottom quintile in which it reaches 16%. As with turnover, the magnitude of the volatility effects (the absolute value of close-to-close returns and price range) and their significance are highest in the bottom

quintile. The reduction in intraday volatility suggests that the trades that disappear on strike days are those that settle at extreme prices, possibly as previously argued, because some individual investors refrain from trading. The fact that the price range declines in most quintiles including the top one is consistent with this interpretation. Indeed, extreme prices are a function of the number of noise traders, not of their proportion in the investor base. While big stocks are mostly held by institutions, they also have a large number of individual investors.[13] More data is needed to pin down the reason for the decline in the price range.

Finally, the bottom panel of Table 4 shows that stock returns are not affected by strikes, even among the smallest firms – *p*-values are above 0.4 across all quintiles. To summarize, turnover and volatility (close-to-close and intraday) are reduced on strike days and the reductions are the strongest within the bottom size quintile.

The similarity in the behaviors of turnover and absolute return is noteworthy, and consistent with their well-documented positive correlation. Both variables drop on strike days in the bottom three size quintiles and the drops are the strongest within the bottom quintile. Their differences are also interesting. Within quintiles 2 and 3, turnover falls strongly but volatility does not. In quintile 2 for example, turnover contracts by 19% (*p*-value 3%) on average while the absolute value of returns falls by an insignificant 3% (*p*-value 53%) on average. This disparity between turnover and close-to-close volatility most plausibly reflects the forces of arbitrage: news continues to be incorporated into stock prices (absolute value of stock return is *not* reduced) even though many investors do not participate in the market for these stocks (turnover weakens), thanks to the trading of investors who remain informed in spite of the news blackout.

[13] Turnover falls by an insignificant 9.6% in the top size quintile, consistent with individual investors, who account for a small fraction of big stocks' investor base, sitting on the sidelines on strike days.

This suggests that the media are not essential to the informational efficiency of stock prices for these firms, even though they play an important role in propagating information among investors.

These findings not only shed light on the role of the media in financial markets, but also speak to the debate on the determinants of trading volume in the stock market. Trading volume is extremely large across most developed stock markets. In my sample, the ratio of the value of all shares traded in a stock market to its capitalization (the average value-weighted turnover) equals on average 0.32% per day or 75% per year. This means that the entire market value of a typical firm changes hands every 16 months.[14] Several theories have been put forward to explain this high trading intensity. These include models in which agents are heterogeneous in their prior beliefs (e.g. Harris and Raviv (1993), Kandel and Pearson (1995)), and models in which news diffuses gradually or fails to attract investors' full attention (e.g. Hong and Stein (1999), Peng and Xiong (2006)). The findings reported here are consistent with the gradual diffusion of information being a cause of the large observed turnover, and with the media being a means of this diffusion. They suggest that the media (and possibly other means of diffusing information such as word of mouth) contribute to the large observed turnover. Moreover, this can happen without returns being affected. In quintile 2 for example, turnover is 19% higher with no change in returns only because newspaper come out.[15]

[14] Turnover increases over time in the sample. It equals 0.21% per day (52% per year) in the 1990's vs. 0.39% (98% per year) in the 2000's. Hong and Stein (2007) report a similar figure for the U.S. (102% in 2005).

[15] These results cast doubt on the notion that investors learn from prices since investors refrain from trading even though the information that the media failed to convey is at least partly reflected in stock prices. A key element of information diffusion models is that, contrary to the standard rational expectations framework, investors learn neither from stock prices nor from the trades of informed investors (that is, they must "agree to disagree", for example because they are overconfident). In such a setting, the information conveyed by the media may influence investors even if this information is already public. Hong and Stein (1999) show that a model in which agents

3. Media Strikes and Return (Cross-)Autocorrelations

I have found that trading activity and price movements are reduced on media strike days and that these effects are more pronounced for small stocks. These findings suggest that the media contribute to the diffusion of information, especially about small stocks. To check this interpretation, I examine return autocorrelations and cross-autocorrelations around strike days. Several patterns have been documented for U.S. stocks. First, stock market indices are positively autocorrelated over horizons ranging from a day to a week, and this autocorrelation is larger for smaller stocks (e.g. Lo and MacKinlay (1988), Campbell, Grossman and Wang (1993)). Second, lagged returns on big firms predict current returns on small firms, and this predictive power is greater than that of lagged returns on small firms for current returns on big firms. This phenomenon is known as the "lead-lag effect" (e.g. Lo and MacKinlay (1990), McQueen et al. (1996)). An interpretation of these findings is that information is gradually incorporated into the returns, especially for small stocks: if the returns of small stocks respond more slowly to news than the returns of large stocks, then they will display stronger autocorrelations and significant cross-autocorrelations.

In this section, I look into the impact of media strikes on return autocorrelations and cross-autocorrelations. Importantly, the press typically covers news from the previous day because of lead-times in the editorial and printing process. If the media help marketwide information (from the preceding day) find its way into the prices of small stocks, then on media strike days the returns of small stocks should display lower first-order autocorrelation and cross-autocorrelation i.e., the predictive power of lagged returns of small and large firms for current

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extract information from stock prices to different degrees can explain the momentum and reversal patterns observed in stock markets.

returns of small firms should weaken. To take an extreme illustration, suppose that marketwide news affects the return of large stocks immediately, but the returns of small stocks respond partially on the news day, and fully once the news is reported in the media on the following day. In this case, returns of small stocks will be positively autocorrelated *except on media strike days*, and lagged returns of large stocks will predict current return of small stocks *except on media strike days*.

I test these predictions in Table 5. I define an indicator variable, $Strike_{t,k}$, which equals one if a national newspaper strike occurs on day *t* in country *k* and zero otherwise. In Panel A, I regress returns of small stocks on day *t* on the returns of small and big stocks on day *t*-1, *Return_Big*(*t*-1) and *Return_Small*(*t*-1), and these returns interacted with the media strike dummy on day *t*, *Return_Big*(*t*-1) x *Strike*(*t*) and *Return_Small*(*t*-1) x *Strike*(*t*). Importantly, the dependent variables, *Return_Small*(*t*) and *Return_Big*(*t*), and the strike are measured contemporaneously. Standard errors are adjusted for heteroskedasticity and clustered by date to account for world shocks to returns. The results are consistent with both predictions. In regression 1, the coefficient estimate on *Return_Small*(*t*-1) x *Strike*(*t*) is significantly negative, and in regression 2, the coefficient estimate on *Return_Big*(*t*-1) x *Strike*(*t*) is significantly negative.[16] Thus, on strike days, the return of small stocks is no longer related to the lagged return of small and big stocks.

Some authors have cautioned that the lead-lag effect between big firms and small firms may be spurious and result from small firms' own autocorrelations coupled with high

[16] Throughout the regressions displayed in Table 5, I include lagged returns (of small and/or big stocks) interacted with day-of-the-week dummy variables. The overall impact of lagged returns on current returns is obtained by summing the coefficient estimates on these variables. I find as in the U.S that it is positive for both small and big stocks and of larger magnitude for small stocks.

contemporaneous correlation between big and small firms (e.g. Boudoukh et al. (1994)), i.e. from a high positive correlation between *Return_Small*(*t*-1) and *Return_Small*(*t*) and between *Return_Big*(*t*-1) and *Return_Small*(*t*-1). To control for this possibility, I include in regression 3 the strike dummy interacted with lagged returns of both small and big firms, *Return_Small*(*t*-1) x *Strike*(*t*) and *Return_Big*(*t*-1) x *Strike*(*t*). The coefficient estimate on *Return_Small*(*t*-1) x *Strike*(*t*) is unchanged while that on *Return_Big*(*t*-1) x *Strike*(*t*) remains negative but loses significance. Of the news immediately reflected into the returns of small and big stocks, *Return_Small*(*t*-1) and *Return_Big*(*t*-1), the former is the most relevant to the current returns of small stocks, *Return_Small*(*t*). Overall, these results suggest that news about the economy is capitalized more slowly into returns of small stocks on strike days.

In regressions 4 to 6, I perform a similar analysis from the perspective of big stocks, i.e. I examine how media strikes influence the returns of large stocks. In regressions 4 and 6, the coefficient estimate on *Return_Big*(*t*-1) x *Strike*(*t*) is insignificant, indicating that the dependence of the returns of large stocks on their own lag is not significantly different on strike days. Regression 5 focuses on cross-autocorrelations i.e., on the predictive power of lagged returns of small firms for current returns of big firms. The coefficient estimates on *Return_Small*(*t*-1) x *Strike*(*t*) is significantly positive (5% level), indicating that small stock returns have some predictive power for big stock returns, but it is no longer significantly different from zero when *Return_Big*(*t*-1) x *Strike*(*t*) is included in the regression (regression 6). These results imply that the impact of strikes is not symmetric between small and big stocks. It is strong for small stocks and weak for big stocks.

As a final check, I consider the impact of a strike on returns one day after the strike. The regressions are similar to those of Panel A, except that the dependent variables are day-*t*+1

returns and the independent variables include the strike indicator interacted with both contemporaneous (day-*t*) returns and lagged (day-*t*-1) returns. The information diffusion story predicts that for small stocks the media strike 1) will have no bearing on the predictive power of day-*t* returns for day-*t*+1 returns since the press covers news from day *t*-1, but 2) will increase the predictive power of day-*t*-1 returns for day-*t*+1 returns as the day-*t*-1 news that failed to be reported on day-*t* is eventually in the press on day-*t*+1. The results presented in in Panel B support both predictions. The coefficient estimates on *Return_Small*(*t*) x *Strike*(*t*) and *Return_Big*(*t*) x *Strike*(*t*) are never significant, even for small stocks, consistent with prediction 1). Moreover, the coefficient estimate on *Return_Small*(*t*-1) x *Strike*(*t*) is significantly positive in regression 2 and 3, indicating a stronger influence of day-*t*-1 returns for day-*t*+1 returns for small stocks, in line with prediction 2). For completeness, Panel B shows the symmetric regression with *Return_Big*(*t*+1) as the dependent variable. As expected, media strikes have no impact on next day returns for big stocks.

All in all, these findings support the notion that the media help the prices of small stocks, and small stocks only, incorporate marketwide news.

4. Robustness Checks

In this section, I check that the baseline results presented in Table 3 are robust to alternative specifications and estimation techniques, and consider out-of-sample evidence. I start by investigating how the market behaves on the days surrounding a newspaper strike. Then, I try to alleviate the concern that the strike effect could be driven by a few outlier strikes or one particular country. Next, I estimate the strike impact with panel regression models, specified in various ways. Finally, I examine out-of-sample evidence.

4.1. Days Surrounding Strikes

I examine how the stock market behaves on the days surrounding a newspaper strike. In principle, if trading activity or volatility weaken on day *t* because of the news blackout, then they should not weaken on day *t*-1 nor day *t*+1. This prediction is complicated by two features. First, about a third of newspaper strikes last more than one day. Second, several national newspaper strikes are surrounded by other media strikes such as national strikes in other media (news agencies such as ANSA in Italy or AFP in France, television or radio stations), or by strikes in one or several leading newspapers. To identify these confounding events, I search Factiva for any occurrence of a media strike on the day before or after a national newspaper strike used in my sample. I find that half (a third) of the strikes are preceded (followed) by a strike in any kind of media, i.e. by a strike affecting the working of a media outlet without paralyzing the entire newspaper sector. Accordingly, I split the event-study into two parts, depending on whether or not the days before and after the strike are subject to strikes.

The results of this analysis are presented in Table 6. Panel A focuses on the day before a national newspaper strike. It reveals that turnover, the absolute value of close-to-close returns and the price range tend to be lower on the days before a strike, but these effects are entirely imputable to the confounding media strikes occurring on these days. Indeed, the strike effect is visible when other strikes occur, and vanishes when there are none. Interestingly, the absolute value of close-to-close returns appears to decline significantly on the day before a national newspaper strike if there is a concurrent media strike. This finding contrasts with that reported in Table 3 in which the impact on absolute returns was negative but not significant.

On the day after strikes, there is no significant change in turnover and absolute value of close-to-close returns. But the price range declines significantly (Panel B). The fall in the range

is particularly strong when there is a concurrent media strike, and weakens when there is none, remaining significant at the 5% and 7% levels.

The table reveals that turnover and volatility tend to be somewhat lower on the days before and after a national newspaper strike, but these effects weaken and often vanish when there are no confounding media strikes occurring on these days, indicating that they are most of the time imputable to confounding strikes. I conclude that, overall, the impact of a national newspaper strike is concentrated on the strike day except when a concurrent media strike occurs, as expected.

4.2. Country Analysis

To ensure that the results are not driven but a few outliers or one particular country, I conduct the analysis after removing each country in turn from the sample. The results presented in Panel A in Table 7 confirm that, though they weaken at times, the estimate of the strike effect remain negative and overwhelmingly significant. The results are statistically the weakest when Italy is excluded, reflecting the fact that Italy accounts for the largest number of strikes in the sample.

4.3. Retaining Print and Distribution Strikes Occurring After 1996

In the analysis, I excluded from the sample of events 11 strikes initiated by print and distribution workers after 1996 on the basis that newspapers where available online from that date onward.[17] To gauge their influence on my results, I add them back to the sample of events, proceeding in two steps. Panel B in Table 7 adds back 6 strikes occurring between 1996 and

[17] There are 10 such strikes in France, and one in Italy; France's leading newspaper, *Le Monde*, started a free web version on December 19, 1995.

2006, and panel C adds the remaining 5 –so all strikes are present in Panel C. The strike effect is qualitatively similar (turnover and the price range decline on strike days), but weakens as print and distribution strikes are added to the sample. In particular, the reduction in turnover is, respectively, 13% and 8% in Panels B and C, compared to 14% in the baseline analysis, consistent with the notion that online substitutes make print and distribution strikes less effective.

4.4. Using All Strike Days

The event-study so far is performed on the first day of each strike. When a strike lasts several days, readers will switch to alternative sources of information. For example, the 2002 and 2004 Norwegian strikes which lasted 7 business days lead to an increase in foreign press sales.[18] Panel D of Table 7 shows results when all strike days are used as event-days. They are qualitatively similar to the baseline event-study in Table 3, but quantitatively weaker as expected.

4.5. Panel Regressions

I check whether the event-study results obtain when I use a different statistical approach. I estimate panel regression models with various lags and country and time fixed-effects. An advantage of this approach is that it allows to control for worldwide shocks to equity markets. The main regressor is the indicator variable used in Section 4, $Strike_{t,k}$, which equals one if a national newspaper strike occurs on day *t* in country *k* and zero otherwise. I adjust standard errors for heteroskedasticity and cluster them by date to account for world shocks. I include in regressions day-of-the-week and month dummies to control for calendar effects, and year dummies to control for time trends. I use the same stock market variables as in the event-study,

[18] In 2002 and 2004, the Norwegian kiosks chain Narvesen registered a strong rise in the foreign press sales ("Norwegian Journalists Strike Increases Foreign Newspaper Sales", *Norwegian News Digests*, 21 May 2004).

except that I remove low-frequency variations in turnover by dividing it by a 100-day backward moving average and taking logs.[19] Thus, abnormal turnover, *ATurnover*, is defined as:

$$ATurnover_t = \ln\left(\exp(Turnover_t) \Big/ \frac{1}{100}\sum_{s=1}^{100} \exp(Turnover_{t-s}) \right).$$

Table 8 shows the results of these panel regressions. Panel A presents the baseline results corresponding to Table 3. As with the event-study, abnormal turnover and the price range decline on the strike day but only when these variables are equally weighted across firms. The statistical significance level is somewhat stronger than in Table 3 but the economic magnitude of the effect is similar. For example, the slope coefficient in regression 2 measures the average percentage difference in abnormal turnover between strike and non-strike days: on average, equally-weighted abnormal turnover falls by 15.5% on media strike days (statistically significant at the 0.2% level) –recall that turnover falls by 14.2% in the event-study (1% significance level). The magnitude of the coefficient is reduced (the coefficient is less negative) when lagged abnormal turnover, $ATurnover_{t-1}$, is included as a regressor. This reflects the well-documented persistence of turnover and the fact that newspaper strikes are associated with low turnover on the day of the strike but also on the day before, because of strikes in other media as discussed above. The volatility effect is also similar to that obtained with the event-study. There is no discernable change in the absolute value of close-to-close returns, while the price range falls by 14.6% with a 1% significance level. Thus, the panel regressions confirm the event-study results.

[19] An alternative measure of abnormal turnover is obtained by first taking the log of the ratio of the number of shares traded to the number of shares outstanding, and then subtracting a 100-day backward moving average of log of the ratio. This measure is highly correlated to the one used here (the correlation coefficient is 0.85) but its distribution looks more non-normal (higher skewness and kurtosis).

Panel B focuses on turnover and considers more flexible ways of estimating abnormal turnover. In regression 1, I allow the coefficient on lagged turnover to vary with calendar dummies, i.e. include as regressors $ATurnover_{t-1}$ interacted with year, month and day-of-the-week dummies. In regression 2, I add an additional lag of turnover, $ATurnover_{t-2}$. In both cases, the estimated coefficient on the strike dummy remains negative and statistically significant at the 2% level.

The regressions in Panel A force all slope coefficients to be identical across countries. In regressions 3 and 4 of Panel B, I implement a more flexible two-step procedure that allows countries to load differently on lagged abnormal turnover and calendar dummies. In the first step, I regress, for each country, abnormal turnover on a set of control variables:

$$ATurnover_{t,k} = a_k + b_k ATurnover_{t-1,k} + \sum_l c_{k,l} calendar\_dummy_{t,l} + \varepsilon_{t,k} ,$$

where k denotes a country, $calendar\_dummy_{t,l}$ is a set of dummy variables indexed by l and indicating the day of the week, the month and the year, and $\varepsilon_{t,k}$ is a residual.[20] In regression 3 of Panel B, no lag of abnormal turnover is included in this first-step regression, while one lag is included in regression 4. The residuals from these regressions are then estimated according to $\hat{\varepsilon}_{t,k} = ATurnover_{t,k} - \hat{a}_k - \hat{b}_k ATurnover_{t-1,k} - \sum_l \hat{c}_{k,l} calendar\_dummy_{t,l}$ where a ^ denotes an estimate. The second step consists of a panel regression of residual turnover $\hat{\varepsilon}_{t,k}$ on the newspaper strike dummy, $Strike_{t,k}$:

[20] Strike days are excluded from these regressions.

$$\hat{\varepsilon}_{t,k} = \gamma Strike_{t,k} + \nu_{t,k}.$$

The results, displayed in regressions 3 and 4 of Panel B confirm again the media strike effect on turnover. The coefficient estimates on the media strike dummy are negative, of similar magnitude as those of regressions 1 and 2 of Panel A, and statistically significant at the 1% to 2% levels.

I consider a final specification, similar to the previous two except that the variance of residuals is allowed to vary over time in the spirit of Gallant, Rossi, and Tauchen (1992). In the first step, I run the same regression as before adding a second lag of abnormal turnover, a time trend and its square:

$$ATurnover_{t,k} = a_k + b_k ATurnover_{t-1,k} + b_{2,k} ATurnover_{t-2,k} + \sum_l c_{k,l} calendar\_dummy_{t,l} + d_k t + d_{2,k} t^2 + \varepsilon_{t,k}$$

Next, I estimate the residual as:

$$\hat{\varepsilon}_{t,k} = ATurnover_{t,k} - \hat{a}_k - \hat{b}_k ATurnover_{t-1,k} - \hat{b}_{2,k} ATurnover_{t-2,k} - \sum_l \hat{c}_{k,l} calendar\_dummy_{t,l} - \hat{d}_k t - \hat{d}_{2,k} t^2,$$

and its variance according to the regression model:

$$\ln(\hat{\varepsilon}_{t,k}^{\ 2}) = a'_k + \sum_l c'_{k,l}\ calendar\_dummy_{t,l} + d'_k\ t + d'_{2,k}\ t^2 + \xi_{t,k},$$

where $\xi_{t,k}$ denotes the residual from this variance regression. Finally, I define the residual turnover as:

$$\hat{w}_{t,k} = \exp(\hat{\xi}_{t,k}/2) = \frac{\hat{\varepsilon}_{t,k}}{\exp\left[(\hat{a}'_k + \sum_l \hat{c}'_{k,l}\ calendar\_dummy_{t,l} + \hat{d}'_k\ t + \hat{d}'_{2,k}\ t^2)/2\right]}.$$

Step two consists of regressing residual turnover $\hat{w}_{t,k}$ on the newspaper strike dummy, $Strike_{t,k}$. Regression 5 in Panel B shows again that the coefficient estimate on the strike dummy is negative and statistically significant at the 5% level, consistent with a reduction in trading volume on media strike days.[21]

4.6. Out-of-Sample Evidence

4.6.1. Evidence from the European Protest and Coercion Dataset

Political scientists interested in labor relations and social conflicts have created a dataset that lists protest and repressive events such as strikes and occupations in 28 European countries from 1980 to 1995.[22] An interesting feature of this data for my purpose is that it contains precise information on the type of action, target, location and date of the strikes, so I can identify national newspaper strikes and the day on which they occur. The overlap between this dataset on my sample is limited. My sample covers the period 1989-2010. Moreover, I have not been able to find in *Factiva* information about most of the strikes the dataset identifies between 1989 and 1995. Indeed, the list of European news sources offered by *Factiva* is limited in the early nineties, while the protest and coercion dataset was constructed using numerous local sources and the *Reuters Textline* library. The Protest and Coercion Dataset lists 54 strikes between 1989 and 1995, occurring in Denmark, France, Germany, Greece, Italy and Norway and Switzerland. Of these, 11 (20%; 5 out 24 with valid turnover data) are present in my sample. The strike days

[21] Gallant, Rossi, and Tauchen (1992) use the natural logarithm of the dollar trading volume as dependent variable rather than turnover. They focus on the U.S. stock market while my sample contains several countries. Turnover is better suited for a cross-country analysis given the important differences in stock market sizes and currencies across countries.

[22] The dataset is developed by Professor Ron Francisco at the University of Kansas and can be downloaded from http://web.ku.edu/~ronfran/data/index.html.

coincide for 7 of them, but the remaining 4 are recorded as occurring on the day after the strike date which I identified in my sample. The reason for this ambiguity is that the actual day on which newspapers fail to come out depends on the function fulfilled by the protesters and the time of the day on which they strike. For example, a newspaper will not reach readers on the *same* day distributors strike, but will usually fail to go out on the day *after* printers or journalists strike since today's newspaper has already been delivered. In constructing my sample, I was careful to identify the actual date newspapers are not distributed.

With its little overlap with my sample, this dataset offers a useful out-of-sample test for the impact of newspaper strikes on the stock market. I conduct an event-study analogous to that of Table 3, and find similar results, displayed in Table 9. Equally-weighted turnover falls by 18% on strike days, more than by the 14% observed in my sample. The fall is statistically significant both parametrically (at the 0.4% significance level) and non-parametrically (at the 2% level). For close-to-close returns, volatility is unchanged but it drops within the day by 19% (at the 3% and 1% significance levels), again more than the 9% reported in Table 3. Value-weighted averages show no significant change on strike days. These findings confirm that newspaper strikes lead to a drop in trading activity and intraday volatility, without much affecting close-to-close returns.

4.6.2. Evidence from Local Strikes in the U.S.

While national newspaper strikes have not occurred in the U.S., several cities have experienced local newspapers strikes. Given the size of the country and the breadth of stock ownership (integrated market), these local news blackouts are unlikely to significantly affect stocks' turnover or return. Nonetheless, they may influence the trading behavior of local investors, i.e. of investors who rely on the striking local newspapers for news (Engelberg and

Parsons (2011)). I investigate this hypothesis using household trading data from a large discount brokerage. The data contain the trades of 78,000 households from January 1991 through December 1996.[23] Over this 5-year period, three cities experienced strikes that prevented readers from receiving their newspapers. 1) A strike by drivers forced Pittsburgh's two daily newspapers, the *Post-Gazette* and *The Pittsburgh Press*, to stop publishing on May 18, 1992 for several weeks; 2) San Francisco's two main daily newspapers, the *San Francisco Chronicle* and *San Francisco Examiner*, had to shutdown printing plants on November 3rd, 1994 for 11 days because of a strike by 2,600 journalists, editors, lorry drivers, press operators and paper handlers; 3) Detroit's two largest newspapers, the *Detroit Free Press* and *The Detroit News*, were hit by a strike on July 14, 1995 which lasted several months. Though these three strikes lasted several days or weeks, it is not clear, given the availability of substitutes (e.g. *The New York Times*), whether their impact would last beyond few days.[24]

I study the trading behavior of investors located in a 50-mile radius of the striking city, around the first day of the strike.[25] A drawback of an examination of local trades is that it tells us nothing about the impact of newspaper strikes on stock returns. An advantage is that these data allow to control for shocks to the stock market occurring on strike days. Suppose, for example, that May, 18 1992 (the first day of the Pittsburgh strikes) is a day on which investors pay little

[23] See Barber and Odean (2000) for a compete description of these data. Trade values are winsorized at the 1% level.

[24] Many readers switched to other newspapers as well as to new media outlets developed by publishers (e.g. "Readers scramble for other news sources", *Associated Press*, 20 May 1992). The publishers of the two San Francisco newspapers responded to the strike by launching a combined free electronic version, one of the earliest examples of an online newspaper edition, which contributed to the development of online media ("Newspapers and Strikers Wage a Cyberspace Duel", *The Wall Street Journal*, 7 November 1994). The Pittsburgh strike prompted a competing newspaper, *The North Hills News Record*, to expand from a semi-weekly to a daily publication ("Gannett Paper Expands To Take Advantage Of Pittsburgh Strike", *Dow Jones News Service*, 20 May 1992).

[25] The brokerage dataset provides zipcode information for 54,297 households.

attention to the economy, either because there is little going on, or because they are distracted (e.g. on a Friday, or a day with major non-economic news or international events). Then trading volume by Pittsburgh investors will be low on that day, regardless of the newspaper strike, but excess trading volume relative to the rest of the country will not.

On each day *t*, I aggregate the dollar trading volume over all investors located in the striking city *k* and over all stocks in the country, denoted $Vol\$\_Strike_{k,t}$. Similarly, I aggregate the dollar trading volume over all investors located outside the striking city and over all stocks in the country, $Vol\$\_NoStrike_{k,t}$. I estimate the abnormal local trading volume in a striking city relative to the rest of the country as the log ratio of aggregate trading volume in the striking city to aggregate trading volume in the rest of the country:

$$AVol_{k,t} = \ln\left(Vol\$\_Strike_{k,t} / Vol\$\_NoStrike_{k,t}\right).$$

I perform, for each newspaper strike, an event-study on abnormal trading volume in the spirit of Table 3, using data from a 100-day window centered on the strike day. The results, presented in Table 10, show a strong impact of the strike on local trades: on average trading volume falls by 86% in a striking city relative to the rest of the country. The fall is statistically significant, with *p*-values of respectively 3% and 10% in the Patell and rank tests. Unreported tests show no significant strike effect on the days before and after the strikes. With only three observations, this evidence is only suggestive. But it does provide out-of-sample support for an effect of newspaper strikes on trading activity, as documented in the cross-country study. It also highlights the importance of the role played by individual investors who appear to be very responsive to media blackouts.

5. Conclusion

In this paper, I provide evidence that the media have a causal impact in financial markets, and shed light on the mechanism underlying this impact. I employ a novel identification strategy based on media blackouts that are exogenous to stock market movements and which result from nationwide newspaper strikes. I document that on average trading activity is considerably weaker on strike days (14% lower on average across all stocks). I also find evidence of a matching reduction in the price range (9% on average), while close-to-close volatility is not significantly affected. These effects are strongest for small firms and monotonically decrease with firm size. In the bottom size quintile, turnover falls by 24%, close-to-close volatility by 10% and the price range by 16%.

Moreover, media strikes alter the patterns of return autocorrelations and cross-autocorrelations. Specifically, the power of lagged returns of small and big firms for predicting current returns of small firms, and of small firms only, vanishes on media strike days. But it increases for predicting returns of small firms on the day following the strike. These findings support the notion that newspapers help stock prices of small firms capitalize news from the preceding day.

This paper shows that the gradual diffusion of information is a cause of the high levels of turnover observed across stock markets, and that the media contributes to this diffusion. In so doing, it offers a more nuanced view of the role of the media. For small firms, the media play an important role by stimulating trading and helping stock returns incorporate information. For big firms in contrast, there is no such role –their turnover and stock returns are unaffected by the media. Most interestingly, for medium-size firms, the media increase turnover but do not influence returns –the trades of few informed arbitrageurs seem to be sufficient to ensure the

incorporation of relevant information into stock prices. For these firms, the media are not essential to the informational efficiency of stock prices, even though they play an important role in propagating information among investors.

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Table 1: Sample of National Newspaper Strikes

This table lists national newspaper strikes that occur on a business day and are specific to the publishing and media sector. Duration is measured in trading days.

Country	Date	Duration	Who strikes?
France	08 March 1989	2	Print & distribution workers
	28 June 1989	1	Print & distribution workers
	15 December 1989	6	Print & distribution workers
	20 February 1992	1	Journalists
	29 April 1993	1	Print & distribution workers
	14 October 1993	1	Print & distribution workers
	08 November 1995	1	Print & distribution workers
	16 October 1996	1	Journalists
	15 November 1996	1	Journalists
	10 April 1997	1	Print & distribution workers
	08 July 1997	1	Print & distribution workers
	07 April 1999	1	Print & distribution workers
	13 June 2001	1	Print & distribution workers
	08 September 2005	1	Print & distribution workers
	12 June 2008	1	Print & distribution workers
	16 September 2008	1	Print & distribution workers
	30 October 2008	1	Print & distribution workers
	28 October 2009	1	Print & distribution workers
	21 April 2010	2	Print & distribution workers
Greece	10 April 2001	1	Journalists
	07 February 2002	2	Journalists
	07 March 2002	1	Journalists
	28 March 2002	2	Journalists
	14 July 2004	4	Journalists
	25 November 2005	1	Journalists
	09 May 2007	1	Journalists
	28 November 2007	1	Journalists
	02 October 2008	1	Journalists
	24 June 2009	1	Journalists
	04 June 2010	1	Journalists
Italy	30 January 1991	1	Journalists
	28 May 1991	3	Journalists
	29 July 1991	2	Journalists
	30 September 1993	1	Journalists
	16 March 1994	2	Journalists
	11 April 1995	1	Journalists
	28 April 1995	1	Journalists
	20 October 1995	3	Journalists
	10 December 1999	1	Journalists
	30 November 2000	2	Journalists
	12 December 2000	1	Journalists
	22 January 2002	1	Print & distribution workers
	11 June 2003	1	Journalists
	28 October 2003	1	Journalists
	09 November 2005	2	Journalists
	06 October 2006	2	Journalists
	16 November 2006	1	Journalists
	22 December 2006	3	Journalists
	09 July 2010	1	Journalists
Norway	11 June 1990	2	Journalists
	30 May 2002	7	Journalists
	13 May 2004	7	Journalists

Table 2: Descriptive Statistics

This table displays summary statistics for the daily data used in the event-study analysis of the impact of national newspaper strikes on the stock market. *Turnover* in a country is obtained by estimating for each firm and day the ratio of the number of shares traded in the firm on that day to the number of shares outstanding, averaging across all firms in the country, and taking logs. Volatility in a country is measured as the log of one plus the absolute value of the residual from a regression of daily stock market returns on 5 day-of-the-week dummy variables, and is denoted *Absolute Return.* The price *Range* is defined as the log of the ratio for each stock of the intra-day high to low prices, averaged across all stocks in a country. *Return* is the average return on the market in a country. Averages (turnover, absolute return, range and return) are computed using equal weights, and purged from day-of-the-week effects by regressing them on 5 day-of-the-week dummy variables and taking residuals. The statistics are computed over a 100-day window centered on the strike day. Δ represents the change in the variable over one trading day.

Country	Statistic	ΔLnTurnover	LnTurnover	ΔAbs. Return	Abs. Return	ΔRange	Range	Return
France	Obs.	1,301	1,347	1,798	1,856	1,232	1,275	1,856
	Mean	0.000	0.001	-0.003	0.312	-0.001	0.000	-0.001
	Median	0.002	0.000	0.005	0.255	-0.004	-0.013	0.012
	Std. Dev.	0.192	0.234	0.302	0.250	0.117	0.169	0.582
	Min	-0.831	-1.173	-1.070	0.000	-0.556	-0.642	-2.096
	Max	0.808	0.975	1.090	1.177	0.590	0.720	2.246
Greece	Obs.	1,011	1,059	1,008	1,053	1,011	1,059	1,053
	Mean	-0.002	-0.002	-0.011	0.602	-0.005	-0.001	0.002
	Median	-0.003	-0.020	0.008	0.526	-0.008	-0.017	-0.022
	Std. Dev.	0.318	0.361	0.507	0.411	0.129	0.196	1.405
	Min	-1.819	-0.910	-1.538	0.001	-0.426	-0.574	-5.229
	Max	2.070	1.726	1.502	1.920	0.434	0.836	5.822
Italy	Obs.	1,482	1,542	1,770	1,830	1,344	1,414	1,830
	Mean	0.001	-0.002	-0.003	0.379	0.005	-0.001	-0.001
	Median	-0.002	-0.003	-0.007	0.314	0.000	-0.019	0.009
	Std. Dev.	0.222	0.289	0.355	0.275	0.349	0.301	0.708
	Min	-1.251	-1.237	-1.134	0.000	-2.720	-1.125	-2.685
	Max	1.097	1.411	1.323	1.339	2.570	1.701	2.816
Norway	Obs.	179	189	263	279	179	189	279
	Mean	-0.011	0.001	0.003	0.540	-0.008	0.000	-0.002
	Median	0.000	0.032	-0.027	0.473	-0.012	-0.023	0.049
	Std. Dev.	0.256	0.331	0.398	0.339	0.200	0.243	1.092
	Min	-0.723	-0.906	-1.071	0.001	-0.509	-0.576	-3.427
	Max	0.609	0.910	1.117	1.540	0.488	0.705	3.663
Total	Obs.	3,973	4,137	4,839	5,018	3,766	3,937	5,018
	Mean	-0.001	-0.001	-0.004	0.410	0.000	-0.001	0.000
	Median	-0.001	-0.003	0.001	0.331	-0.004	-0.017	0.008
	Std. Dev.	0.243	0.295	0.377	0.324	0.233	0.234	0.888
	Min	-1.819	-1.237	-1.538	0.000	-2.720	-1.125	-5.229
	Max	2.070	1.726	1.502	1.920	2.570	1.701	5.822

Table 3: Average Impact of Newspaper Strikes

This table presents the impact of national newspaper strikes on the stock market. Strikes carried out by print and distribution workers after 1996 are excluded because of the availability of online editions. *Turnover* in a country is obtained by estimating for each firm and day the ratio of the number of shares traded in the firm on that day to the number of shares outstanding, computing the average across all firms in the country, and finally taking logs. Volatility in a country is measured 1) as the log of one plus the absolute value of the residual from a regression of daily stock market returns on 5 day-of-the-week dummy variables, denoted *Absolute Return*, and 2) as the price *Range*, defined as the log of the ratio for each stock of the intra-day high to low prices, averaged across all stocks in a country. *Return* is the average return on the market in a country. Averages (turnover, absolute return, range and return) are computed using equal weights and market-capitalization weights, and are purged from day-of-the-week effects by regressing them on 5 day-of-the-week dummy variables and taking residuals. The event-study is performed using a 100-day estimation window centered on the strike day. Statistics for the whole sample of events for both equally-weighted and value-weighted averages are displayed in Panel A. The tables show for the 4 variables their mean and median difference on newspaper strike days relative to the other days in the estimation window, the statistics and *p*-values for the Patell (1976) test and for Corrado (1989) rank test. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Panel B lists event-study statistics by event. It displays for turnover, absolute return and range their difference on the newspaper strike day relative to their average over the estimation window ("raw difference"), and this difference divided by the standard deviation of the variables over the estimation window ("standardized difference").

Panel A: Overall

	Equally Weighted			
	Turnover	Abs. Return	Range	Return
Mean	-0.142	0.003	-0.086	-0.030
Median	-0.112	-0.038	-0.080	-0.024
Patell Stat	-2.521 **	0.063	-1.906 *	-0.747
p-value	0.012	0.950	0.057	0.455
Rank Stat	-2.894 ***	0.105	-2.450 **	-0.673
p-value	0.004	0.916	0.014	0.501
Events	32	41	30	41
	Value Weighted			
	Turnover	Abs. Return	Range	Return
Mean	-0.017	0.010	-0.083	-0.073
Median	0.002	-0.037	-0.071	-0.089
Patell Stat	-0.254	-0.051	-1.308	-0.606
p-value	0.800	0.959	0.191	0.544
Rank Stat	0.060	-0.070	-1.629	-0.405
p-value	0.952	0.944	0.103	0.685
Events	32	41	30	41

Panel B: By Event

Country	Date	Turnover		Abs. Return		Range	
		Raw difference	Standardized difference	Raw difference	Standardized difference	Raw difference	Standardized difference
France	08/03/1989	n.a.	n.a.	-0.211	-0.870	n.a.	n.a.
	28/06/1989	n.a.	n.a.	0.061	0.331	n.a.	n.a.
	15/12/1989	n.a.	n.a.	-0.253	-1.025	n.a.	n.a.
	20/02/1992	n.a.	n.a.	0.270	1.129	n.a.	n.a.
	29/04/1993	-0.463	-2.019	0.383	2.002	n.a.	n.a.
	14/10/1993	n.a.	n.a.	0.111	0.615	n.a.	n.a.
	08/11/1995	0.108	0.617	-0.243	-1.382	-0.137	-0.766
	16/10/1996	0.088	0.327	-0.122	-0.877	-0.031	-0.312
	15/11/1996	0.078	0.325	0.101	0.645	0.094	0.928
Greece	10/04/2001	-0.368	-0.822	-0.149	-0.311	-0.405	-1.655
	07/02/2002	-0.327	-1.067	-0.202	-0.525	-0.213	-1.210
	07/03/2002	0.127	0.442	-0.016	-0.045	-0.137	-0.864
	28/03/2002	0.103	0.349	-0.399	-1.055	0.068	0.473
	14/07/2004	-0.445	-1.457	-0.075	-0.236	-0.112	-0.793
	25/11/2005	-0.491	-1.247	-0.149	-0.497	-0.102	-0.710
	09/05/2007	-0.185	-0.555	-0.027	-0.095	-0.164	-1.231
	28/11/2007	-0.087	-0.261	0.602	1.411	0.044	0.186
	02/10/2008	-0.044	-0.112	-0.720	-1.384	0.032	0.102
	24/06/2009	-0.469	-0.974	-0.281	-0.723	-0.161	-0.810
	04/06/2010	0.034	0.097	0.506	1.188	0.237	1.329
Italy	30/01/1991	n.a.	n.a.	-0.023	-0.073	n.a.	n.a.
	28/05/1991	n.a.	n.a.	-0.041	-0.174	n.a.	n.a.
	29/07/1991	n.a.	n.a.	-0.144	-0.553	n.a.	n.a.
	30/09/1993	-0.279	-1.177	-0.038	-0.149	-1.066	-1.262
	16/03/1994	0.012	0.039	-0.243	-0.770	-0.547	-1.045
	11/04/1995	-0.280	-1.130	0.224	0.859	-0.035	-0.193
	28/04/1995	0.375	1.516	0.227	0.886	0.005	0.023
	20/10/1995	-0.177	-0.485	0.562	2.361	-0.001	-0.002
	10/12/1999	-0.228	-0.563	0.126	0.448	-0.012	-0.045
	30/11/2000	-0.123	-0.447	0.176	0.581	-0.061	-0.314
	12/12/2000	-0.316	-1.124	-0.084	-0.282	-0.056	-0.286
	11/06/2003	0.039	0.207	-0.188	-0.857	0.699	2.202
	28/10/2003	-0.219	-0.779	-0.064	-0.265	n.a.	n.a.
	09/11/2005	-0.524	-1.967	-0.255	-1.199	-0.076	-0.560
	06/10/2006	0.106	0.313	-0.120	-0.773	-0.108	-1.305
	16/11/2006	-0.071	-0.264	-0.241	-1.393	-0.083	-0.974
	22/12/2006	-0.510	-1.854	0.259	1.108	-0.174	-0.947
	09/07/2010	-0.101	-0.417	0.167	0.451	-0.123	-0.634
Norway	11/06/1990	n.a.	n.a.	0.066	0.216	n.a.	n.a.
	30/05/2002	-0.086	-0.281	0.194	0.507	-0.229	-0.895
	13/05/2004	0.182	0.509	0.369	1.175	0.262	1.131

Table 4: Impact of Newspaper Strikes across Stock Size Groups

This table presents the impact of national newspaper strikes on trading activity, volatility and returns across stock size groups. Stocks are sorted into quintiles in each country based on their market capitalization at the end of the previous year. The variables, methodology and test statistics are described in Table 3. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Turnover									
	Quintile 1		2		3		4		Quintile 5	
Mean	-0.236		-0.194		-0.171		-0.005		-0.036	
Median	-0.245		-0.210		-0.201		0.034		-0.017	
Patell Stat	-2.619	***	-2.219	**	-2.450	**	0.066		-0.338	
p-value	0.009		0.026		0.014		0.947		0.735	
Rank Stat	-2.444	**	-2.603	***	-2.731	***	0.253		-0.173	
p-value	0.015		0.009		0.006		0.801		0.863	
Events	32		32		32		32		32	
	Abs. Return									
	Quintile 1		2		3		4		Quintile 5	
Mean	-0.102		-0.031		-0.053		0.003		0.032	
Median	-0.132		-0.057		-0.077		0.007		-0.047	
Patell Stat	-1.784	*	-0.618		-0.997		-0.001		0.422	
p-value	0.075		0.537		0.319		0.999		0.673	
Rank Stat	-1.656	*	-0.380		-0.940		0.246		0.522	
p-value	0.098		0.704		0.347		0.806		0.602	
Events	41		41		41		41		41	
	Range									
	Quintile 1		2		3		4		Quintile 5	
Mean	-0.161		-0.052		-0.138		-0.075		-0.123	
Median	-0.145		-0.065		-0.128		-0.027		-0.033	
Patell Stat	-2.759	***	-1.084		-2.564	***	-1.252		-2.029	**
p-value	0.006		0.278		0.010		0.210		0.042	
Rank Stat	-2.174	**	-1.303		-2.977	***	-1.697	*	-1.960	**
p-value	0.030		0.192		0.003		0.090		0.050	
Events	31		30		31		29		31	
	Return									
	Quintile 1		2		3		4		Quintile 5	
Mean	-0.058		0.017		0.047		-0.031		-0.052	
Median	-0.068		-0.056		-0.010		0.023		-0.036	
Patell Stat	-0.810		-0.535		-0.326		-0.634		-0.245	
p-value	0.418		0.593		0.745		0.526		0.807	
Rank Stat	-0.827		-0.509		-0.252		-0.539		0.032	
p-value	0.408		0.611		0.801		0.590		0.974	
Events	41		41		41		41		41	

Table 5: Impact of Newspaper Strikes on Return (Cross-)Autocorrelations

This table reports the results of panel regression models of returns on small and big stocks. Stocks are sorted into quintiles in each country based on their market capitalization at the end of the previous year. Panel A displays the impact of newspaper strikes on contemporaneous returns and Panel B the impact on next-day returns. In Panel A, the dependent variable is the average return on day *t* of stocks in the bottom quintile (small stocks, in regressions 1 to 3), and in the top quintile (big stocks, in regressions 4 to 6). The independent variables include an indicator variable, $Strike_{t,k}$, which equals one on the first day a newspaper strike occurs in country *k* and zero otherwise, and interactions of this variable with lagged returns of small and big stocks. In Panel B, the dependent variable is the average return of stocks on day *t* +1 in the bottom quintile (small stocks in regressions 1 to 4), and the average return on stocks in the top quintile (big stocks in regressions 5 to 8). The independent variables include the indicator variable, $Strike_{t,k}$, and its interactions with lagged (regressions 2, 3, 6 and 7) and contemporaneous (all regressions except 2 and 6) returns of small and big stocks. Country, year, month and day-of-the-week dummy variables are included in the regressions, as well as returns interacted with day-of-the-week dummy variables when indicated. Standard-errors and *p*-values adjusted for heteroskedasticity and clustered by date are displayed in parentheses in this order below the regression coefficient estimates. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Impact on Contemporaneous Returns

	Return_Small(t)			Return_Big(t)		
	(1)	(2)	(3)	(4)	(5)	(6)
Return_Small(t-1) x Strike(t)	-0.428***		-0.406***		0.288*	0.213
	(0.146)		(0.127)		(0.149)	(0.154)
	(0.003)		(0.001)		(0.053)	(0.167)
Return_Big(t-1) x Strike(t)		-0.402***	-0.173	0.147		0.169
		(0.121)	(0.131)	(0.221)		(0.207)
		(0.001)	(0.189)	(0.507)		(0.414)
Strike(t)	-0.138	-0.027	-0.057	-0.144	-0.064	-0.076
	(0.109)	(0.087)	(0.083)	(0.161)	(0.133)	(0.128)
	(0.204)	(0.760)	(0.492)	(0.372)	(0.628)	(0.552)
Return_Big(t)		0.597***	0.596***			
		(0.010)	(0.010)			
		(0.000)	(0.000)			
Return_Small(t)					0.463***	0.457***
					(0.009)	(0.009)
					(0.000)	(0.000)
Return_Big(t-1) x Day-of-week		yes	yes	yes		yes
Return_Small(t-1) x Day-of-week	yes		yes		yes	yes
Observations	21769	21655	21631	21678	21658	21631
R-squared	0.046	0.304	0.313	0.031	0.291	0.295

Panel B: Impact on Next-Day Returns

	Return_Small(t+1)				Return_Big(t+1)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Return_Small(t) x Strike(t)	0.034		0.186	-0.182				0.187
	(0.194)		(0.209)	(0.223)				(0.188)
	(0.859)		(0.375)	(0.414)				(0.318)
Return_Small(t-1) x Strike(t)		0.317**	0.372**					
		(0.160)	(0.178)					
		(0.048)	(0.036)					
Return_Big(t) x Strike(t)				0.009	0.163		0.188	0.074
				(0.132)	(0.148)		(0.136)	(0.180)
				(0.948)	(0.268)		(0.166)	(0.680)
Return_Big(t-1) x Strike(t)						-0.141	-0.195	
						(0.169)	(0.164)	
						(0.403)	(0.234)	
Strike(t)	-0.141	-0.114	-0.107	-0.100	-0.015	-0.026	-0.006	0.031
	(0.131)	(0.123)	(0.125)	(0.108)	(0.111)	(0.118)	(0.109)	(0.098)
	(0.282)	(0.355)	(0.390)	(0.358)	(0.891)	(0.823)	(0.959)	(0.749)
Return_Big(t+1)				0.594***				
				(0.010)				
				(0.000)				
Return_Small(t-1)		0.018	0.018					
		(0.012)	(0.012)					
		(0.130)	(0.130)					
Return_Big(t-1)						-0.022*	-0.022*	
						(0.013)	(0.013)	
						(0.092)	(0.092)	
Return_Big(t) x Day-of-week				yes	yes	yes	yes	yes
Return_Small(t) x Day-of-week	yes	yes	yes	yes				yes
Observations	21769	21659	21659	21631	21679	21567	21567	21631
R-squared	0.045	0.045	0.045	0.311	0.032	0.032	0.032	0.294

Table 6: Market Reaction on the Days Surrounding Newspaper Strikes

This table presents the impact of national newspaper strikes on the stock market on the days surrounding the strikes. The variables, methodology and test statistics are described in Table 3. Panel A displays results for the day preceding the strike and Panel B for the day following the strike. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Day Preceding Strikes

	Day Before - All			
	Turnover	Abs. Return	Range	Return
Mean	-0.074	-0.134	-0.077	-0.076
Median	-0.104	-0.120	-0.070	-0.057
Patell Stat	-1.202	-2.500 **	-1.670 *	-0.398
p-value	0.229	0.012	0.095	0.691
Rank Stat	-1.740 *	-2.121 **	-1.483	-0.461
p-value	0.082	0.034	0.138	0.645
Events	33	41	32	41
	Day Before - No Other Strike			
	Turnover	Abs. Return	Range	Return
Mean	0.010	-0.066	-0.107	-0.034
Median	0.029	-0.069	-0.059	0.063
Patell Stat	0.170	-1.064	-0.629	-0.005
p-value	0.865	0.287	0.529	0.996
Rank Stat	0.164	-0.599	-0.274	0.158
p-value	0.870	0.549	0.784	0.875
Events	15	22	14	22
	Day Before - Other Strike			
	Turnover	Abs. Return	Range	Return
Mean	-0.144	-0.213	-0.054	-0.124
Median	-0.159	-0.139	-0.086	-0.110
Patell Stat	-1.783 *	-2.527 **	-1.672 *	-0.579
p-value	0.075	0.012	0.095	0.563
Rank Stat	-2.372 **	-2.214 **	-2.118 **	-0.915
p-value	0.018	0.027	0.034	0.360
Events	18	19	18	19

Panel B: Day Following Strikes

	Day After - All			
	Turnover	Abs. Return	Range	Return
Mean	-0.088	-0.069	-0.133	-0.173
Median	-0.069	-0.088	-0.089	-0.102
Patell Stat	-1.266	-0.974	-2.526 **	-1.100
p-value	0.205	0.330	0.012	0.271
Rank Stat	-1.385	-1.002	-2.672 ***	-0.822
p-value	0.166	0.316	0.008	0.411
Events	30	38	29	38

	Day After - No Other Strike			
	Turnover	Abs. Return	Range	Return
Mean	-0.088	-0.022	-0.118	-0.233
Median	-0.065	-0.027	-0.082	-0.102
Patell Stat	-0.928	0.125	-1.949 *	-1.283
p-value	0.353	0.901	0.051	0.200
Rank Stat	-0.797	0.166	-1.812 *	-0.749
p-value	0.425	0.868	0.070	0.454
Events	23	26	22	26

	Day After - Other Strike			
	Turnover	Abs. Return	Range	Return
Mean	-0.088	-0.170	-0.179	-0.045
Median	-0.171	-0.217	-0.188	-0.052
Patell Stat	-0.939	-1.917 *	-1.688 *	-0.070
p-value	0.348	0.055	0.091	0.944
Rank Stat	-0.923	-2.166 **	-2.165 **	-0.406
p-value	0.356	0.030	0.030	0.685
Events	7	12	7	12

Table 7: Robustness Checks

This table presents robustness checks of the impact of national newspaper strikes on the stock market. The variables, methodology and test statistics are described in Table 3. In Panel A, each country is removed in turn to perform the event study. In Panel B, printer strikes occurring after 1996 are not removed from the sample in spite of the availability of online editions. In Panel C, all strike days, not only the first day of any strike, are used for the event study. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Excluding One Country at a Time

	Turnover							
	Excluding France		Excluding Greece		Excluding Italy		Excluding Norway	
Mean	-0.155		-0.114		-0.132		-0.155	
Median	-0.150		-0.101		-0.086		-0.150	
Patell Stat	-2.553	**	-1.888	*	-1.487		-2.645	***
p-value	0.011		0.059		0.137		0.008	
Rank Stat	-2.866	***	-2.282	**	-1.622		-2.884	***
p-value	0.004		0.023		0.105		0.004	
Events	28		21		17		30	
	Abs. Return							
	Excluding France		Excluding Greece		Excluding Italy		Excluding Norway	
Mean	0.001		0.034		-0.008		-0.014	
Median	-0.039		0.019		-0.027		-0.052	
Patell Stat	-0.029		0.488		0.041		-0.243	
p-value	0.977		0.625		0.967		0.808	
Rank Stat	0.037		0.488		0.178		-0.274	
p-value	0.970		0.626		0.859		0.784	
Events	32		30		23		38	
	Range							
	Excluding France		Excluding Greece		Excluding Italy		Excluding Norway	
Mean	-0.093		-0.088		-0.060		-0.094	
Median	-0.083		-0.061		-0.107		-0.080	
Patell Stat	-1.981	**	-1.207		-1.275		-2.018	**
p-value	0.048		0.228		0.202		0.044	
Rank Stat	-2.737	***	-1.939	*	-1.324		-2.551	**
p-value	0.006		0.052		0.185		0.011	
Events	27		19		16		28	

Panel B: Dropping Printer Strikes After 2006

	Equally Weighted			
	Turnover	Abs. Return	Range	Return
Mean	-0.133	-0.015	-0.084	-0.021
Median	-0.094	-0.064	-0.080	-0.011
Patell Stat	-2.596 ***	-0.504	-2.297 **	-0.663
p-value	0.009	0.614	0.022	0.508
Rank Stat	-2.585 ***	-0.500	-2.769 ***	-0.595
p-value	0.010	0.617	0.006	0.552
Events	38	47	36	47

Panel C: Retaining All Printer Strikes

	Equally Weighted			
	Turnover	Abs. Return	Range	Return
Mean	-0.082	0.002	-0.054	-0.045
Median	-0.071	-0.054	-0.056	-0.052
Patell Stat	-1.572	-0.024	-1.468	-1.122
p-value	0.116	0.981	0.142	0.262
Rank Stat	-1.815 *	-0.376	-1.727 *	-0.825
p-value	0.069	0.707	0.084	0.409
Events	43	52	41	52

Panel D: All Strike Days

	Equally Weighted			
	Turnover	Abs. Return	Range	Return
Mean	-0.115	-0.020	-0.074	-0.048
Median	-0.094	-0.070	-0.055	-0.053
Patell Stat	-2.520 **	-0.553	-1.925 *	-0.557
p-value	0.012	0.580	0.054	0.577
Rank Stat	-1.670 *	-0.438	-1.903 *	-0.670
p-value	0.095	0.661	0.057	0.503
Events	48	67	46	67

Table 8: Robustness Checks using Panel Regressions

This table shows the impact of national newspaper strikes on the stock market, estimated using panel regression models. Strikes carried out by print and distribution workers after 1996 are excluded because of the availability of online editions. The main independent variable is an indicator variable, $Strike_{t,k}$, which equals one on the first day of a newspaper strike in country *k* and zero otherwise. Panel A reproduces the results of Table 3 for the stock market as a whole. In regressions 1 and 2, the dependent variable is the abnormal turnover in the country, defined as $ATurnover_t = \ln\left(\exp(Turnover_t) \Big/ \frac{1}{100}\sum_{s=1}^{100} \exp(Turnover_{t-s}) \right)$ where *Turnover* is defined in Table 3 as the equally-weighted average across all firms in a country of the log of the ratio of the number of shares traded in the firm on that day to the number of shares outstanding. In regressions 3 to 6, the dependent variables are the measures of volatility defined in Table 3, *Absolute Return* and *Range*. Country, year, month and day-of-the-week dummy variables are included in the regressions. Panel B shows different specifications of the panel regressions for turnover. In regression 1, lagged abnormal turnover interacted with year, month and day-of-the-week dummies are included as regressors. In regression 2, an additional lag of abnormal turnover is included as a regressor. In regressions 3 to 5, the dependent variable is the *residual* abnormal turnover in the country, estimated from first-step country-specific regressions of abnormal turnover on year, month and day-of-the-week dummy variables. In regression 4, lagged abnormal turnover is included as a regressor in the first-step regression. In regression 5, a second lag of abnormal turnover, a time trend and its square are also included, and the variance of residuals in the first-step regression varies over time in the spirit of Gallant, Rossi, and Tauchen (1992). Year, month and day-of-the-week dummy variables are included in all the regressions. Standard-errors and *p*-values adjusted for heteroskedasticity and clustered by date are displayed in parentheses in this order below the coefficient estimates. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Baseline Regressions

	Equally Weighted					
	X(t) = ATurnover(t)		X(t) = Abs. return(t)		X(t) = Range(t)	
	(1)	(2)	(3)	(4)	(5)	(6)
Strike(t)	-0.083***	-0.155***	0.008	-0.037	-0.069**	-0.146***
	(0.030)	(0.049)	(0.041)	(0.042)	(0.030)	(0.056)
	(0.006)	(0.002)	(0.843)	(0.375)	(0.021)	(0.009)
X(t-1)	0.632***		0.211***		0.734***	
	(0.008)		(0.009)		(0.011)	
	(0.000)		(0.000)		(0.000)	
Observations	16748	17234	21119	21668	16652	17215
R-squared	0.464	0.100	0.233	0.198	0.789	0.533
	Value Weighted					
	X(t) = ATurnover(t)		X(t) = Abs. return(t)		X(t) = Range(t)	
	(1)	(2)	(3)	(4)	(5)	(6)
Strike(t)	-0.042	-0.031	-0.050	-0.072	-0.159	-0.190
	(0.031)	(0.052)	(0.058)	(0.059)	(0.098)	(0.176)
	(0.182)	(0.544)	(0.389)	(0.223)	(0.104)	(0.281)
X(t-1)	0.517***		0.145***		0.892***	
	(0.009)		(0.009)		(0.013)	
	(0.000)		(0.000)		(0.000)	
Observations	16748	17234	21119	21668	16652	17215
R-squared	0.359	0.124	0.120	0.101	0.852	0.332

Panel B: Other Specification of Turnover Regressions

	ATurnover(t)		Residual Turnover(t)		
	Lag turnover interacted with calendar dummies	2 lags of turnover	No lag of ATurnover in step-1 regression	One lag of ATurnover in step-1 regression	Gallant, Rossi, and Tauchen (1992) on Aturnover
	(1)	(2)	(3)	(4)	(5)
Strike(t)	-0.073**	-0.073**	-0.145***	-0.074**	-0.613**
	(0.029)	(0.031)	(0.047)	(0.031)	(0.307)
	(0.010)	(0.018)	(0.002)	(0.016)	(0.046)
ATurnover(t-1)	0.473***	0.478***			
	(0.050)	(0.011)			
	(0.000)	(0.000)			
ATurnover(t-2)		0.251***			
		(0.011)			
		(0.000)			
Observations	16748	16266	17234	16748	16688
R-squared	0.474	0.501	0.0004	0.0002	0.0001

Table 9: Evidence based on the European Protest and Coercion Data

This table presents the impact of national newspaper strikes on the stock market, using the European Protest and Coercion Data between 1989 and 1995. The variables, methodology and test statistics are described in Table 3. Statistics for the whole sample of events for both equally-weighted and value-weighted averages are displayed in Panel A. The tables show for the turnover, absolute return, range and return their mean and median difference on newspaper strike days relative to the other days in the estimation window, the statistics and *p*-values for the Patell (1976) test and for Corrado (1989) rank test. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Panel B lists event-study statistics by event. It displays for turnover, absolute return and range their difference on the newspaper strike day relative to their average over the estimation window ("raw difference"), and this difference divided by the standard deviation of the variables over the estimation window ("standardized difference"). A "x" marks a strike present in my sample (described in Table 1).

Panel A: Overall

	Equally Weighted			
	Turnover	Abs. Return	Range	Return
Mean	-0.182	0.024	-0.191	0.065
Median	-0.157	-0.023	-0.154	0.130
Patell Stat	-2.864 **	0.760	-3.020 ***	0.310
p-value	0.004	0.447	0.003	0.756
Rank Stat	-2.358 **	0.192	-2.593 ***	0.396
p-value	0.018	0.848	0.010	0.692
Events	24	54	24	54
	Value Weighted			
	Turnover	Abs. Return	Range	Return
Mean	-0.044	0.053	-0.086	0.181
Median	-0.042	0.027	-0.056	0.274
Patell Stat	-0.836	1.478	-1.189	1.382
p-value	0.403	0.139	0.234	0.167
Rank Stat	-0.885	1.193	-1.382	1.430
p-value	0.376	0.233	0.167	0.153
Events	24	54	24	54

Panel B: By Event

			Turnover		Abs. Return		Range	
	Country	Date	Raw difference	Standardized difference	Raw difference	Standardized difference	Raw difference	Standardized difference
	Denmark	23/06/1989	n.a.	n.a.	-0.143	-0.506	n.a.	n.a.
⌞	France	28/06/1989	n.a.	n.a.	0.061	0.331	n.a.	n.a.
x	France	15/12/1989	n.a.	n.a.	-0.253	-1.025	n.a.	n.a.
x	France	21/02/1992	n.a.	n.a.	0.077	0.320	n.a.	n.a.
x	France	29/04/1993	-0.463	-2.019	0.383	2.002	n.a.	n.a.
	France	07/10/1993	-0.087	-0.369	0.125	0.669	-0.208	-1.626
	Germany	03/03/1989	n.a.	n.a.	0.497	1.771	n.a.	n.a.
	Germany	07/05/1990	n.a.	n.a.	0.094	0.381	n.a.	n.a.
	Germany	03/05/1991	n.a.	n.a.	-0.332	-1.403	n.a.	n.a.
	Germany	06/05/1992	n.a.	n.a.	0.169	1.096	n.a.	n.a.
	Germany	14/05/1992	n.a.	n.a.	-0.118	-0.622	n.a.	n.a.
	Germany	21/05/1992	n.a.	n.a.	-0.165	-0.853	n.a.	n.a.
	Germany	01/02/1993	n.a.	n.a.	-0.011	-0.051	n.a.	n.a.
	Germany	14/03/1994	-0.125	-0.390	-0.063	-0.218	-0.027	-0.066
	Germany	24/03/1994	0.004	0.010	-0.254	-1.283	-0.199	-1.497
	Germany	07/04/1994	-0.082	-0.168	0.006	0.031	0.037	0.283
	Germany	20/05/1994	-0.638	-1.099	-0.125	-0.690	-0.027	-0.162
	Greece	18/12/1995	-0.496	-1.263	0.318	1.009	-0.253	-1.335
	Italy	30/11/1989	n.a.	n.a.	0.171	0.658	n.a.	n.a.
	Italy	07/12/1989	n.a.	n.a.	-0.251	-0.963	n.a.	n.a.
	Italy	14/12/1989	n.a.	n.a.	0.474	1.772	n.a.	n.a.
	Italy	21/12/1989	n.a.	n.a.	-0.341	-1.223	n.a.	n.a.
	Italy	23/01/1990	n.a.	n.a.	-0.217	-0.840	n.a.	n.a.
	Italy	30/01/1990	n.a.	n.a.	0.187	0.716	n.a.	n.a.
	Italy	08/02/1991	n.a.	n.a.	-0.138	-0.434	n.a.	n.a.
	Italy	18/02/1991	n.a.	n.a.	0.871	2.776	n.a.	n.a.
	Italy	18/03/1991	n.a.	n.a.	-0.237	-0.790	n.a.	n.a.
x	Italy	29/05/1991	n.a.	n.a.	0.285	1.224	n.a.	n.a.
	Italy	21/06/1991	n.a.	n.a.	0.644	2.548	n.a.	n.a.
x	Italy	30/07/1991	n.a.	n.a.	-0.313	-1.216	n.a.	n.a.
	Italy	10/03/1992	n.a.	n.a.	-0.152	-0.624	n.a.	n.a.
	Italy	07/08/1992	n.a.	n.a.	0.164	0.482	n.a.	n.a.
	Italy	12/10/1992	n.a.	n.a.	-0.192	-0.545	n.a.	n.a.
	Italy	20/10/1992	n.a.	n.a.	-0.036	-0.102	n.a.	n.a.
	Italy	27/09/1993	0.046	0.192	0.052	0.200	-1.010	-1.202
x	Italy	30/09/1993	-0.279	-1.177	-0.038	-0.149	-1.066	-1.262
	Italy	27/10/1993	-0.158	-0.640	0.343	1.384	n.a.	n.a.
	Italy	25/11/1993	-0.060	-0.190	0.087	0.339	-0.311	-0.424
	Italy	01/12/1993	-0.232	-0.703	-0.096	-0.370	0.854	1.189
	Italy	14/03/1994	-0.394	-1.232	-0.252	-0.871	-0.498	-1.228
x	Italy	16/03/1994	0.012	0.039	-0.243	-0.770	-0.547	-1.045
	Italy	21/09/1994	-0.080	-0.396	-0.168	-0.609	-0.240	-1.191
	Italy	28/09/1994	0.434	2.242	0.384	1.470	-0.072	-0.382
	Italy	14/10/1994	-0.083	-0.452	0.021	0.077	-0.035	-0.176
	Italy	18/10/1994	-0.130	-0.699	0.198	0.718	-0.033	-0.172
	Italy	06/03/1995	-0.238	-0.854	-0.389	-1.377	-0.147	-0.779
	Italy	03/04/1995	-0.226	-0.837	0.236	0.908	-0.162	-0.873
	Italy	06/04/1995	-0.477	-1.943	-0.355	-1.395	-0.233	-1.353
x	Italy	11/04/1995	-0.280	-1.130	0.224	0.859	-0.035	-0.193
x	Italy	20/10/1995	-0.177	-0.485	0.562	2.361	-0.001	-0.002
x	Norway	12/06/1990	n.a.	n.a.	-0.229	-0.775	n.a.	n.a.
	Norway	21/05/1993	n.a.	n.a.	0.010	0.027	-0.497	-1.450
	Norway	04/10/1994	-0.157	-0.468	-0.186	-0.657	0.242	0.723
	Switzerland	04/11/1994	n.a.	n.a.	-0.037	-0.182	-0.122	-0.571

Table 10: Evidence from Local Strikes in the U.S.

This table shows the impact on trading activity of three local newspaper strikes occurring in the U.S.. The events are the November 3rd, 1994-San Francisco strike, the July 14, 1995-Detroit strike, and the May 18, 1992-Pittsburgh strike. The variable of interest is *abnormal local trading volume* in a striking city, measured relative to the rest of the country as $AVol_{k,t} = \ln\left(Vol\$\_Strike_{k,t} / Vol\$\_NoStrike_{k,t}\right)$, where $Vol\$\_Strike_{k,t}$ denotes the dollar trading volume aggregated over all investors located within a 100 km radius from the striking city, and $Vol\$\_NoStrike_{k,t}$ denotes the dollar trading volume aggregated over all investors located outside the striking city. The event-study is performed using a 100-day estimation window centered on the strike day. Statistics for the whole sample of events for equally-weighted averages are displayed in Panel A. The table shows, for abnormal local volume, the mean and median difference on newspaper strike days relative to the other days in the estimation window, the statistics and *p*-values for the Patell (1976) test and for Corrado (1989) rank test. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Panel B lists event-study statistics by event. It displays the difference in abnormal local trading volume on the newspaper strike day relative to their average over the estimation window ("raw difference"), and this difference divided by the standard deviation of the variables over the estimation window ("standardized difference").

Panel A: Overall

	Abnormal Local Volume	
Mean	-0.859	
Median	-0.687	
Patell Stat	-2.195	**
p-value	0.028	
Rank Stat	-1.631	
p-value	0.103	
Events	3	

Panel B: By Event

		Abnormal Local Volume	
City	Date	Raw difference	Standardized difference
Detroit	14/07/1995	-1.657	-2.068
Pittsburgh	18/05/1992	-0.687	-0.860
San Francisco	03/11/1994	-0.235	-0.874