Ferretti et al., *Cogent Economics & Finance* (2016), 4: 1142847
http://dx.doi.org/10.1080/23322039.2016.1142847

cogent economics & finance

FINANCIAL ECONOMICS | RESEARCH ARTICLE

Can an unglamorous non-event affect prices? The role of newspapers

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Received: 23 October 2015
Accepted: 13 January 2016
Published: 10 February 2016

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Reviewing editor:
David McMillan, University of Stirling, UK

Additional information is available at the end of the article

Abstract: Our paper offers evidence that the print media can affect stock prices by covering public information. After price-to-book value figures of Italian listed shares were first published on the major national financial newspaper, the prices of value stocks did, on average, show a positive reaction. The price reaction was limited to small caps stocks and disappeared within three weeks. Over the period of analysis, we could not find any abnormal behaviour of the returns of small and value stocks on other European markets. These findings support the view that newspapers play a role in disseminating information to small investors and grabbing their attention, even if news are continuously realeased by faster and more sophisticated media.

Subjects: Econometrics; Investment & Securities; Psychological Science

Keywords: market efficiency; inattention; media and financial markets; event studies; wild boostrap

JEL Classifications: G14; C58

1. Introduction and main findings

Financial markets feed on information. Investors set the intrinsic value (also known as the fair value) of financial assets, and consequently decide whether to buy or sell, on the basis of their expectations on issuers' business fundamentals and on the macroeconomic context. Expectations depend on the quality and quantity of information available and on the investors' ability to process it correctly. The role played by information is so important that one of the criteria for evaluating the efficiency of financial markets is based on how it is reflected in market prices, as expressed in Fama's well-known definitions of efficiency (Fama, 1970).

ABOUT THE AUTHORS

Andrea Cipollini research interests are in the area of the empirical analysis of financial fragility issues. In particular, he has done empirical work on the determinants of financial turmoil for banks, currency markets and sovereign government, including spillover analysis. The research activity of Riccardo Ferretti deals mainly with financial market efficiency, behavioral finance and bank's valuation. The research activity of Francesco Pattarin deals mainly with financial market efficiency, behavioral finance and credit risk.

PUBLIC INTEREST STATEMENT

Our paper offers evidence that the print media can affect stock prices by covering public information. After price-to-book value figures of Italian listed shares were first published on the major national financial newspaper, the prices of value stocks did, on average, show a positive reaction. The price reaction was limited to small caps stocks and disappeared within three weeks. Over the period of analysis, we could not find any abnormal behaviour of the returns of small and value stocks on other European markets. These findings support the view that newspapers play a role in disseminating information to small investors and grabbing their attention, even if news are continuously realeased by faster and more sophisticated media.

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Relevant information for investors consists of fresh news not yet reflected in securities prices. Since this kind of information can have important effects on prices, its release is usually referred to as an 'event'. According to the market efficiency theory, only fresh news affect prices; however, the financial literature has documented many anomalies in this respect.

Huberman and Regev (2001) provide a macroscopic example that the press is able to influence prices even by publishing contents that can be considered as 'non-events', because they do not add to or improve on currently available information. The authors note that in response to the publication in the *New York Times* of Sunday, 3 May 1998, of an article about the potential development of a new cancer drug, there was a significant, permanent growth in the stock price of the company concerned and, to a lesser extent, of the whole biotechnology sector, even though the news was far from fresh. Indeed, it had already been published several months earlier by the scientific journal *Nature*, taken up on the very same day by the popular press (*Newsdays* and the *New York Times* itself) and by some television programmes (*CNN's MoneyLine* and *CNBC's Street Signs*). Back then the stock price of the involved company rose strongly, but the variation was much lower than the surge generated by the 3 May article: +28.4% compared to +330%. The May article contained basically the same information as the former, but was given greater emphasis with regard to the spin, which was much more optimistic, and appeared as front-page news while the previous did not. Huberman and Regev's focus is on the efficiency of financial markets, and appear to interpret this story as showing that, by changing the emphasis, the press can trigger price reactions even by publishing news that are, strictly speaking, not such.

Also on the subject of non-events, Ho and Michaely (1988) claim that journalists' negative comments on a specific stock, which the authors assess as the mere reworking of public information, cause a significant price reduction from the day before to the day after the publication; also, price falls are particularly large for small companies.

Adding emphasis or controlling the degree of importance given to a specific news item is also viewed as critical by Dyck and Zingales (2003), who see this as the defining characteristic of the paper media. The authors analyse how the stock market reacts to the publication of earning announcements, conditioning on whether GAAP or pro-forma figures are stated first in newspaper articles. The degree of influence is found to be stronger when investors have few sources of information beyond the paper media (approximated by the number of financial analysts monitoring a specific company) and when the newspaper's reputation is good. These findings suggest that investors do consider the information conveyed by newspapers even if it has already been published or is available from other channels, and this can affect stock prices. According to the authors there may be various reasons for this: (a) even in the Internet age, sourcing information is expensive and the paper media broaden the audience of informed investors, (b) newspapers enjoy greater credibility than the web and (c) they convey shared knowledge, since each reader acquires not only information but also the awareness that it has been provided to a large number of other people. A further interesting finding by Dyck and Zingales is that the spin given to news by the press follows the lead of the sources; in other words, the press releases of listed companies are probably reported with positive spin to win favour with the issuers and thus obtain first-hand information more easily from it in the future.[1]

Outside the world of print newspaper, Engelberg, Sasseville, and Williams (2012) and Shabani (2012) document market reactions to TV broadcast stale information. Tetlock (2011) finds a market reactions to stories published on the DJ newswires with the release of information that is stale to some degree. All these papers uncover return reversals and that retail investors trade more aggressively than professional investors on second-hand news.

The aim of our paper was to provide evidence that the press may temporarily influence prices of small stocks by publishing news already of public domain even *without* adding emphasis to it or exercising any selective coverage. Since in Italy, retail investors play a key role in the trading of small stocks and newspapers are still their main means of acquiring information, simply publishing

second-hand raw facts may have an impact on the market. However, a non-event of this type tends to trigger only a delayed price reaction, because its initial attention-grabbing potential is low.

The discounting of emphasis and spin factors differentiates this work from those of Ho and Michaely (1988), Huberman and Regev (2001), and Dyck and Zingales (2003), making it unique, to the best of our knowledge, in the literature on the relationship between the media and asset pricing.[2] Actually, Gilbert, Kogan, Lochstoer, and Ozyildirim (2012) identify a general market reaction to the release of a stale summary statistics (the Conference Board US Leading Economic Index®—LEI), but their stale news is a macroeconomic information released on a predetermined schedule while our stale statistics (the PBV ratio) relates to individual stocks and its first time publication was unexpected.

Our study focuses on the Italian Stock Exchange, the European stock market with the lowest incidence of foreign demand and the highest incidence of individual investors in the ownership structure of the listed companies (Coraggio & Franzosi, 2008; Federation of European Securities Exchanges [FESE], 2007). More specifically, Coraggio & Franzosi (2008) show that, in Italy, the ratio of shares directly owned by households to the one indirectly owned (though mutual funds, pension funds and insurance companies) is equal to 4.7% and this ratio is higher than the one in other financially developed countries. Indirect channels of shareholding are preferred by the UK, Dutch and Danish households for which direct/indirect ratio falls below 1. In these countries, equity is held primarily through pension funds and insurance companies due to the expansion reached by institutional investors among households. Moreover, Coraggio and Franzosi (2008) show that institutional investors such as mutual funds, in Italy, exhibit the lowest percentage of assets invested in equity (20.6%). An opposition situation occurs in UK where mutual funds are characterized by a high propensity to equity (74%).

The opportunity that makes our analyses possible is that, on 1 March 2002, the most widely read Italian financial newspaper, *Il Sole 24 Ore*, started publishing the PBV ratio of all the stocks listed on the Borsa Italiana MTA ('Mercato Telematico Azionario', the main Italian electronic stock exchange) alongside the price-earnings, price-to-cash flow and dividend yield multiples it had already been printing for several years.[3] The multiples represent relative prices, which may make it easier to compare stocks, especially within the same economic sector. By looking at the multiples, for example, the reader can distinguish between 'value' and 'growth' stocks, and thus draw up investment strategies focusing on one category rather than the other.[4] Some people consider that multiples are also helpful for stock picking, i.e. for identifying mispriced stocks[5].

Since it is reasonable to assume that, thanks to the work of financial analysts and financial data providers, at least part of the market (securities brokers, professional and institutional investors) is already familiar with the multiples, regardless of whether or not they are published in the newspapers, it is fair to classify the publication of the PBV on *Il Sole 24 Ore* as a non-event and to expect not to observe any effect on stock prices after it.

However, our econometric analyses lead to reject this hypothesis. When we examine the returns on the two portfolios, each formed by 50 MTA stocks with, respectively, the highest and lowest PBV, some interesting evidence emerges. While during the weeks before 1 March 2002, both portfolios did not show any abnormal returns (ARs), from that day onwards the 50 low-PBV stocks gradually achieved a statistically significant extra performance, while the high-PBV portfolio did not show any anomalies.

The delayed and transitory price reaction of the low-PBV portfolio, which is mainly composed by small firms, along with the absence of negative reactions after the event in the high-PBV portfolio, consisting of firms whose average size is much larger, are precisely what should be observed if the most sophisticated investors were already aware of the information while retail investors were not. Indeed, low-PBV stocks are held mostly by individual investors, show high illiquidity and the lack of

analyst coverage (Phalippou, 2008); small and value stocks also have a disproportionately high retail trading intensity (Kumar & Lee, 2006).

2. Data and samples

In order to form the two portfolios of stocks with the highest and lowest PBV, we considered all common shares quoted on the MTA, the PBV ratio of which appeared for the first time in the *Il Sole 24 Ore* of Friday 1 March 2002, the day of the (non-) event. The 231 stocks that meet this criterion, out of a total of 237 listed common stocks, were arranged in decreasing order by PBV value. The top ranking 50 stocks formed the high-PBV portfolio ('Top50') and the bottom 50 the low-PBV portfolio ('Bottom50'); both portfolios are equally weighted (EW).[6] To reduce the risk of abnormal performance not related to the event, three stocks delisted within 12 months after the end of the event period (28 March 2002) were excluded. In order to keep the size of the two portfolios unchanged, the two stocks deleted from the *Top50* (Italgas and Ferretti) were replaced by those immediately below in the PBV ranking (Banca Intermobiliare and RAS) and the only stock deleted from the *Bottom50* (Marangoni) was replaced by that immediately above (Caltagirone). Panels A and B of Table 1 contain descriptive statistics of the two portfolios, computed for several multiples, market capitalization and trade size; the last two columns contain the *t*-test for the difference in the mean values and the *z*-score of Wilcoxon, Mann&Whitney for the differences between the medians.

There are significant differences between the *Bottom50* and the *Top50* not only with regard to the mean PBV level (0.68× compared to 4.50×) but also in two other multiples: a price-to-cash flow of 6.52× compared to 17.31× and a dividend yield of 3.47% compared to 1.93%. There is also a difference in price-earnings, with a mean value of 30.2× compared to 59.47×. With regard to size, the mean capitalization of the low-PBV companies is 10 times lower than that of the high-PBV firms: €729 million compared to €8,215 million; the gap between the median capitalization values is even greater, €93 million vs. €1,447. The mean trade size is also lower for the low-PBV companies: €2,902 compared to €10,867. These features point to the *Bottom50* stocks belonging to companies that are mainly small- and micro-caps, which makes them potentially attractive for retail traders; also, the statistics on multiples other then PBV clearly show their 'value' nature.

Since the *Top50* and the *Bottom50* stocks differ strongly in terms of size, we formed two EW portfolios, each matching their respective average market capitalization. These portfolios were used in the analyses to control for the possible interference of a size effect, which might induce the spurious detection of PBV-related anomalies if small-cap stocks outperformed the market during the sample period. The constituents of the control portfolios were selected from the 131 stocks with mid-range PBV by matching their individual market capitalizations as close as possible with the *Top50* and *Bottom 50* stocks on a pair-wise basis. Panel C and D of Table 1 contain descriptive statistics of the two control portfolios; the tests on the difference between the *Top50* portfolio and its control (Panel C) and between the *Bottom50* portfolio and its control (Panel D) are also displayed.

As the data reveal, there is not any statistical difference between the *Top50* portfolio and its control in terms of mean capitalization, though the companies in the *Top50* portfolio have a 70% higher average market value. The same holds with respect to the mean trade size. As expected, the *Bottom50* control portfolio has a significantly higher PBV (1.41× compared to 0.68×) and the *Top50* control portfolio has a significantly lower PBV (1.50× compared to 4.50×) than their respective counterparts. The control of the high-PBV portfolio do differ significantly in having greater price-earnings and price-to-cash flow, but a lower dividend yield, while the control of the low-PBV portfolio shows lower price-earnings and a price-to-cash flow whose statistical significance is limited to the *z*-score.

While the two control samples seem fit to control for a potentially confounding size effect, a similar issue arises because of the growth and value slant of the *Top50* and of the *Bottom50* portfolios. As their statistics reveal, control portfolios are not a viable solution to this problem, which we decided to address in two ways: (a) looking at the ARs of small&value stocks in other European

Table 1. Descriptive statistics of PBV portfolios and control samples

	Mean	Median	Min	Max	St_dev	Obs	*t*-Test	*z*-Score
Panel A: Top50 portfolio								
Price-earnings	59.47	27.63	6.72	696.96	116.07	45	1.40	4.24*
Price-cash flow	17.31	12.40	6.17	67.91	12.80	42	4.89*	5.96*
Price-to-book value	4.50	3.70	2.36	13.56	2.48	50	10.85*	8.61*
Dividend yield (%)	1.93	1.54	0.13	6.71	1.45	38	−3.87*	3.84*
Market cap (mln€)	8,215	1,447	30	63,718	14,707	50	3.57*	5.84*
Trade size (€)	10,867	6,581	800	63,469	12,491	50	4.35*	5.54*
Panel B: Bottom50 portfolio								
Price-earnings	30.20	13.72	0.96	387.24	67.82	34		
Price-cash flow	6.52	4.86	0.87	35.68	6.26	40		
Price-to-book value	0.68	0.71	0.21	0.89	0.16	50		
Dividend yield (%)	3.47	3.09	1.03	8.90	1.85	33		
Market cap (mln€)	729	93	9	11,999	1,975	50		
Trade size (€)	2,902	1,471	308	14,467	3,408	50		
Panel C: Top50 control sample								
Price-earnings	18.25	15.25	1.41	69.87	12.78	44	2.37^	4.57*
Price-cash flow	8.68	7.28	1.08	35.68	6.78	42	3.86*	5.18*
Price-to-book value	1.50	1.48	0.87	2.32	0.42	50	8.43*	8.61*
Dividend yield (%)	2.88	2.96	0.57	6.55	1.32	42	−3.05*	3.36*
Market cap (mln€)	4,835	1,404	30	41,025	9,080	50	1.38	0.60
Trade size (€)	7,557	5,210	167	28,429	6,588	50	1.66	1.04
Panel D: Bottom50 control sample								
Price-earnings	23.81	17.99	5.49	133.86	21.23	43	0.53	2.06
Price-cash flow	8.72	7.26	2.58	38.02	6.80	44	−1.54	2.59
Price-to-book value	1.41	1.34	0.90	2.32	0.38	50	−12.37*	8.61
Dividend yield (%)	3.01	2.67	0.95	7.44	1.42	35	1.14	0.91
Market cap (mln€)	679	91	8	9,593	1,697	50	0.14	0.24
Trade size (€)	3,540	2,246	67	25,527	4,521	50	−0.80	1.38

Notes: The Top50 (Bottom50) portfolio includes the first (last) fifty stocks by PBV ranking as of 2.28.2002. The Top50's (Bottom50's) control sample replicates the average market capitalization of the Top50 (Bottom50) portfolio. The stocks of the control sample are selected from the stocks with mid-range PBV on a pair-wise basis. Tests regarding the differences between means and between medians are in the last two columns: Top50 portfolio vs. Bottom50 portfolio in Panel A; Top50 portfolio vs. its control sample in Panel C; Bottom50 portfolio vs. its control sample in Panel D. Source: Il Sole 24 Ore of 1 March, 2002?. * and ^ denote the 1% and 5% significance levels, respectively. *z*-Score: Wilcoxon/Mann–Whitney.

countries around our event day; (b) using the Fama and French (1993) three-factor model as a robustness-check benchmark for computing ARs.

The daily returns from 5 February 2001 to 28 March 2002 were calculated for the *Top50* and *Bottom50* portfolios as well as for their controls. For each portfolio there is a total of 290 observations, 270 before the event date and 19 afterwards.[7] The daily return of each portfolio was calculated as the simple mean of the daily returns of its component stocks based on prices corrected for stock offerings and splits. All stock data used for this paper were collected from Datastream.

3. Research method

In order to ascertain whether the publication of PBVs produced any effects on stock prices, we have used the event study method in its traditional version and by regression analysis. The event period consists of the 20 trading days prior to the event date (the whole month of February 2002), the event date (1 March 2002) and the 19 trading days that follow the event date (2 to 28 March 2002).[8] Under the null hypothesis that stock prices went unaffected, ARs on the event date and over the following trading month are expected to be not significantly different from zero.

With the traditional approach, ARs over the time window $t \in [-20, +19]$ surrounding the event date $t = 0$ are defined as the simple difference of the daily returns on the given portfolio and its control sample:

$$\mathrm{AR}_{pt} = R_{pt} - R_{ct} \tag{1}$$

As a robustness check we have also computed ARs against the EW index of all stocks traded on the Borsa Italiana MTA. The literature has empirically shown that the returns on value-weighted indices lied below the efficient frontier (Haugen & Baker, 1991; Hsu, 2006). For the Italian stock market, EW portfolio are more efficient than value-weighted indices (Ferretti & Murgia, 1991). Therefore, we prefer to focus on EW portfolios less biased than value-weighted ones to finding evidence of ARs.

The statistical significance of each single AR is assessed by the standardized return statistic:

$$\mathrm{SR}_{pt} = \frac{\mathrm{AR}_{pt}}{\sigma(\mathrm{AR}_p)} \tag{2}$$

In order to avoid possible contamination of anomalous price variations over the event window (see Kothari & Warner, 2007 on the issue), the standard deviation of the ARs has been estimated by its sample analogue computed over the 250 trading days before the beginning of the event period itself (the 'estimation window').

Estimates have been adjusted with a four-lag HCCME correction for serial dependence in the time series of returns. Assuming that the ARs are *i.i.d.* random variables, the SR statistic is distributed as a Student's t with 249 degrees of freedom (Brown & Warner, 1985) for any t.

We have used (2) to test for anomalies on the day of the event and on each of the following four days. Furthermore, we have computed the cumulative abnormal return (CAR):

$$\mathrm{CAR}_{p(t_0,t_1)} = \sum_{t=t_0}^{t_1} \mathrm{AR}_{pt} \tag{3}$$

CARs have been examined over several periods in the event window: from $t_0 = -20$ to $t_1 = -1$ (the 20 days prior to the event), from $t_0 = 0$ to $t_1 = +4$ (the day of the event and the 4 following days), from $t_0 = 0$ to $t_1 = +9$ (from the day of the event to the 9th following day), and from $t_0 = 0$ to $t_1 = +19$ (approximately four trading weeks from the event date onwards). The statistical significance of the CAR values is checked using the Portfolio Test Statistics (Aharony, Saunders, & Swary, 1988)[9]:

$$\mathrm{PTS}_{p(t_0,t_1)} = \frac{\mathrm{CAR}_{p(t_0,t_1)}}{\sigma(\mathrm{AR}_p)\sqrt{t_1 - t_0 + 1}} \tag{4}$$

Under the previous assumptions on the ARs, the PTS distribution is approximately a standard normal.

The same methodology has been followed to uncover the potential presence of a widespread 'Small&Value' effect in other four European countries: France, Germany, Spain and United Kingdom.

In this case, the event study is based on MSCI price indices, and the ARs are day-by-day differences between the Small&Value index' return and the Small&Growth index' return. If the Small&Value indices showed a significant and positive extra-performance over the Small&Growth indices over the same days of our post-event period, we should conclude that the price reaction of our *Bottom50* portfolio could be spurious and not related to the publication of the PBV ratio, being the simple reflection of a general 'Value effect' among small stocks in the European markets.

Regression analyses have been performed by regressing daily returns of the *Top50* and the *Bottom50* portfolios on the following independent variables: (a) the daily returns of the EW stock market index; (b) a dummy for each day from 11 September 2001 to the end of the month in order to isolate the examination of the impact of PBV publication on prices from any possible contamination of that period of extreme market volatility on AR's estimation and testing; (c) a dummy for each of the 40 days of the event window; (d) the daily returns of the 'size' portfolio (SMB); (e) the daily returns of the 'value' portfolio (LMH).[10] CARs for each period of interest have been calculated by adding together the coefficients on the dummies associated to the days they comprised. Inference on the regression (cumulated) ARs are based either on the Wald test statistic, referring to its asymptotic distribution or to its wild bootstrap empirical distribution for critical values (see Davidson & Flachaire, 2008; and the 9.0 version of the software Eventus (2010)). In both cases, standard errors are estimated by White's robust HCCME.[11] All econometric details are provided in the appendix.

4. Results

Table 2 shows ARs of the *Top50* and *Bottom50* portfolios against their control samples (Panel A) and the EW-index (Panel B) for the pre-event trading month, the event day and each of the following four days, and periods of five, ten and twenty trading days starting from the event date; *p*-values are also displayed.

For the *Top50* portfolio there is not any evidence of anomalies both over the pre- and the post-event month.[12] Since most *Top 50* stocks are large-cap firms, evidence of any reaction would be strongly at odds with market efficiency, as the pricing of these stocks is unlikely to be affected by retail traders in any relevant way. A very different evidence emerges for the *Bottom50* portfolio, because from the day of PBVs publication large and positive abnormal performances are observed. The CARs are strongly significant for the two longer time intervals, adding up to about 6% over a month for those based on the control sample. The positive abnormal performance in day +1 and the negative abnormal performance over the previous month lay on the border of significance.

If the publication of the PBV is taken as informative by retail investors whose trading influences small-value stock prices, then this first evidence raises some questions. Why does the *Bottom50* portfolio react so slowly? The first highly statistically significant AR appears on day +5. Why does the reaction of the *Bottom50* portfolio last such a long time, from the second to the fourth week after the event? Is there a market trend favourable to small-value stocks that has nothing to do with the event?

Actually, a market trend in favour of small value stocks shows up in the dynamics of the trading volume of our two portfolios. Figure 1 illustrates the market adjusted abnormal turnover of the *Top50* and the *Bottom50* portfolios over the event window.[13] A relevant shift in the trading activity from growth stocks (*Top50*) to small value stocks (*Bottom50*) is observable in the post-event period: the magnitude of the abnormal turnover strongly increases in both portfolios but with a negative sign for the former and a positive sign for the latter.

For sure, this shift in the investment style preferences (from growth to value stocks) seems to be a peculiarity of Italy. The data of Table 3 reveal that, in the post-event period, the index of 'Small&Value' shares does not statistically outperform the index of 'Small&Growth' shares in any of the four examined European countries. This evidence supports the hypothesis that the positive abnormal performance of the *Bottom50* portfolio is rooted in the publication of the PBV ratio.

Table 2. Event study of Top50 and Bottom50 portfolios

	Top50		Bottom50	
	Value (%)	*p*-Value	Value (%)	*p*-Value
Panel A: against control sample				
CAR −20 to −1	0.48	0.818	−4.04	0.060
AR 0 (event day)	0.08	0.857	−0.03	0.960
AR +1	0.13	0.780	0.93	0.055
AR +2	0.07	0.873	−0.21	0.660
AR +3	0.20	0.660	0.61	0.205
AR +4	0.26	0.569	0.65	0.178
CAR 0 to +4	0.74	0.465	1.94	0.070
CAR 0 to +9	−0.59	0.682	4.42	0.004
CAR 0 to +19	−0.35	0.865	5.82	0.007
Panel B: against EW-market index				
CAR −20 to −1	0.77	0.675	−2.66	0.049
AR 0 (event day)	0.22	0.583	0.00	0.992
AR +1	0.38	0.348	0.58	0.056
AR +2	−0.07	0.857	−0.04	0.889
AR +3	0.30	0.466	0.15	0.625
AR +4	0.13	0.742	0.53	0.081
CAR 0 to +4	0.96	0.289	1.21	0.072
CAR 0 to +9	−0.70	0.582	3.33	0.001
CAR 0 to +19	−0.94	0.603	3.74	0.005

Notes: The Top50 (Bottom50) portfolio includes the first (last) fifty stocks by PBV ranking, as of 2.28.2002. The control samples replicate the average market capitalization of the Top50 and the Bottom50 portfolios. The stocks of the control samples are selected from the stocks with mid-range PBV on a pair-wise basis. The equally weighted market index is the simple average of prices of all stocks traded on the Italian Stock Exchange. Abnormal returns (AR) are simple day-by-day differences from the control sample (EW-Index). All abnormal returns are cumulated (CAR) for any period but for the event day and the following four days. *p*-Values from Student's *t* for daily abnormal returns and from standardized normal (*z*) for CARs. The standard deviation of the abnormal returns' time series is computed by using a Newey–West correction for serial dependence.

Figure 1. Abnormal turnover.

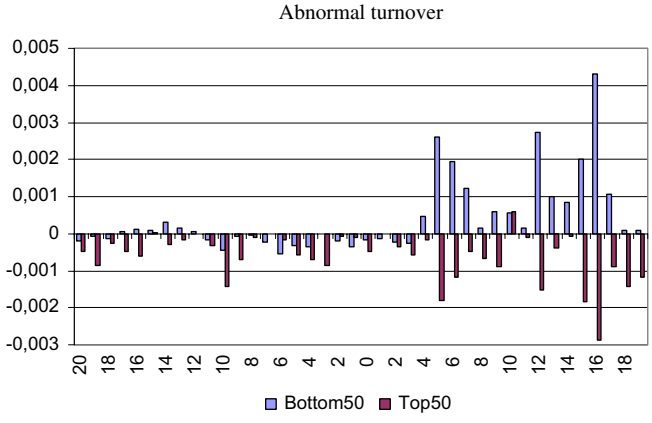

Table 4 shows the CARs obtained controlling for the size and the value effect through Fama and French (1993) three-factor pricing model. The statistical significance of each CAR is assessed through the Wald test statistics which is compared to its asymptotical distribution, as well as to the more

Table 3. Event study of Small&Value Index vs. Small&Growth Index

	Value (%)	*p*-Value	Value (%)	*p*-Value
	France		Germany	
CAR −20 to −1	3.33	0.358	1.82	0.736
AR 0 (event day)	0.02	0.977	0.00	1.000
AR +1	−0.34	0.676	−0.38	0.756
AR +2	0.31	0.703	0.43	0.721
AR +3	−0.22	0.790	−0.28	0.816
AR +4	0.32	0.695	−0.45	0.712
CAR 0 to +4	0.10	0.958	−0.67	0.804
CAR 0 to +9	1.06	0.679	0.07	0.985
CAR 0 to +19	−0.40	0.912	0.40	0.942
	Spain		United Kingdom	
CAR −20 to −1	5.22	0.029	5.17	0.052
AR 0 (event day)	−0.72	0.176	0.01	0.983
AR +1	−1.05	0.049	0.02	0.969
AR +2	−0.17	0.751	0.15	0.803
AR +3	−0.73	0.174	−0.13	0.826
AR +4	0.43	0.419	−0.19	0.753
CAR 0 to +4	−2.24	0.061	−0.13	0.920
CAR 0 to +9	−2.58	0.126	0.88	0.638
CAR 0 to +19	−3.19	0.181	1.06	0.689

Notes: Abnormal returns (AR) are simple day-by-day differences between the Small&Value shares' return and the Small&Growth shares' return (MSCI price indexes). All abnormal returns are cumulated (CAR) for any period but for the event day and the following four days. *p*-Values from Student's *t* for daily abnormal returns and from standardized normal (*z*) for CARs. The standard deviation of the abnormal returns' time series is computed by using a Newey–West correction for serial dependence.

Table 4. Three-factor model's abnormal returns

	Top50				*Bottom50*			
	CAR (%)	Test			CAR (%)	Test		
		W	*W1*	*W2*		*W*	*W1*	*W2*
−20 to −1	0.23	0.5198	0.7836	0.7722	−1.39	0.0340	0.3722	0.3644
0 (event day)	−0.07	0.0151	0.3370	0.5138	0.10	0.0009	0.3398	0.4894
+1	−0.14	0.0159	0.3120	0.5058	0.62	0.0000	0.2736	0.4758
+2	0.00	0.6131	0.6484	0.6602	−0.05	0.0274	0.4116	0.4906
+3	−0.09	0.0424	0.3460	0.5042	0.21	0.0000	0.3030	0.4764
+4	0.03	0.5369	0.5966	0.6108	0.54	0.0417	0.2886	0.3886
0 to +4	−0.26	0.1033	0.3106	0.3052	1.42	0.0000	0.0758	0.0748
0 to +9	−1.24	0.0000	0.1214	0.1296	3.01	0.0000	0.0116	0.0104
0 to +19	−0.88	0.1592	0.4080	0.4138	2.69	0.0000	0.1816	0.1988

Notes: The Top50 (Bottom50) portfolio includes the first (last) fifty stocks by PBV ranking, as of 2.28.2002. The three factors are: the Equally Weighted Market Index of the Italian Stock Exchange, the SMB portfolio, and the LMH portfolio. SMB and LMH portfolios are formed following Fama and French (1993); since we base the analysis on the price-to-book ratio the Low Minus High (LMH) portfolio replaces the High Minus Low (HML) portfolio. All abnormal returns are cumulated for any period but for the event day and the following four days. The values reported in the columns with label Test are the Wald test *p*-values based on the White robust HCCME (described in equation A.3), and using either the asymptotic *F* distribution (*W*), or the wild boostrapped distribution driven by a two-point distribution for the ε_t^* (*W*1), or the wild bootstrapped distribution driven by a Rademacher distribution for the ε_t^* (*W*2).

robust wild bootstrap distributions. The new evidence confirms the lack of significant ARs pre- and post-event for the *Top50* portfolio, while revealing some differences for the *Bottom50* portfolio. The CAR for the *Bottom50* portfolio is statistically insignificant over the pre-event window. A statistically significant reaction of the low-PBV portfolio CAR occurs during the event day and it ends at $t = +9$, after 10 days from the event. Moreover, a modest contribution to the assessed extra-performance comes from the CAR of the first five days, which is only weakly significant.

The regression-based ARs in Table 4 provide strong evidence that the *Bottom50* portfolio reaction went beyond any underlying value trend, and that it had a temporary nature. These elements support some preliminary conclusions: (a) something happened that affected the pricing of small-value stocks, but not the pricing of growth stocks, though (b) it had not any real informative content since the effects of the initial market reaction were eliminated in just a couple of weeks: the 0 to +19 CAR is 32 bp less than the 0 to +9 CAR and non-statistically significant. This evidence is what we should expect when uninformative news influences the buying decisions of naïve investors, whose trades make small stocks overvalued and trigger sales by professional traders. The *Bottom50* abnormal turnover behaviour (Figure 1) supports this explanation: a first wave of heavy trading occurred from day +4 to day +10, with a simultaneous positive surge in prices, and a second wave of heavy trading, from day +12 to day +17, was associated with ARs disappearing.

What was the event that temporarily influenced the *Bottom50* portfolio? Could it be the PBV publication, despite a delayed reaction of four trading days? There are some arguments that make it more than plausible the hypothesis that the information about the PBV multiple was wrongly regarded as real news by small traders.

Reactions to news by small traders are documented in the literature to be more sluggish than reactions by institutional investors.[14] In contrast with the *Top50* portfolio, micro- and small-cap stocks, for which the average size of market orders is very low, mainly compose the *Bottom50* portfolio; large professional investors often neglect these stocks and, consequently, their pricing is more affected by the decisions of small traders.[15]

Individual investors suffer from cognitive biases in the information acquisition process that may reduce the speed of reaction to news; one of these distortions is inattention. DellaVigna and Pollet (2005) find that price and trading reactions to earnings announcements at odds with expectations occur later when the news appears on Fridays than on any other day of the week. The study provides evidence that data published on Fridays refer to companies with average size smaller than that of companies which issue earnings statements on other days of the week; also, delayed reactions to Friday news become insignificant when the size of companies is closer to average. These findings may indicate that the attention gap mainly affects small investors, as long as the incidence of trading by professional investors tends to decrease with the issuer's size.[16] This evidence is particularly important in our context, since the day in which the publication of the PBV started was a Friday.

It is worthwhile remarking that while attention can be obtained through emphasis from professional as well as retail investors, in our case the publication of PBVs was not a glamorous event; it was just the addition of two more columns in a table with 197 rows and 46 columns published on the last page of the newspaper. Also, according to some research, inattention for a quite long time can even be a rational behaviour when investors face information and transactions costs (Abel, Eberly, & Panageas, 2013); these costs are undoubtedly higher for small than for large investors. Experimental findings suggest that individual investors, on average, check their portfolios once a year (Benartzi & Thaler, 1995). Inattention is also greater during periods when markets are falling (Hou et al., 2006).[17] The publication of PBVs on *Il Sole 24 Ore* occurred when the Italian stock market index had declined by 20% in the previous 12 months. However, our data show that in the post-event trading month the market experienced a price increase of 9.2%, as measured by the EW index, and of 6.3% according to the value-weighted Comit Global Price Index; also, its trend was flat during the pre-event trading month. Argentesi et al. (2010) find that, over the 1978–2003 period, the Italian stock market index

and the number of *Il Sole 24 Ore* sold copies, excluding subscriptions, followed the same trend, and that the former predicts the latter. According to the authors, non-professional investors tend to buy newspapers when stock prices are high and do not buy them when prices are low. On the other hand, more newspaper sales are not found to be systematically correlated with an increase in trading activity.

Concerning the interpretation of our results, these finding are coherent with more small investors buying Il Sole 24 Ore in the post event month, thus increasing the potential diffusion of the information on PBVs among them.[18] However, the attitude to inattention of small investors and their sluggishness in trading on news could explain the observed delay in price reaction (Peng, 2005).[19]

5. Conclusions

With effect from 1 March 2002, *Il Sole 24 Ore*, Italy's leading economic and financial newspaper, started to publish the PBV ratio of the stocks listed on the Italian Stock Exchange on a daily basis. In principle, the publication of these data in the paper media should not have had any significant effect on stocks' performance. The multiple is based on public information (the net book value and market price) easily accessible to professional investors, and is also normally distributed to them by specialist data providers, or contained in the reports they receive from financial analysts. Therefore, the stock prices of an information-efficient market should have already reflected any significant information contained in the PBV figures and stock prices should not have reacted to the publication of the multiple in the newspaper in any way.

However, our research reveals an average increase in the price of the 50 stocks with the lowest PBV values, mainly small- and micro-caps, that cannot be attributed to market dynamics only. Indeed, this phenomenon is not observed in other European stock markets over the same period. The extra-performance disappears two weeks after the event. This variation is consistent with the hypothesis that some investors considered the published PBVs as providing valuable information and consequently increased their demand for low-PBV stocks believing that they were, on average, undervalued, though that information was actually already embedded in the stock prices. Conversely, the portfolio of the 50 stocks with the highest PBV, mainly large and medium caps, did not show any reaction.

Therefore, size appears to be a factor that can account for the observed extra-performance after the publication of the multiple in the newspaper. We believe that this is because of the (relatively) important role of small traders on the market for small-cap stocks. These stocks normally receive only limited attention from institutional investors; they often feature low liquidity and a low frequency and size of trades, so that the activity of small, non-professional investors can play an important role in setting market prices.

This explanation can be supported by two arguments. First, it is likely that most small traders did not know the PBV figures before their publication in the newspaper, because they have no access to the expensive channels through which these data are normally available to professional investors; for small investors those figures were probably genuine news. The second factor is that the price reaction observed after the first publication date occurred only few days later and continued over a week. On the basis of previous research, this kind of price dynamics strongly points to the importance of small traders on the market since, unlike professional investors, they normally show some inertia in reacting to news, often causing momentum effects in price variations.

The results of our research provide empirical evidence supporting the hypothesis that newspapers can influence prices by publishing information which is not new, but is effectively distributed only among some market participants. Furthermore, our study differs from previous work on the subject in showing that the influence of newspapers on stock prices does not necessarily depend on the reworking of information, the emphasis or the spin with which it is presented to readers. Even the simple publication of a raw figure like the PBV ratio can have significant, though transitory, effects

on prices. These conclusions reinforce the claim that, as already put forward by other authors, newspapers are still a significant information channel for small investors, due to their low costs and wide distribution, in spite of the competition of radio, television, the electronic media and the Internet.

Funding
The authors received no direct funding for this research.

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Citation information
Cite this article as: Can an unglamorous non-event affect prices? The role of newspapers, Riccardo Ferretti, Andrea Cipollini & Francesco Pattarin, *Cogent Economics & Finance* (2016), 4: 1142847.

Notes

1. Dyck and Zingales (2003) call this explanation for a positive spin 'quid-pro-quo' theory. For other theories of media bias see Baron (2006), Besley and Prat (2006), Mullainathan and Shleifer (2005), Gentzkow and Shapiro (2006).
2. See also the recent study of reaction of Italian stocks to attention grabbling stale information by Cervellati, Ferretti, and Pattitoni (2014)
3. On *Il Sole 24 Ore* absolute leadership in the Italian financial daily press sector, see data provided in Argentesi, Lütkepohl, and Motta (2010). The multiples published by *Il Sole 24 Ore* are historic figures since they are based on the data reported in the last financial statement approved by the General Shareholders Meeting.
4. For empirical evidence on the 'value premium' see, among others: Basu (1977), Fama and French (1993), Davis (1994), Davis, Fama, and French (2000), Adrian and Franzoni (2004), Ang and Chen (2007).
5. On the profitability of investing in stocks with low PBV and on the precautions to be taken when using this multiple as a stock picking tool, see above all Damodaran (2004, Chapter 4).
6. The use of portfolios with 50 stock is in line with existing studies, see for instance Kolari and Pynnnen (2011), following the design set-up by Brown and Warner (1985), drawing, in their simulation study, portfolios with a maximum size set equal to 50 stocks.
7. The *Top50* portfolio includes four shares with less than 270 pre-event observations: Juventus (46 observations), Amplifon (170), Air Dolomiti (181), Lottomatica (200).
8. Since the percentage of negative returns for the TOP50 portfolio is 47%, while the one associated with the BOTTOM50 portfolio is 51%, we exclude that portfolio stock returns for BOTTOM50 arrive from very few stock returns.
9. On significance tests for ARs, see also Brown and Warner (1985), Mikkelson and Partch (1986), Hannan and Wolken (1989), DeLong (2001). For a survey of the event studies methodology, see MacKinley (1997).
10. The 'size' and the 'value' portfolios for the Italian market are formed following the Fama and French (1993) procedure. Both factors are statistically significant in our regression. Since we base the analysis on the price-to-book ratio the Low Minus High (LMH) portfolio replaces the High Minus Low (HML) portfolio.
11. See Arghyrou and Gregoriou (2007) and also Sajjad, Coakley, and Nankervis (2008) for financial econometrics applications of the wild bootstrap beyond event study analysis.
12. Similar tests were run on sub-intervals of the pre-event period that also confirmed the absence of any anomalies in excess returns.
13. The abnormal volumes are derived from the estimation of the regression equation:
$$T_{pt} = \alpha + \beta T_{mt} + \sum_{i=-20}^{19} \gamma_i D_i + u_t$$
where T_p is the daily turnover of either the *Top50* or the *Bottom50* portfolios, T_m is the stock market's daily turnover (defined as the EW average of individual stocks' turnover) and D_i are the event-window dummy variables, so that estimated gamma's measure abnormal volumes. Turnover is defined as the ratio of the number of shares traded in a given day to the number of outstanding shares.
14. See: Cready (1988), Lee (1992), Battalio and Mendenhall (2005), Shanthikumar (2012), Lamont and Frazzini (2007).
15. On this point see Bhattacharya (2001). To sum up the concept, Bhattacharya (2001, p. 222) states: 'On average, wealthier and more informed investors are likely to make larger trades, whereas less wealthy and less informed investors are likely to make smaller trades'. The author also notes that small trades refer above all to the stocks of firms with only a limited amount of public information, such as small firms. Moreover, according to Baker and Wurgler (2007), small company size is one of the typical features of stocks most affected by investor sentiment and thus by behavioural biases. Sarin, Shastri, and Shastri (2000) find that average transaction size is larger in firms with higher institutional ownership.
16. Other examples of inattention are documented in Francis, Pagach, and Stephan (1992), Bagnoli, Clement, and Watts (2005), DellaVigna and Pollet (2009), Hirshleifer, Lim, and Teoh (2009), Hou, Xiong, and Peng (2006). According to Barber and Odean (2008), individual investors face serious search problems in buying decisions, while selling decisions are much easier; a way to simplify the buying decision is to focus on attention-grabbing securities. As a consequence, events capturing the investors' attention tend to induce more buying than selling. The asymmetric performance of the Top50 and the Bottom50 portfolios may also reflect this kind of investors' bias.
17. Inaction when stock prices are low is also put forward by Karlsson, Loewenstein, and Seppi (2009), who note that investors tend to check their portfolios more often when stock prices are rising than when they are falling.
18. One referee suggested that we should control for the role played by competing news. We argue that this type of robustness check would affect our empirical findings only in the unlikely case of competing news prevailing in one of the two portfolios.
19. Sluggish price variations can also be explained by the distracting effect of a large number of announcements mainly affecting small stocks (Hirshleifer et al., 2009).

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Appendix

Estimation and inference on CARs

With the regression method, abnormal returns are computed from the linear regression equation:

$$R_t = \alpha + \beta_1 R_{mt} + \beta_2 \mathrm{SMB}_t + \beta_3 \mathrm{LMH}_t + \sum_{i=1}^{N} \gamma_i D_i + u_t \tag{A.1}$$

where the coefficients are estimated by ordinary least squares. Beta's are the coefficients associated with the Fama and French (1993) three factors, while gamma's on the *D* dummy variables, one for each day of the event window, have been inserted to account for event-related anomalies in portfolio returns. This regression was estimated on the whole data-set (i.e. estimation window and event window), since the dummies warrant that estimates of alpha and beta's are not affected by the values of any event-period return. In order to control for the influence of extreme September 2001 volatility, we augmented our basic regression equation by dummying out all September days from Tuesday 11th onwards. Then, CARs can easily be computed as sums of the appropriate gamma estimates, and hypothesis testing on the event effects conducted with the Wald test (Greene, 2003, Chapter 5).

For inference purpose, we use the following Wald test statistics, which follows a chi-squared distribution with degrees-of-freedom equal to the number of zero restrictions on the gammas:

$$W = (C\theta)'(C\Omega_{\mathrm{HCCME}}C')^{-1}(C\theta) \tag{A.2}$$

where theta is the k-dimensional vector of all parameters entering the unrestricted regression (A.1) and C is the $1 \times k$ matrix designing the restrictions. To avoid making inference based on a biased estimate of the parameters' covariance matrix due to heteroscedasticity in the time series of returns, the Wald test statistics is constructed using the Heteroscedastic Consistent Covariance Matrix Estimator (HCCME) given by:

$$\Omega_{\text{HCCME}} = \left(X'X\right)^{-1} X'\Omega X(X'X)^{-1} \tag{A.3}$$

where the estimated $T \times T$ diagonal matrix Ω has as a constant element $a_t^2 \hat{u}_t^2$ with $\hat{u}_t$ being the OLS residual from the unrestricted regression (A.1). If the scalars a_t are set to unity the HC_0 version of the White robust covariance matrix estimator obtains, while setting a_t to $\sqrt{n(n-k)^{-1}}$ gives the HC_1 version, which is adjusted for finite samples. However, as shown by Flachaire (2005) and by Davidson and Flachaire (2008), hypothesis testing could still be affected by size distortions when using the HCCME on small samples even in the HC_1 version. Therefore, we follow the suggestions of Flachaire (2005) and by Davidson and Flachaire (2008) and use wild bootstrapping to compute the finite-sample distribution of the Wald test statistics. The bootstrap series of artificial returns are generated through the equation:

$$R_t^* = X_t \tilde{\beta} + a_t \tilde{u}_t \varepsilon_t^* \tag{A.4}$$

where $\tilde{\beta}$ and $\tilde{u}_t$ are the OLS estimated coefficients and residuals from the restricted linear regression model (i.e. the model with all gamma's set to zero). Following Davidson and Flachaire (2008), the ε_t^* are white noise innovations artificially generated from either the two-point distribution:

$$F_1{:}\varepsilon_t^* = \begin{cases} -\left(\sqrt{5}-1\right)/2 & \text{with probability } p = \left(\sqrt{5}+1\right)/\left(2/\sqrt{5}\right) \\ \left(\sqrt{5}+1\right)/2 & \text{with probability } (1-p) \end{cases}$$

or from the Rademacher distribution:

$$F_2{:}\varepsilon_t^* = \begin{cases} 1 & \text{with probability } 0.5 \\ -1 & \text{with probability } 0.5 \end{cases}$$

The bootstrap resampling is carried out on $\tilde{u}_t \varepsilon_t^*$ over 5,000 replications. The Wald test statistics corresponding to the mth replication is:

$$\tilde{W}^m = (C\tilde{\theta}^m)'(C\tilde{\Omega}^m_{\text{HCCME}} C')^{-1}(C\tilde{\theta}^m) \tag{A.5}$$

where the θ and Ω estimates are from the unrestricted OLS regression associated with the mth bootstrap replication generated by equation (A.4). This procedure provides the empirical distribution for the Wald test based upon the HCCME estimator. Therefore, the bootstrap p-value of W is computed as:

$$p = \frac{1}{B} \sum_{m=1}^{B} I(W^m > W)$$

where B = 5,000 and $I(\cdot)$ is the indicator function, that takes value one when the Wald statistics corresponding to the mth replication (W^m) is greater than the Wald test statistics (A.3) from the unrestricted OLS regression, and value zero otherwise.

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