

**News Events and Price Movements.
Price Effects of Economic and Non-Economic Publications
in the News Media**

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Abstract

Numerous empirical studies have demonstrated that asset prices react rapidly, if at all, to news published in the mass media. In many cases, the information has been discounted and prices have already moved upon primary publication through news wires, press releases or firm announcements. Any remaining information is usually quickly priced in after dissemination through the mass media. But not always: Often enough delayed price adjustments, underreactions as well as overreactions, can be observed after particular news reports have been published. This points to inadequacies in the efficient markets hypothesis *as well as* in Behavioral Finance theories: Delayed reactions appear too often to be explained away as “anomalies” within models of rational pricing. But they appear too erratically to be explained as “normalities” such as in newer models of systematically irrational pricing. In other words: Asset prices frequently do not react to news published in the media. Sometimes they do. The evidence leads to the following conclusion:

That markets can be efficient and inefficient at the same time.

News Events and Price Movements. Price Effects of Economic and Non-Economic Publica- tions in the Mass Media

Synchronization was perfect and after the event, commentators in the media shuddered to acknowledge it. The signs of destruction left no room for doubt about the perpetrators' intentions: The plan was to hit the core of capitalism, symbol and control center of the globalized economy, in a coolly calculated strike. The Northern Tower had just gone up in flames when many TV stations were already broadcasting live. At the moment when the Twin Towers collapsed, a good hour later, the international public had tuned in.¹ The whole world was watching as, on the sunny morning of September 11th 2001, the World Trade Center was reduced to a pile of rubble.

The tremendous speed of the realtime-conflict forces a rapid counter-reaction. The response of the world's financial markets is immediate and severe: The London Stock Exchange experiences the heaviest crash in its history, the FTSE 100-Index falls by 5.7 per cent. The CAC 40-Index in Paris loses 7.4 per cent. Also in Frankfurt, panic selling is reported and the DAX loses 8.5 per cent of its value – one of the largest daily price losses in its history. The Nikkei-Index in Tokio drops below 10,000 points for the first time since 1984.² In return, the prices for gold and crude oil sharply increase. The Dollar plunges. The shock waves of the news from New York shake markets around the globe.

No doubt: This is an emergency. Decision makers in the central banks are conscious of this fact: The U.S. Federal Reserve Bank, The European Central Bank, the Bank of Japan and many of their colleagues in the international prudential supervision and regulatory agencies hold crisis talks. They hasten to assure the markets that they will allocate the necessary funds in order to keep

international payment systems operational and avoid an imminent financial collapse. Interest rates are lowered, and substantial financial aid is dispensed to protect the industries directly concerned from the worst.³

Markets continue to vibrate for quite some time from the psychological shock of the terrorist attacks. In fact, the financial fallout at the target of the attack, Wall Street, is relatively small in comparison: Stockbroking does not even start on September 11th and remains closed for several days, which prevents immediate shock reactions. Hardly two months later, and thus much faster than many other international stock exchanges in regions far away from the explosion, the U.S.-indices reach the level they had before the attacks.⁴ But most other international indices recover in the medium term as well. It seems as if the serious price losses immediately after the attacks, particularly in Europe, were overreactions triggered by the shock.

Undoubtedly, it is the incredibility of the events “as such” that causes these overreactions. However, it is not physical violence alone that defines the significance of this world event, but also its psychological multiplication through simultaneous global broadcasting in the mass media. The whole world is watching, knowing that the rest of the world is watching. Accordingly, reactions are vehement. Although it is impossible to separate the event itself from its media broadcast – the two are inseparably intertwined –, there is a lot to be said for the fact that the specific quality of the cataclysm is due to its deliberate realization as a media event.⁵ In view of this, it is appropriate to assume an autonomous share of the media in these (over)reactions.

1. Introduction

A whole industry lives on it: Investment magazines, financial networks and business papers, even the general daily press, convey the impression that information selected and presented by them permits conclusions about future movements of the stock markets. The media as well as certain market observers seem to maintain that business news circulating in public have a significant, economically realizable and relevant information content. Some even suppose that business news provoke systematic price movements in the finan-

cial markets. As it seems, the media are not just observers, they are movers of markets.

“Knowing what will be important” is the slogan of the German edition of the *Financial Times*. “Facts make money” explains the German investment magazine *Focus Money*. “Profit from it” promises US finance television *CNBC*. Such slogans nurture the idea of news producers as visionary forecasters or powerful movers of markets. It is in the media’s commercial interest to convince the public that their news move stock prices. For the higher the potential of business coverage to forecast or influence stock prices, the higher the benefit that can be expected from intensive media consumption. This again increases the incentive to buy such media products.

Actual or supposed market manipulations also nurture the idea of the media as influential movers of stock prices: In numerous cases, business journalists or their contact persons in the industry were accused of having influenced investment behavior through well-directed publications of investment tips and exaggerated forecasts of price movements in order to manipulate the prices of certain market values.⁶ For some time, such attempts of instrumentalizing the press and television became the content of media coverage themselves.⁷ Supposed manipulation attempts in financial shows on television received particular attention.⁸

On the other hand, many investors had to realize with the breakdown of the New Economy that the potential of the business media to move stock prices is a lot smaller than individual cases of manipulation seem to suggest: While the media were still dreaming of a permanent stock market upswing, the financial markets crashed and shattered the hopes of many investors. But the journalists stuck to their positive message: Even in the middle of the stock market crisis, the number of buy recommendations by far exceeded the number of sell recommendations.⁹ Obviously, the business media neither serve as an early warning system nor as reliable forecasters or makers of stock prices. Is the published information not relevant to stock prices after all?

Despite self-confident statements of certain media or finance professionals, the actual quality of the interaction of markets and the media is far from being established. On the part of finance studies, the topic has received a lot of at-

tention, mainly in connection with the question how exactly information is processed in the financial markets. This is based on a very narrow definition of “information content” that reduces the term to news contents which provoke prompt stock price movements. Media studies has mostly analyzed the effects of business news from the point of view of a supposed influence on voters' behavior, thus in a political context, if at all.¹⁰ So far, the interaction of markets and the media has not been studied by this discipline.

In the following, the results of empirical research on the functioning of data processing in the financial markets will be extracted and examined in a qualitative meta-analysis. The goal is to understand the immediate effects of the media on financial markets. As a synthesis of the existing material will show, a long-term analysis reveals recurring patterns. There is a relationship between markets and the media, the media can have an effect on the markets. However, there is only a limited possibility of summarizing how this happens in universally applicable terms. The following questions are to be answered: Do news published in the mass media have an immediate effect on financial markets? And if yes, in which way?

2. State of the Art: "Random Walks" and "Irrational Exuberance"

Do news have price effects on the financial markets or not? This question is part of a central and heated debate in economics which is far from being settled. In numerous studies, exponents of empirical capital market research have come to the conclusion that new information is reflected in stock prices quickly and without considerable delay. This is why they call markets “efficient” and consider news to be generally ineffective.¹¹ Advocates of Behavioral Finance, however, document multiple cases of delayed price reactions after the arrival of new information and therefore describe the markets as “inefficient”.¹² They consider the news in the media to be potentially effective.

The theoretical premises of the two approaches and their implications could hardly be more different: As Paul Samuelson (1965) explains in his classic text “Proof That Properly Anticipated Prices Fluctuate Randomly”, the current price of a stock is the best estimate of its true value. If the correct future price was already known, according to Samuelson, the price would immediately

move into this direction. But this, precisely, is not the case. As a consequence, price fluctuations come about. The theory says, according to Eugene Fama's (1970) classic definition of the "efficient market hypothesis" „that security prices at any time 'fully reflect' all available information".¹³ A specification of this sentence shows that price formation in the financial markets follows a random walk.¹⁴ In brief: In a market reacting efficiently to information, stock price changes cannot be predicted.¹⁵

The concept of efficient markets implies that the analysis and evaluation of information available to the public does not promise above-average returns. If stock prices only react to future, i.e. unknown, data, accessible news, as they are disseminated by the mass media, are almost irrelevant to price formation. They are anticipated by the market. Price adjustments which have not been realized prior to publication take place without any delay.¹⁶ In a nutshell: The prices already "contain" the news. As a result, prices always represent an adequate reflection of fundamental values.¹⁷ An analysis of media contents in order to find future price patterns thus is obsolete because it would not create an additional value. For there are no future price patterns that could be derived.

Conclusions from newer, behavioral approaches are different: Behavioral Finance, which is based on findings from psychology, sociology and anthropology, has emphatically pointed out the existence of so-called "market anomalies". This is a term for price movements which seem to contradict the explanations of models of rational economic behavior.¹⁸ Factors in the market environment, according to these observations, seem to lead to deviations of prices from their rationally justifiable levels. Stock prices divert more or less strongly from fundamental values.¹⁹ Irrational exaggerations and price "bubbles" are possible consequences. In brief: Stock prices do not (always) follow a random distribution.

The considerations of Behavioral Finance imply that the reports of the news media can be relevant for stock prices. As stock prices under- or overreact to good or bad news, the mass media are of importance: because they intensify such market reactions or perhaps even provoke them themselves. Robert Shiller (1999) writes on this: "It appears as if stock prices overreact to some news [...] before investors come to their senses and correct the prices."²⁰ As far as they arouse public interest, influence public opinion and unify inves-

tor behavior, the media potentially are a central factor in understanding the dynamics of financial markets.

In sum: Finance research provides substantial evidence for the fact that media reports have an impact on stock prices. And it provides substantial evidence for the fact that media reports do *not* have an impact on stock prices.

Media research has dealt with the topic, if at all, from a different perspective: Special priority has been given to the problem of insiders in business coverage and potential conflicts of interest resulting from this.²¹ The reason for these studies were cases in which journalists, who were in close contact with actors in the financial markets and thus became *de facto* insiders, used their non-public knowledge for personal enrichment – for example by publishing stock recommendations for companies they had business relations with in order to make speculative gains.²²

Criticism of these occurrences is based on the assumption, which is at least implied, that the business media could have an influence on investor behavior. If the media were without influence, discussions about unethical behavior of journalists would be without practical relevance, since no negative consequences were to be expected from journalists breaching regulations. These negative consequences are insinuated, however, if one urges journalists to deal responsibly with their audience and warns of manipulations.²³ The scant approaches in media research in this regard therefore at least implicitly assume that news have at least a punctual effect on investor behavior and can lead to market distortions through manipulative influencing of investors.

Only recently have there been attempts to systematically analyze the interaction of markets and the media in communication research. Schuster (2000a and 2001c) provides solid evidence for the fact that the role of the mass media has to be taken into account for an understanding of the dynamics of financial markets. There is sufficient proof that cause-effect-relations which can be easily isolated are the exception rather than the rule. Extraordinary price movements after stock recommendations for example are only an exception. However, it can by no means be deduced that the media do not have any effect and that secondary information in the mass media does not have an influence on price formation. The media can produce manifest as well as latent effects.

3. News Effects: Rapid Return Reactions

Piles of studies of empirical financial market research make it evident: Delayed effects of news do not represent the norm. Even on days when “big events” dominate headlines in the media, according to Cutler, Poterba and Summers (1989), the price movements that occur are rather small most of the time. On the other hand, many of the largest market movements take place on days without significant events in the news. Generally speaking, it seems to be true that no systematic relationship can be established between the publication of business and other news in the media and consequent substantial stock price changes in the financial markets. Market prices fluctuate, but often the news are not very important. And vice versa.

This result has been and is still underpinned by exponents of the theory of efficient markets in a large number of event studies: Stock prices react quickly to new information, even before it is published by the news media. Effects of new information on stock prices in the form of systematic and delayed price reactions do not represent the rule. On the contrary: Fama, Fisher, Jensen and Roll (1969) already point out in their study on market reactions to stocks splits “that stock prices adjust very rapidly to new information.”²⁴ Shortly after the announcement of splits, the authors state, mostly within one day only, the relevant price adjustments have been carried out.²⁵ Therefore, it is usually impossible to achieve an abnormal gain by reacting to such data.

Ball and Brown (1968) look at market reactions to the publication of accounting income numbers in the *Wall Street Journal*. Their result: The major part of new information is anticipated in stock prices in the preceding months. The actual publication in the newspaper hardly has got any measurable effect.²⁶ “The market”, according to Dimson and Mussavian (2000), “appears to anticipate the information, and most of the price adjustment is complete before the event is revealed to the market. When news is released, the remaining price adjustment takes place rapidly and accurately.”²⁷ The conclusion from this is the following: That published information does not permit forecasts of stock price changes.

A multitude of event studies provide evidence for the speed with which the market really reacts. For example to companies' press releases: Patell and Wolfson (1984) demonstrate that price movements in connection with dividend and earnings announcements through the *Dow Jones News Service* set in prior to publication. The main boost in stock prices follows five to fifteen minutes after the publication. Sixty to ninety minutes later, price adjustments are for the most part concluded.²⁸ While earnings announcements at least seem to trigger significant price movements around the publication date, the reactions to dividend announcements are weak and only worth mentioning in case of dividend changes. If price movements occur at all after dividend announcements, these are carried out very quickly.

Similar results are available for the German market: Gerke, Oerke and Sentner (1997) investigate market reactions to the publication of dividend changes in business newswires and in the business paper *Handelsblatt* for the period from 1987 to 1994. Their findings show that stock prices react to dividend increases with abnormal returns of about one per cent on the same day; after that, there are no noticeable price fluctuations.²⁹ The situation is different, however, for negative surprises: Dividend decreases and dividend omissions are responded to with immediate declines in prices, but this reaction does not stop until several days later. In addition, it is striking that a significant share of the price adjustment only happens when the information has been disseminated in the press (and not after the agency report).

In many cases, the processing of information happens very quickly. Röder (2000a) comes to the conclusion that a certain type of company report, so-called ad hoc-announcements, are processed very smoothly for companies listed in the DAX. After the publication date, no abnormal price movements can be established. The price reaction sets in during the first 15 minutes after publication and the major part of it is completed within the first hour of trading.³⁰ Stock prices of smaller companies, however, can show delayed price reactions to company news, even on the day after the publication. But these theoretical excess returns that can be observed with hindsight can hardly be realized in practice since the transactions costs exceed the potential gain.

Positive firm announcements, according to the results of Woodruff and Senchack (1988) on the American market, are reflected especially rapidly in

stock prices. Mostly, they have already been anticipated at the time of their publication. May (1994) and Röder (2000b) present similar test results for the German stock exchange. The general maxim seems to be: “Good news is no news.”³¹ Negative information can cause stronger price fluctuations, especially in a positive market environment, by increasing insecurity about prospects for the future.³² But even such negative information is mostly processed without greater delays. Outsiders, who buy after the public dissemination, usually do not have time to react to them. The market (re)acts (very) quickly.

But not always. Stice (1991) proves that the publication method can have an impact on the price response: Accounting income numbers, which do not produce a measurable effect at the time of their obligatory publication, might very well do so when they are published in the *Wall Street Journal* at a later date. Possibly, this is a violation of the efficient market theory, according to which republications should not produce abnormal price fluctuations. This could hint at autonomous media effects because the newspaper articles do not contain any new information. However, the figures Stice presents on movements of prices and volumes are hardly significant economically. Moreover, they concern very small companies – and their stock prices usually react more slowly because they are not in the public eye.

Beaver (1986) already provides evidence for the fact that stock prices and volumes of trade can react to the publication of accounting income numbers: He documents abnormal returns and turnovers around the publication date and concludes that the accounting income reports do have an information content. Comparable extraordinary trading activities after the publication of accounting income numbers have been shown for smaller companies: Bamber (1986) for example reports above-average turnovers at the time of earnings announcements in the *Wall Street Journal*, particularly for stocks in narrow markets. If the returns are unexpectedly high, the stocks concerned can show increased trading volume. Both Beaver's and Bamber's results indicate that extraordinary trading activities come to an end very quickly.

Rapidity in information processing seems to be the norm in the majority of cases. Announcements of data concerning the national economy provoke particularly rapid reactions on the markets – if they react at all. For example inflation numbers: Schwert (1981) shows that the stock market often reacts only

weakly to the release of inflation rates.³³ Pearce and Roley (1985) also find only very weak evidence of price reactions to inflation rates. Jain (1988) replicates these results: Inflation rate, industrial production or unemployment rate – the release of these statistics mostly does not lead to any remarkable change in stock prices. If corresponding effects occur, they do so very quickly, generally within one hour.³⁴ After that, the price effect has been exhausted.³⁵

Interest and currency markets react even more quickly than the stock markets. Ederington and Lee (1993 and 1995) demonstrate that in these markets, price reactions begin to set in shortly after the publication of macroeconomic data. The main price adjustments take place within only one minute. “[...] Trading profits based on the initial reaction basically disappear within this period“, the authors say.³⁶ Andersen, Bollerslev, Diebold and Vega (2002) reveal how surprising macro-economic information can influence exchange rates. The rates react abruptly with negative information provoking much stronger reactions than positive information. In general: Exchange rates respond instantly to the release of economic information.³⁷

Maloney and Mulherin (1998) show in a case study on the explosion of the Challenger space shuttle in 1986 that even particularly surprising non-economic news is rapidly processed by the markets: Within 13 minutes of the agency report about the crash of the space shuttle in the *Dow Jones News Wire*, which was published eight minutes after the explosion, the stocks of several companies involved in the production of the shuttle went down. The price of one particular stock was hit especially hard. While the stock market prices of the other companies quickly recovered, this stock continued to go down in value during the day. It turned out several weeks later that this was the company responsible for the production error that had caused the accident.³⁸

4. Irregular Price Regularities

Recent studies on the aggregative level of news and price fluctuations clarify that the relationship between markets and the media does not obey to any simple rule: Mitchell and Mulherin (1994) correlated news published in the *Dow Jones News Service* and the *Wall Street Journal* with stock market prices

and trading volumes between 1983 and 1990 – more than 750,000 headlines. Their results show a moderate relationship of news variables with trading volumes, but only a weak relation with stock returns. “While we find a direct, robust relation between Dow Jones news stories and stock market activity“, the authors write, “the observed relation is often as weak as that reported in prior research.”³⁹

Berry and Howe (1994) present similar results: Using *Reuter’s News Service* as an example, their study illustrates that the news flow in the course of one trading day follows a typical pattern: The volume of news increases during the first hours of trading, reaches its peak shortly after the close and abates afterwards. Berry and Howe find a similar pattern for stock exchange transactions. The returns, however, do not show any remarkable correlation.⁴⁰ Studies carried out by McQueen and Roley (1993), however, show that the effects of macroeconomic news vary with the economic climate – and that they could possibly be stronger than assumed up to now: If the economy is already booming, positive news reports seem to provoke negative price reactions, whereas they lead to (weak) positive reactions in a less favorable economic climate.

Depending on the overall market situation, identical news thus seems to provoke different price reactions. This indicates that the state of the market as well as perceptions and psychological dispositions of market participants play a greater role than assumed by advocates of the efficient market hypothesis. Asymmetrical price movements in response to comparable news give grounds to believe that investors overreact in some cases and underreact in others. The psychological disposition of the market seems to constitute a framework for behavior within which investors carry out their transactions. This no longer excludes the possibility that prices may divert from their fundamental values. Or, to put it differently: Reactions of the market are sometimes more, sometimes less efficient.

Under certain circumstances, stock market prices (but also prices in other markets) can overreact or underreact. Underreaction means that the average return after a publication is *higher* than the return of the benchmark indices. In other words, the price reacts to the news with a certain delay, an error which is corrected afterwards through above average returns. It is only gradually that

the news is integrated into stock prices. Overreaction means that the average return after a publication is *lower* than the return of the benchmark index. The price prematurely reacts to the news, an error, which is corrected afterwards with lower returns. The news is integrated too strongly into stock market prices.⁴¹

Underreactions to the publication of accounting income numbers can be considered well documented: Positive earnings surprises can lead to excess returns and higher trading volume beyond the event day. Several event studies demonstrate that positive surprises lead to excess returns over a period of several months (so-called post-event price drift).⁴² This means that in certain cases, business news can (also) be followed by successive price changes which correlate, therefore constitute a trend and are, as it seems, economically significant.⁴³ Cutler et al. (1991) prove positive autocorrelations for a time-span of up to one year for returns in various international markets, including stock, currency and real-estate markets: It seems to be true for a broad range of asset classes that excess returns are slightly interrelated.⁴⁴

Chan (2002) demonstrates that abnormal returns can occur after the publication of business news. In his research of market reactions to publications in the news media such as the *Wall Street Journal*, the *Chicago Tribune*, the *New York Times* and the *Washington Post*, it turns out that stock market prices, particularly quotations of smaller companies, can fall behind their benchmark index after the publication of bad news. "It seems to take a long time", Chan states, "for news in headlines to affect prices."⁴⁵ If positive information is published, excess returns are less pronounced, but still measurable.⁴⁶ To put it differently: (Especially negative) business news (sometimes) has a lasting effect.

Besides underreactions, overreactions have also repeatedly been observed in empirical studies: In their pioneering study on this phenomenon, Werner De Bondt and Richard Thaler (1985) found out that former over-performers turn into losers in the medium term, and vice versa: undervalued stocks seem to beat previous winning stocks.⁴⁷ The authors see the reason for such turn-arounds in prices in investors' overreactions. In his book *Irrational Exuberance* Robert Shiller (2000) mentions the mass media as an important factor in the generation of overreactions: Due to their capacity to arouse attention, Shiller says, the media can create positive feedback and reinforce existant

trends – and contribute to the reinforcement of speculative price movements and financial bubbles.⁴⁸

The central result of the studies on overreactions is that stock market prices can show successive (slightly) negative autocorrelations for an event space of several months up to a few years: The initial overreaction is followed by a market price correction, the return decreases and comes closer to the average. Of course this implies that stock market prices would have to be predictable if these price fluctuations occurred systematically and could be attributed to certain behavioral dispositions of the market participants. In so far as the mass media contribute to the “overdrive” in investor behavior by focussing public attention, they have to be taken into consideration as the potential driving force behind this “irrational exuberance”.⁴⁹

Barberis, Shleifer and Vishny (1998) draw up a model of mood changes among investors which could cause such fluctuations. They find an explanation in the phenomenon, well-known to psychologists, that people attach too much significance to information that is particularly striking.⁵⁰ Accordingly, a sequence of good or bad news⁵¹, which already generates increased interest in itself, could induce investors to extrapolate a trend. Overreactions to news, which are followed by a deviation of stock market prices from their fundamental values, can thus be explained. If the news are extraordinarily striking, these exaggerations even seem highly probable. Unobtrusive information, which receives little attention, would accordingly lead to underreactions.⁵²

It is therefore theoretically possible that striking media events in particular lead to overvaluations among investors and, as a consequence, to overreactions. Barberis, Shleifer and Vishny deduce the following prognosis: „The theory predicts that, holding the weight of information constant, one-time strong news events should generate an overreaction. [...] For example, stock prices bounced back strongly in the few weeks after the crash of 1987. One interpretation of the crash is that investors overreacted to the news of panic selling by other investors even though there was little fundamental news about security values. Thus the crash was a high-strength, low-weight news event which, according to the theory, should have caused an overreaction.”⁵³

It is not at all certain that over- and underreactions are „pervasive regularities”.⁵⁴ What is striking, however, is that price movements, which seemed to be abnormal from the point of view of traditional financial theory, apparently occur with a relatively high frequency.⁵⁵ It remains to be seen if they really interfere with the theory. As many authors point out, there is also room for slight anomalies in traditional efficiency concepts.⁵⁶ However, unusual interrelations of markets and the media intimate that finance theory has too long followed a very simplistic formula, when it philosophized about frictionless information processing. Market activities following strong stimuli coming from the media also show, though, that modern financial economics is also off the mark if it generally infers *systematic* stock price regularities from behavioral regularities.

5. World Events: The Effects of "Big News"

The effects of major media events on the financial markets represent a litmus test for the prognoses of recent behavioral approaches – a test that they only pass in part. According to the theory, conspicuous news events would have to lead to irrational price fluctuations, due to their increased visibility and following overreactions of many investors (and not to their fundamental information content). In other words: The more visibly an event appears in the media, the stronger price reactions should be, regardless of how significant the event is “in itself”. The few empirical studies on the market effects of big media events only provide mixed evidence in this regard.

Ray Fair (2000) for example tried to establish a relationship between major price movements and relevant news for the U.S.- stock market between 1982 and 1999. In order to do this, he looked for extraordinary price activities, defined as price changes of more than 0.75 per cent within five minutes, on 4,417 trading days. He found such price reactions on 179 days. In the following, the archives of four news providers, the *Dow Jones News Service*, the *Associated Press Newswire*, the *New York Times* and the *Wall Street Journal*, were searched for extraordinary media events. The result: Significant events, which could be considered triggers of the market activities, were found for (only) 58 of the 179 days.⁵⁷ On 121 days with strong price fluctuations, there was no important news.

In the first place, the existence of strong price fluctuations despite the absence of corresponding media reports only implies that there must be other reasons apart from the mass media to account for abnormally strong fluctuations on certain days. What is remarkable, however, is the existence of the opposite phenomenon: There are several news events which do not provoke any unusual price movements – although they seem to be very similar to the news actually moving prices. Fair writes: „There have, for example, been hundreds of important macroeconomic announcements between 1982 and 1999, and only a small fraction have led to a large stock price change. An adequate model would need to explain why particular events [...] led to large price changes, while many other seemingly similar events did not.“⁵⁸

The most important study on the financial and economic effects of “big” events underpins these findings: „Many of the largest market movements in recent years have occurred on days when there were no major news events.“⁵⁹ This result of the study “What Moves Stock Prices” by Cutler, Poterba and Summers (1989) shows the limits of the importance of news (and the events behind them) in explaining the dynamics of financial markets: Even the biggest price changes frequently occur without prior news – which doubtless means that price variance which cannot be explained by fundamental economic factors cannot simply and unambiguously be deduced from external events and the following media coverage either.⁶⁰

Nevertheless, there are numerous examples of far-reaching events in the news – economic policy measures, political events, international conflicts and war – which have substantial effects on the whole market: The Standard & Poor’s Composite Stock Index for example lost 4.37 per cent on the Monday after the Japanese attack on Pearl Harbor. The American declaration of war against Japan on the next day was followed by a loss of 3.23 per cent. The nuclear bomb attack on Nagasaki made a difference of 1.65 per cent. On the announcement of the deployment of Russian nuclear missiles on Cuba in October 1962, the market lost 2.67 per cent. After President Kennedy was assassinated, stocks fell by 2.81 per cent. The biggest plunge occurred due to a medical event: After President Eisenhower’s heart attack in the fall of 1955, the market fell by 6.62 per cent.⁶¹

Niederhoffer (1971) states that big, but isolated news, which only flash in the media for one day, provoke less price movements than series of consecutive big news, as they occur in times of international crises. Evidently, consecutive and interrelated big news, like those during the Korean War or the Cuban Missile Crisis, lead to an aggregate effect which makes increased market activities more probable. It is, however, not clear whether this observation supports the theory of Barberis, Shleifer and Vishny that „one-time strong news events should generate an overreaction” or rather calls it into question.⁶² It is clear, on the other hand, that big news can bring about overreactions. But how much of those are due to media influence?

In cases of strong price reactions, it is fair to assume that there is a causal relationship with media coverage (and the events behind it). Nevertheless, this cannot be stated without any doubt. For the fact that a piece of news is followed by price movements is no conclusive proof of a causal relationship. Pure coincidence could play a role as well. Quite frequently, the direction of the price movement is different from what would be expected with regard to the “direction” of the event: The 1.65 per cent movement after Nagasaki for instance was *positive*. The 0.73 per cent change on the day the attempt to liberate American hostages in Iran failed as well. In brief: Big news can cause big price movements – but it is hardly possible to say in advance which and into what direction.

Niederhoffer (1971) finds a slight tendency indicating that events which are usually considered rather positive are more frequently followed by price increases. The other way round, price losses tend to occur more often after coverage of negative events. However, the difference is minimal: Accordingly, news about peace negotiations are followed by price increases in 58 per cent of all cases, whereas the same happens in only 50 per cent of all cases after reports of hostile negotiations.⁶³ That these regularities are irregular can easily be seen from the fact that (actually negative) reports about an aggravation of international tensions lead to a price *increase* in 62.5 per cent of all cases and that “extremely bad” news generally tend to bring about price gains.

Even incidents in the same event-category do not always produce the same effects. Like terrorist attacks: Chen and Siems (2002a) demonstrate that „terrorist attacks and military invasions have great potential to effect capital mar-

kets around the world in a short period of time.”⁶⁴ But an analysis of historical examples shows that these effects are highly variable: Sometimes price effects occur, sometimes they do not. Sometimes even price increases can be found, for example on the day of the Oklahoma City Bombing or the attack on the U.S. embassy in Kenya in 1998. It is true, though, that a certain connection between the dimension of the event and the corresponding market activity seems to exist: The fluctuation after September 11th *was* strong. So were price movements after Pearl Harbor or the invasion of Kuwait.

Most of the “big” news do *not* bring about any big and prompt price movements: Only after 15 out of the 49 big events which Cutler, Poterba and Summers identify from 1941 to 1987 follows an index movement of more than 1.5 per cent. Many important events are hardly noticed in stock prices: The gain during the invasion of the Bay of Pigs is only 0.47 per cent. Reacting to the Soviet invasion of Afghanistan, the S&P rises by 0.11 per cent. On the occasion of the assassination attempt on Ronald Reagan, the index only loses 0.27 per cent. The death of U.S. marines in Lebanon in 1983 is a non-event at the stock market with a plus of 0.02 per cent. The Chernobyl Nuclear Disaster also only makes a small difference of minus 1.06 per cent.⁶⁵ Hurricane Andrew, one of the most severe natural disasters to date in the US is followed by an excess return on the event day of minus 0.8 per cent.⁶⁶

Establishing the actual media effects on market activities is complicated by the structural problem of separating the effects of the events “in themselves” from the effects of the news. Isolating the two aspects can be very difficult. The announcement of a lot of economic policy data and their publication in the media for example often happen simultaneously. With increasing real-time-coverage, events and reports about them will even be less distinguishable in the future. The clearest conclusions can be drawn from two types of cases: Firstly, those in which no abnormal price movements can be observed, even if they are preceded by big events or big news; secondly, those in which strong price movements follow journalistic non-events.

In cases of the first type, which occur quite frequently, it is obvious that many times, neither an event nor the coverage of it have an effect. This leads to the logical conclusion that there is no conclusive and systematic relationship between big news and big price movements. From cases of the second

type, that are found less frequently, but are thus all the more meaningful, the existence of autonomous media effects can be deduced, even if these do not occur systematically. In real life, repeatedly occurring price movements are found following news which have one decisive feature: They themselves are the event, since there is no real event behind them. Reactions to such fictitious media coverage can sometimes turn out to be very strong.⁶⁷

The thesis of the effectiveness of big media events and resulting market overreactions therefore needs considerable qualifications: For the majority of news, no significant price correlations can be found. If they appear, they do so unsystematically. Often, it remains not only unclear whether reactions will occur and how strong they will be, but also into which direction they will go. Cutler et al. (1989) sum up: „For the set of events we analyze, the average absolute market move is 1.46% in contrast to 0.56% over the entire 1941-1987 period. These findings suggest a surprisingly small effect of non-economic news, at least of the type we have identified, on share prices.“⁶⁸

These observations result in important conclusions both for financial economics and for communication research of media impacts on the financial markets: The obvious ”ineffectiveness” of many big media events casts serious doubt on the theory that the conspicuousness of a piece of news alone explains behavioral overreactions. Evidently, other factors have to be taken into account, which condition the effects of news on market activities and the way they manifest themselves. A simple one-factor-model, which derives the price reaction from the “strength” of the news, does not do justice to the problem. “Big” news do provoke “big” market reactions – but often, they simply don’t.

Dismissing the cases in which media effects do occur as negligible “anomalies”, however, would underrate their importance. News have direct and short-term as well as indirect and long-term market effects, a quantifiable percentage of which is due to the specific mechanisms of information transmission in the mass media. This observation contradicts the idea of ineffective media which is still popular in parts of media effect research.⁶⁹ The immediacy of real time communication prevents longer thinking and the absorption of public reactions through interpersonal communication. Especially in the financial markets, where reaction speed is essential, this can lead to rapid mood swings.

In these cases, social networks do not lead to a relativization, objectivization or attenuation of public reactions to media coverage. On the contrary: They can even have a reinforcing effect, making mutual psychological “infection” possible and facilitating collective panic attacks. Advisers cannot serve as a stabilizing factor either: In case of surprising news events, “experts” and “opinion leaders” look for advice themselves. More often than not, they succumb to the immediate power of the events or pursue their own interests on the market.

It is thus correct to refrain from monocausal explanations which try to deduce market reactions from media influence alone. Rather, it is a specific constellation of factors which decides the probability of over- or underreactions in price formation. If such a process gets going, the media are far from just playing the role of an amplifier. Rather, they are able to contribute to a qualitative turn of market activities to another level of activity. Under certain circumstances, events and their presentation in the news can thus decisively shape the character of processes of price formation. In brief: Frequently, news do not lead to noticeable market reactions – but sometimes, they do precisely this.

6. Summary

Price formation in the financial markets is a complex function of diverse factors whose combination and weight vary with time. The nature of this systemic process makes it impossible to definitely determine to what degree different causes have an effect on prices. Individual factors have more or less impact, depending on their specific combination and the actual state of the system. It is not only the specific mixture in which certain variables determine market activities that is unclear. So far, not even the number and the character of the factors which play a role at all has been established. Let alone the intensity of the impact they have on prices.⁷⁰ Accordingly, the success rate in explaining price movements greatly varies – even with hindsight.⁷¹

Roll (1988) shows that only 40 per cent of the price variation of an average stock can be accounted for by general economic influences, industry specific conditions and company news releases. That means that a large percentage of average price movements cannot be explained by news. Other important fac-

tors which have not been identified so far must play their part as well. Many things which are relevant for price movements happen behind the screen of information available to the public – we just do not know exactly what they are. This relativizes the significance of news in the mass media: They only represent one among many factors that play a role. A multitude of empirical studies shows that news do not lead to any permanent and stable, delayed price reactions (und thus cannot systematically be turned into cash either).

The attempt to convert news published in the mass media into short-term gains is therefore of little use to investors. Market participants anticipate new information, insiders use their information lead – most of the time, the information content is exhausted *before* the public comes into play. In many cases, there is *no* immediate relationship between media contents and price movements. Slight underreactions do repeatedly occur in different asset classes. Sporadic overreactions due to media coverage and subsequent price corrections are also demonstrable. With regard to the aggregative level, however, it is very difficult to make a generalizing statement: Sometimes news do show an immediate effect, sometimes they do not.

In case of big media events and reports about incidents of global significance, especially international crises, on the other hand, there is an increased probability of abnormal price movements. The conspicuousness of these events seems to reinforce the tendency of many investors to react too strongly to prominently placed information. Especially consecutive news, which mutually reinforce each other's effects, can lead to corresponding overreactions in the financial markets. With the current state of knowledge, though, it is hardly possible in these cases as well to forecast accurately and *ex ante* when abnormal price effects will occur, how strong they will be and in which direction they will go. If effects do occur, the relationship is sporadic and unsystematic and disappears as soon as it is discovered.

But is it always discovered at once? It depends on the answer to this question if the possibility of long-term interrelations between markets and the media and subsequent price movements away from fundamental values is admissible or not. Experiences with the 1987 stock market crash and the internet bubble of the “New Economy” indicate that fits of collective panic or euphoria repeatedly occur in the financial markets – and therefore stock prices

which reflect a limited market rationality. If coolly calculating actors try to derive speculative gains from trend following behavior, an essential regulative element is lost. It is conceivable that extreme price movements in particular persist for a certain period of time, if even those who know better do not take a different direction because the market risk is too high or because they hope for a profit.

There is no doubt that the media as generators of attention possess the potential to contribute to the “overdrive” of mass behavior: In times of a greatly increased media range, economic and non-economic events are today broadcast everywhere and in real time. The competitive situation on the media market intensifies the exaggeration of the contents and an increase in their emotional appeal through prominent placement and an eye-catching presentation of selected issues. The induction of an emotional public response in order to generate feedback effects constitutes a priority of today’s mass media, also of the business media. There is thus absolutely no doubt that the news flow of the mass media does not follow a random pattern. A homogenization of the market response is thereby certainly not prevented.

Endnotes

¹ "As An Attack Unfolds, a Struggle to Provide Vivid Images to Homes." In: *The New York Times*, 09/12/2001; Schuster (2001a and 2001b).

² Figures in: "Attack Shuts Down U.S. Markets and Causes Global Declines." In: *The Wall Street Journal*, 09/12/2001.

³ OECD (2002).

⁴ Chen and Siems (2002).

⁵ Nacos (2002) shows that the dissemination and intensification of their actions over the media is part of the calculation of terrorists. Images of spectacular violent actions fit the pattern of news factors and narrative conventions of the media, a fact which makes sure that terrorist actions receive sufficient publicity. "As long as terrorists offer visuals and sound bites, drama, threats, and human interest tales, the news media will report – and actually over-report [...]." Nacos (2002), 4.

⁶ For more details see Schuster (2001c), 127-153.

⁷ "Börsenjournalist verurteilt." In: *Frankfurter Allgemeine Zeitung*, 08/31/2002; "Erstes Insiderurteil gegen einen Journalisten." In: *Süddeutsche Zeitung*, 08/31/2002; "Der dubiose Guru von Kulmbach." In: *Der Spiegel*, 07/02/2002; "Im Börsenbetrugsfall Opel kommt es wohl zur Anklage." In: *Süddeutsche Zeitung*, 10/26/2001; "Nun ist die Harmonie dahin. Egbert Prior und die Haffa-Brüder stehen sich vor Gericht gegenüber." In: *Süddeutsche Zeitung*, 01/17/2001; "Wirtschaftskrimineller oder Opfer der Justiz?" In: *Süddeutsche Zeitung*, 01/10/2001; Thomas Schuster, "Schwacher Charakter, volle Börse. Insider-Handel: Der erste Finanzjournalist steht vor der Anklage." In: *Frankfurter Allgemeine Zeitung*, 11/02/2000; "Riesen-Börsen-Betrug." In: *Bild*, 10/31/2000; Thomas Schuster, "Wie man der Börse aufspielt. Ad hoc, ad hoc: Pressemeldungen narren die Wirtschaftspresse." In: *Frankfurter Allgemeine Zeitung*, 09/19/2000; "Insiderhandel: Schwer in den Griff zu kriegen." In: *Wirtschaftswoche*, 08/24/2000; "Aufregung um Börsenguru Bernd Förtsch." In: *Süddeutsche Zeitung*, 08/17/2000; "Die rechten Artikel zur rechten Zeit." In: *Süddeutsche Zeitung*, 12/17/1999.

⁸ "Macht und Ohnmacht der Börsenpolizei." In: *Frankfurter Allgemeine Zeitung*, 01/18/2001; "Egbert Prior wegen Kursmanipulation angeklagt." In: *Frankfurter Allgemeine Zeitung*, 01/10/2001; "Neuer Ärger um '3Sat-Börse'." In: *Der Spiegel*, 05/29/2000; "Wohl kein Verfahren rund um Consors." In: *Süddeutsche Zeitung*, 01/17/2000; "Zocken an der Börse wird zum Volkssport." In: *Süddeutsche Zeitung*, 08/27/1999; "Neuer Verdacht." In: *Der Spiegel*, 08/16/1999; "Insider-Verdacht gegen Kunden von Consors." In: *Süddeutsche Zeitung*, 08/13/1999; "Anklage gegen 3sat-Börsenspezialisten." In: *Neue Zürcher Zeitung*, 11/21/1998; "Der Aktien-Berater Egbert Prior: Zuschauen und Reichwerden?" In: *Süddeutsche Zeitung*, 07/07/1998.

⁹ Kladroba and von der Lippe (2001) examined 5,985 recommendations which were published between January and June 2001 in the following magazines: *DM, Börse Online, Focus Money, Geldidee, Telebörse* and *Aktien Research*. Only every tenth stock review recommended a sale. The result in detail: 66.9% buy, 22.2% hold, 10.9% sell. Cf. Madrick (1999 and 2001).

¹⁰ Cf. exemplarily Friedrichsen (2001) and Gavin (1998).

¹¹ For an introduction to the theory of efficient markets cf. Beechey, Gruen and Vickery (2000) and Dimson and Mussavian (2000).

¹² For an introduction to the theory of behavioral finance cf. Barberis and Thaler (2002), Shiller (1999) and Thaler (1999).

¹³ Fama (1970), 383.

¹⁴ Fama (1970), 387 emphasizes that the random walk model is not identical to the efficient market theory, but represents a specific version of it.

¹⁵ The efficient market hypothesis is based on the view of conventional neo-classical economics, according to which economic subjects are rational, utility-maximizing agents. Decision-making processes therefore follow an expected utility function, they are based on a matter-of-fact cost-benefit-analysis. Advocates of this view readily admit that not all subjects behave rationally. They say it is sufficient if this applies to a leading group which makes sure that prices are correct.

¹⁶ Even the advocates of the efficient market hypothesis do not deny that markets are never 100 per cent efficient. Fama (1970) points out that the theory that prices always reflect all available information is an extreme null hypothesis ("We do not expect it to be literally true."). He also gives different examples of – in his view not economically significant – persistence in price movements. In his view, inefficiencies are most obvious in the possibility of using advantages from insider information. Grossman und Stiglitz (1980) argue that it has to be possible for informed market actors to compensate the costs of their information research through abnormal returns. For empirical findings on Germany cf. Möller (1985).

¹⁷ That means, as Krämer (2001), 1269 puts it: "An efficient market does not look back." Dimson and Mussavian (2000), 962f. write: "The theory involves defining an efficient market as one in which trading on available information fails to provide an abnormal profit."

¹⁸ Behavioral finance gets its most important impetus from the prospect theory by Kahneman and Tversky (1979), from the theory of cognitive dissonance by Festinger (1957) as well as from studies on overconfidence by Fischhoff, Slovic and Lichtenstein (1977).

¹⁹ Shiller (1981 and 1984) and Summers (1986).

²⁰ Shiller (1999).

²¹ Weischenberg (2001), 292 ff.

²² Cf. Gerke (2000) and Wolff (2000).

²³ Weischenberg (2001), 293 writes: "A lot of German media contributed in an ethically problematic way to the creation of a myth of wealth without work through the

'new economy'. Stock exchange transactions were presented as a huge spectacle of the 'fun society', economic risks were played down and profit prospects euphorized. A kind of 'investor journalism' emerged as a subdivision of business coverage. What was particularly conspicuous were some journalists who did not have any problem with working parallelly in journalism and in investment counseling. By mingling journalism and business, they acted irresponsibly in two ways: With regard to the media public, which is unclear about collisions of interest and with regard to private investors by making possibly negligent or even wrong promises."

²⁴ Fama, Fisher, Jensen and Roll (1969), 20.

²⁵ Fama, Fisher, Jensen and Roll (1969), 18.

²⁶ Ball and Brown (1968), 176 write: "The annual income report does not rate highly as a timely medium, since most of its content (about 85 to 90 per cent) is captured by more prompt media which perhaps include interim reports."

²⁷ Dimson and Mussavian (2000), 962.

²⁸ Patell and Wolfson (1984), 224.

²⁹ Gerke et al. use daily data, not ticker data, which is why they cannot give any information on the exact adjustment speed of the stock prices.

³⁰ Röder (2000b), 16.

³¹ May (1994), 345.

³² Conrad, Cornell and Landsman (2002).

³³ Schwert (1981) writes: "For the days after the announcement, the market seems to react slowly to the announcement of unexpected inflation, but the magnitude of the reaction is so small that there is probably no opportunity for a profitable trading strategy." Schwert (1981), 28.

³⁴ Jain (1988), 228.

³⁵ The studies quoted at this point refer to the primary publications of the relevant authorities, the Federal Reserve Bank, the Bureau of Labor Statistics etc., not to the secondary publications in the mass media. Since the introduction of finance television and above all the Internet with its realtime information, primary and secondary publication are increasingly taking place simultaneously.

³⁶ Ederington and Lee (1993), 1189.

³⁷ Almeida, Goodhart and Payne (1998) and Goodhart, Hall, Henry and Pesaran (1993) arrive at similar results. Balduzzi, Elton and Green (2001) present comparable findings for the bond market: Price adjustment due to macroeconomic information occurs within one minute after the publication of the data.

³⁸ Blose, Bornkamp, Brier, Brown and Frederick (1996) come to very similar results. According to their figures on all NASA contractors, the stocks of those whose turnovers were most dependent on the shuttle production reacted significantly. Most seriously concerned was the price of Morton Thokiol, the manufacturer of the defective sealing rings.

³⁹ Mitchell and Mulherin (1994), 949.

⁴⁰ In a study of the effects of cover stories published in newspapers, Chan, Chui und Kwok (2001) find similar results as Berry and Howe and Mitchell and Mulherin: They find a moderate relationship between news and volumes of trade, with barely detectable effects on returns. Interestingly, Chan et al. state that economic news stimulates trading volume, whereas political news tends to go along with a reduction in the volume of trade. The authors attribute this to the poorer quality of political news with regard to price forecasts which can be deduced from them.

⁴¹ For a good starting point for literature on the predictability of stock prices on the basis of short-term autocorrelations cf. French and Roll (1986) and Lo and MacKinlay (1988).

⁴² For an overview of the research results cf. Bernard (1992).

⁴³ Cf. Pritamani and Singal (2001).

⁴⁴ Cutler, Poterba and Summers (1991), 536 write: "The estimated monthly autocorrelations are not only statistically but also substantively significant, often implying negative expected returns." Fama (1991), 1602 points out that it should not be surprising in view of the large number of empirical event studies if some of them come across anomalies such as the post-announcement drift. In his view, it is important to keep in mind that event studies provide the clearest evidence in favor of market efficiency (not least because they are least troubled by methodological problems like the joint-hypothesis-problem). However, it is difficult to thereby refute the point made by Cutler et al. that the price patterns they document represent statistic regularities in a variety of markets. Then again, they make the following restriction: "While these findings appear in many markets, they are not universal." Cutler et al. (1991), 535.

⁴⁵ Chan (2002), 31.

⁴⁶ Daniel and Titman (2001) find no evidence of such an underreaction.

⁴⁷ Conrad and Kaul (1993) provide evidence for the fact that De Bondt's and Thaler's results were generated through methodological errors.

⁴⁸ Shiller (2000), 71-95.

⁴⁹ On overreactions cf. also Liu (2000) and Dharan and Ikenberry (1995).

⁵⁰ Cf. Griffin and Tversky (1992) and Shoemaker (1996).

⁵¹ In their model, Barberis, Shleifer and Vishny use a generalized concept of news, which does not distinguish between primary information (e.g. press conferences) and secondary information (e.g. newspaper articles).

⁵² For an alternative model which seeks to explain over- and underreactions with the help of the concepts of *overconfidence* and *biased self-attribution* cf. Daniel, Hirshleifer and Subrahmanyam (1998).

⁵³ Barberis, Shleifer and Vishny (1998), 28f.

⁵⁴ As Barberis, Shleifer and Vishny (1998) put it.

⁵⁵ Behavioral Finance literature has researched a number of other unusual systematic price effects, but those are not of immediate interest in our context of examining the relationship between markets and the media. They include: the small firm effect, the

value effect, and numerous "seasonal effects", such as the Monday-effect, the turn-of-the-month effect or the January-effect. For an introduction cf. Shleifer (2000) and Lo and MacKinlay (1999).

⁵⁶ Exemplarily Dimson and Mussavian (2000), 963: "To make sense, the concept of market efficiency has to admit the possibility of minor market inefficiencies." Cf. note 16.

⁵⁷ Fairs findings show that the majority of the news which is followed by a price movement is directly or indirectly related to questions of monetary policy. With 5 out of 58 events, the Iraq conflict also has a strong influence.

⁵⁸ Fair (2000), 12.

⁵⁹ Cutler, Poterba and Summers (1989), 4f. Similarly Shiller (2000), 78f.

⁶⁰ Ibid.

⁶¹ Cutler, Poterba and Summers (1989), 8.

⁶² Cf. page 15.

⁶³ Niederhoffer (1971), 211.

⁶⁴ Chen and Siems (2002a), 1.

⁶⁵ Cutler, Poterba and Summers (1989), 8.

⁶⁶ Chen and Siems (2002b), 6.

⁶⁷ For detailed information see Schuster (2003).

⁶⁸ Cutler, Poterba and Summers (1989), 8f.

⁶⁹ Cf. Schenk (2003), Burkart (2002), 215-219; Jäckel (1999), 64-85, 99-131.

⁷⁰ Cf. Brown (1999) and Roll (1988).

⁷¹ Andersen et al. (2002), 1 write: "How is news about fundamentals incorporated into asset prices? The topic confronted by this question – characterization of the price discovery process – is of basic importance to all of financial economics. Unfortunately, it is also one of the least well understood issues." Roll (1988), 541 writes: "The immaturity of our science is illustrated by the conspicuous lack of predictive content about some of its most intensely interesting phenomena, particularly *changes* in asset prices."

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