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Price Effects after One-Day Abnormal Returns in Developed and Emerging Markets: ESG versus Traditional Indices

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Abstract

This paper examines the price effects after one-day abnormal returns in stock markets indices of both developed and emerging while differentiating between Environmental, social, and governance (ESG) and conventional indices. Using daily data of MSCI family indices over the period 2007-2020. Using various methods to avoid methodological bias, the following hypotheses are tested: after one-day abnormal returns specific price effects (momentum/contrarian) do appear (H1) for the case of positive (H1.1) and negative (H1.2) returns; price effects after one-day abnormal returns are stronger for the case of traditional indices compared to ESG indices (H2); price effects after one-day abnormal returns are stronger during the crisis period (H3); dynamic trigger approach is more appropriate to define abnormal returns than static (H4); price effects after one-day abnormal returns are stronger for emerging markets compared to developed ones (H5). The results are mixed for the case of H1 and provide no evidence in favor of H2-H5. They do not exhibit significant differences between ESG and conventional indices. Types of detected effects are the same; in some cases, the power of the effects is different, but not significantly, and no patterns in these differences are detected. Overall, there is a strong contrarian effect in the US stock market after one-day abnormal returns. A trading strategy constructed based on this effect can generate profits from trading. The main results give additional evidence against the Efficient Market Hypothesis and provide implications that can help practitioners in beating the market.

Keywords: *abnormal returns; momentum effect; contrarian effect; ESG; developed and emerging stock markets*

JEL classification: *G12, C63*

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1. Introduction

There has been substantial growth in the academic literature on stock market prices, refuting the random walk hypothesis of Fama (1965). Previous studies have indicated that stock returns can be predicted based on a set of fundamental variables (e.g., economic, political) (Rapach et al., 2005; Chen, 2009; Alqahtani et al., 2020). Some other studies have provided evidence in favor of various patterns in stock price dynamics such as (calendar) anomalies (e.g., Plastun et al., 2019)[1] or specific events like force-majors or news, which suggests the inefficiency of stock markets. Another group of anomalies that disturb market efficiency is the significance of the overreaction hypothesis through which investors respond too strongly to unfavorable and favorable information (De Bondt and Thaler, 1985; Richards, 1997; Malin and Bornholt 2013; Alves and Carvalho, 2020)[2]. However, after the overreactions, prices tend to move in the opposite direction (Jegadeesh and Titman, 1993), leading to a price reversal (also called contrarian effect) which can be explained by irrational behavior of investors. Many studies have considered the long-term reversal size effect (e.g., Blackburn and Cakici, 2017). A specific case of the overreaction hypothesis is price behaviour after one-day abnormal returns. Bremer and Sweeney (1991) have found evidence of price reversals after one day of decline in the stock market[3]. Recent studies have provided mixed results for different stock markets and datasets. In fact, differences in results can be explained by the use of different markets as an object of analysis as well as differences in the applied methods. There are two major approaches to define abnormal returns (static and dynamic) and both can provide different results even if the same datasets are used. Furthermore, previous studies have mostly drawn conclusions involving the US and other developed economies; they also have mostly considered conventional stock indices,

[1] These can include seasonal or another timing aspect like day of the week or month of the year.

[2] Such anomalies are related to the existence of the fat tails in the financial data which is against the normal distribution of the data and thus the non-random specific of price behaviour.

[3] Some studies have confirmed the existence of the contrarian effect after one-day abnormal returns in the foreign exchange market (Parikakis and Syriopoulos, 2008). Other studies have found evidence in favor of momentum effects after one-day abnormal returns in the cryptocurrency market (Caporale and Plastun, 2019).

ignoring the case of environmental, social and governance (ESG) stock indices which can be different. ESG investment has become a big and influential industry, constituting a significant portion of global equity portfolios and funds (Daugaard, 2020), and numerous studies have pointed to its ability to generate abnormal returns (e.g., Henke, 2016). Notably, institutional investors, as being the largest player in the universe of ESG investment, tend to focus on the ESG characteristics of stocks more than fundamentals (Cao et al., 2019). Accordingly, socially responsible funds tend hold stocks with high ESG ratings after the announcement of adverse news or fundamentals (Starks et al., 2017). In fact, preferences for ESG can affect the overreaction of investors to news announcement relating to ESG investment, which can ultimately affect market inefficiency.

Despite a lot of empirical evidence related to stock price effects after abnormal returns, there are still unexplored aspects. For example, which markets are more vulnerable for the price effects after one-day abnormal returns: developed or emerging? Are there any differences in price effects over the crises and non-crisis periods? Which methodology is better to define abnormal returns: dynamic or static? Are the price effects after one-day abnormal returns in ESG indices different from those in conventional stock indices?

In this paper, we extend the related literature on price effects after one-day abnormal returns by providing answers for the above research questions. Therefore, different hypotheses are tested: after one-day abnormal returns specific price effects (momentum/contrarian) do appear (H1) for the case of positive (H1.1) and negative (H1.2) returns; price effects after one-day abnormal returns are stronger for the case of traditional indices compared with ESG indices (H2); price effects after one-day abnormal returns are stronger during the crisis period (H3); dynamic trigger approach is more appropriate to define abnormal returns in the stock markets than static (H4); and price effects after one-day abnormal returns are stronger for the case of emerging markets compared with developed ones (H5). For these purposes, different statistical tests and methodological approaches are used including average analysis, modified cumulative abnormal returns approach, regression analysis with dummy variables, R/S analysis, parametric Student's t-test and ANOVA, non-parametric Mann-Whitney tests and trading simulation approach.

The layout of the paper is organized as follows. Section 2 reviews literature. Section 3 describes the data and methodology. Section 4 presents the empirical results. Section 5 offers some concluding remarks.

2. Literature review

The idea of price effects as a reaction to price changes is generated by De Bondt and Thaler (1985) who showed that stock prices that experience long term gain tend to underperform in the future and vice versa. Following that study, many papers have been published to confirm/reject the overreaction hypothesis and examine price effects caused by abnormal returns. In this regard, developed stock markets have been the subject of first studies (see, among others, Cox and Peterson, 1994; Clements et al., 2009; Dyl et al., 2019), whereas later studies have considered emerging markets (e.g., Boubaker et al., 2015; Pokavattana et al., 2019; Zaremba, 2019)[4]. Existing evidence is mixed: contrarian effects have been detected by Bremer and Sweeney (1991), Jegadeesh and Titman (1993), Richards (1997), Kudryavtsev (2013). However, Jegadeesh (1990), Caporale and Plastun (2019) have found evidence in favor of momentum effects. These differences can be explained by the differences in approaches to define abnormal returns. Bremer and Sweeney (1991) have proposed a 10% price change as the measure of abnormal return (static approach). Caporale et al. (2018) have defined abnormal returns on the basis of the number of standard deviations to be added to the average return (dynamic trigger approach).

Relatively, studies considering the price effects after abnormal returns are understudied in the universe of ESG data. Environmental, social and governance (ESG) investing comprises financial and ethical paradigms with the aim of prioritizing investments that have a positive impact on society and the world. It has

[4] Other studies consider the commodity markets (e.g., Borgards et al., 2021).

experienced a tremendous growth over the past decade, especially following the 2008 global financial crisis period during which ESG investments outperformed their conventional counterparts (Andersson et al., 2020). Numerous studies on the performance of ESG have been conducted in developed countries and fewer studies have focused on emerging countries (see Daugaard, 2020)[5]. Most of the existing studies on ESG have examined the relationship between socially responsible investing and price over- underperformance (Flammer, 2015). Chang and Witte (2010), Derwall and Koedijk (2009) have found evidence in favor of over performance of ESG companies. However, Jegourel and Maveyraud (2010) have reported a negative relationship between social responsibility and returns. Cui and Docherty (2020) have explored the price reaction after negative ESG news and found a contrarian effect in stock prices. Krueger (2015) and Capelle-Blancard and Petit (2019) have reported that the stock market reacts to ESG news in an asymmetric manner by showing that there is a significant negative reaction to the bad ESG news but a little reaction to the good news, which contradicts with Starks et al. (2017).

As shown above, although papers have been devoted to price effects after abnormal returns in conventional stock indices, very little is known regarding about price effects after abnormal return in ESG stock markets indices. Importantly, the related literature has ignored a comparison between ESG and conventional stock market indices regarding their price effects after one-day abnormal returns. Specifically, do price effects after abnormal return in ESG stock indices differ compared with those in conventional stock indices? Interestingly ESG data is important because environmental, social and corporate governance criteria are getting more and more popular among investors. But does incorporation of these criteria influence the efficiency of the market indices? Are ESG indices less vulnerable for the price effects after abnormal returns? Those questions are still unanswered. Furthermore, the question on the differences of price effects after abnormal returns for the developed and emerging markets remains relevant today,

[5] The existing literature highlights the importance of the institutional setting and investors' preferences for ESG stock price performance.

including: What happens with price effects during the crises? Are they more powerful during crisis periods? Which methodology is better to define abnormal returns: dynamic or static? This current paper extends the related literature by answering these research questions.

3. Data and Methodology

We use daily data covering a family of MSCI indices for both traditional and ESG for the following countries: USA, UK and Japan (developed markets) and India and China (emerging markets). The data source is MSCI (https://www.msci.com/). The sample period is October 1, 2007 to February 10, 2020, according to price data availability.

The following five hypotheses are tested in this research paper:

- Hypothesis 1 – after one-day abnormal returns specific price effects (momentum/contrarian) do appear.
    - Hypothesis 1.1 – after one-day abnormal positive returns specific price effects do appear.
    - Hypothesis 1.2 – after one-day abnormal negative returns specific price effects do appear.
- Hypothesis 2 – price effects after one-day abnormal returns are stronger for the case of traditional indices compared with ESG indices.
- Hypothesis 3 – price effects after one-day abnormal returns are stronger during the crisis period.
- Hypothesis 4 – dynamic trigger approach is more appropriate to define abnormal returns in the stock markets than static.
- Hypothesis 5 – price effects after one-day abnormal returns are stronger for the case of emerging markets compared with developed ones.

We define the momentum effect as the tendency of the stock index to maintain its trend going forward (i.e., the rising stock index to rise further and a falling stock index to fall further). Conversably, the contrarian or reversal effect is the tendency of the stock index to reverse its current trend.

Various techniques are used to test H1-H5. They include, average analysis, parametrical tests (Student's t-tests, ANOVA analysis), non-parametrical tests (Mann-Whitney tests), modified cumulative abnormal returns approach, regression analysis with dummy variables, trading simulation approach. The average analysis is used to assess potential differences between returns. Parametric and non-parametric tests are used to examine the presence of fat tails and excess kurtosis in the return series. The null is that the data comes from the same population; a rejection of the null indicates evidence of anomaly. We use the Student's t-tests to assess whether return series for day of the week come from the same population; a rejection of the null at a significance level below 95% indicates evidence of anomaly on a particular day. As for the index return at time t, it is calculated as:

$$\mathrm{R_i} = \left(\frac{\text{Index close}_\mathrm{i}}{\text{Index close}_\mathrm{i\text{-}1}}\text{-}1\right) \times 100\% \,, \tag{1}$$

As indicated in the introduction section, it is important to define abnormal returns give previous studies provide various threshold levels in this regard. While Bremer and Sweeney (1991) have used 10% price change, other studies have indicated potential bias in the results based on a constant value (e.g., Cox and Peterson, 1994), because various time periods can be described by various measures of volatility. Interestingly, Caporale et al. (2018) define abnormal returns using a dynamic trigger approach. Accordingly, positive abnormal returns are computed as:

$$R_i > (\bar{R}_n + k \times \delta_n), \tag{2}$$

whereas negative abnormal returns are computed as:

$$R_i < (\bar{R}_n - k \times \delta_n), \tag{3}$$

where $\overline{R}_n$ is the average of daily returns in period n; k – is the number of standard deviations used to compute abnormal returns and δ_n is the standard deviation of daily returns in period n.

To test Hypothesis 4 and avoid biased results potentially driven by the specifics of the approach used to define abnormal returns, we use calculations based on both methods: dynamic trigger approach and static approach.

Dynamic trigger approach is sensitive for the number of standard deviations added to the mean return to measure one-day abnormal returns and period parameter to calculate average and sigma. In this paper, two standard deviations and period 50 are used to calculate abnormal returns. The rationale for this is provided in Plastun et al (2021).

Using Equations (2) and (3), we construct various two datasets: the first contains returns after days with positive/negative abnormal returns, the second contains returns on usual days (days with normal returns).

To uncover the patterns in price behavior after days with abnormal returns, we employ regressions with a binary variable as:

$$\mathrm{Y_t} = \mathrm{a_0} + \mathrm{a_1}\mathrm{D_{1t}} + \varepsilon_\mathrm{t} \tag{4}$$

where Y_t denotes index returns on day t; $\mathrm{a_n}$ denotes the mean return on a day that does not exhibit abnormal return; $\mathrm{D_{nt}}$ denotes a binary variable for a specific data group, which takes the value of 1 when the data concern an abnormal return day, and 0 otherwise; ε_t is a random error term at time t. Notably, the magnitude, sign, and significance of the binary coefficients is used to make inferences regarding market anomalies.

We define abnormal returns as:

$$AR_t = R_t - E(R_t) \tag{5}$$

Where, R_t is the index return at time *t* and $E(R_t)_m$ is average return calculated for the sample period *m* as follows:

$$E(R_t)_m = (\frac{1}{T}) \sum_{i=1}^{T} R_i \qquad (6)$$

where T is the sample size of period m.

Following MacKinlay (1997) the cumulative abnormal return (CAR_i) is given by:

$$CAR_i = \sum_{i=1}^{T} \ AR_i \qquad (7)$$

If there is a trend in CAR dataset, then there is an abnormal behavior of data over the period m. To detect a trend, a time regression is used, and the hypotheses are accepted or rejected based on the regression Multiple R^2 and P-value of F-statistics as well as the significance of the slope coefficient.

To evaluate the ability to exploit potential anomalies to make abnormal profits, we use an algorithm based on the weekend effect. This is done by replicating the behavior of a trader who opens and holds positions in the index for a certain time. The trading process is simulated as described in the following procedures. First, we calculate result of the trade:

$$\%\, result = \frac{100\% \times P_{open}}{P_{close}} \qquad (8)$$

where P_{open} denoted the opening price and P_{close} the closing price.

If the sum of results from each deal is positive, then there is an exploitable market anomaly. Conversely, a negative sum indicates no possibility to exploit market anomaly in profitable trades.

To ensure that the obtained results are statistically different from the random trading ones, we conduct t-tests on the means of the two samples based on a 5%

critical value. H0 is that the mean comes from the same population in both samples. If H0 is rejected, we indicate that the adopted strategy can produce abnormal profits. An example of the t-test is presented in Table 1.

Table 1: Example of the t-test for the trading strategy effectiveness evaluation: MSCI ESG USA testing for the case of contrarian effect after positive abnormal returns

Parameter	Value
Number of the trades	74
Total profit	32,67%
Average profit per trade	0,44%
Standard deviation	2,04%
t-test	1,86
t critical (0,95)	1,78
Null hypothesis	rejected

Note: This table presents the trading simulation results for the case of contrarian effect after negative abnormal returns over the period 1900-1909. The first column specifies parameters; the second column shows the values of parameters.

As can be seen, there is statistically significant difference in terms of total net profits relative to the random trading case, which confirms market inefficiency.

4. Empirical results

We start with the traditional indices. Empirical results for the case of the positive abnormal returns are presented in Appendix A and for the case of negative abnormal returns they are shown in Appendix B. We start with the case of the positive abnormal returns. The results of simple average analysis are displayed in Table A.1 and Figure A.1. As can be seen, the results are mixed. Emerging countries demonstrate momentum effect: on the next day after abnormal increase, prices tend to increase further. Developed countries (except UK) tend to show contrarian effects. These observations are true for the both approaches: dynamic and static.

To provide more detailed analysis of statistical differences (which is crucial for this paper), several parametrical (ANOVA analysis, t-tests) and non-parametrical methods (Mann-Whitney test) as well as additional technical are used (modified CAR approach and regressions analysis with dummy variables).

ANOVA analysis results are presented in Table A.2. They show that observed previously effects are statistically significant only for developed countries. For the case of Japan and UK, the difference in methodology (static or dynamic approach) affects the difference in results of testing. Dynamic approach happened to be more effective for Japan, but less effective for the UK and vice-versa for the static approach.

Results of t-tests (Table A.4) also show that, for the case of the USA, returns on the day after positive abnormal returns differ from those during the normal days, and this difference is statistically significant. For most of the other cases, anomaly is not confirmed.

Non-parametrical Mann-Whitney test (Table A.3) confirms results for the USA, but also reveals anomalies in emerging countries for the case of dynamic approach.

Results of the Modified CAR approach (Table A.5) confirm the presence of abnormal price behavior on the day after positive abnormal for all of the analyzed data except the case of China with static approach.

Regression analysis with dummy variables (Table A.6) provide results similar to the ANOVA-analysis: contrarian effects for the developed countries and statistically insignificant momentum effects for the case of emerging markets. Statistically significant momentum effect is observed for the case of the UK with data static approach to define abnormal returns.

To see whether detected effect are real market anomalies (i.e., they allow to "beat the market"), we use trading simulation approach. The algorithm of the trading strategy is very simple: buy right on the start of the day after the positive abnormal returns in case of momentum effect and sell in case of contrarian effect. Positions should be closed at the end of the day. Transaction costs (e.g., spread, commissions to the broker, commissions to the bank) are ignored, because it is almost impossible to incorporate them correctly for different indices and time periods.

Results of the trading simulations are presented in Table A.7 and Figure A.2. They show that the contrarian effect detected in the USA data is not just a statistical anomaly, but also can be used to generate extra profits from trading. All other countries fail to pass t-test, meaning that their results do not differ from the random trading.

Table 2: Overall results for the one-day abnormal positive returns for the case of dynamic and static

Period	Average analysis	Student's t-test	ANOVA	Mann-Whitney test	Modified CAR	Regression with dummy variables	Trading simulation	Overall
Dynamic								
USA	1	1	1	1	1	1	1	7
UK	1	0	0	0	1	0	0	2
Japan	1	0	1	0	1	1	0	4
China	1	0	0	1	1	1	1	5
India	1	0	0	1	1	0	0	3
Static								
USA	1	1	1	1	1	1	1	7
UK	1	0	1	1	1	1	0	5
Japan	1	0	0	0	1	0	0	2
China	0	0	0	0	0	0	0	0
India	1	0	0	0	1	0	0	2

Note: This table presents the overall results for the case of positive abnormal returns. "1" indicates that the anomaly is confirmed and "0" indicates that anomaly is not confirmed. The average analysis confirms the anomaly, if the mean return calculated for the abnormal return day data is much higher (lower) compared with the mean return related to non- abnormal returns day data. The statistical tests (both parametrical and non-parametrical) rejection of the null hypothesis (data for the abnormal returns day and normal returns day data belong to the same general population) also confirms the anomaly if it is statistically significant. The regression analysis with dummy variables gives evidence in favor of anomaly presence if a1 (slope of the dummy variable) is statistically significant ($p < 0.05$). The MCAR approach confirms the anomaly if the trend model based on cumulative abnormal returns data has high multiple R, passes the F test and the regression coefficients are statistically significant (p value < 0.05). The higher the overall rating, the stronger the evidence of the anomaly.

Summary of the results for the case of positive abnormal returns are presented in Table 2. The dynamic approach detects the contrarian effect in the USA and Japanese stock markets and the momentum effect in the Chinese stock market. Static approach is less efficient with strong evidence in favor of anomalies only for USA and UK.

We provide similar analysis for negative abnormal returns. Simple average analysis provides evidence in favor of contrarian effects on the days after negative abnormal returns comparing with the usual days for the developed countries, both for the dynamic and static approach (Table A.1 and Figure A.1.). But these differences are statistically significant only for the USA and Japan (see Tables B.2 and B.4 for parametrical ANOVA and t-test and B.3 for non-parametrical Mann-Whitney test). This observation is confirmed by the Modified CAR approach (Table B.5) and regression analysis with dummy variables (Table B.6).

Trading simulations (Table B.7 and Figure B.2) show that statistically different from random results are obtained only for contrarian effect in the USA and Japan. All other cases cannot provide results statistically different from random trading.

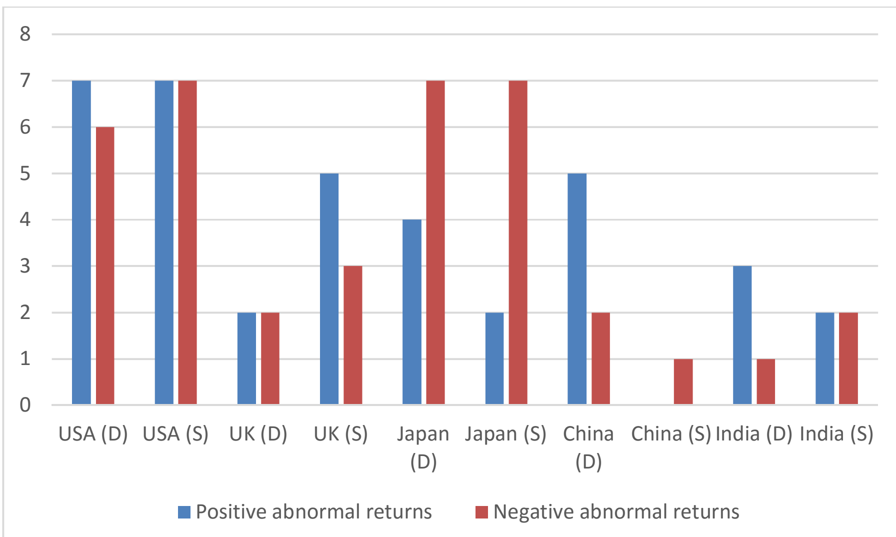
Table 3: Overall results for the one-day abnormal negative returns for the case of dynamic and static

Period	Average analysis	Student's t-test	ANOVA	Mann-Whitney test	Modified CAR	Regression with dummy variables	Trading simulation	Overall
Dynamic								
USA	1	0	1	1	1	1	1	6
UK	1	0	0	0	1	0	0	2
Japan	1	1	1	1	1	1	1	7
China	1	0	1	0	0	0	0	2
India	1	0	0	0	0	0	0	1
Static								
USA	1	1	1	1	1	1	1	7
UK	1	0	0	0	1	1	0	3
Japan	1	1	1	1	1	1	1	7
China	0	0	0	0	1	0	0	1
India	1	0	0	0	1	0	0	2

Note: This table presents the overall results for the case of positive abnormal returns. "1" indicates that the anomaly is confirmed and "0" indicates that anomaly is not confirmed. The average analysis confirms the anomaly, if the mean return calculated for the abnormal returns day data is much higher (lower) compared with the mean return related to non- abnormal returns day data. The statistical tests (both parametrical and non-parametrical) rejection of the null hypothesis (data for the abnormal returns day and normal returns day data belong to the same general population) also confirms the anomaly if it is statistically significant. The regression analysis with dummy variables gives evidence in favor of anomaly presence if a1 (slope of the dummy variable) is statistically significant ($p < 0.05$). The MCAR approach confirms the anomaly if the trend model based on cumulative abnormal returns data has high multiple R, passes the F test and the regression coefficients are statistically significant (p value < 0.05). The higher the overall rating, the stronger the evidence of the anomaly.

Summary of results for the case of negative abnormal returns are presented in Table 5.

Figure 1: Visualization of the price effects after one-day abnormal returns in the traditional indices for the cases of dynamic and static approaches



Note: This figure displays the power of the price effects after one-day abnormal returns. The y-axis refers to the overall rating for the anomaly presence (the higher the overall rating, the stronger the evidence of the anomaly), and the secondary to the x-axis shows data sets.

As for the visualization of the price effects after one-day abnormal returns, it is shown in Figure 1. As can be seen, really strong anomalies are present only in the USA and Japan. Negative abnormal returns generate more powerful effects. Emerging markets are mostly immune for the price effects after one-day abnormal returns. We find no convincing evidences in favor better efficiency of the dynamic or static approach. A typology of these effects (momentum or contrarian) is presented in Table 4.

Table 4: Typology of the price effects after one-day abnormal returns: case of traditional indices for the dynamic and static approach

Period	Positive abnormal returns		Negative abnormal returns	
	Type of effect	Power	Type of effect	Power
Dynamic				
USA	contrarian	7	contrarian	6
UK	momentum	2	contrarian	2
Japan	contrarian	4	contrarian	7
China	momentum	5	contrarian	2
India	momentum	3	momentum	1
Static				
USA	contrarian	7	contrarian	7
UK	momentum	5	contrarian	3
Japan	contrarian	2	contrarian	7
China	no effect	0	no effect	1
India	momentum	2	momentum	2

Note: This table presents typology of the price effects in the stock markets after one-day abnormal returns for different time periods. The first column reports values of the period parameter being considered, the second and fourth report types of effects (contrarian or momentum) for the cases of positive and negative abnormal returns respectively, the third and the fifth report power of detected effects (the higher the parameter is, the stronger the evidence of the anomaly) for the cases of positive and negative overreactions respectively.

Next, we provide similar analysis for the ESG data (see Appendices C and D for the cases of positive and negative abnormal returns respectively). A summary of the results for the case of positive abnormal returns are presented in Table 5.

Table 5: Overall results for the one-day abnormal positive returns for the case of dynamic and static

Period	Average analysis	Student's t-test	ANOVA	Mann-Whitney test	Modified CAR	Regression with dummy variables	Trading simulation	Overall
Dynamic								
USA	1	1	1	0	1	1	1	6
UK	0	0	0	0	1	0	0	1
Japan	1	1	1	1	1	1	1	7
China	1	0	0	0	1	0	0	2

India	0	0	0	1	1	0	0	2
Static								
USA	1	1	1	1	1	1	1	7
UK	1	1	1	1	1	1	1	7
Japan	0	0	0	0	1	0	0	1
China	0	0	0	0	1	0	0	1
India	1	0	0	0	1	0	0	2

Note: This table presents the overall results for the case of positive abnormal returns. "1" indicates that the anomaly is confirmed and "0" indicates that anomaly is not confirmed. The average analysis confirms the anomaly, if the mean return calculated for the abnormal returns day data is much higher (lower) compared with the mean return related to non- abnormal returns day data. The statistical tests (both parametrical and non-parametrical) rejection of the null hypothesis (data for the abnormal returns day and normal returns day data belong to the same general population) also confirms the anomaly if it is statistically significant. The regression analysis with dummy variables gives evidence in favor of anomaly presence if a1 (slope of the dummy variable) is statistically significant ($p < 0.05$). The MCAR approach confirms the anomaly if the trend model based on cumulative abnormal returns data has high multiple R, passes the F test and the regression coefficients are statistically significant (p value < 0.05). The higher the overall rating, the stronger the evidence of the anomaly.

As can be seen, developed countries again are quite sensitive for the price effects after one-day positive abnormal returns in the form of contrarian effect on the day after abnormal return day. Furthermore, these effects can be exploitable to generate abnormal profits from trading (Table C.7). Emerging markets are immune for the price effects after positive one-day abnormal returns. A summary of results for the case of negative abnormal returns are presented in Table 6.

Table 6: Overall results for the one-day abnormal negative returns for the case of dynamic and static approaches

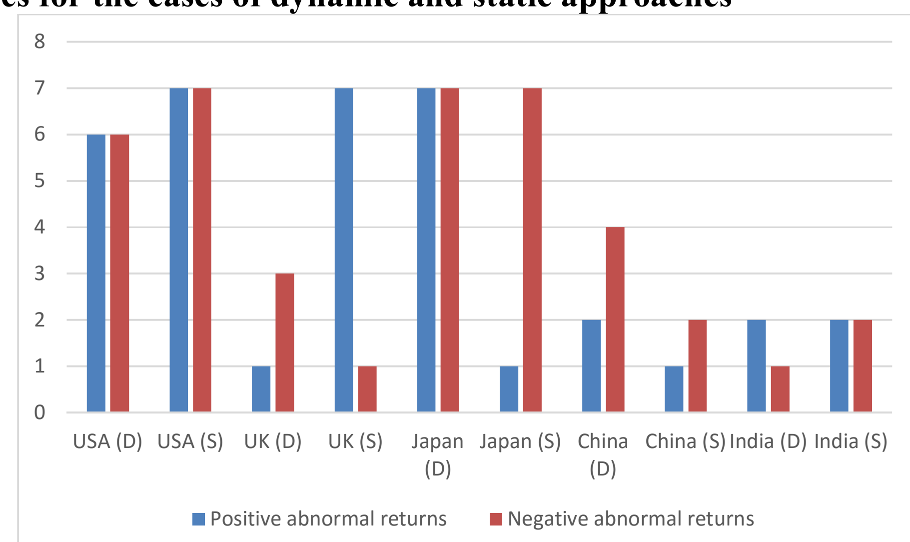
Period	Average analysis	Student's t-test	ANOVA	Mann-Whitney test	Modified CAR	Regression with dummy variables	Trading simulation	Overall
Dynamic								
USA	1	0	1	1	1	1	1	6
UK	1	0	1	0	0	1	0	3
Japan	1	1	1	1	1	1	1	7
China	1	0	1	0	1	1	0	4
India	1	0	0	0	0	0	0	1
Static								
USA	1	1	1	1	1	1	1	7

UK	1	0	0	0	0	0	0	1
Japan	1	1	1	1	1	1	1	7
China	1	0	0	0	1	0	0	2
India	1	0	0	0	1	0	0	2

Note: This table presents the overall results for the case of positive abnormal returns. "1" indicates that the anomaly is confirmed and "0" indicates that anomaly is not confirmed. The average analysis confirms the anomaly, if the mean return calculated for the abnormal returns day data is much higher (lower) compared with the mean return related to non- abnormal returns day data. The statistical tests (both parametrical and non-parametrical) rejection of the null hypothesis (data for the abnormal returns day and normal returns day data belong to the same general population) also confirms the anomaly if it is statistically significant. The regression analysis with dummy variables gives evidence in favor of anomaly presence if a1 (slope of the dummy variable) is statistically significant ($p < 0.05$). The MCAR approach confirms the anomaly if the trend model based on cumulative abnormal returns data has high multiple R, passes the F test and the regression coefficients are statistically significant (p value < 0.05). The higher the overall rating, the stronger the evidence of the anomaly.

Results for the negative abnormal returns are in line with those for the positive ones. Strong contrarian effects are detected in the developed markets and no effects are observed in the emerging markets. A visualization of the price effects after one-day abnormal returns for the ESG indices is presented in Figure 2. As can be seen, results are in line with those for the positive abnormal returns.

Figure 2: Visualization of the price effects after one-day abnormal returns in the ESG indices for the cases of dynamic and static approaches



Note: This figure displays the power of the price effects after one-day abnormal returns. The y-axis refers to the overall rating for the anomaly presence (the higher the overall rating, the stronger the evidence of the anomaly), and the secondary to the x-axis shows data sets.

A typology of the detected effects (momentum or contrarian) is presented in Table 7.

Table 7: Typology of the price effects after one-day abnormal returns in the stock markets for the case of dynamic and static approaches

Period	Positive abnormal returns		Negative abnormal returns	
	Type of effect	Power	Type of effect	Power
Dynamic				
USA	contrarian	6	contrarian	6
UK	momentum	1	contrarian	3
Japan	contrarian	7	contrarian	7
China	momentum	2	contrarian	4
India	momentum	2	momentum	1
Static				
USA	contrarian	7	contrarian	7
UK	momentum	7	contrarian	1
Japan	contrarian	1	contrarian	7
China	contrarian	1	contrarian	2
India	momentum	2	momentum	2

Note: This table presents typology of the price effects in the stock markets after one-day abnormal returns for different time periods. The first column reports values of the period parameter being considered, the second and fourth report types of effects (contrarian or momentum) for the cases of positive and negative abnormal returns respectively, the third and the fifth report power of detected effects (the higher the parameter is, the stronger the evidence of the anomaly) for the cases of positive and negative overreactions respectively.

To test the Hypothesis 2, we compare the power of detected effects for the cases of ESG data and Traditional indices. Results for the positive and negative abnormal returns are presented in Tables 8 and 9, respectively.

Table 8: Comparison of the price effects after one-day positive abnormal returns: ESG vs Traditional indices

Period	ESG		Traditional	
	Type of effect	Power	Type of effect	Power
Dynamic				
USA	contrarian	6	contrarian	7
UK	momentum	1	momentum	2
Japan	contrarian	7	contrarian	4

China	momentum	2	momentum	5
India	momentum	2	momentum	3
Static				
USA	contrarian	7	contrarian	7
UK	momentum	7	momentum	5
Japan	contrarian	1	contrarian	2
China	contrarian	1	no effect	0
India	momentum	2	momentum	2

Based on the results of Table 8, it is hard to find any evidence in favor of Hypothesis 2. Types of effects are the same both for the ESG and Traditional indices. The power of detected effects is different across countries and approaches, but there is no detectable pattern in the differences. No ESG or traditional indices are more vulnerable for the price effects after one-day positive returns.

Table 9: Comparison of the price effects after one-day negative abnormal returns: ESG vs Traditional indices

Period	ESG		Traditional	
	Type of effect	Power	Type of effect	Power
Dynamic				
USA	contrarian	6	contrarian	6
UK	contrarian	3	contrarian	2
Japan	contrarian	7	contrarian	7
China	contrarian	4	contrarian	2
India	momentum	1	momentum	1
Static				
USA	contrarian	7	contrarian	7
UK	contrarian	1	contrarian	3
Japan	contrarian	7	contrarian	7
China	contrarian	2	no effect	1
India	momentum	2	momentum	2

According to results from Table 9, the types of effects are the same for the ESG and traditional indices. The power of these effects is very close for the analyzed data sets. This means that Hypothesis 2 is rejected: price effects after one-day abnormal returns are not stronger for the case of traditional indices compared with ESG indices.

Next, we analyze price effects after one-day abnormal returns for a data set over the period 2007-2009 which is commonly recognized as a Global Financial Crisis. ESG indices acted as objects of analysis. To test the Hypothesis 3, we compare results over the crisis period with those for the overall data set both for the case of ESG and traditional indices. Resuls for the case of positive and negative abnormal returns are presented in Tables 10 and 11, respectively.

Table 10: Comparison of results for the price effect after one-day abnormal positive returns based on dynamic and static approaches for the case of crisis and overall data sets

Country	Effect (crisis)	ESG	Traditional	Crisis (ESG)
Dynamic				
USA	contrarian	-0,44% (2.07)	**-0,43% (2.28)**	-0,70% (1.23)
UK	contrarian	0,10% (0.39)	**0,10% (0.44)**	-0,05% (0.06)
Japan	contrarian	**-0,33% (2.44)**	-0,21% (1.27)	-1,02% (1.56)
China	no effect	0,09% (0.35)	**0,35% (1.91)**	0,00% (0.03)
India	contrarian	0,11% (0.26)	0,11% (0.26)	**-0,31% (0.61)**
Static				
USA	contrarian	-0,65% (2.61)	**-0,65% (2.61)**	-0,47% (0.98)
UK	contrarian	**0,35% (1.69)**	0,30% (1.23)	-0,05% (0.09)
Japan	contrarian	-0,05% (0.32)	-0,15% (0.64)	**-0,53% (0.86)**
China	contrarian	-0,03% (0.25)	0,00% (0.13)	**-0,87% (1.37)**
India	contrarian	0,25% (0.56)	0,25% (0.56)	**-0,68% (0.73)**

Note: * t criterion in parentheses.

Table 11: Comparison of results for the price effect after one-day abnormal negative returns based on dynamic and static approaches for the case of crisis and overall data sets

Country	Effect (crisis)	ESG	Traditional	Crisis (ESG)
Dynamic				
USA	contrarian	0,36% (1.65)	0,34% (1.48)	**0,77% (1.67)**
UK	contrarian	**0,36% (1.47)**	0,13% (0.60)	1,03% (1.24)
Japan	contrarian	**0,48% (1.93)**	0,44% (1.78)	1,06% (1.81)
China	contrarian	**0,28% (1.18)**	0,11% (0.34)	1,34% (1.00)

India	momentum	-0,10% (0.64)	-0,10% (0.64)	**-0,36% (0.85)**
		Static		
USA	contrarian	**0,71% (2.27)**	0,63% (1.96)	0,82% (1.06)
UK	contrarian	0,18% (0.54)	0,20% (0.69)	**0,63% (0.93)**
Japan	contrarian	0,47% (1.69)	**0,50% (1.87)**	0,64% (1.06)
China	contrarian	0,20% (0.59)	-0,01% (0.11)	**1,01% (0.81)**
India	momentum	-0,10% (0.51)	-0,10% (0.51)	**-0,63% (0.82)**

Note: * t criterion in parentheses.

As can be seen, both dynamic and static approaches for the case of crisis data give no evidence in favor of Hypothesis 3. Price effects during the crisis in general are not stronger, especially for the case of dynamic approach. For the case of static approach, price effects for the case of negative abnormal returns look stronger compared with overall data, but they are not strong enough to call them anomalies (t-tests are not passed).

Overall, we find no serious evidence in favor of the idea that price effects tend to be stronger during the crisis periods. At the same time, after negative abnormal returns, stock markets (with the only exception – the Indian stock market) tend to demonstrate contrarian effects. These effects are stronger for the case of developed countries (USA and Japan).

To conclude and sum up.

- Hypothesis 1 is not rejected for the case of developed countries: in most of the cases (both ESG and traditional indices), after one-day abnormal returns, contrarian effects do appear, and they can be used to generate abnormal profits from trading in the stock markets. This is true for the one-day abnormal positive returns (Hypothesis 1.1) and one-day abnormal negative returns (Hypothesis 1.2);

- Hypothesis 1 is not rejected for the case of emerging countries: in most of the cases (both ESG and traditional indices), after one-day abnormal returns, there are no statistically significant price effects;

- Hypothesis 2 is rejected, suggesting that price effects are not stronger for the traditional indices compared with ESG indices.

- Hypothesis 3 is rejected, implying that price effects after one-day abnormal returns are not stronger during the crisis period

- Hypothesis 4 is rejected, indicating that dynamic trigger approach shows no better efficiency overall to define abnormal returns in the stock markets than the static approach.

- Hypothesis 5 is rejected, suggesting that price effects after one-day abnormal returns are not stronger for the case of emerging markets compared with developed ones. They are stronger for the developed markets.

Results of this study find no evidence that low efficiency of the stock market leads to market anomalies: emerging stock markets (which should be less efficient) are immune to price effects after one-day abnormal returns, but developed markets are vulnerable. ESG indices are not.

The question of methodology to define abnormal returns is still open: in some cases, dynamic approach is more sensitive and provide better results, in other – static one. Accordingly, each data set requires additional calculations to justify the choice.

Another important conclusion of this study is that US stock market is still (even nowadays) extremely vulnerable for the price effects after abnormal returns: prices tend to move in the opposite direction the day after the day with abnormal returns. These effects can be exploitable to generate abnormal profits from trading.

The nature of the price effects after one-day abnormal returns is still unclear, but the statistical significance of results shows that detected anomalies can be utilized by practitioners (traders, investors, etc.) to generate profits. Trading based on contrarian strategies can be profitable. Overall, those results expand a variety of empirical evidence from academics related to price patterns after one-day abnormal returns.

5. Conclusions

In this paper, we have examined price effects (momentum and contrarian) after one-day abnormal returns in the stock markets of both developed and emerging while comparing ESG stock indices to conventional stock indices. A number of hypotheses are tested: after one-day abnormal returns specific price effects (momentum/contrarian) do appear (H1) for the case of positive (H1.1) and negative (H1.2) returns; price effects after one-day abnormal returns are stronger for the case of traditional indices compared with ESG indices (H2); price effects after one-day abnormal returns are stronger during the crisis period (H3); dynamic trigger approach is more appropriate to define abnormal returns in the stock markets than static (H4); and price effects after one-day abnormal returns are stronger for the case of emerging markets compared with developed ones (H5). For these purposes, different statistical tests and methodological approaches are used including average analysis, modified cumulative abnormal returns approach, regression analysis with dummy variables, R/S analysis, parametric Student's t-test and ANOVA, non-parametric Mann-Whitney tests and trading simulation approach.

The results are mixed for the case of H1 and provide no evidence in favor of H2-H5. The US stock market is extremely vulnerable to the price effects after one-day abnormal returns in the form of contrarian price movements. Some strong effects are found in the Japanese stock market data. Emerging markets are immune for the price effects: we find no stable specific patterns with statistically significant results. Results involving ESG indices are in general in line with those for the conventional indices. Types of detected effects are the same for the ESG and conventional indices. In some cases, power of the effects is different, but these differences are not significant, and no patterns in their appearance are detected. During the crisis period price effects are not more or less significant.

The results of this paper provide a bunch of new empirical evidence related to the price effects after one-day abnormal returns in the understudied universe of ESG stock indices. From the point of economic theory, they give additional evidence against the Efficient Market Hypothesis: markets are partially efficient. For example, the US stock market continues to be extremely vulnerable for the price effects after abnormal returns (prices tend to move in the opposite direction the day after the day with abnormal returns), which can be exploited to generate abnormal profits from trading. So, “beat the market” attempts make sense. Behavioral finance gets another experimental confirmation in favor of irrational markets. Practitioners can use the results of this paper to generate extra profits from trading based on detected price patterns. Future studies can consider the stability and time variation in the price effects in both conventional and ESG stock indices. Another line of research can consider the determinants of the price effect and whether they differ between conventional and ESG indices.

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Appendix A

Traditional indices: The case of positive abnormal returns

Table A.1: Average returns for the usual days and days after positive abnormal returns: the case of static and dynamic approaches

Country	Usual day	Day after positive abnormal returns (dynamic)	Day after positive abnormal returns (static)
USA	0,06%	-0,43%	-0,65%
UK	0,03%	0,10%	0,30%
Japan	0,01%	-0,21%	-0,15%
China	0,03%	0,35%	0,00%
India	0,05%	0,11%	0,25%

FigureA.1: Average returns for the usual days and days after positive abnormal returns: the case of static and dynamic approaches

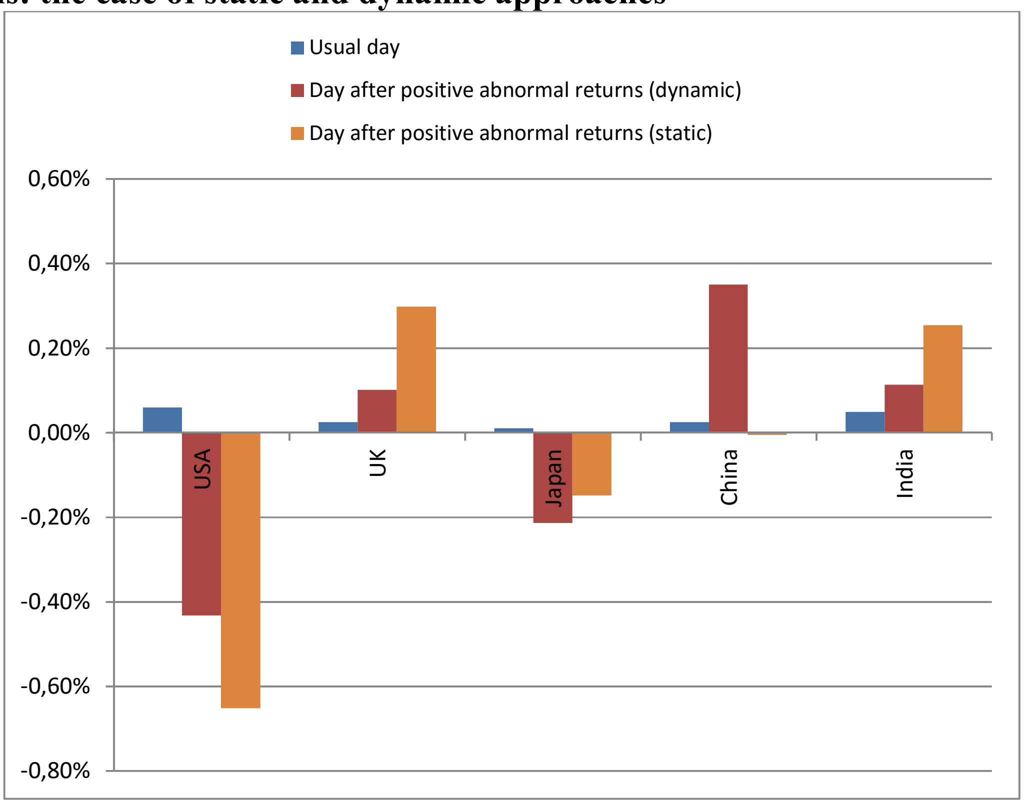


Table A.2: ANOVA test of the price effects after positive abnormal returns for the case of static and dynamic approaches

Country	F	p-value	F critical	Null hypothesis	Anomaly	Multiplier
Dynamic						
USA	34,93	0,00	3,84	rejected	confirmed	9,08
UK	0,63	0,43	3,84	not rejected	not confirmed	0,16
Japan	6,15	0,01	3,84	rejected	confirmed	1,60
China	0,61	0,43	3,84	not rejected	not confirmed	0,16
India	0,37	0,54	3,84	not rejected	not confirmed	0,10
Static						
USA	64,59	0,00	3,84	rejected	confirmed	16,80
UK	9,87	0,00	3,84	rejected	confirmed	2,57
Japan	3,12	0,08	3,84	not rejected	not confirmed	0,81
China	0,11	0,74	3,84	not rejected	not confirmed	0,03
India	3,31	0,07	3,84	not rejected	not confirmed	0,86

Table A.3: Mann-Whitney test of the price effects after positive abnormal returns for the case of static and dynamic approaches

Country	Adjusted H	d.f.	P value	Critical value	Null hypothesis	Anomaly	Multiplier
Dynamic							
USA	6,54	1,00	0,01	3,84	rejected	confirmed	1,70
UK	0,17	1,00	0,68	3,84	not rejected	not confirmed	0,04
Japan	2,58	1,00	0,11	3,84	not rejected	not confirmed	0,67
China	5,93	1,00	0,01	3,84	rejected	confirmed	1,54
India	4,24	1,00	0,04	3,84	rejected	confirmed	1,11
Static							
USA	9,67	1,00	0,00	3,84	rejected	confirmed	2,52
UK	4,02	1,00	0,05	3,84	rejected	confirmed	1,05
Japan	2,18	1,00	0,14	3,84	not rejected	not confirmed	0,57
China	0,80	1,00	0,37	3,84	not rejected	not confirmed	0,21
India	2,28	1,00	0,13	3,84	not rejected	not confirmed	0,59

Table A.4: T-test of the price effects after positive abnormal returns for the case of static and dynamic approaches

Country	Parameter	Usual day	Day after positive abnormal returns (dynamic)	Day after positive abnormal returns (static)
USA	Mean, %	0,06%	-0,43%	-0,65%
	Stand. Dev., %	0,68%	1,94%	2,42%
	Number of values	2602	81	79
	t-criterion		2,28	2,61
	Null hypothesis		rejected	rejected
	Anomaly		confirmed	confirmed
UK	Mean, %	0,03%	0,10%	0,30%
	Stand. Dev., %	0,81%	1,48%	2,42%
	Number of values	2614	74	119
	t-criterion		0,44	1,23
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
Japan	Mean, %	0,01%	-0,21%	-0,15%
	Stand. Dev., %	0,74%	1,49%	2,33%
	Number of values	2573	72	88
	t-criterion		1,27	0,64
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
China	Mean, %	0,03%	0,35%	0,00%
	Stand. Dev., %	0,94%	1,45%	2,42%
	Number of values	2572	74	108
	t-criterion		1,91	0,13
	Null hypothesis		rejected	not rejected
	Anomaly		confirmed	not confirmed
India	Mean, %	0,05%	0,11%	0,25%
	Stand. Dev., %	0,88%	2,15%	3,64%
	Number of values	2586	78	98
	t-criterion		0,26	0,56
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed

Table A.5: Modified CAR approach: results of the price effects after positive abnormal returns for the case of static and dynamic approaches*

Country	Multiple R	F-test	a0	a1	Anomaly
Dynamic					
USA	0,89	286,62 (0,00)	-0,0563 (0,00)	-0,0021 (0,00)	confirmed
UK	0,53	28,47 (0,00)	-0,0332 (0,00)	0,0006 (0,00)	confirmed
Japan	0,83	149,42 (0,00)	-0,0907 (0,00)	-0,0017 (0,00)	confirmed
China	0,98	1476,38 (0,00)	-0,0304 (0,00)	0,0036 (0,00)	confirmed
India	0,82	160,19 (0,00)	-0,0752 (0,00)	0,0031 (0,00)	confirmed
Static					
USA	0,87	229,76 (0,00)	0,0162 (0,35)	-0,0056 (0,00)	confirmed
UK	0,92	603,09 (0,00)	-0,1806 (0,00)	0,0039 (0,00)	confirmed
Japan	0,76	120,28 (0,00)	-0,0450 (0,00)	-0,0025 (0,00)	confirmed
China	0,16	2,74 (0,10)	-0,2102 (0,00)	0,0005 (0,10)	not confirmed
India	0,81	180,54 (0,00)	-0,1199 (0,00)	0,0044 (0,00)	confirmed

Note: p-values are in parentheses.

Table A.6: Regression analysis with dummy variables: results of the price effects after positive abnormal returns for the case of static and dynamic approaches*

Country	Multiple R	F-test	a0	a1	Anomaly
Dynamic					
USA	0,11	34,93 (0,00)	0,0006 (0,00)	-0,0049 (0,00)	confirmed
UK	0,02	0,6283 (0,42)	0,0002 (0,12)	0,0008 (0,42)	not confirmed
Japan	0,05	6,15 (0,01)	0,0001 (0,50)	-0,0023 (0,01)	confirmed
China	0,06	8,42 (0,00)	0,0002 (0,18)	0,0033 (0,00)	confirmed
India	0,01	0,37 (0,54)	0,0005 (0,00)	0,0006 (0,54)	not confirmed
Static					
USA	0,15	63,89 (0,00)	0,0006 (0,00)	-0,0071 (0,00)	confirmed
UK	0,06	9,87 (0,00)	0,0002 (0,16)	0,0027 (0,00)	confirmed
Japan	0,03	3,11 (0,08)	0,0001 (0,53)	-0,0016 (0,08)	not confirmed
China	0,01	0,0884 (0,76)	0,0002 (0,21)	-0,0003 (0,76)	not confirmed
India	0,04	3,31 (0,07)	0,0005 (0,02)	0,0021 (0,07)	not confirmed

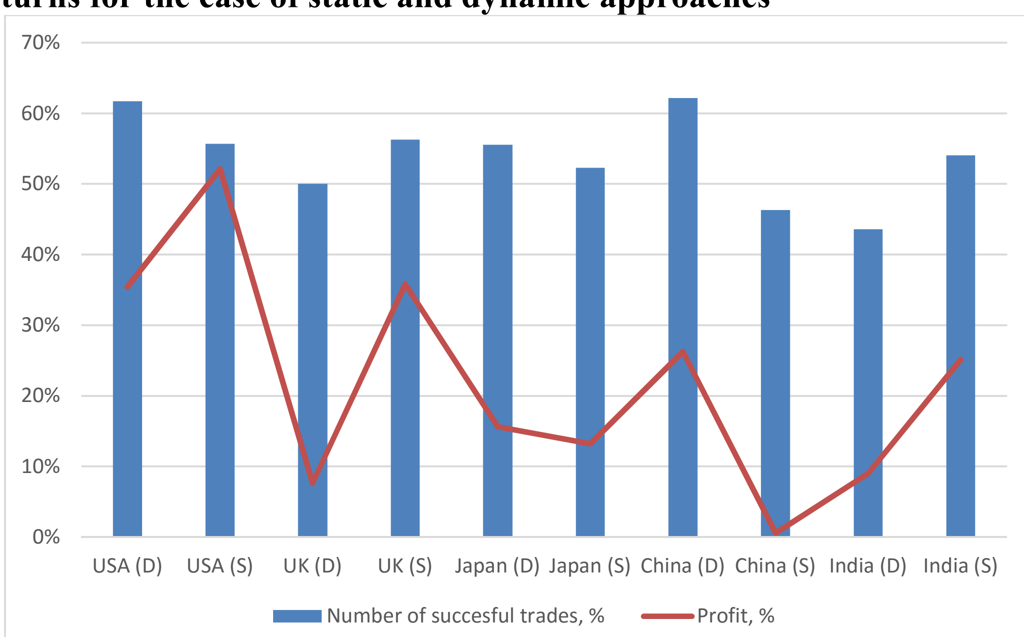
Note: p-values are in parentheses.

Table A.7: Trading simulation results of the price effects after positive abnormal returns for the case of static and dynamic approaches

Country	Number of trades, units	Number of successful trades, unit	Number of successful trades, %	Profit, %	Profit % per year	Profit % per trade	t-test calculated value	t-test status
Dynamic								
USA***	81	50	62%	35%	3%	0%	2,03	rejected
UK*	74	37	50%	8%	0,59%	0,10%	0,60	not rejected
Japan*	72	40	56%	16%	1,20%	0,22%	1,23	not rejected
China**	74	46	62%	26%	2,63%	0,35%	2,10	rejected
India*	78	34	44%	9%	0,90%	0,12%	0,47	not rejected
Static								
USA*	79	44	56%	52%	4%	1%	2,42	rejected
UK*	119	67	56%	36%	2,75%	0,30%	1,36	not rejected
Japan*	88	46	52%	13%	1,02%	0,15%	0,60	not rejected
China*	108	50	46%	1%	0,05%	0,01%	0,02	not rejected
India**	98	53	54%	25%	2,52%	0,26%	0,70	not rejected

Note: * momentum effect; ** contrarian effect; *** no specific effect detected.

Figure A.2: Trading simulation results of the price effects after positive abnormal returns for the case of static and dynamic approaches



Appendix B

Traditional indices: The case of negative abnormal returns

Table B.1: Average returns for the usual days and days after negative abnormal returns for the case of static and dynamic approaches

Country	Usual day	Day after negative abnormal returns (dynamic)	Day after negative abnormal returns (static)
USA	0,06%	0,34%	0,63%
UK	0,03%	0,13%	0,20%
Japan	0,01%	0,44%	0,50%
China	0,03%	0,11%	-0,01%
India	0,05%	-0,10%	-0,10%

Figure B.1: Average returns for the usual days and days after negative abnormal returns for the case of static and dynamic approaches

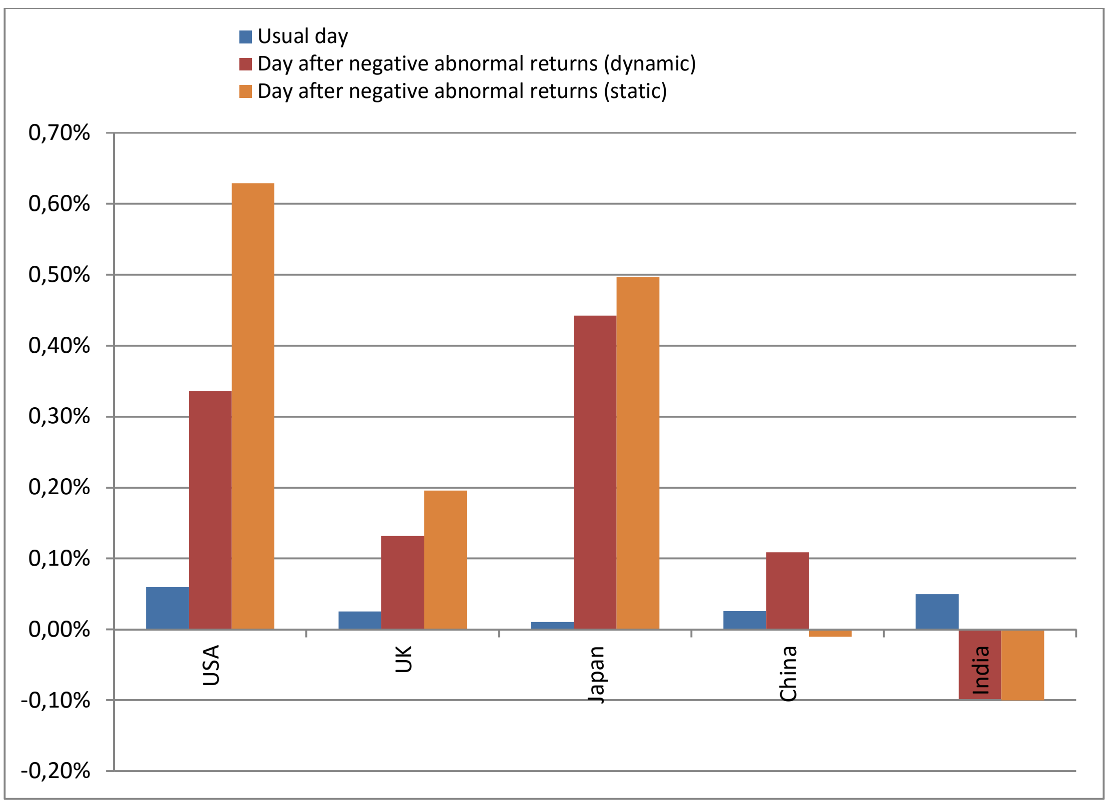


Table B.2: ANOVA test of the price effects after negative abnormal returns for the case of static and dynamic approaches

Country	F	p-value	F critical	Null hypothesis	Anomaly	Multiplier
Dynamic						
USA	14,52	0,00	3,84	rejected	confirmed	3,78
UK	1,22	0,27	3,84	not rejected	not confirmed	0,32
Japan	24,08	0,00	3,84	rejected	confirmed	6,26
China	8,42	0,00	3,84	rejected	confirmed	2,19
India	2,21	0,14	3,84	not rejected	not confirmed	0,57
Static						
USA	42,91	0,00	3,84	rejected	confirmed	11,16
UK	3,72	0,05	3,84	not rejected	not confirmed	0,97
Japan	30,56	0,00	3,84	rejected	confirmed	7,95
China	0,09	0,77	3,84	not rejected	not confirmed	0,02
India	2,10	0,15	3,84	not rejected	not confirmed	0,55

Table B.3: Mann-Whitney test of the price effects after negative abnormal returns for the case of static and dynamic approaches

Country	Adjusted H	d.f.	P value	Critical value	Null hypothesis	Anomaly	Multiplier
Dynamic							
USA	5,71	1,00	0,02	3,84	rejected	confirmed	1,49
UK	0,05	1,00	0,82	3,84	not rejected	not confirmed	0,01
Japan	11,57	1,00	0,00	3,84	rejected	confirmed	3,01
China	0,11	1,00	0,74	3,84	not rejected	not confirmed	0,03
India	0,00	1,00	0,98	3,84	not rejected	not confirmed	0,00
Static							
USA	11,06	1,00	0,00	3,84	rejected	confirmed	2,88
UK	0,61	1,00	0,44	3,84	not rejected	not confirmed	0,16
Japan	12,62	1,00	0,00	3,84	rejected	confirmed	3,29
China	0,01	1,00	0,91	3,84	not rejected	not confirmed	0,00
India	0,02	1,00	0,88	3,84	not rejected	not confirmed	0,01

Table B.4: T-test of the price effects after negative abnormal returns for the case of static and dynamic approaches

Country	Parameter	Usual day	Day after negative abnormal returns (dynamic)	Day after negative abnormal returns (static)
USA	Mean,%	0,06%	0,34%	0,63%
	Stand. Dev., %	0,68%	2,05%	3,04%
	Number of values	2602	121	109
	t-criterion		1,48	1,96
	Null hypothesis		not rejected	rejected
	Anomaly		not confirmed	confirmed
UK	Mean,%	0,03%	0,13%	0,20%
	Stand. Dev., %	0,81%	1,54%	2,90%
	Number of values	2614	75	138
	t-criterion		0,60	0,69
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
Japan	Mean,%	0,01%	0,44%	0,50%
	Stand. Dev., %	0,74%	2,33%	2,64%
	Number of values	2573	93	104
	t-criterion		1,78	1,87
	Null hypothesis		rejected	rejected
	Anomaly		confirmed	confirmed
China	Mean,%	0,03%	0,11%	-0,01%
	Stand. Dev., %	0,94%	2,41%	3,38%
	Number of values	2572	95	116
	t-criterion		0,34	0,11
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
India	Mean,%	0,05%	-0,10%	-0,10%
	Stand. Dev., %	0,88%	2,24%	3,09%
	Number of values	2586	96	109
	t-criterion		0,64	0,51
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed

Table B.5: Modified CAR approach: results of the price effects after negative abnormal returns for the case of static and dynamic approaches*

Country	Multiple R	F-test	a0	a1	Anomaly
Dynamic					
USA	0,75	150,29 (0,00)	0,0555 (0,00)	0,0015 (0,00)	confirmed
UK	0,73	81,49 (0,00)	-0,0663 (0,00)	0,0011 (0,00)	confirmed
Japan	0,93	615,44 (0,00)	-0,0189 (0,10)	0,0053 (0,00)	confirmed
China	0,10	0,9773 (0,32)	0,1200 (0,00)	-0,0002 (0,32)	not confirmed
India	0,18	1,75 (0,19)	-0,1255 (0,00)	-0,0003 (0,19)	not confirmed
Static					
USA	0,94	808,49 (0,00)	-0,0374 (0,00)	0,0051 (0,00)	confirmed
UK	0,37	21,98 (0,00)	0,0568 (0,00)	0,0007 (0,00)	confirmed
Japan	0,93	703,05 (0,00)	-0,0806 (0,00)	0,0058 (0,00)	confirmed
China	0,45	29,17 (0,00)	-0,0403 (0,00)	-0,0008 (0,00)	confirmed
India	0,81	103,60 (0,00)	0,0164 (0,50)	-0,0077 (0,00)	confirmed

Note: p-values are in parentheses.

Table B.6: Regression analysis with dummy variables: results of the price effects after negative abnormal returns for the case of static and dynamic approaches*

Country	Multiple R	F-test	a0	a1	Anomaly
Dynamic					
USA	0,07	14,52 (0,00)	0,0006 (0,00)	0,0028 (0,00)	confirmed
UK	0,02	1,22 (0,26)	0,0002 (0,12)	0,0011 (0,26)	not confirmed
Japan	0,09	24,08 (0,00)	0,0001 (0,53)	0,0044 (0,00)	confirmed
China	0,02	0,6131 (0,21)	0,0002 (0,43)	0,0008 (0,21)	not confirmed
India	0,03	2,21 (0,13)	0,0005 (0,00)	-0,0015 (0,13)	not confirmed
Static					
USA	0,12	42,91 (0,00)	0,0006 (0,00)	0,0057 (0,00)	confirmed
UK	0,37	21,98 (0,00)	0,0568 (0,00)	0,0007 (0,00)	confirmed
Japan	0,11	30,56 (0,00)	0,0001 (0,56)	0,0049 (0,00)	confirmed
China	0,03	2,59 (0,10)	0,0003 (0,20)	0,0017 (0,10)	not confirmed
India	0,03	2,10 (0,15)	0,0005 (0,02)	-0,0015 (0,15)	not confirmed

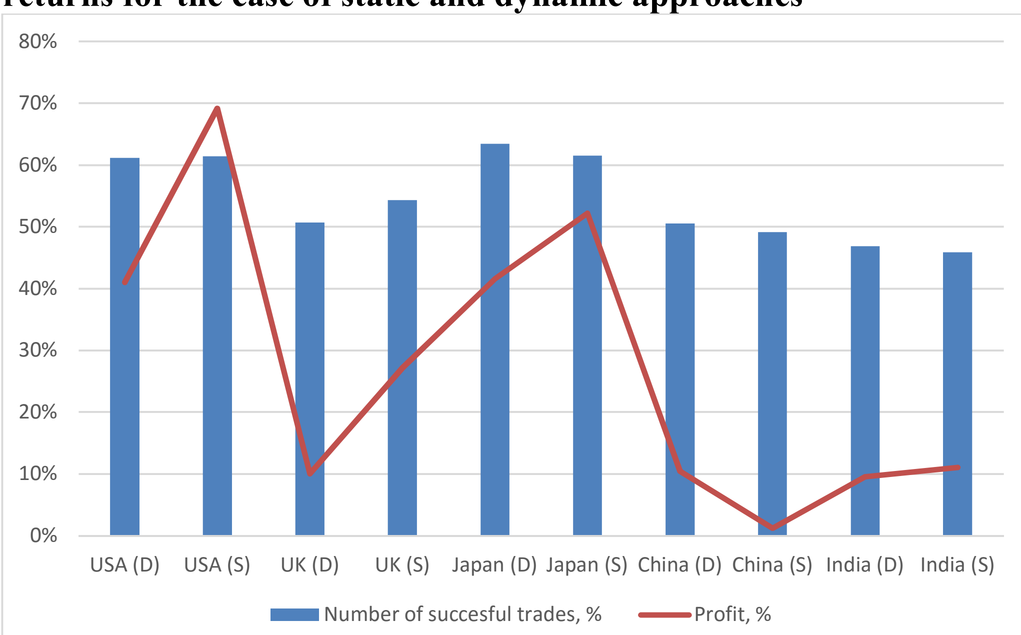
Note: p-values are in parentheses.

Table B.7: Trading simulation results of the price effects after negative abnormal returns for the case of static and dynamic approaches

Country	Number of trades, units	Number of successful trades, unit	Number of successful trades, %	Profit, %	Profit % per year	Profit % per trade	t-test calculated value	t-test status
Dynamic								
USA**	121	74	61%	41%	3%	0%	1,82	rejected
UK**	75	38	51%	10%	0,77%	0,13%	0,75	not rejected
Japan**	93	59	63%	42%	3,20%	0,45%	1,85	rejected
China**	95	48	51%	10%	0,80%	0,11%	0,45	not rejected
India*	96	45	47%	10%	0,96%	0,10%	0,43	not rejected
Static								
USA**	109	67	61%	69%	5%	1%	2,18	rejected
UK**	138	75	54%	27%	2,09%	0,20%	0,80	not rejected
Japan**	104	64	62%	52%	4,02%	0,50%	1,94	rejected
China***	116	57	49%	1%	0,09%	0,01%	0,03	not rejected
India*	109	50	46%	11%	1,10%	0,10%	0,34	not rejected

Note: * momentum effect; ** contrarian effect; *** no specific effect detected.

Figure B.2: Trading simulation results of the price effects after negative abnormal returns for the case of static and dynamic approaches



Appendix C

ESG indices: The case of positive abnormal returns

Table C.1: Average returns for the usual days and days after positive abnormal returns: the case of static and dynamic approaches

Country	Usual day	Day after positive abnormal returns (dynamic)	Day after positive abnormal returns (static)
USA	0,06%	-0,44%	-0,65%
UK	0,03%	0,10%	0,35%
Japan	0,02%	-0,33%	-0,05%
China	0,03%	0,09%	-0,03%
India	0,05%	0,11%	0,25%

Figure C.1: Average returns for the usual days and days after positive abnormal returns: the case of static and dynamic approaches

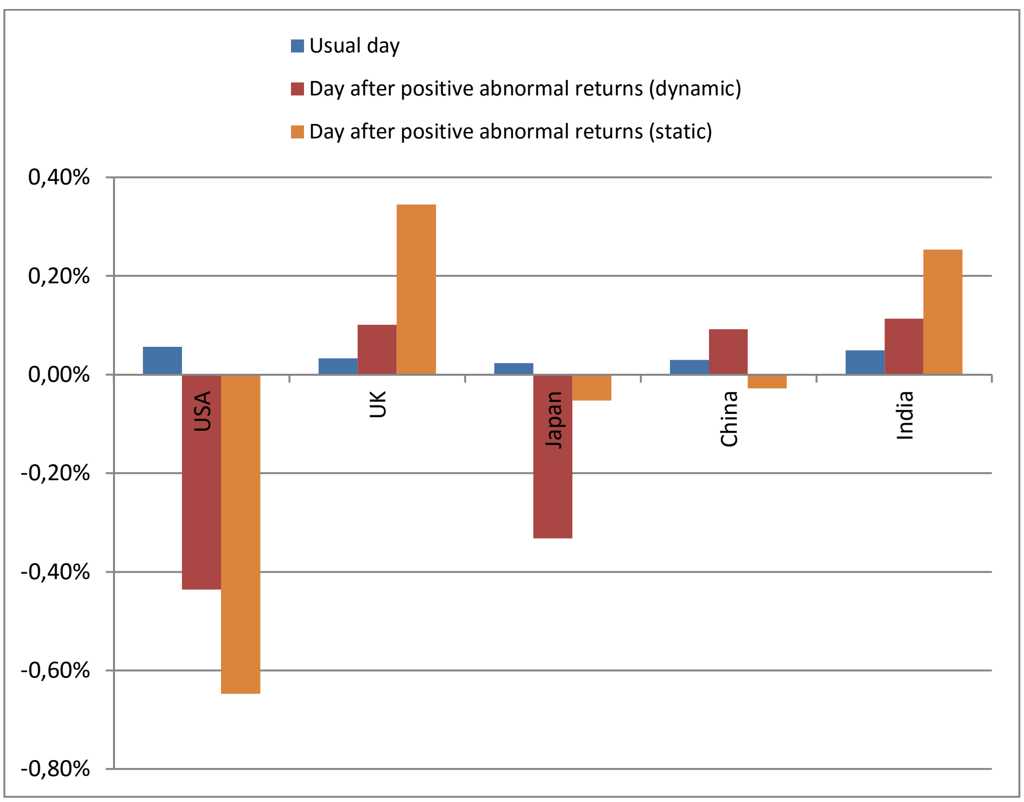


Table C.2: ANOVA test of the price effects after positive abnormal returns for the case of static and dynamic approaches

Country	F	p-value	F critical	Null hypothesis	Anomaly	Multiplier
Dynamic						
USA	30,45	0,00	3,84	rejected	confirmed	7,92
UK	0,53	0,47	3,84	not rejected	not confirmed	0,14
Japan	15,08	0,00	3,84	rejected	confirmed	3,92
China	0,28	0,60	3,84	not rejected	not confirmed	0,07
India	0,37	0,54	3,84	not rejected	not confirmed	0,10
Static						
USA	61,54	0,00	3,84	rejected	confirmed	16,01
UK	14,46	0,00	3,84	rejected	confirmed	3,76
Japan	0,72	0,39	3,84	not rejected	not confirmed	0,19
China	0,31	0,58	3,84	not rejected	not confirmed	0,08
India	3,31	0,07	3,84	not rejected	not confirmed	0,86

Table C.3: Mann-Whitney test of the price effects after positive abnormal returns for the case of static and dynamic approaches

Country	Adjusted H	d.f.	P value	Critical value	Null hypothesis	Anomaly	Multiplier
Dynamic							
USA	2,60	1,00	0,11	3,84	not rejected	not confirmed	0,68
UK	0,20	1,00	0,66	3,84	not rejected	not confirmed	0,05
Japan	6,12	1,00	0,01	3,84	rejected	confirmed	1,59
China	0,34	1,00	0,56	3,84	not rejected	not confirmed	0,09
India	4,24	1,00	0,04	3,84	rejected	confirmed	1,11
Static							
USA	9,81	1,00	0,00	3,84	rejected	confirmed	2,55
UK	5,31	1,00	0,02	3,84	rejected	confirmed	1,38
Japan	0,42	1,00	0,51	3,84	not rejected	not confirmed	0,11
China	0,00	1,00	1,00	3,84	not rejected	not confirmed	0,00
India	2,28	1,00	0,13	3,84	not rejected	not confirmed	0,59

Table C.4: T-test of the price effects after positive abnormal returns for the case of static and dynamic approaches

Country	Parameter	Usual day	Day after positive abnormal returns (dynamic)	Day after positive abnormal returns (static)
USA	Mean,%	0,06%	-0,44%	-0,65%
	Stand. Dev., %	0,70%	2,04%	2,43%
	Number of values	2595	74	81
	t-criterion		2,07	2,61
	Null hypothesis		rejected	rejected
	Anomaly		confirmed	confirmed
UK	Mean,%	0,03%	0,10%	0,35%
	Stand. Dev., %	0,78%	1,48%	1,97%
	Number of values	2597	74	114
	t-criterion		0,39	1,69
	Null hypothesis		not rejected	rejected
	Anomaly		not confirmed	confirmed
Japan	Mean,%	0,02%	-0,33%	-0,05%
	Stand. Dev., %	0,76%	1,24%	2,34%
	Number of values	2585	73	96
	t-criterion		2,44	0,32
	Null hypothesis		rejected	not rejected
	Anomaly		confirmed	not confirmed
China	Mean,%	0,03%	0,09%	-0,03%
	Stand. Dev., %	0,97%	1,48%	2,40%
	Number of values	2575	68	112
	t-criterion		0,35	0,25
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
India	Mean,%	0,05%	0,11%	0,25%
	Stand. Dev., %	0,88%	2,15%	3,64%
	Number of values	2586	78	98
	t-criterion		0,26	0,56
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed

Table C.5: Modified CAR approach: results of the price effects after positive abnormal returns for the case of static and dynamic approaches*

Country	Multiple R	F-test	a0	a1	Anomaly
Dynamic					
USA	0,82	129,00 (0,00)	-0,0599 (0,00)	-0,0019 (0,00)	confirmed
UK	0,33	7,92 (0,00)	0,0038 (0,08)	0,2258 (0,00)	confirmed
Japan	0,95	652,59 (0,00)	-0,0737 (0,00)	-0,0029 (0,00)	confirmed
China	0,86	183,78 (0,00)	-0,0574 (0,00)	0,0021 (0,00)	confirmed
India	0,82	160,19 (0,00)	-0,0752 (0,00)	0,0031 (0,00)	confirmed
Static					
USA	0,94	468,93 (0,00)	-0,0103 (0,00)	-0,0031 (0,00)	confirmed
UK	0,36	9,08 (0,00)	0,0123 (0,00)	0,2029 (0,00)	confirmed
Japan	0,69	58,39 (0,00)	0,0183 (0,00)	-0,0023 (0,00)	confirmed
China	0,65	46,20 (0,00)	-0,0898 (0,00)	-0,0021 (0,00)	confirmed
India	0,81	180,54 (0,00)	-0,1199 (0,00)	0,0044 (0,00)	confirmed

Note: p-values are in parentheses.

Table C.6: Regression analysis with dummy variables: results of the price effects after positive abnormal returns for the case of static and dynamic approaches*

Country	Multiple R	F-test	a0	a1	Anomaly
Dynamic					
USA	0,10	30,45 (0,00)	0,0005 (0,00)	-0,0049 (0,00)	confirmed
UK	0,01	0,53 (0,46)	0,0003 (0,04)	0,0007 (0,46)	not confirmed
Japan	0,08	15,08 (0,00)	0,0002 (0,12)	-0,0036 (0,00)	confirmed
China	0,01	0,28 (0,59)	0,0003 (0,12)	0,0006 (0,59)	not confirmed
India	0,01	0,37 (0,54)	0,0005 (0,00)	0,0006 (0,54)	not confirmed
Static					
USA	0,15	61,54 (0,00)	0,0005 (0,00)	-0,0071 (0,00)	confirmed
UK	0,07	14,45 (0,00)	0,0003 (0,05)	0,0031 (0,00)	confirmed
Japan	0,02	0,72 (0,39)	0,0002 (0,17)	-0,0007 (0,39)	not confirmed
China	0,01	0,31 (0,57)	0,0003 (0,16)	-0,0005 (0,57)	not confirmed
India	0,04	3,31 (0,07)	0,0005 (0,02)	0,0021 (0,07)	not confirmed

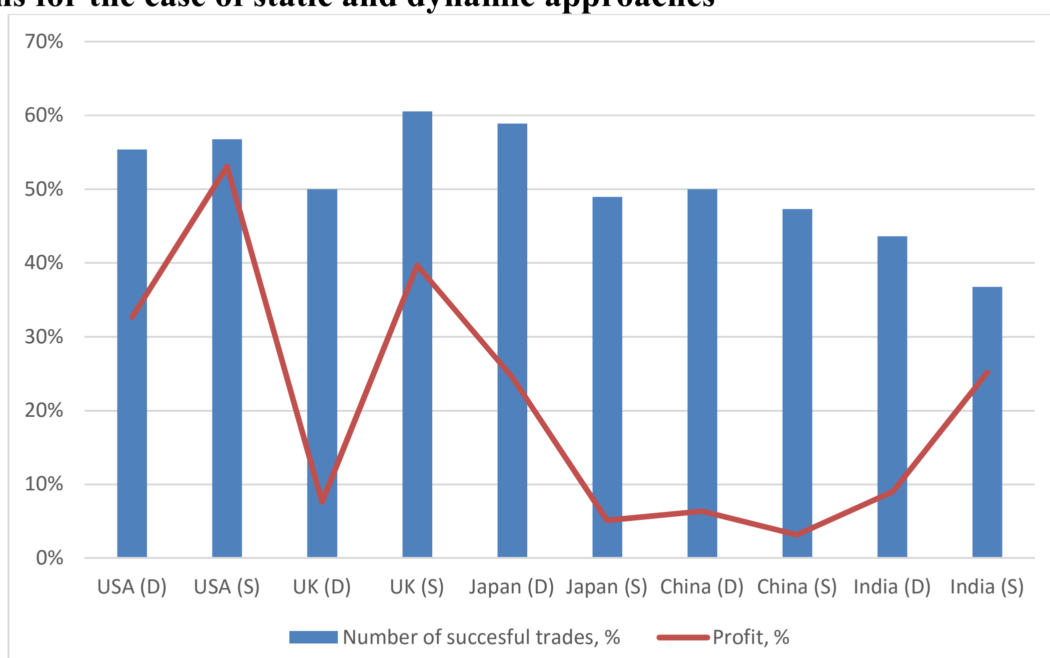
Note: p-values are in parentheses.

Table C.7: Trading simulation results of the price effects after positive abnormal returns for the case of static and dynamic approaches

Country	Number of trades, units	Number of successful trades, unit	Number of successful trades, %	Profit, %	Profit % per year	Profit % per trade	t-test calculated value	t-test status
Dynamic								
USA**	74	41	55%	33%	3%	0%	1,86	rejected
UK*	74	37	50%	8%	0,59%	0,10%	0,60	not rejected
Japan**	73	43	59%	25%	1,89%	0,34%	2,32	rejected
China*	68	34	50%	6%	0,64%	0,09%	0,52	not rejected
India*	78	34	44%	9%	0,90%	0,12%	0,47	not rejected
Static								
USA**	81	46	57%	53%	4%	1%	2,43	rejected
UK*	114	69	61%	40%	3,05%	0,35%	1,89	rejected
Japan**	96	47	49%	5%	0,39%	0,05%	0,22	not rejected
China***	112	53	47%	3%	0,31%	0,03%	0,12	not rejected
India*	98	36	37%	25%	2,52%	0,26%	0,70	not rejected

Note: * momentum effect; ** contrarian effect; *** no specific effect detected.

Figure C.2: Trading simulation results of the price effects after positive abnormal returns for the case of static and dynamic approaches



Appendix D

ESG indices: The case of negative abnormal returns

Table D.1: Average returns for the usual days and days after negative abnormal returns for the case of static and dynamic approaches

Country	Usual day	Day after negative abnormal returns (dynamic)	Day after negative abnormal returns (static)
USA	0,06%	0,36%	0,71%
UK	0,03%	0,36%	0,18%
Japan	0,02%	0,48%	0,47%
China	0,03%	0,28%	0,20%
India	0,05%	-0,10%	-0,10%

Figure D.1: Average returns for the usual days and days after negative abnormal returns for the case of static and dynamic approaches

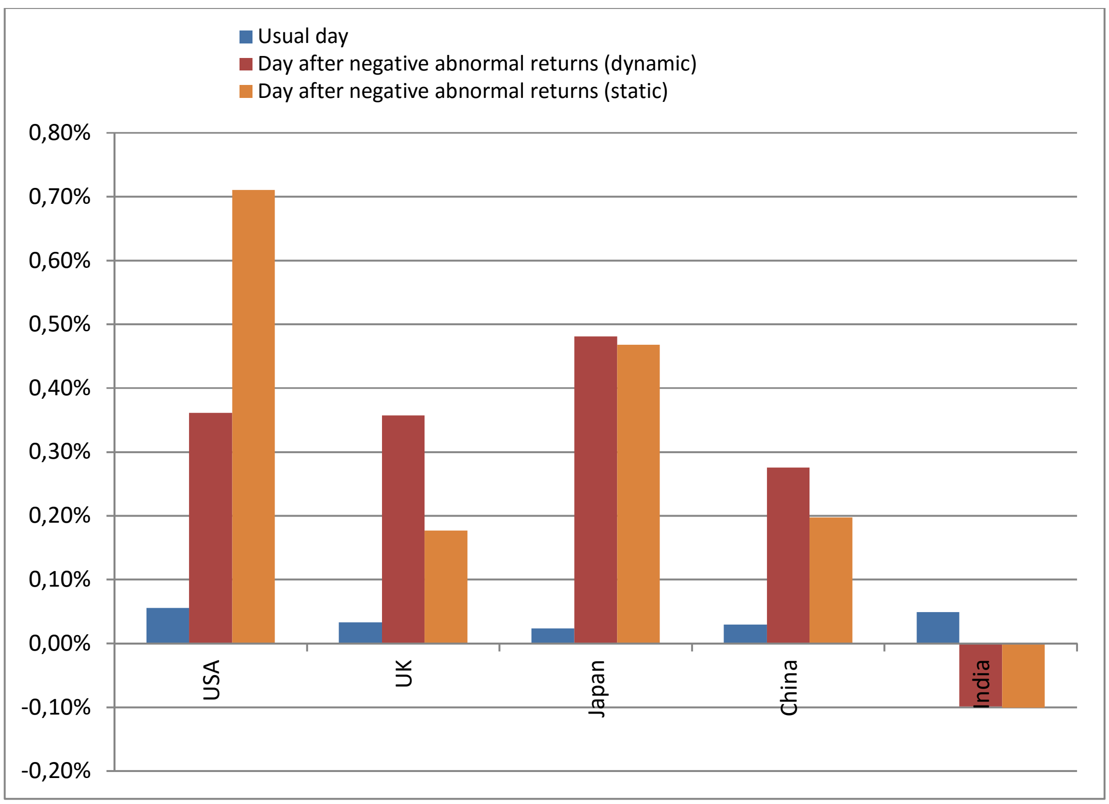


Table D.2: ANOVA test of the price effects after negative abnormal returns for the case of static and dynamic approaches

Country	F	p-value	F critical	Null hypothesis	Anomaly	Multiplier
Dynamic						
USA	16,99	0,00	3,84	rejected	confirmed	4,42
UK	13,96	0,00	3,84	rejected	confirmed	3,63
Japan	26,13	0,00	3,84	rejected	confirmed	6,80
China	5,34	0,02	3,84	rejected	confirmed	1,39
India	2,21	0,14	3,84	not rejected	not confirmed	0,57
Static						
USA	55,05	0,00	3,84	rejected	confirmed	14,32
UK	2,53	0,11	3,84	not rejected	not confirmed	0,66
Japan	24,21	0,00	3,84	rejected	confirmed	6,30
China	2,59	0,11	3,84	not rejected	not confirmed	0,67
India	2,10	0,15	3,84	not rejected	not confirmed	0,55

Table D.3: Mann-Whitney test of the price effects after negative abnormal returns for the case of static and dynamic approaches

Country	Adjusted H	d.f.	P value	Critical value	Null hypothesis	Anomaly	Multiplier
Dynamic							
USA	6,33	1,00	0,01	3,84	rejected	confirmed	1,65
UK	3,63	1,00	0,06	3,84	not rejected	not confirmed	0,94
Japan	12,74	1,00	0,00	3,84	rejected	confirmed	3,32
China	1,58	1,00	0,21	3,84	not rejected	not confirmed	0,41
India	0,00	1,00	0,98	3,84	not rejected	not confirmed	0,00
Static							
USA	10,67	1,00	0,00	3,84	rejected	confirmed	2,78
UK	1,09	1,00	0,30	3,84	not rejected	not confirmed	0,28
Japan	13,75	1,00	0,00	3,84	rejected	confirmed	3,58
China	2,43	1,00	0,12	3,84	not rejected	not confirmed	0,63
India	0,02	1,00	0,88	3,84	not rejected	not confirmed	0,01

Table D.4: T-test of the price effects after negative abnormal returns for the case of static and dynamic approaches

Country	Parameter	Usual day	Day after negative abnormal returns (dynamic)	Day after negative abnormal returns (static)
USA	Mean,%	0,06%	0,36%	0,71%
	Stand. Dev., %	0,70%	2,02%	2,98%
	Number of values	2595	120	107
	t-criterion		1,65	2,27
	Null hypothesis		not rejected	rejected
	Anomaly		not confirmed	confirmed
UK	Mean,%	0,03%	0,36%	0,18%
	Stand. Dev., %	0,78%	2,29%	3,03%
	Number of values	2597	108	129
	t-criterion		1,47	0,54
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
Japan	Mean,%	0,02%	0,48%	0,47%
	Stand. Dev., %	0,76%	2,30%	2,70%
	Number of values	2585	95	106
	t-criterion		1,93	1,69
	Null hypothesis		rejected	rejected
	Anomaly		confirmed	confirmed
China	Mean,%	0,03%	0,28%	0,20%
	Stand. Dev., %	0,97%	2,00%	3,26%
	Number of values	2575	92	133
	t-criterion		1,18	0,59
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
India	Mean,%	0,05%	-0,10%	-0,10%
	Stand. Dev., %	0,88%	2,24%	3,09%
	Number of values	2586	96	109
	t-criterion		0,64	0,51
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed

Table D.5: Modified CAR approach: results of the price effects after negative abnormal returns for the case of static and dynamic approaches*

Country	Multiple R	F-test	a0	a1	Anomaly
Dynamic					
USA	0,94	390,61 (0,00)	0,0147 (0,00)	0,0044 (0,00)	confirmed
UK	0,07	0,27 (0,61)	0,0099 (0,22)	-0,0164 (0,61)	not confirmed
Japan	0,83	120,47 (0,00)	0,0352 (0,00)	0,0037 (0,00)	confirmed
China	0,45	13,26 (0,00)	0,1248 (0,00)	0,0009 (0,00)	confirmed
India	0,18	1,74 (0,19)	-0,1255 (0,00)	-0,0003 (0,19)	not confirmed
Static					
USA	0,95	505,01 (0,00)	-0,0663 (0,00)	0,0072 (0,00)	confirmed
UK	0,18	1,84 (0,18)	0,0016 (0,76)	0,0677 (0,18)	not confirmed
Japan	0,79	88,55 (0,00)	-0,0423 (0,00)	0,0038 (0,00)	confirmed
China	0,56	24,32 (0,00)	-0,0167 (0,26)	-0,0022 (0,00)	confirmed
India	0,81	103,59 (0,00)	0,0164 (0,50)	-0,0077 (0,00)	confirmed

Note: p-values are in parentheses.

Table D.6: Regression analysis with dummy variables: results of the price effects after negative abnormal returns for the case of static and dynamic approaches*

Country	Multiple R	F-test	a0	a1	Anomaly
Dynamic					
USA	0,08	16,99 (0,00)	0,0005 (0,00)	0,0031 (0,00)	confirmed
UK	0,07	13,96 (0,00)	0,0003 (0,06)	0,0032 (0,00)	confirmed
Japan	0,10	26,12 (0,00)	0,0002 (0,16)	0,0046 (0,00)	confirmed
China	0,04	5,34 (0,02)	0,0003 (0,14)	0,0025 (0,02)	confirmed
India	0,05	4,71 (0,03)	0,0002 (0,30)	0,0023 (0,03)	confirmed
Static					
USA	0,14	55,05 (0,00)	0,0005 (0,00)	0,0066 (0,00)	confirmed
UK	0,03	2,53 (0,11)	0,0003 (0,09)	0,0014 (0,11)	not confirmed
Japan	0,09	24,21 (0,00)	0,0002 (0,19)	0,0045 (0,00)	confirmed
China	0,03	2,59 (0,10)	0,0003 (0,21)	0,0017 (0,10)	not confirmed
India	0,03	2,10 (0,14)	0,0005 (0,02)	-0,0015 (0,14)	not confirmed

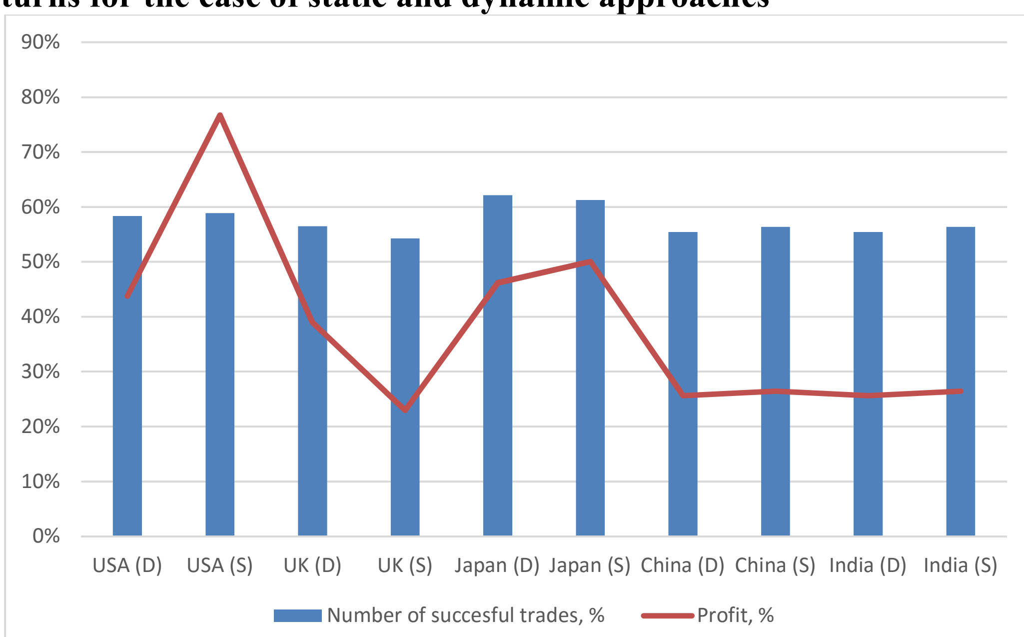
Note: p-values are in parentheses.

Table D.7: Trading simulation results of the price effects after negative abnormal returns for the case of static and dynamic approaches

Country	Number of trades, units	Number of successful trades, unit	Number of successful trades, %	Profit, %	Profit % per year	Profit % per trade	t-test calculated value	t-test status
Dynamic								
USA**	120	70	58%	44%	3%	0%	1,98	rejected
UK**	108	61	56%	39%	3,00%	0,36%	1,64	not rejected
Japan**	95	59	62%	46%	3,55%	0,49%	2,06	rejected
China**	92	51	55%	26%	1,97%	0,28%	1,34	not rejected
India*	96	45	47%	10%	0,96%	0,10%	0,43	not rejected
Static								
USA**	107	63	59%	77%	6%	1%	2,48	rejected
UK**	129	70	54%	23%	1,77%	0,18%	0,67	not rejected
Japan**	106	65	61%	50%	3,85%	0,47%	1,80	rejected
China**	133	75	56%	26%	2,04%	0,20%	0,70	not rejected
India*	109	50	46%	11%	1,10%	0,10%	0,34	not rejected

Note: * momentum effect; ** contrarian effect; *** no specific effect detected.

Figure D.2: Trading simulation results of the price effects after negative abnormal returns for the case of static and dynamic approaches



Appendix E

Price effects and Global Financial crisis: the case of positive abnormal returns

Table E.1: Average returns for the usual days and days after the abnormal returns: the case of positive abnormal returns

Country	Usual day	Day after positive abnormal returns (dynamic)	Day after positive abnormal returns (static)
USA	0,03%	-0,70%	-0,47%
UK	-0,01%	-0,05%	-0,05%
Japan	0,07%	-1,02%	-0,53%
China	-0,02%	0,00%	-0,87%
India	0,08%	-0,31%	-0,68%

Figure E.1: Average returns for the usual days and days after positive abnormal returns: the case of Global Financial Crisis

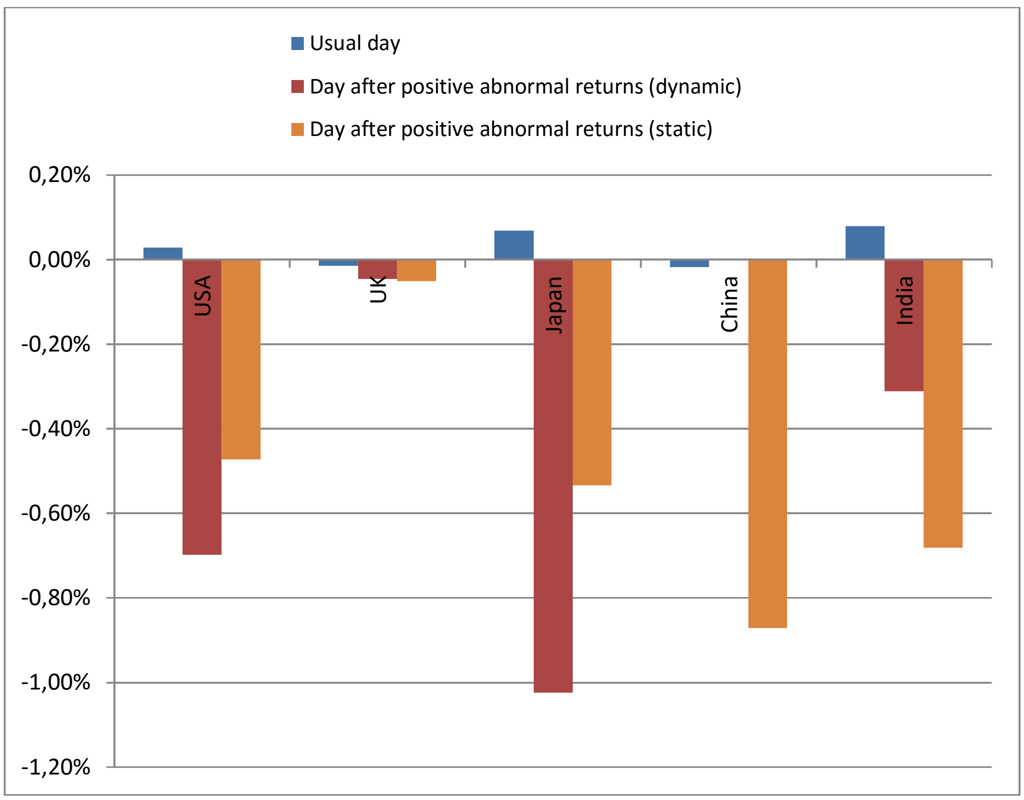


Table E.2: T-test of the price effects after positive abnormal returns: the case of the Global Financial Crisis

Country	Parameter	Usual day	Day after positive abnormal returns (dynamic)	Day after positive abnormal returns (static)
USA	Mean,%	0,03%	-0,70%	-0,47%
	Stand. Dev., %	1,18%	2,03%	2,62%
	Number of values	408	12	27
	t-criterion		1,23	0,98
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
UK	Mean,%	-0,01%	-0,05%	-0,05%
	Stand. Dev., %	1,30%	1,80%	1,98%
	Number of values	412	13	26
	t-criterion		0,06	0,09
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
Japan	Mean,%	0,07%	-1,02%	-0,53%
	Stand. Dev., %	1,23%	2,20%	3,43%
	Number of values	392	10	24
	t-criterion		1,56	0,86
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
China	Mean,%	-0,02%	0,00%	-0,87%
	Stand. Dev., %	1,69%	2,29%	2,47%
	Number of values	410	12	16
	t-criterion		0,03	1,37
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
India	Mean,%	0,08%	-0,31%	-0,68%
	Stand. Dev., %	1,54%	2,47%	4,16%
	Number of values	410	15	16
	t-criterion		0,61	0,73
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed

Appendix E

Price effects and Global Financial crisis: the case of positive abnormal returns

Table F.1: Average returns for the usual days and days after the abnormal returns: the case of positive abnormal returns

Country	Usual day	Day after positive abnormal returns (dynamic)	Day after positive abnormal returns (static)
USA	0,03%	0,77%	0,82%
UK	-0,01%	1,03%	0,63%
Japan	0,07%	1,06%	0,64%
China	-0,02%	1,34%	1,01%
India	0,08%	-0,36%	-0,63%

Figure F.1: Average returns for the usual days and days after negative abnormal returns: the case of Global Financial Crisis

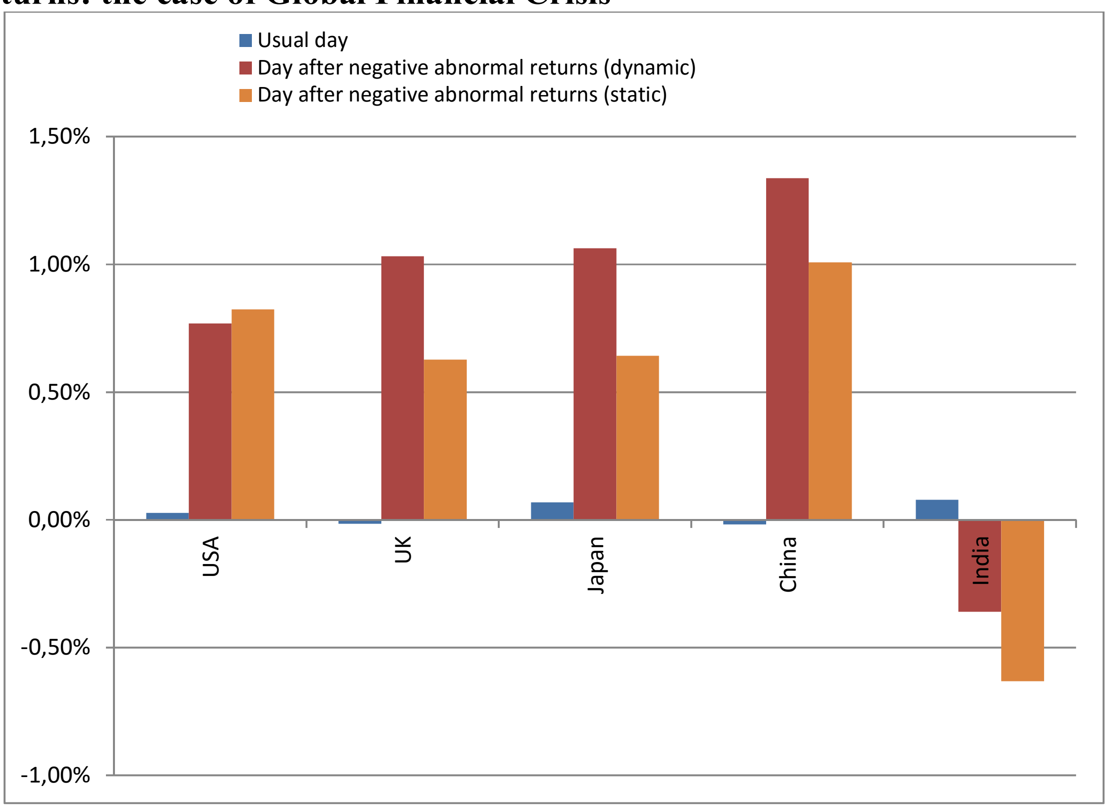


Table F.2: T-test of the price effects after negative abnormal returns: the case of the Global Financial Crisis

Country	Parameter	Usual day	Day after negative abnormal returns (dynamic)	Day after negative abnormal returns (static)
USA	Mean,%	0,03%	0,77%	0,82%
	Stand. Dev., %	1,18%	1,86%	3,66%
	Number of values	408	18	24
	t-criterion		1,67	1,06
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
UK	Mean,%	-0,01%	1,03%	0,63%
	Stand. Dev., %	1,30%	3,36%	3,72%
	Number of values	412	16	29
	t-criterion		1,24	0,93
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
Japan	Mean,%	0,07%	1,06%	0,64%
	Stand. Dev., %	1,23%	1,96%	2,78%
	Number of values	392	13	27
	t-criterion		1,81	1,06
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
China	Mean,%	-0,02%	1,34%	1,01%
	Stand. Dev., %	1,69%	4,06%	5,94%
	Number of values	410	9	22
	t-criterion		1,00	0,81
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed
India	Mean,%	0,08%	-0,36%	-0,63%
	Stand. Dev., %	1,54%	2,71%	4,16%
	Number of values	410	28	23
	t-criterion		0,85	0,82
	Null hypothesis		not rejected	not rejected
	Anomaly		not confirmed	not confirmed