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Do their reputations precede them? Stock market reaction to changes in corporate reputation in the context of sector and market maturity

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Abstract. Our study extends the existing literature by examining whether the stock market's maturity and the sector in which a company operates affect the relationship between an improvement in its corporate reputation and its stock returns. This event-study research is based on data from developed and emerging stock markets: the NYSE (US) and the WSE (Poland). The improvement in corporate reputation is proxied by its inclusion in a reputational index. We analysed inclusions in the RESPECT Index and WIG-ESG in Poland from 2009 to 2023. Then we compared the effects of inclusions on stock prices in the Polish market and the US market, in which the Dow Jones Sustainability Index (DJSI) was applied. Our findings suggest that in the emerging Polish market, significant reaction to inclusion in the index persists even when the sectoral circumstances are considered. Contrarily, in the developed US market, the strong positive effect of inclusion disappears in the sectoral context. Hence, significant returns may not be driven by the inclusion in a reputational index but rather result from other events that affect the particular sector.

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1. INTRODUCTION

Investors are in constant search of financially sound, trustworthy companies in which to invest their money, thus practitioners and scholars keep developing new theories and models to help investors in their decision-making. To meet the needs of investors, stock exchanges and other institutions create and publish stock indices that group companies and enable investors to access more information.

According to stakeholder theory (also called the Friedman doctrine), the main aim of a company is to maximise returns to shareholders, and it has no social responsibility to the public (Friedman, 1970). The past few decades, however, have seen a meaningful increase in the significance of factors other than profits, hard financial data, and returns to shareholders; there has been rapid development of concepts such as Socially Responsible Investing (SRI), ethical or sustainable investing, and socially responsible funds. Environmental, Social and Governance (ESG) standards have also gained popularity. All these factors influence corporate reputation and are supposed to positively impact value for shareholders. Multiple studies confirm the positive impact of corporate reputation on retaining valuable employees (Ali et al., 2020; Almeida & Coelho, 2019; Badawi et al., 2017; Davies et al., 2003), increasing the firm's competitiveness (Davies et al., 2003), financial performance (Pham & Tran, 2020; Roberts & Dowling, 2002), stock performance and market value (Lee & Roh, 2012; Smith et al., 2010; Vergin & Qoronfleh, 1997).

However, some doubts persist, including a famous criticism expressed by Aswath Damodaran in an article on his website (Damodaran, 2020). These doubts raise the question of whether the notion of the impact of corporate reputation, including Corporate Social Responsibility (CSR), ESG factors and similar concepts, on stock prices still merits study. The answer may be found by exploring corporate reputation itself.

Corporate reputation 'is the perceptions in the minds of those observing the organisation' (Haywood, 2005; Stefko et al., 2016). It is a social concept, as it reflects stakeholders' perceptions of a firm (Rose & Thomsen, 2004). As a result, it is not the individual perception that counts but the collective perception of a firm (Dowling, 2016; Rindova et al., 2006; Van Der Merwe & Puth, 2014), i.e. the reputation that results from the recognition of corporate reputation by all entities in a stock market. Investors not only form their own perceptions of corporate reputation (Derun & Mysaka, 2018) but also update or even change them under the influence of the observed behaviours of others (Blajer-Gołębiewska, 2021). Furthermore, regardless of whether or not an investor believes in the importance of corporate reputation, the investor assumes that corporate reputation influences other investors' decisions and thus share prices. Consequently, changes in corporate reputation became signals of market interest in shares that are important to all investors and affect their decisions in stock markets (Blajer-Gołębiewska, 2021).

Assuming that stock market prices reflect fundamental value, any event related to a given company, if it is significant to investors, should affect investment decisions and, subsequently, stock prices. Following the previous literature on this topic, we assume that investors track socially responsible, ethical and sustainable companies and indices. If investors are rational and fully informed, then an announcement of either a company's inclusion or its removal from a reputational index should be reflected in its stock prices.

This study was motivated by the concern that the results of previous studies on the impact of inclusion in reputational stock indices on a stock's returns are inconclusive and conflicting, showing both a positive impact (Adamska & Dąbrowski, 2016, 2021; Cheung, 2011; Consolandi et al., 2008; Nakai et al., 2013; Ramchander et al., 2012) and a negative impact (Becchetti et al., 2012; Białkowski & Sławik, 2021; Cheung & Roca, 2013; Doh et al., 2010; Kappou & Oikonomou, 2016). Furthermore, some studies find no statistically significant impact of inclusions on market returns (Becchetti et al., 2012; Curran & Moran, 2007; Doh et al., 2010; Hawn et al., 2018; Oberndorfer et al., 2013; Robinson et al., 2011; Yilmaz et al., 2020).

Consequently, this study fills the gap in understanding the abovementioned relationship by considering two factors that could mitigate the impact of inclusion on investors' behaviour expressed in stock prices: market maturity and sectoral conditions. Therefore, our study aims to examine whether sectoral aspects and a market's maturity mediate the relationship between an improvement in a corporation's reputation and the valuation of the company by investors.

Our study extends the previous literature in two ways. First, we contribute to the literature by comparing the impacts of inclusion in reputational indices in stock markets of different maturity. We compare the mature market of the US (specifically, companies listed on the New York Stock Exchange, NYSE) with a less mature market in Poland, the Warsaw Stock Exchange (WSE), which was the first stock exchange in Central and Eastern Europe to introduce a reputational index, the RESPECT Index (an acronym for Responsibility, Ecology, Sustainability, Participation, Environment, Community and Transparency). Thus, we provide a shred of international evidence on whether the level of stock market maturity affects investors' reaction to enlarging the reputational index. Second, we consider the sectoral conditions existing in developed and emerging markets and assess whether they alter the investors' response to introducing into the reputational index of a new company.

The remainder of this paper is organised as follows: the following section provides a brief literature review on the impact of corporate reputation on stock prices, where inclusion in reputational indices serves as a proxy for corporate reputation. Section 3 describes the data selection procedure, and the subsequent section presents and discusses the applied methodology and its conceptual background. The outcomes of the empirical analysis are presented in Section 5. Finally, the study is summarised and conclusions are presented.

2. LITERATURE REVIEW AND DEVELOPMENT OF HYPOTHESES

The transition to reputation portfolios as an investment method has resulted in the emergence of indices that, in addition to companies' hard financial data, take into account their responsible behaviour, respect for the environment, corporate governance, sustainable development and other factors that enhance the company's reputation in the eyes of investors.

The family of Dow Jones Sustainability Indices, created in the US in 1999, are among the first and most famous indices of this type. Investors can also follow the FTSE4Good indices, Calvert US Large Cap Core Responsible Index, DAXglobal Sarasin Sustainability Index, ECPI Ethical Indices family, Johannesburg Stock Exchange SRI Index, WIG-ESG in the WSE (formerly the RESPECT Index), SRI-KEHATI in the Indonesian Stock Exchange and others. The methodologies of constructing such indices vary.

Researchers conducting mainly event studies have analysed reputation-related concepts based on these indices, such as corporate social responsibility and responsible investing (Adamska & Dąbrowski, 2016, 2021; Becchetti et al., 2012; Consolandi et al., 2008; Curran & Moran, 2007; Doh et al., 2010; Hawn et al., 2018; Lackmann et al., 2012; Nakai et al., 2013; Ramchander et al., 2012; Robinson et al., 2011), SRI (Consolandi et al., 2008; Doh et al., 2010), ethical stocks and ethical investment (Consolandi et al., 2008), corporate sustainability (Adamska & Dąbrowski, 2021; Cheung, 2011; Cheung & Roca, 2013; Çıtak et al., 2018; Hawn et al., 2018; Lackmann et al., 2012; Nakai et al., 2013; Oberndorfer et al., 2013; Robinson et al., 2011; Yilmaz et al., 2020), the reliability of the market (Lackmann et al., 2012) and, finally, reputation (Robinson et al., 2011; Tischer & Hildebrandt, 2014). Empirical results of all the above-mentioned highly cited studies are described in detail in Table 1 concerning sample, study period, length of estimation and event windows and general conclusions.

As the above-mentioned studies show, these indices aim to group and distinguish companies that are expected to be socially responsible, sustainable, ethical and trustworthy. Generally, these companies are expected to have a relatively better corporate reputation and bring future profits to their stakeholders (Nate et al, 2022). For the purpose of this study, they are referred to as reputational indices.

A substantial number of studies on the impact of corporate reputation (CSR, sustainability, etc.) on stock prices are based on an index of the Dow Jones Sustainability Indices family (Cheung, 2011; Cheung & Roca, 2013; Consolandi et al., 2008; Hawn et al., 2018; Lackmann et al., 2012; Oberndorfer et al., 2013; Robinson et al., 2011) (Table 1). The family includes the DJ Sustainability Indices for the World, North America, Europe, Asia-Pacific, Emerging Markets, Korea, Australia, Chile and the MILA (Mercado Integrado Latinoamericano) Pacific Alliance (*DJSI Index Family*, 2022). The main reasons for their popularity are that they are publicly accessible, transparent, rigorous in their methodology and recognisable (Hawn et al., 2018; Endress, 2018). They make it possible to analyse companies' stock prices in developed as well as emerging markets.

Table 1

Literature review of the event studies analysing the impact of inclusions and exclusions on abnormal returns

Study	Event	Period, sample, region	a. Index for market returns b. Estimation windows c. Event windows	Conclusions
Curran and Moran (2007)	inclusion in and exclusions from the FTSE4Good UK	1999-2002; 54 firms; the UK	a. FTSE All-Share Index b. (-310, -10) before the start of the event window c. various sub-windows within (-4, +8) for each of 7 samples referring to inclusion or exclusions on different AD and ED	No statistically significant effects on AD or ED.
Consolandi, Jaiswal-Dale, Poggiani and Vercelli (2009)	inclusion in and exclusions from the Dow Jones Sustainability Stoxx Index (DJSSI)	2001-2006; 113 companies included and 95 excluded; European corporations	a. Europe DJ Stoxx 600 Surrogate Complementary Index (SCI) b. 250 trading days preceding the test period c. various sub-windows based on AD and ED within the period (-10, +1) for AD, and (-1, +10) for the ED	For inclusions into the index, positive returns were observed before AD and culminated around ED, and then diminished. For exclusions, returns diminish shortly after AD, become negative shortly before ED, and continue to diminish till the end of the event window.
Doh, Howton and Siegel (2010)	inclusions in and exclusions from the Calvert Social Index announced in the financial press	2000-2005; 56 inclusions and 69 exclusions; the US	a. n/a b. n/a c. AD(-1, +2) and analysis extended to 10 days after AD	For inclusions, no effect, for exclusions – negative abnormal returns.
Cheung (2011)	inclusions in and exclusions from the DJSI World	2002–2008; 139 firms, 177 events (80 inclusions and 97 exclusions)	a. value-weighted portfolio of the NYSE stocks of the same size and return deciles a year earlier b. (-250, -16) c. various sub-windows based on AD and ED within the period (-15, +4) for AD, and (-1, +60) for ED	No strong evidence of the impact of AD on stock return and risk. On ED, significant but temporary increases in stock returns for firms included in the index. Similarly, on ED, firms excluded from the index experienced significant but temporary decreases in stock returns.
Robinson, Kleffner and Bertels (2011)	inclusion in and exclusion from the DJSI World index	2003-2007; 48 inclusions and 43 exclusions; North America (the US and Canada)	a. S&P 500 for the US firms and the S&P/TSX Composite for Canadian firms b. no estimation window (market model) c. AD(-60, -1), AD(0) till ED(-1), ED(+1, +60)	For inclusions, a sustained increase in a firm's value, for exclusions an insignificant effect.
Ramchander, Schwebach and Staking (2012)	inclusions in and exclusions from the Domini Social 400 index	(1190-2007); 166 inclusions and 28 exclusions; the US	a. Market return is the return on an equally weighted CRSP market index built from peer firms' stock prices b. (-255, -46) c. AD(−3, +3), AD(+1, +3), AD(0)	Positive abnormal returns for inclusions and negative for exclusions. The stock price reaction is more pronounced for firms that sell intangible products or carry intangible assets (informationally opaque industries).
Becchetti, Ciciretti, Hasan and	inclusions in and exclusions from	1990-2004; 327 events, 278 firms; the US	a. S&P 500	The impact of both inclusions and exclusions on returns increased over time. For exclusions, significantly negative abnormal

Kobeissi (2012)	the Domini 400 Social Index		b. 8-month window plus robustness check to control whether results are confirmed with a 2-month window c. event windows (0), (−1), (−1, +3), (−1, +1), (−1, 0)	returns around the event. Cumulative abnormal returns before and after inclusions are quite stable around the level of zero.
Clacher and Hagendorff (2012)	inclusions in the FTSE4Good	2001-2008; 356 inclusions; the UK	a. FTSE100, FTSE350 and FTSE-All Share index b. AD(-220, -20) c. various sub-windows within the period from AD(-20) to AD(+5)	No strong evidence on the significant impact of the announcement of inclusion in the index on a firm's value. Large cross-sectional variation in the market reactions in the case of some firms. A positive market reaction for larger companies with lower leverage and higher employee productivity.
Lackmann, Ernstberger and Stich (2012)	inclusions in the DJSI STOXX	2001-2008; 344 events; Europe	a. self-computed value-weighted portfolio of all publicly traded European companies b. 100 trading days before the event window c. event windows (-2, +2), (-5, +5), (-10, +10)	The reliability of sustainability information affects investors' decisions. Higher-risk companies are more responsive to the increased reliability of sustainability information. In times of economic uncertainty, an increase in the reliability of sustainability information leads to greater benefits.
Cheung and Roca (2013)	inclusion to or exclusion from Asia-Pacific markets from the DJSWI	2002–2010; 103 inclusions, 75 exclusions; Asia-Pacific (Australia, Hong Kong, China, India, Japan, Malaysia, Singapore, South Korea, Taiwan, and Thailand)	a. market index to which a firm belongs b. (-250, +16) c. various sub-windows within the period from AD(-15) to ED(+30)	For both inclusions and exclusions, significant decreases in returns as well as increases in trading volume and idiosyncratic risk (but no change in systematic risk).
Nakai, Yamaguchi and Takeuchi (2013)	inclusion on and exclusion from Morningstar-SRI Index	2003-2010; 1087 inclusions, 133 exclusions (239 firms and 124 firms respectively); Japan	a. Tokyo stock Price IndeX (TOPIX) b. 150 transaction days before the event windows c. AD(-1, +1)	For inclusions, increases in returns, for exclusions, no significant changes in share prices.
Oberndorfer, Schmidt, Wagner and Ziegler (2013)	inclusion in the DJSI STOXX and the DJSI World	1999-2002; 23 (DJSI STOXX) +28 (DJSI World) inclusions for 23 (DJSI STOXX) +27 (DJSI World) firms; Germany	a. German market portfolio, which comprises all stocks traded on the Frankfurt stock exchange b. (-125, -26) c. various sub-windows within (-24, +5)	No significant abnormal returns for the inclusion in the index.
Kappou and Oikonomou (2016)	inclusion in and exclusions from the MSCI KLD 400	1990-2010; 201 exclusions; 77 exclusions; the US	a. S&P 500 b. post-inclusion estimation period (+126, +375) c. short-term (-10, +15), long-term (-10, +125)	No material changes in market prices after inclusions and negative cumulative abnormal returns after exclusions. In cases of exclusions trading volumes significantly increase on the event date, and firms' operational performances deteriorate later.
Adamska and Dąbrowski (2016)	inclusion or exclusion of the companies operating on the Warsaw Stock Exchange from the RESPECT Index	2009-2014; 41 inclusions and 13 exclusions (firms); Poland	a. WIG index b. 60 days preceding the event c. AD(-5; -1), and AD(+1; +5)	For inclusions, increases in returns, for exclusions, decreases in returns.
Hawn, Chatterji, and Mitchell (2018)	inclusions, exclusions, or continuing on the index DJSI World	1999-2015; 321 inclusions (273 firms), 215 exclusions (188 firms), and 1,646 retentions (286 firms); 27 countries (44.4% the US-based companies)	a. two comparison groups of firms: those that stay on the index (1,943 events) and sets of observationally-equivalent firms that receive 'placebo addition, continuation, or deletion' (36,282 events). b. AD(-240, -41) c. various event windows; AD(-1,0) in the main specification	When compared to observationally-equivalent firms, DJSI events have limited significance. Diminishing reactions to U.S. firms, and increasing benefits of continuation on the index over time.
Çıtak, Akel and Ersoy (2018)	announcement of firms included in the BIST	2015-2016; 29 firms in the BIST SI and 21 firms not qualified for	a. BIST 50 Index b. no estimation window (market model) c. AD(-10, +10)	No significant difference between returns for firms included in BIST SI and firms not qualified for BIST SI. For inclusions, no significant effects on abnormal returns after

	Sustainability Index (BIST SI)	the BIST SI; Turkey		AD. Positive effects on cumulated abnormal returns.
Yilmaz, Aksoy and Tatoglu (2020)	inclusion in or exclusion from the BIST SI	2014–2017; 48 inclusions, 4 exclusions, two portfolios (1) composed of companies included in the BIST SI, (2) companies not included in the BIST SI; Turkey	a. BIST 100 b. (-110, -10) c. AD(-3, 0), AD(+1, +10).	No strong evidence on the effect of inclusions or exclusions on stock returns and systematic risk. A positive relationship between inclusions and the level of institutional ownership. No significant relationship between inclusions and foreign ownership.
Adamska and Dabrowski (2021)	an announcement of a company's inclusion in or exclusion from sustainability indices in Brazil (ISE), Japan (FTSE4Good Japan), Poland (RESPECT Index), South Africa (JSE SRI and FTSE/JSE RII), the UK (FTSE4Good UK), the US (FTSE4Good USA)	2009-2017; 815 events (484 inclusions and 331 exclusions); 3 emerging and 3 developed markets: Brazil, Japan, Poland, South Africa, the UK, the US	a. main market index for each country b. 60 days preceding the event c. various event windows	For inclusions, increases in returns, and for exclusions, decreases in returns. In markets with riskier institutional environments, investors' responses are stronger. CSR is associated rather with risk reduction than with value creation.
Bialkowski and Slawik (2021)	inclusion in or exclusion from the RESPECT Index; new entrants to WIG-ESG	2009-2019; 54 inclusions and 23 exclusions to the RESPECT index (45 firms), 60 new entrants to WIG-ESG; Poland	a. WIG b. 250 days preceding the event c. various event windows for AD and ED	In the case of both, inclusion and exclusion: - results for AD not significant - results for ED in certain windows significant (negative CAARs). In the case of new entrants to WIG-ESG, CAARs for AD are significant and negative, and for ED not significant.

Source: Own compilation.

The differences between stock price behaviours and, consequently, the behaviours of stock market indices in developed and emerging stock markets are undisputable. Studies on crises in financial markets in the years 1970–1997 show that, in developed markets, crises become less severe over time in terms of the magnitude of price decline and the time to recovery. However, stock crises in emerging markets cause a rapid and significant decline in prices. Moreover, it takes more time for the stock exchange to recover after the crisis (Patel & Sarkar, 1998). The results of the study on the reaction of 23 developed and 26 emerging stock markets to the COVID-19 outbreak showed that the short-term response of the developed markets was not significant, in contrast to the emerging markets (Pandey & Kumari, 2021). A study of seven emerging stock markets and five developed stock markets in the years 2000–2016 found higher returns and higher volatilities in emerging markets. In other words, a higher risk-return trade-off is associated with emerging stock markets, and a lower risk-return trade-off is associated with developed stock markets (Ahmed et al., 2018).

However, little is known about differences in the impact of inclusion in (or exclusion from) a reputational index on investors' behaviour between developed and emerging stock markets. A study on the Turkish stock exchange in the years 2015–2016 revealed no significant difference between the returns of firms included in the BIST Sustainability Index and those not qualified for the index (Çıtak et al., 2018). Moreover, after inclusion, no positive effects were observed on returns except for cumulative abnormal returns. The results of another study based on the BIST index found no strong evidence for the effect of inclusion or exclusion on stock returns and systematic risk in the years 2014–2017 (Yilmaz et al., 2020). Inclusion improved the resilience of Turkish firms under a severe crisis, reducing the total risk and protecting them from decreases in stock prices. An analysis of Polish companies delivered ambiguous results: (Adamska & Dąbrowski, 2016) revealed a positive investor reaction to inclusion in the RESPECT Index and a negative reaction to exclusion from the index, but (Białkowski & Sławik, 2021) drew different conclusions: they proved that both inclusion to and exclusion from the RESPECT Index resulted in a lower level of stock returns.

Multiple-market studies often provide insight into emerging markets, but the effect of market maturity on the relationship between a change in corporate reputation and stock returns is not always the subject of such studies. A study on the impact of positive and negative environmental news on stock prices in Argentina, Mexico, Chile and the Philippines revealed an increase in reaction to the announcement of rewards and recognition of environmental excellence (Dasgupta et al., 1998). Additionally, a negative reaction of stock markets to citizens' complaints was found. However, the difference in market maturity was not the subject of the study. In a study on selected Asia-Pacific countries (Australia, Hong Kong/China, India, Japan, Malaysia, Singapore, South Korea, Taiwan and Thailand), both inclusion in and exclusion from a local market index resulted in a significant decline in returns and an increase in trading volume (Cheung & Roca, 2013). Otherwise, no change was found in systematic risk, but an increase was reported in idiosyncratic risk. The impact of market maturity was not the subject of this study, nor was it the focus of a study of inclusions, continuations and exclusions in 27 developed and emerging markets (Hawn et al., 2018). An analysis of three emerging and three developed markets (Brazil, Poland and South Africa and Japan, the UK, and the US, respectively) revealed inclusions led to positive returns and exclusions to negative returns (Adamska & Dąbrowski, 2021). Moreover, in markets with riskier institutional environments (i.e. emerging markets), investors' responses are even stronger. The authors conclude that CSR should be associated with risk reduction rather than with value creation.

Studies of both developed and emerging markets yield inconclusive results in terms of the direction of the impact of corporate reputation on market returns and regard to market maturity, so further investigation of various dimensions is merited (Bachtijeva et al., 2023). Despite the ongoing global convergence of CSR norms and practices (Hawn et al., 2018; Lim & Tsutsui, 2011; Waddock, 2008), corporate reputation differs between countries (Matten & Moon, 2008), and its importance may also be differently perceived by investors in developed and emerging stock markets. Studies of corporate reputation, CSR, ESG, etc., show that the perception of these factors' importance is relatively weaker in less developed, emerging countries and that, consequently, practices related to corporate reputation and responsibility are not sufficiently developed (Khemir, 2019). Thus, it seems that, in less developed markets, changes in corporate reputation may have a weaker impact on investor behaviour as expressed in changes in share prices.

Interestingly, the recent research results also indicate the differences between emerging and developed countries regarding firms' sustainable performance. For example, Lozano and Martinez-Ferrero (2022) investigated the impact of the board-level, ownership-level, and country-related factors on publicly listed companies' ESG performance and compared the results within emerging and developed economies in 2012-2018. Their findings show that the country-level institutional drivers exhibit tremendous power to explain why companies are more committed to increasing their ESG performance in emerging markets. On the contrary, no significant effect of the institutional-level factors was found in developed economies. Instead, the board-level determinants, followed by the ownership effect, mainly affected ESG performance (Lozano & Martínez-Ferrero, 2022).

Another issue worth mentioning is the sectoral context. (Dartey-Baah & Amoako, 2021) review of empirical research on CSR in emerging markets shows that, due to the use of secondary data in previous studies, little attention has been paid to contextual influences, such as industry. The significance of sectoral context is revealed by a study of the Chinese stock market, where the strength of investor sentiment's impact on stock returns depended on, among other things, the sector in which a company operates (Niu et al., 2021).

The above-mentioned inconclusive results regarding the direction of corporate reputation's effect on stock prices as well as gaps in the understanding of the roles of sector and market maturity in the relationship between corporate reputation and the behaviour of stock market investors inspired us to formulate three hypotheses:

H1: The inclusion of a company in a reputational index positively affects stock returns.

H2: In developed markets, the inclusion of a company in a reputational index has a more substantial effect on stock returns than in emerging markets.

H3: Sectoral conditions in developed and emerging markets diversely affect the market response to the inclusion of a company in a reputational index.

To examine the abovementioned hypotheses, we raised five research questions. Regarding hypothesis 1:

1. Does including a company in a reputational index significantly affect its returns around the date of inclusion announcement?

2. Does including a company in a reputational index significantly affect its returns around the effective date of inclusion?

Considering hypothesis 2:

3. Do the market responses around the announcement day and effective day differ depending on the market maturity?

Regarding hypothesis 3:

4. Are the market reactions around the announcement day and effective day affected by the sectoral circumstances?

5. Do the sectoral circumstances affect the market response equally in developed and emerging markets?

To verify the research hypotheses and answer the research questions, we took advantage of a wide range of statistical tests appropriate for the particular distribution of the calculated rate of returns. To this end, we analysed stock returns for the developed US and the emerging Polish markets. For the US we investigated companies included in the Dow Jones Sustainability Index World (DJSI). In Poland, companies with the best reputations are in the WIG-ESG Index, a descendant of the RESPECT Index, which was launched in 2009 and closed in 2019, when it was replaced by the WIG-ESG.

The case of the WSE needs some clarification, as assigning the Polish market to a specific group of stock markets is not an unequivocal matter (Table 2). Morgan Stanley Capital International classifies Poland as an emerging market (Raphael, 2021), and companies listed on the WSE are also included in the Dow Jones Emerging Markets Index (Dow Jones Global Indices Methodology, 2021). Furthermore, the International Monetary Fund generally considers Poland to remain an emerging market (Global Financial Stability Report. COVID-19, Crypto, and Climate: Navigating Challenging Transitions, 2021). There is, however, one exception. On Sept. 29, 2017, FTSE Russell included Poland in the group of developed equity markets (FTSE Classification of Equity Markets. FTSE Equity Country Classification. Annual Announcement, 2021).

Table 2

The most renowned stock markets' classifications

Institution	FTSE Russell	MSCI	S&P
– Stock Markets' classification	– Developed – Advanced Emerging – Secondary Emerging – Frontier	– Developed – Emerging – Frontier – Standalone	– Developed – Emerging

Source: Own compilation.

Considering the most common measures of stock market development, it can be stated that the WSE is certainly still developing and not yet fully mature, having a domestic market capitalisation of 151,618.86 m USD (NYSE: 24,096765,37 m USD; NASDAQ-US: 13,002,048.01 m USD). There were only 833 listed companies both in the main market and the alternative trading system— the NewConnect market (NYSE: 2,384; NASDAQ: 3,140) as of December 2019 (which is relevant data for this study) according to the World Federation of Exchanges.

3. DATA SELECTION

3.1. Choice of reputational indices

Having chosen to compare the emerging market in Poland and the developed market in the US, we considered inclusions in the RESPECT Index and the DJSI as signals of improvement in corporate reputation.

The RESPECT Index was introduced in 2009 as the first index of responsible companies in Central and Eastern Europe. To be included in the index, companies had to undergo a three-stage verification. The index was published till the end of 2019, but the last announcement of its constituents was on December 12, 2018. There were 16 to 31 companies listed in various editions of the RESPECT Index (Table 3). A new index that replaced the RESPECT Index–WIG-ESG – was announced on August 23, 2019. Its construction differs from that of the RESPECT Index. The WIG-ESG was published for the first time on September 3, 2019, with 60 companies included, and there were 42 to 61 companies listed in various editions of the WIG-ESG. Until the end of 2019, both indices (RESPECT and WIG-ESG) were published by the WSE. The numbers of companies and inclusions in both Polish indices in the years 2009-2023 are presented in Table 3. We only considered companies new to the index or reinstated after two years off. We excluded those that were announced to be the index components only once.

Table 3

Number of companies & inclusions in the reputational indices in Poland, 2009-2023

RESPECT Index (2009-2019)				ESG-WIG Index (2019-2023)			
AD	ED	No. of companies	No. of inclusions	AD	ED	No. of companies	No. of inclusions
19.11.2009	19.11.2009	16	10	23.08.2019	03.09.2019	60	58
25.01.2011	01.02.2011	16	5	22.11.2019	02.12.2019	59	0
14.07.2011	01.08.2011	22	7	21.02.2020	02.03.2020	43	0
31.01.2012	01.02.2012	23	4	12.03.2020	17.03.2020	42	0
31.07.2012	01.08.2012	20	1	22.05.2020	01.06.2020	58	16
24.01.2013	01.02.2013	20	1	11.09.2020	21.09.2020	60	10
17.12.2013	23.12.2013	23	4	26.11.2020	27.11.2020	60	1
18.12.2014	22.12.2014	24	3	01.12.2020	04.12.2020	60	1
14.12.2015	21.12.2015	23	0	11.12.2020	21.12.2020	60	1
14.12.2016	19.12.2016	25	4	12.03.2021	22.03.2021	60	0
14.12.2017	18.12.2017	28	5	11.06.2021	21.06.2021	59	3
12.12.2018	27.12.2018*	31	3	10.09.2021	20.09.2021	60	3
				10.12.2021	20.12.2021	60	1
				11.03.2022	21.03.2022	60	1
				10.06.2022	20.06.2022	60	1
				01.08.2022	04.08.2022	61	1
				09.09.2022	19.09.2022	60	2
				02.11.2022	07.11.2022	61	1
				09.12.2022	19.12.2022	59	2
				10.03.2023	20.03.2023	59	0
				09.06.2023	19.06.2023	59	1
				05.09.2023	08.09.2023	59	1
				08.09.2023	18.09.2023	60	2
				29.09.2023	04.10.2023	60	1
				08.12.2023	18.12.2023	59	3

Note: * The composition of the RESPECT Index has not changed since December 2018, but it was still published until September 2019.

Source: Own compilation based on RESPECT Index: http://RESPECTindex.pl/; GPW Benchmark: https://gpwbenchmark.pl/en-komunikaty-i-uchwaly-gpw

However, WIG-ESG revived a little interest from investors. According to the survey conducted in 2023 by the Polish Association of Individual Investors, and presented on its website, 80% of respondents did not take ESG factors into account while making their investment decisions. As a result, in Feb. 2024, GPW Benchmark (the administrator of its benchmarks/indices) announced on its website that the last day of the WIG-ESG index publication will be June 28, 2024.

Considering the significant differences in the methodologies of the two indices and the meaningful increase in the number of constituents, we decided that our sample would cover only the period when the RESPECT Index was published. It is worth noting that the methodology of the RESPECT Index was also evaluated and changed during the period of its publication, but these changes were not as significant.

In analysing inclusions in the RESPECT Index, we used the total return version of the index values. Information about the composition of the index, inclusions, announcement dates and effective change dates was obtained from the websites of the RESPECT Index and press releases available on the WSE website. In the case of the RESPECT Index, the announcement date is the date of the conference organised by the WSE during which the new composition of the index was announced.

The US DJSI World was first published in 1999. It appraises the world's leading companies in terms of economic, environmental and social criteria. The DJSI Index family is widely recognised as the first global sustainability benchmark (Cheung & Roca, 2013; Oberndorfer et al., 2013). It is also considered reliable and consistent (Hawn et al., 2018; Oberndorfer et al., 2013).

In analysing inclusions in the DJSI World, we used the total return version of the index values. Information about the composition of the index, inclusions, announcement dates and effective change dates was obtained from the website of S&P Global. We focused only on the US firms.

3.2. Choice of companies

We suggest that conflicting or even inconclusive findings of previous studies might result from companies' selection criteria which were not selective enough. Consequently, we propose a more thorough procedure to select companies from the RESPECT Index and the DJSI. First, to be included in the sample of US companies, international companies had to meet two criteria: their headquarters had to be in the US, and the companies had to operate primarily in the US. Second, we focused on inclusions from the years 2009–2019. Third, we selected only those companies that were included in the index for the first time or that had been off the index for two years or more and were then reinstated in the index. The initial sample that met these criteria comprised 85 inclusions in the US market and 54 in the Polish one. Fourth, to ensure that the sample included only firms with a truly good and stable corporate reputation, we excluded from the initial sample companies that were announced to be in the index only once. Fifth, we excluded companies that were added to the index after mergers and acquisitions. Next, we deleted companies for which historical stock price information was not available, i.e. non-listed companies and companies that were no longer traded on the stock markets. Subsequently, we eliminated from our sample companies that experienced the most important confounding events in the event window, i.e. announcements of financial reports (Doh et al., 2010; Landsman & Maydew, 2002; Modi et al., 2015), CEO changes (Modi et al., 2015), dividend announcements (Aharony & Swary, 1980; Modi et al., 2015) and mergers and acquisitions (Modi et al., 2015). In doing so, we used two different sources of data. In the case of the Polish companies, we used the Polish Press Agency (PAP) Market Insider. For the US companies, we used the EDGAR database of the US Securities and Exchange Commission. Finally, because we considered sectoral conditions, we also removed seven inclusions in the RESPECT Index and three in the DJSI, as those companies were not components of any sectoral index. Our final research sample comprised 63 inclusions (59 companies) in the DJSI and 20 inclusions (19 companies) in the RESPECT Index—all the events that met our restrictive selection criteria. Questioning the inconsistent results of previous studies, we decided to improve the sample selection criteria and resign from a larger sample size.

4. METHODOLOGY

4.1. Selection of the estimation window

In most studies, the estimation window is a period no longer than one year and just before the event window, e.g. 60 days before the event window (Adamska & Dąbrowski, 2021), 100 days (Lackmann et al., 2012; Oberndorfer et al., 2013), 150 days (Nakai et al., 2013; Tischer & Hildebrandt, 2014), 200 days (Clacher & Hagendorff, 2012), 210 days (Ramchander et al., 2012), 235 days (Cheung, 2011; Cheung & Roca, 2013) or 250 days (Consolandi et al., 2008). However, Curran and Moran applied a longer estimation window of 311 days.

Denis and colleagues (Denis et al., 2003), analysing S&P 500 index inclusions, applied post-inclusion realised earnings and compared them to pre-inclusion forecasts. Based on this work, Kappou and Oikonomou applied a post-inclusion estimation period (+126,+375) that started after the long-term event window (-10,+125) (Kappou & Oikonomou, 2016). They claimed that calculations based on the pre-event estimation period are biased, as firms included in an index usually perform well before the inclusion.

Therefore, it could be not reputation but performance before the event that leads to inclusion. To avoid the impact of performance, they focused on the post-estimation period.

In our study, we applied an event window covering one year before the announcement date, which was 250 trading days before the earliest event window (-253, -4).

4.2. Selection of the event window

Regarding the event window, its length should be selected carefully. On the one hand, defining a larger event window aims to capture any leak of information before the date of the announcement as well as changes caused by latecomers to the announcement (Curran & Moran, 2007). On the other hand, a short window minimises the impact of other information inflows (confounding effects) (Curran & Moran, 2007).

Some event windows start on the first date of the announcement of inclusion (t=0) to capture the reaction to the announcement (Curran & Moran, 2007) while event windows starting before the inclusion are intended to reveal a leakage of information (McWilliams & Siegel, 2000; Tischer & Hildebrandt, 2014). A broad array of studies have applied various sub-windows around the event day (Adamska & Dąbrowski, 2016, 2021; Clacher & Hagendorff, 2012; Consolandi et al., 2008; Curran & Moran, 2007; Lackmann et al., 2012).

As in numerous studies, we decided to use various event windows covering the period from AD(-3) to ED(+3) (see Table 4) (AD—announcement date; ED—effective date). The rationale for this short period was the multiple confounding events that we found for the analysed companies. The longest window covered the whole period (AD-3, ED+3), and its length varied depending on the year of inclusion (Table 5). We applied two windows focused on the analysis around the AD, namely AD(-2, +2) and AD(-1, +1). To analyse the impact immediately after the AD, two windows were used: AD(0, +1) and AD(0, +3). The next event windows were settled to analyse abnormal returns in the periods around the ED—i.e. ED(-3, +3)—and just after the ED: ED(0, +1), E (0, +3) and ED(+1, +3).

Table 4

Estimation and event windows applied

Window in trading days	Explanation
(-253, -4)	estimation window
AD(-3, +3)	around AD (7 days)
AD(-2, +2)	around AD (5 days)
AD(-1, +1)	around AD (3 days)
(AD-3, ED+3)	the longest event window
AD(+1, +3)	post-AD window
AD(0, +1)	immediate AD reaction (2 days)
AD(0, +3)	immediate AD reaction (4 days)
ED(-3, +3)	around ED (7 days)
ED(+1, +3)	post-ED window
ED(0, +1)	immediate ED reaction (2 days)
ED(0, +3)	immediate ED reaction (4 days)

Source: Own compilation.

Table 5

Revisions of components in the RESPECT Index and DJSI in the years 2009-2019

RESPECT Index		DJSI	
AD	ED	AD	ED
19.11.2009	19.11.2009	03.09.2009	21.09.2009
-	-	09.09.2010	20.09.2010
25.01.2011	01.02.2011	08.09.2011	19.09.2011
14.07.2011	01.08.2011	-	-
31.01.2012	01.02.2012	13.09.2012	24.09.2012
31.07.2012	01.08.2012	-	-
24.01.2013	01.02.2013	12.09.2013	23.09.2013
17.12.2013	23.12.2013	-	-
18.12.2014	22.12.2014	11.09.2014	22.09.2014
14.12.2015*	21.12.2015*	10.09.2015	21.09.2015
14.12.2016	19.12.2016	08.09.2016	19.09.2016
14.12.2017	18.12.2017	07.09.2017	18.09.2017
12.12.2018	27.12.2018	13.09.2018	24.09.2018
-	-	13.09.2019	23.09.2019

Notes: *in 2015, no inclusions or exclusions for the RESPECT Index were reported

Source: own compilation based on reports from the S&P Global and RESPECT websites, (RESPECT Index, 2019); https://www.spglobal.com, http://RESPECTindex.pl/

4.3. Abnormal and cumulative abnormal returns. Testing of significance

Our empirical research using the event study methodology was conducted in the following steps. First, we focused on the specification of the expected return model, choosing a market model (Sharpe's model) as a basis (Sharpe, 1964). We used the S&P 500 and WIG indices as market benchmarks for the US and Poland respectively. We checked for the ARCH effect in the residuals' time series, but, for the majority of analysed stocks, the effect was not present. Thus, we decided not to use the market model with the GARCH(1,1) error estimation. We employed an estimation window [T_0, T_1] comprising 250 trading days before the widest event window [T_1+1, T_2]. Second, we assumed that the market sector was an important predictor of changes in stock prices and chose to apply a market-adjusted model based on the sectoral indices. In this case, our benchmarks were sector indices as listed in Table 6. All the estimations were conducted independently for the US and PL subsamples.

Third, we calculated the abnormal returns (ARs), average abnormal returns (AARs), cumulative abnormal returns (CARs) and cumulative average abnormal returns (CAARs) using the following formulas:

1. for ARs: $AR_{i,t} = R_{i,t} - E\left[R_{i,t}|\Phi_{i,t-1}\right]$,

where $E\left[R_{i,t}|\Phi_{i,t-1}\right]$ denotes the expected value of R_i at time t conditional of the information set assessed at time $t-1$,

2. for AARs: $AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{i,t}$,

where N denotes the number of analysed event

3. for CARs: $CAR_i = \sum_{t=T_1+1}^{T_2} AR_{i,t}$,

where $[T_1+1, T_2]$ denotes the event window, and $[T_0, T_1]$ denotes the estimation-window length,

4. for CAARs: $CAAR = \frac{1}{N}\sum_{i=1}^{N} CAR_i$.

Table 6

Comparison of sector classifications of the RESPECT Index's constituents and DJSI constituents in the analysed period

PL Sector Index	Description	Firms in the final sample (tickers)	US Sector Index	Description	Firms in the final sample (tickers)
WIG-GORNIC	Mining Sector Index	JSW (2 inclusions)	NYUSMMTT	Market Basic Materials Sector Index	AA, APD
WIG-MOTO	Automobiles and Parts Sector Index	CAR	NYUSMCGT	Market Consumer Goods Sector Index	CCEP, CL (2 inclusions), GM, GPS, HSY, KO, MDLZ, SWK, WHR
WIG-MEDIA	Media Sector Index	AGO, OPL	NYUSMCST	Market Consumer Services Sector Index	CVS, HRB, NLSN, TGT, TNL
WIG-ENERG	Energy Sector Index	ENG, KGN, PGE, TPE	NYUSMENT	Market Energy Sector Index	HAL, SLB
WIG-PALIWA	Oil&Gas Sector Index	LTS, PGN, PKN			
WIG-BANKI	Banking Sector Index	BHW, ING, MBK, SPL	NYUSMFNT	Market Financials Sector Index	BK, CBRE, HST, MS, NTRS, PEAK, PLD, SPGI, VTR, WELL, WY
-		-	NYUSMHCT	Market Healthcare Sector Index	ABBV, AMGN, ANTM, BIIB, CI, DVA, EW, ILMN, IQV, JNJ, MDT, REGN
WIG-BUDOW	Construction Sector Index	BDX, ELB, TRK	NYUSMINT	Market Industrials Sector Index	BLL, LMT, OC, OSK, RSG, UPS, WM (2 inclusions), XRX, XYL
WIG-CHEMIA	Chemical Sector Index	PCR			
-		-	NYUSMTCT	Market Technology Sector Index	ADSK, CRM, GOOGL, MSFT, TDC (2 inclusions)
WIG-TELEKOM	Telecommunication Sector Index	-	NYUSMUTT	Market Utilities and Telecommunications Sector Index	DUK, PCG, PEG, SRE (2 inclusions)

Source: Own compilation.

Fourth, we calculated the main descriptive statistics for ARs and CARs. Fifth, we conducted a substantial number of significance tests to assess whether the obtained ARs and CARs were significantly different from zero. We employed six parametric tests:

1. Cross-sectional t-test (csect t)
2. Skewness-adjusted t-test (skew. corr. t) (Hall, 1992)
3. Patell test (Patell z) (Patell, 1976)
4. Adjusted Patell test (adj. Patell z)
5. Standardised cross-sectional Boehmer, Musumeci and Poulsen test (BMP z) (Boehmer et al., 1991; Mikkelson & Partch, 1986)
6. Adjusted Boehmer, Musumeci and Poulsen test (adj. BMP z, adj. standard. cross-sectional test) (Kolari & Pynnönen, 2010)

and five nonparametric tests:

1. Cowan sign test (sign z)
2. Cowan generalised sign test (generalised sign z) (Cowan, 1992)

3. Corrado and Zivney rank test z statistic (rank z) (Campbell & Wesley, 1993; Corrado & Zivney, 1992)
4. Generalised Kolari and Pynnönen (2011) test (GRANK t) (Kolari & Pynnonen, 2011)
5. Generalised Kolari and Pynnönen (2011) test (GRANK z).

In order to verify the set of hypotheses

$$H_0: E(AAR_t) = 0$$
$$H_1: E(AAR_t) \neq 0$$

we employed firstly a simple cross-sectional test based on the following statistics

$$t = \frac{AAR_t}{S_{AAR_t}} \sqrt{N}$$

where $S_{AAR_t} = \left[\frac{1}{N-1} \sum_{i=1}^{N} \left(AR_{i,t} - AAR_t\right)^2\right]^{0.5}$.

The t-statistic for assessing the significance of the CAARs based on a set of hypotheses

$$H_0: E(CAAR) = 0$$
$$H_1: E(CAAR) \neq 0$$

is calculated analogously:

$$t = \frac{CAAR}{S_{CAAR}} \sqrt{N}$$

where $S_{CAAR} = \left[\frac{1}{N-1} \sum_{i=1}^{N} (CAR_i - CAAR)^2\right]^{0.5}$.

It is important to note that the cross-sectional test is susceptible to event-induced volatility, and, in effect, its power is diminished (Brown & Warner, 1985). For this reason, we applied also the skewness-adjusted t-test introduced by (Hall, 1992) which takes into account correction for the skewness of the abnormal return distribution.

The third parametric test is the Patell test based on the standardized ARs:

$$SAR_{i,t} = \frac{AR_{i,t}}{S_{AR_{i,t}}}.$$

The standardized errors are adjusted by the forecast errors because the event-window ARs are out-of-sample predictions. Thus

$$S_{AR_{i,t}} = \left[S_{AR_i}^2 (1 + \frac{1}{M_i} + \frac{\left(R_{m,t} - \bar{R}_m\right)^2}{\sum_{t=T_0}^{T_1} \left(R_{m,t} - \bar{R}_m\right)^2}\right]^{0.5},$$

where $R_{m,t}$ stands for the market return at time t, $\bar{R}_m$ denotes the average of the market returns in the estimation window, $S_{AR_i}^2 = \frac{1}{M_i - 2} \sum_{t=T_0}^{T_1} (AR_{i,t})^2$ is the variance of the ARs in the estimation window and M_i stands for the number of non-missing (matched) returns.

The Patell test statistic used to verify the hypothesis $H_0: E(AAR_t) = 0$ is constructed as follows:

$$z_{Patell,t} = \frac{ASAR_t}{S_{ASAR_t}},$$

where $ASAR_t = \sum_{i=1}^{N} SAR_{i,t}$ and $S_{ASAR_t} = \left(\sum_{i=1}^{N} \frac{M_i - 2}{M_i - 4}\right)^{0.5}$.

For testing the hypothesis $H_0: E(CAAR) = 0$, the Patell statistic is equal to

$$z_{Patell} = \frac{1}{\sqrt{N}} \sum_{i=1}^{N} \frac{CSAR_i}{S_{CSAR_i}},$$

where $CSAR_i = \sum_{t=T_1+1}^{T_2} SAR_{i,t}$ and $S_{CSAR_i} = \left(L_2 \frac{M_i-2}{M_i-4}\right)^{0.5}$; L_2 denotes the event-window length, $L_2 = T_2 - T_1$, and L_1 denotes the estimation-window length, $L_1 = T_1 - T_0 + 1$. Assuming the cross-sectional independence, Patell z statistic has a standard normal distribution under the null hypothesis.

The fourth parametric test is the adjusted Patell test (Kolari & Pynnönen, 2010). It introduces a correction that accounts for the cross-correlation of abnormal returns. The test statistic is calculated as follows

$$adj\ z_{Patell,t} = z_{Patell,t}\sqrt{\frac{1}{1-(N-1)\bar{r}}},$$

where $\bar{r}$ is the average of the sample-cross correlations of the estimation-period abnormal returns. The above statistic is used to verify hypotheses referring to ARs, $H_0: E(AAR_t) = 0$. In the case of CARs, $H_0: E(CAAR) = 0$, the statistic is denoted as

$$adj\ z_{Patell} = z_{Patell}\sqrt{\frac{1}{1-(N-1)\bar{r}}}.$$

Boehmer, Musumeci and Poulsen (1991), hereafter BMP, imposed a test based on a standardized cross-sectional approach that is robust to any additional variance caused by the event (Boehmer et al., 1991). For testing $H_0: E(AAR_t) = 0$, the statistic

$$z_{BMP,t} = \frac{1}{\sqrt{N}}\frac{ASAR_t}{S_{ASAR_t}},$$

where $ASAR_t = \sum_{i=1}^{N} SAR_{i,t}$ and $S_{ASAR_t} = \left[\frac{1}{N-1}\sum_{i=1}^{N}\left(SAR_{i,t} - \frac{1}{N}\sum_{i=1}^{N} SAR_{i,t}\right)^2\right]^{0.5}$.

For testing $H_0: E(CAAR) = 0$, the test statistic is given by

$$z_{BMP,t} = \sqrt{N}\frac{\overline{SCAR}}{S_{\overline{SCAR}}},$$

where $\overline{SCAR} = \frac{1}{N}\sum_{i=1}^{N} SCAR_i$; $SCAR_i = \frac{CAR_i}{S_{CAR_i}}$.

S_{CAR_i} denotes the forecast-error-corrected standard deviation calculated according to the corrections proposed by (Mikkelson & Partch, 1988b, 1988a). For the sake of brevity, the detailed formulas of those corrections have been omitted.

The adjusted version of the BMP test introduced by (Kolari & Pynnönen, 2010) accounts for the cross-correlation of abnormal returns. The modified test statistic is based on the following formula for testing the significance of ARs

$$adj\ z_{BMP,t} = z_{BMP,t}\sqrt{\frac{1-\bar{r}}{1+(N-1)\bar{r}}},$$

and for CARs

$$adj\ z_{BMP,} = z_{BMP}\sqrt{\frac{1-\bar{r}}{1+(N-1)\bar{r}}}.$$

Among the nonparametric tests, we took advantage of the sign test introduced by (Cowan, 1992) based on the following statistic

$$t_{sign} = \sqrt{N}\left(\frac{\hat{p}-0.5}{\sqrt{0.5(1-0.5)}}\right),$$

where $\hat{p}$ denotes the ratio of positive cumulative abnormal returns in the event window. Under the null hypothesis, the ratio should not differ significantly from 0.5.

We also employed the Cowan generalized sign test (Cowan, 1992). Under the null hypothesis, $H_0: E(AAR_t) = 0$ or $H_0: E(CAAR) = 0$, the number of stocks with positive CARs in the event window is expected to be consistent with the fraction of positive CARs from the estimation period. When the number of positive CARs is significantly higher than the expected number derived from the estimation-period fraction, then the null hypothesis is rejected. The verification is based upon the statistic

$$z_{sign} = \frac{\omega - N\hat{p}}{\sqrt{N\hat{p}(1-\hat{p})}},$$

where ω is the number of stocks with positive CARs during the event period and $\hat{p}$ denotes the estimation-period fraction of positive CARs calculated according to the formula

$$\hat{p} = \frac{1}{N}\sum_{i=1}^{N}\frac{1}{L_1}\sum_{t=T_0}^{T_1}\varphi_{i,t},$$

where $\varphi_{i,t} = \begin{cases} 1 \text{ when the sign of the CAR is positive} \\ 0 \text{ otherwise} \end{cases}.$

The p-value in this test is computed under the assumption of a normal approximation to the binomial distribution with the parameters $\hat{p}$ and N.

The third nonparametric test that has been considered, was the Corrado rank test based on the (Corrado, 1989) proposal and the (Corrado & Zivney, 1992) correction. In this approach, all of the ARs were transformed into standardized ranks, namely

$$K_{i,t} = \frac{rank(AR_{i,t})}{1+M_i+L_i},$$

where L_i denotes the number of non-missing returns in the event window, and M_i stands for the number of non-missing (matched) returns in the estimation window. The statistic for testing the significance of AR on a single day is calculated as follows

$$t_{rank,t} = \frac{\overline{K}_t - 0.5}{S_{\overline{K}}},$$

where $\overline{K}_t$ denotes the mean rank across the stocks in the event window, $\overline{K}_t = \frac{1}{N_t}\sum_{i=1}^{N_t}K_{i,t}$; N_t denotes the number of non-missing returns across the stocks and $S_{\overline{K}} = \left[\frac{1}{L_1+L_2}\sum_{t=T_0}^{T_2}\frac{N_t}{N}(K_t - 0.5)^2\right]^{0.5}$.

For the procedure of testing the significance of the CARs, $H_0{:}\,E(CAAR)$, the test statistic was modified according to the suggestion of (Campbell & Wesley, 1993)

$$t_{rank} = \sqrt{L_2}\left(\frac{\overline{K}_{T_1,T_2} - 0.5}{S_{\overline{K}}}\right),$$

where $\overline{K}_{T_1,T_2}$ denotes the mean rank across the stocks and time in the event window, $\overline{K}_{T_1,T_2} = \frac{1}{L_2}\sum_{T=N_t}^{N_t}K_{i,t}$.

For brevity, the description of the two last nonparametric tests introduced by (Kolari & Pynnonen, 2011) (GRANK t and GRANK z) was omitted. However, the GRANK procedure is robust to abnormal return serial correlation and event-induced volatility.

5. RESULTS

The main descriptive statistics for the ARs are summarised in Tables 7 and 8 for the US and Polish samples, respectively.

Table 7

Descriptive statistics for abnormal returns – the US market

AR type	Mean	Median	St. dev.	Asym.	Kurtosis	JB		p-value
Panel A	**Sharpe**							
AD(-3)	0.0017	0.0030	0.0126	-0.2408	1.1482	4.070		0.131
AD(-2)	-0.0013	-0.0011	0.0131	0.2947	1.9565	10.960	***	0.004
AD(-1)	0.0006	0.0011	0.0130	-0.1168	0.2011	0.249		0.883
AD(0)	-0.0007	-0.0005	0.0102	0.2238	1.2710	4.766	*	0.092
AD(+1)	0.0011	0.0013	0.0113	-0.6726	3.5007	36.919	***	0.000
AD(+2)	0.0015	0.0017	0.0118	-0.2335	3.1455	26.545	***	0.000
AD(+3)	-0.0001	-0.0001	0.0089	-0.1181	1.6612	7.391	**	0.025
ED(-3)	-0.0009	0.0007	0.0116	-0.9750	1.5393	16.201	***	0.000
ED(-2)	-0.0004	-0.0008	0.0085	-0.1111	-0.2448	0.287		0.866
ED(-1)	0.0019	0.0001	0.0098	1.3745	3.1082	45.196	***	0.000
ED(0)	-0.0013	-0.0001	0.0155	-0.0374	7.7137	156.204	***	0.000
ED(+1)	-0.0007	-0.0007	0.0114	0.5465	1.6411	10.206	***	0.006
ED(+2)	0.0019	0.0004	0.0153	1.3491	4.7271	77.769	***	0.000
ED(+3)	0.0028	0.0036	0.0091	0.1761	0.3822	0.709		0.702
Panel B	**Mean-adj.**							
AD(-3)	-0.0008	-0.0003	0.0112	-1.0589	2.0247	22.535	***	0.000
AD(-2)	-0.0002	-0.0001	0.0097	0.1032	0.5811	0.998		0.607
AD(-1)	0.0018	0.0016	0.0095	0.5880	0.7028	4.927	*	0.085
AD(0)	-0.0004	0.0004	0.0149	1.0074	9.1885	232.28	***	0.000
AD(+1)	0.0002	0.0001	0.0106	0.4226	1.2777	6.160	**	0.046
AD(+2)	0.0025	0.0001	0.0118	0.4853	1.5437	8.729	**	0.013
AD(+3)	0.0019	0.0011	0.0104	0.6867	2.8412	26.141	***	0.000
ED(-3)	-0.0008	-0.0003	0.0112	-1.0589	2.0247	22.535	***	0.000
ED(-2)	-0.0002	-0.0001	0.0097	0.1032	0.5811	0.998		0.607
ED(-1)	0.0018	0.0016	0.0095	0.5880	0.7028	4.927	*	0.085
ED(0)	-0.0004	0.0004	0.0149	1.0074	9.1885	232.28	***	0.000
ED(+1)	0.0002	0.0001	0.0106	0.4226	1.2777	6.160	**	0.046
ED(+2)	0.0025	0.0001	0.0118	0.4853	1.5437	8.729	**	0.013
ED(+3)	0.0019	0.0011	0.0104	0.6867	2.8412	26.140	***	0.000

Notes: C.V. – coefficient of variation, Asym. – asymmetry ratio, Kurtosis – excessive kurtosis ratio, JB – χ^2 statistic in Jarque-Bera test, Mean-adj. – mean-adjusted model based on sectoral indices, *** (**, *) – significance at 1% (5%, 10%) significance level.
Source: Own calculation.

ARs were calculated using Sharpe's model (panel A) and using mean-adjusted model based on sectorial indices (panel B). In the US sample, the highest mean of the ARs was obtained on day ED(+3) when using Sharpe's model to estimate the expected returns (0.0028; panel A). In the case of the mean-adjusted model based on sectorial indices, the highest mean value of the ARs was obtained on two days: AD(+2) and ED(+2) (0.0025; panel B).

For the Polish (PL) sample, the highest mean of the ARs was obtained on day AD(0), irrespective of which model was used to estimate the expected return (panel A: 0.0077; panel B: 0.0058). In the US sample, the greatest variability of ARs was observed on day ED(-2) in panel A (2,101.2%) and both AD(+1) and ED(+1) in panel B (4,409.58%).

Table 8

Descriptive statistics for abnormal returns – the Polish market

AR type	Mean	Median	St. dev.	Asym.	Kurtosis	JB		p-value
Panel A	**Sharpe**							
AD(-3)	0.0008	-0.0030	0.0150	0.3513	-0.6255	0.737		0.692
AD(-2)	-0.0023	-0.0025	0.0140	-1.0537	1.4937	5.560	*	0.062
AD(-1)	-0.0022	-0.0019	0.0188	0.2121	-0.8134	0.701		0.704
AD(0)	0.0077	0.0040	0.0138	0.5042	-0.5973	1.145		0.564
AD(+1)	-0.0024	-0.0009	0.0149	-0.4077	-0.7773	1.057		0.589
AD(+2)	0.0056	0.0053	0.0108	0.4822	1.4072	2.425		0.297
AD(+3)	0.0008	0.0003	0.0142	0.0939	-0.8872	0.685		0.710
ED(-3)	-0.0050	-0.0067	0.0128	-0.1863	-0.3925	0.244		0.885
ED(-2)	0.0043	0.0067	0.0181	-0.5294	0.3835	1.057		0.590
ED(-1)	0.0005	0.0027	0.0194	-0.0879	-0.8566	0.637		0.727
ED(0)	0.0016	0.0028	0.0128	0.1356	-0.9916	0.881		0.644
ED(+1)	-0.0016	-0.0025	0.0113	0.0985	-0.8151	0.586		0.746
ED(+2)	0.0042	0.0032	0.0144	0.1104	-0.3140	0.123		0.940
ED(+3)	-0.0018	-0.0032	0.0143	0.0811	-0.7490	0.489		0.783
Panel B	**Mean adj.**							
AD(-3)	-0.0014	-0.0040	0.0169	0.5087	-0.3408	0.960		0.619
AD(-2)	-0.0018	0.0001	0.0165	-1.1766	2.0936	8.267	**	0.016
AD(-1)	-0.0003	-0.0030	0.0164	0.7704	0.4125	2.120		0.346
AD(0)	0.0058	0.0038	0.0132	0.7337	-0.3986	1.927		0.382
AD(+1)	-0.0041	-0.0036	0.0140	-0.4015	-0.3329	0.630		0.730
AD(+2)	0.0041	0.0045	0.0101	-0.4765	0.0783	0.762		0.683
AD(+3)	0.0056	0.0043	0.0145	0.5129	-0.6170	1.194		0.550
ED(-3)	-0.0048	-0.0045	0.0169	-0.4441	0.8680	1.285		0.526
ED(-2)	0.0016	0.0018	0.0159	-0.4906	0.4806	0.995		0.608
ED(-1)	0.0039	0.0027	0.0180	0.1786	-0.0448	0.108		0.947
ED(0)	0.0020	0.0025	0.0128	-0.1987	-0.4943	0.335		0.846
ED(+1)	-0.0005	0.0023	0.0099	-0.3410	0.2842	0.455		0.797
ED(+2)	-0.0001	-0.0001	0.0102	0.1742	-0.6651	0.470		0.791
ED(+3)	0.0016	-0.0026	0.0144	1.0419	0.2967	3.692		0.158

Notes: as of Table 7.
Source: Own calculation.

The discrepancies between the coefficients of variation of the ARs summarised in panels A and B are extremely large. The lowest values of coefficients of variation were achieved for ARs on day ED(+3) in panel A (321.17%) and for ARs on days AD(+2) and ED(+2) (464.08%) in panel B.

The highest coefficients of variation for the PL sample were achieved for ARs on day ED(-1) in panel A (3,836.83%) and ED(+2) in panel B (7,580.00%). However, the differences between the maximum and minimum values of coefficients of variation are substantially lower than in the US sample.

The findings for the distribution of ARs are radically different in the two samples. In the US sample, most ARs turned out to be not normally distributed. In the PL sample, by contrast, distribution was not normal only in the case of ARs calculated on day AD(-2). Thus, in the case of the US sample, using nonparametric tests to assess the significance of ARs seems to be justified. In the case of the PL sample, both parametric and nonparametric tests are appropriate.

The main descriptive statistics for CARs are summarised in Tables 9 and 10 for the US and PL samples, respectively.

Table 9

Descriptive statistics for cumulated abnormal returns – the US market

CAR type	Mean	Median	St. dev.	Asym.	Kurtosis	JB		p-value
Panel A	**Sharpe**							
AD(-3, +3)	0.0029	0.0045	0.0356	-0.2616	3.0095	24.493	***	0.000
AD(-2, +2)	0.0012	0.0066	0.0299	-1.4574	4.8461	83.949	***	0.000
AD(-1, +1)	0.0010	0.0026	0.0213	-0.4599	0.6387	3.292		0.193
(AD-3, ED+3)	0.0069	0.0036	0.0485	-0.3531	1.8420	10.216	***	0.006
AD(+1, +3)	0.0025	0.0019	0.0200	-0.0874	3.4961	32.164	***	0.000
AD(0, +1)	0.0004	0.0019	0.0162	-1.4032	5.7335	106.965	***	0.000
AD(0, +3)	0.0018	0.0027	0.0229	-1.1459	5.5411	94.384	***	0.000
ED(-3, +3)	0.0034	0.0052	0.0296	-0.8352	2.4123	22.600	***	0.000
ED(+1, +3	0.0040	0.0029	0.0214	0.4957	1.5539	8.919	**	0.012
ED(0, +1)	-0.0020	-0.0027	0.0171	1.0742	3.2960	40.633	***	0.000
ED(0, +3)	0.0028	0.0027	0.0238	0.1224	0.7487	1.629		0.443
Panel B	**Mean adj**							
AD(-3, +3)	0.0013	0.0007	0.0311	0.1331	2.8168	21.014	***	0.000
AD(-2, +2)	-0.0010	0.0013	0.0273	-1.1839	4.0349	57.455	***	0.000
AD(-1, +1)	-0.0005	-0.0016	0.0201	0.0012	-0.2003	0.105		0.949
(AD-3, ED+3)	0.0072	0.0089	0.0430	-0.3397	1.6249	8.143	**	0.017
AD(+1, +3)	0.0016	0.0017	0.0168	-0.3330	1.6255	8.100	**	0.017
AD(0, +1)	-0.0005	0.0003	0.0154	-1.1376	4.3897	64.170	***	0.000
AD(0, +3)	0.0009	0.0011	0.0185	-1.2833	4.2076	63.764	***	0.000
ED(-3, +3)	0.0050	0.0060	0.0288	0.1912	1.9291	10.153	***	0.006
ED(+1, +3)	0.0047	0.0018	0.0206	0.9009	1.8913	17.912	***	0.000
ED(0, +1)	-0.0002	-0.0021	0.0161	1.3911	5.1914	91.065	***	0.000
ED(0, +3)	0.0043	0.0023	0.0223	1.1017	2.0141	23.393	***	0.000

Notes: as of Table 7.

Source: Own calculation.

Table 10

Descriptive statistics for cumulated abnormal returns – the Polish market

CAR type	Mean	Median	St. dev.	Asym.	Kurtosis	JB	p-value
Panel A	**Sharpe**						
AD(-3, +3)	0.0081	0.0092	0.0387	0.0194	-1.3726	1.571	0.456
AD(-2, +2)	0.0065	0.0054	0.0329	-0.0177	-1.1720	1.146	0.564
AD(-1, +1)	0.0032	0.0023	0.0313	-0.3879	-0.4242	0.651	0.722
(AD-3, ED+3)	0.0033	-0.0017	0.0465	0.2210	-1.2384	1.441	0.487
AD(+1, +3)	0.0041	-0.0021	0.0247	0.1201	-1.3058	1.469	0.480
AD(0, +1)	0.0054	0.0024	0.0209	-0.0133	-0.2562	0.055	0.973
AD(0, +3)	0.0118	0.0163	0.0275	-0.1420	-0.3513	0.170	0.918
ED(-3, +3)	0.0022	-0.0050	0.0395	0.2514	-0.7112	0.632	0.729
ED(+1, +3	0.0007	-0.0069	0.0269	0.2250	-1.2846	1.544	0.462
ED(0, +1)	0.0000	-0.0019	0.0172	0.6012	0.1672	1.228	0.541
ED(0, +3)	0.0024	-0.0036	0.0324	0.2976	-0.9269	1.011	0.603
Panel B	**Mean adj**						
AD(-3, +3)	0.0080	-0.0014	0.0321	0.7326	-0.1547	1.809	0.405
AD(-2, +2)	0.0037	0.0025	0.0243	-0.2044	-0.6008	0.440	0.803
AD(-1, +1)	0.0014	0.0062	0.0280	-0.4202	-0.9020	1.267	0.531
(AD-3, ED+3)	0.0039	-0.0016	0.0340	1.0657	0.4865	3.983	0.137
AD(+1, +3)	0.0056	0.0029	0.0209	0.0480	-1.1516	1.113	0.573
AD(0, +1)	0.0017	0.0018	0.0199	-0.0609	-0.6581	0.373	0.830
AD(0, +3)	0.0114	0.0092	0.0268	-0.3153	-0.8007	0.866	0.649
ED(-3, +3)	0.0037	-0.0032	0.0332	0.4088	-0.7912	1.079	0.583
ED(+1, +3)	0.0010	-0.0013	0.0210	0.2742	-0.7613	0.734	0.693
ED(0, +1)	0.0015	0.0017	0.0159	-0.5436	0.1141	0.996	0.608
ED(0, +3)	0.0030	-0.0007	0.0283	0.0773	-0.5101	0.237	0.888

Notes: as of Table 7.

Source: Own calculation.

In the US sample, the highest values of CARs were obtained in the largest event window (AD-3, ED+3) and are 0.0069 and 0.0072 in panels A and B, respectively. The greatest variability was observed in the case of the AD(0, +1) window in panel A and the ED(0, +1) window in panel B. Most of the CARs were not normally distributed except for those calculated for the window of AD(0, +1) in both panels A and B and for ED(0, +3) in panel A.

The outcomes for the PL sample are different. The highest values of CARs were observed for the AD(0, +3) event window (0.0118 in panel A and 0.0114 in panel B). The CAR values are not as varied as in the US sample. However, the highest variability appears in the ED(0, +1) event window in panel A and the ED(+1, +3) window in panel B. Not surprisingly, the CAR distributions for all the event windows in the PL sample are normal.

The results of the tests summarized in Table 11 reveal that, in the US market, there is a strong, statistically significant positive reaction of the market on ED(+3), i.e. three days after the ED of the inclusion of the stock in the reputational index, DJSI. This reaction was measured using both parametric and nonparametric tests. The use of parametric tests was justified, as we found empirical evidence for the normal distribution for the ARs on ED(+3). Moreover, we also observed a significant positive effect on stock returns on days AD(+1) and AD(+2) (one and two days after the AD). However, the results of the market-adjusted model based on the sectoral indices are conflicting (see Table 12). We cannot interpret the significant findings obtained for ED(+2) based on parametric tests, because the distribution of the ARs was not normal on that day. Thus, we can confirm a significant positive reaction of the rates of return only on days ED(-1) and AD(-3), based only on the selected nonparametric tests. In conclusion, firms that experienced significant ARs in comparison to the whole US stock exchange market did not experience them in comparison to firms in the same sector. In other words, significant ARs are no longer visible when sectoral conditions are considered. This may indicate that appearance of significant ARs in comparison to the whole US stock exchange market does not result from inclusion in a reputational index but from some other events that affected the particular sector.

Table 11

Results of testing of significance of the abnormal returns around AD and ED – the US, Sharpe'a model

AAR type	**AD (-3)**	**AD (-2)**	**AD (-1)**	**AD (0)**	**AD (+1)**	**AD (+2)**	**AD (+3)**	**ED (-3)**	**ED (-2)**	**ED (-1)**	**ED (0)**	**ED (+1)**	**ED (+2)**	**ED (+3)**
AAR value	0.002	-0.001	0.001	-0.001	0.001	0.002	0.000	-0,001	0,000	0,002	-0,001	-0,001	0,002	0,003
N	63	63	63	63	63	63	63	63	63	63	63	63	63	63
Cs t	1.074	-0.789	0.367	-0.546	0.774	1.010	-0.089	-0.613	-0.373	1.543	-0.664	-0.487	0.987	2.436**
Patell z	0.981	-0.688	0.060	-0.349	0.455	1.096	-0.104	-0.582	-0.018	0.901	-0.724	-0.373	0.712	1.443
Adj. Patell z	0.981	-0.688	0.060	-0.350	0.455	1.097	-0.104	-0.583	-0.018	0.901	-0.724	-0.373	0.712	1.444
Std cs t	1.029	-0.728	0.061	-0.456	0.547	1.247	-0.166	-0.588	-0.027	1.264	-0.671	-0.449	0.694	2.058**
Adj. std cs t	1.029	-0.729	0.061	-0.457	0.547	1.248	-0.167	-0.588	-0.027	1.265	-0.672	-0.450	0.695	2.059**
Skew. corr. t	1.087	-0.765	0.347	-0.560	0.762	0.986	-0.069	-0.665	-0.381	1.730*	-0.650	-0.496	1.091	2.522**
Sign z	0.882	-1.134	0.378	-0.126	1.890*	1.890*	-0.378	0.630	-0.882	0.126	-0.126	-0.882	0.630	1.890*
Gen. sign z	0.885	-1.131	0.381	-0.123	1.893*	1.893*	-0.375	0.633	-0.879	0.129	-0.123	-0.879	0.633	1.893*
Rank z	1.354	-1.120	0.508	-0.487	0.782	1.428	-0.040	-0.108	-0.233	0.912	-1.134	-0.757	0.536	1.910*
GRANK t	1.394	-1.148	0.517	-0.411	0.955	1.554	-0.085	-0.132	-0.206	1.004	-1.084	-0.852	0.542	2.307**
GRANK z	1.492	-1.229	0.553	-0.440	1.022	1.664*	-0.090	-0.141	-0.221	1.075	-1.162	-0.912	0.581	2.468**

Notes: Cs t – cross sectional test t statistic, Patell z – Patell test z statistic, Adj. Patell z – adjusted Patell z statistic, Std Cs t – standardized cross-sectional test t statistic, Adj. std cs t – adjusted standardized cross-sectional test t statistic, Skew corr. t – skewness corrected test t statistic, Sign z – Cowan's (1991) sign test z statistic, Generalized sign z – Cowan's (1992) generalized sign test z statistic, Rank z – Corrado and Zivney (1992) rank test z statistic, GRANK t – generalized Kolari and Pynnonen (2010) test t statistic, GRANK z – generalized Kolari and Pynnonen (2010) test z statistic; *** (**, *) – significance at 1% (5%, 10%) significance level

Source: Own calculation.

Table 12

Sectoral context – results of testing of significance of the abnormal returns around AD and ED – the US, market adjusted model

AAR type	AD (-3)	AD (-2)	AD (-1)	AD (0)	AD (+1)	AD (+2)	AD (+3)	ED (-3)	ED (-2)	ED (-1)	ED (0)	ED (+1)	ED (+2)	ED (+3)
AAR value	0.002	-0.002	0.000	-0.001	0.000	0.001	0.000	-0.001	0.000	0.002	0.000	0.000	0.003	0.002
N	63	63	63	63	63	63	63	63	63	63	63	63	63	63
Cs t	1.651	-1.081	-0.062	-0.582	0.145	0.919	0.000	-0.567	-0.164	1.505	-0.213	0.149	1.678*	1.456
Patell z	1.257	-0.987	-0.228	-0.326	0.015	0.934	-0.044	-0.652	0.149	1.044	-0.411	0.368	1.350	0.983
Adj. Patell z	1.258	-0.987	-0.228	-0.326	0.015	0.935	-0.044	-0.653	0.149	1.045	-0.411	0.368	1.351	0.983
Std Cs t	1.471	-1.068	-0.227	-0.459	0.020	1.247	-0.067	-0.693	0.196	1.392	-0.431	0.465	1.582	1.106
Adj. std cs t	1.472	-1.069	-0.227	-0.459	0.020	1.248	-0.067	-0.694	0.196	1.392	-0.432	0.465	1.583	1.107
Skew corr. t	1.661	-1.122	-0.038	-0.575	0.158	0.934	0.017	-0.622	-0.179	1.557	-0.199	0.190	1.7826*	1.517
Sign z	1.134	-1.134	0.126	-0.378	0.126	1.386	0.126	-0.378	-0.378	2.394**	0.630	0.378	0.126	0.882
Gen. sign z	1.243	-1.025	0.235	-0.269	0.235	1.495	0.235	-0.269	-0.269	2.503**	0.739	0.487	0.235	0.991
Rank z	1.612	-1.207	0.249	-0.404	0.040	1.158	0.183	-0.098	0.149	1.241	-0.719	0.092	1.472	0.974
GRANK t	1.7048*	-1.245	0.247	-0.499	0.063	1.343	0.159	-0.051	0.169	1.420	-0.688	0.060	1.474	1.101
GRANK z	1.791*	-1.308	0.259	-0.524	0.066	1.410	0.167	-0.054	0.177	1.492	-0.723	0.063	1.549	1.156

Notes: as of Table 11.

Source: Own calculation.

Table 13

Results of testing of significance of the cumulative abnormal returns around AD and ED – the US, Sharpe's model

CAAR Type	AD (-3, +3)	AD (-2, +2)	AD (-1, +1)	(AD-3, ED+3)	AD (+1, +3)	AD (0, +1)	AD (0, +3)	ED (-3, +3)	ED (+1, +3)	ED (0, +1)	ED (0, +3)
CAAR Value	0.005	0.001	0.001	0.007	0.003	0.000	0.002	0.003	0.004	-0.002	0.003
N	63	63	63	63	63	63	63	63	63	63	63
Cs t	1.375	0.313	0.364	1.090	1.009	0.197	0.629	0.899	1.496	-0.934	0.923
Patell z	1.070	0.257	0.096	0.723	0.836	0.075	0.549	0.513	1.028	-0.776	0.529
Adj. Patell z	1.014	0.236	0.088	0.666	0.769	0.069	0.505	0.473	0.947	-0.714	0.487
Std cs t	1.072	0.222	-0.206	0.846	1.054	-0.039	0.802	0.633	1.224	-0.877	0.629
Adj. std cs t	1.012	0.204	-0.190	0.780	0.972	-0.036	0.739	0.584	1.129	-0.809	0.580
Skew corr. t	1.394	0.276	0.351	1.067	1.003	0.164	0.585	0.853	1.555	-0.871	0.930
Gen. sign z	1.243	2.397**	0.633	1.389	0.885	0.381	1.137	1.389	0.885	-1.383	1.389
Rank z	1.176	0.505	0.488	0.896	1.263	0.236	0.858	0.426	0.967	-1.329	0.279
GRANK t	1.241	1.166	0.427	1.230	1.207	0.393	1.235	1.366	1.027	-1.487	0.817
GRANK z	1.304	1.249	0.457	1.316	1.292	0.421	1.322	1.462	1.099	-1.593	0.875

Notes: as of Table 11.

Source: Own calculation.

Table 14

Sectoral context– results of testing of significance of the cumulative abnormal returns around AD and ED – the US, market adjusted model

CAAR Type	AD (-3, +3)	AD (-2, +2)	AD (-1, +1)	(AD-3, ED+3)	AD (+1, +3)	AD (0, +1)	AD (0, +3)	ED (-3, +3)	ED (+1, +3)	ED (0, 1)	ED (0, +3)
CAAR Value	0.005	-0.001	-0.001	0.006	0.002	-0.001	0.001	0.005	0.005	0.000	0.004
N	63	63	63	63	63	63	63	63	63	63	63
Cs t	1.375	-0.304	-0.209	1.165	0.746	-0.243	0.378	1.375	1.801*	-0.087	1.513
Patell z	1.070	-0.264	-0.311	0.905	0.523	-0.220	0.290	1.070	1.559	-0.031	1.145
Adj. Patell z	1.014	-0.250	-0.294	0.858	0.495	-0.208	0.275	1.014	1.478	-0.029	1.085
Std cs t	1.072	-0.303	-0.451	0.879	0.791	-0.338	0.521	1.072	1.539	0.185	1.138
Adj. std cs t	1.012	-0.286	-0.425	0.830	0.746	-0.319	0.492	1.012	1.452	0.175	1.074
Skew corr. t	1.394	-0.334	-0.209	1.141	0.730	-0.270	0.343	1.394	1.949*	-0.057	1.647
Generalized sign z	1.243	0.487	-0.017	2.503**	0.739	0.991	0.739	1.243	0.739	-0.773	0.487
Rank z	1.176	-0.073	-0.061	1.231	0.798	-0.250	0.490	1.176	1.470	-0.427	0.920
GRANK t	1.241	0.329	-0.114	1.304	0.680	0.104	0.707	1.241	1.337	-0.770	0.834
GRANK z	1.304	0.346	-0.120	1.370	0.715	0.110	0.743	1.304	1.405	-0.809	0.876

Notes: as of Table 12.

Source: Own calculation.

Table 15

Results of testing of significance of the abnormal returns around AD and ED – PL, Sharpe's model

AAR type	AD (-3)	AD (-2)	AD (-1)	AD (0)	AD (+1)	AD (+2)	AD (+3)	ED (-3)	ED (-2)	ED (-1)	ED (0)	ED (+1)	ED (+2)	ED (+3)
AAR value	0.001	-0.002	-0.002	0.008	-0.002	0.006	0.001	-0.005	0.004	0.001	0.002	-0.002	0.004	-0.002
N	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Cs t	0.239	-0.734	-0.524	2.504**	-0.718	2.327**	0.253	-1.750*	1.060	0.115	0.558	-0.632	1.301	-0.563
Patell z	0.248	-0.597	-0.942	1.7592*	-0.713	1.414	-0.022	-1.302	1.010	-0.291	0.227	-0.305	0.869	-0.711
Adj. Patell z	0.247	-0.597	-0.941	1.757*	-0.713	1.413	-0.022	-1.301	1.009	-0.291	0.227	-0.305	0.868	-0.710
Std cs t	0.301	-0.750	-0.838	2.326**	-0.701	2.483**	-0.028	-1.551	1.002	-0.252	0.297	-0.393	1.040	-0.965
Adj. std cs t	0.301	-0.749	-0.837	2.323**	-0.700	2.480**	-0.028	-1.550	1.000	-0.252	0.297	-0.393	1.039	-0.964
Skew corr. t	0.246	-0.839	-0.503	2.806**	-0.739	2.569**	0.265	-1.804*	0.989	0.113	0.574	-0.617	1.307	-0.570
Sign z	-0.447	-0.894	0.000	0.894	0.000	2.236**	0.000	-1.342	1.342	0.894	0.447	-0.447	1.342	-0.447
Gen. sign z	-0.345	-0.793	0.102	0.997	0.102	2.339**	0.102	-1.240	1.444	0.997	0.549	-0.345	1.444	-0.345
Rank z	0.089	-0.528	-0.829	1.836*	-0.494	2.005**	-0.065	-1.558	1.273	0.125	0.305	-0.404	1.237	-0.749
GRANK t	-0.047	-0.524	-0.736	1.953*	-0.499	2.777***	-0.109	-1.6996*	1.260	0.109	0.281	-0.508	1.335	-0.833
GRANK z	-0.046	-0.519	-0.728	1.932*	-0.494	2.747***	-0.108	-1.6819*	1.247	0.108	0.278	-0.503	1.321	-0.824

Notes: as of Table 11.

Source: Own calculation.

Table 16

Sectoral context – results of testing of significance of the abnormal returns around AD and ED – PL, market adjusted model

AAR type	AD (-3)	AD (-2)	AD (-1)	AD (0)	AD (+1)	AD (+2)	AD (+3)	ED (-3)	ED (-2)	ED (-1)	ED (0)	ED (+1)	ED (+2)	ED (+3)
AAR value	-0.001	-0.002	0.000	0.006	-0.004	0.004	0.006	-0.005	0.002	0.004	0.002	-0.001	0.000	0.002
N	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Cs t	-0.370	-0.488	-0.082	1.962*	-1.311	1.811*	1.731*	-1.270	0.449	0.968	0.696	-0.226	-0.044	0.495
Patell z	-0.285	-0.161	-0.417	1.149	-0.566	1.211	0.805	-0.851	0.491	0.642	0.479	0.063	-0.115	-0.129
Adj. Patell z	-0.284	-0.161	-0.415	1.145	-0.564	1.206	0.803	-0.848	0.489	0.640	0.478	0.063	-0.115	-0.129
Std cs t	-0.272	-0.188	-0.457	1.609	-0.594	2.23**	0.943	-0.912	0.570	0.612	0.652	0.119	-0.200	-0.169
Adj. std cs t	-0.271	-0.187	-0.455	1.603	-0.592	2.222**	0.939	-0.909	0.568	0.610	0.650	0.118	-0.199	-0.168
Skew corr. t	-0.338	-0.560	-0.046	2.222**	-1.396	1.683	1.889*	-1.359	0.427	0.986	0.677	-0.225	-0.052	0.565
Sign z	-0.894	0.000	-1.342	0.447	-0.447	3.131***	0.894	-1.342	0.447	0.447	0.894	0.894	0.000	-0.447
Generalized sign z	-1.007	-0.112	-1.454	0.335	-0.560	3.019***	0.783	-1.454	0.335	0.335	0.783	0.783	-0.112	-0.560
Rank z	-0.741	-0.197	-0.663	1.102	-1.054	1.614	0.878	-1.109	0.652	0.456	0.499	-0.084	-0.412	-0.390
GRANK t	-0.736	-0.142	-0.683	1.273	-1.065	2.511**	0.920	-1.127	0.687	0.453	0.599	0.159	-0.499	-0.515
GRANK z	-0.701	-0.136	-0.651	1.213	-1.015	2.392**	0.876	-1.074	0.654	0.432	0.571	0.151	-0.475	-0.491

Notes: as of Table 11.

Source: Own calculation.

Table 17

Results of testing of significance of the cumulative abnormal returns around AD and ED – PL, Sharpe's model

CAAR Type	AD (-3, +3)	AD (-2, +2)	AD (-1, +1)	(AD-3, ED+3)	AD (+1, +3)	AD (0, +1)	AD (0, +3)	ED (-3, +3)	ED (+1, +3)	ED (0, 1)	ED (0, +3)
CAAR Value	0.008	0.007	0.003	0.002	0.004	0.005	0.012	0.002	0.001	0.000	0.002
N	20	20	20	20	20	20	20	20	20	20	20
Cs t	0.935	0.882	0.460	0.243	0.737	1.152	1.919*	0.243	0.122	0.010	0.325
Patell z	0.433	0.412	0.060	-0.129	0.392	0.739	1.219	-0.191	-0.085	-0.055	0.040
Adj. Patell z	0.439	0.417	0.061	-0.130	0.397	0.749	1.235	-0.193	-0.086	-0.056	0.040
Std Cs t	0.146	0.139	-0.203	-0.512	0.219	0.458	0.287	-0.507	-0.172	-0.124	-0.136
Adj. std cs t	0.147	0.140	-0.204	-0.516	0.221	0.462	0.294	-0.511	-0.173	-0.125	-0.137
Skew corr. t	0.937	0.881	0.438	0.255	0.747	1.150	1.871*	0.255	0.132	0.035	0.339
Generalized sign z	0.549	0.549	0.549	-0.793	0.102	0.997	1.891*	-0.793	-0.345	-0.345	-0.345
Rank z	0.761	0.883	0.289	0.086	0.846	0.933	1.618	0.086	0.062	-0.067	0.205
GRANK t	0.708	0.471	0.374	-	0.621	1.145	1.884*	-0.081	-0.144	-0.275	-0.016
GRANK z	0.701	0.466	0.370	-	0.397	0.749	1.235	-0.193	-0.086	-0.056	0.040

Notes: as of Table 11.

Source: Own calculation.

Table 18

Sectoral context – results of testing of significance of the cumulative abnormal returns around AD and ED – PL, market adjusted model

CAAR Type	AD (-3, +3)	AD (-2, +2)	AD (-1, +1)	(AD-3, ED+3)	AD (+1, +3)	AD (0, +1)	AD (0, +3)	ED (-3, +3)	ED (+1, +3)	ED (0, 1)	ED (0, +3)
CAAR Value	0.008	0.004	0.001	0.004	0.006	0.002	0.011	0.004	0.001	0.002	0.003
N	20	20	20	20	20	20	20	20	20	20	20
Cs t	1.108	0.681	0.218	0.495	1.207	0.371	1.909*	0.495	0.218	0.428	0.476
Patell z	0.656	0.544	0.096	0.189	0.837	0.412	1.300	0.219	-0.105	0.383	0.149
Adj. Patell z	0.681	0.565	0.100	0.196	0.869	0.428	1.349	0.227	-0.109	0.398	0.155
Std cs t	0.905	1.010	0.282	0.182	1.150	0.732	1.392	0.255	-0.270	0.895	0.014
Adj. std cs t	0.955	1.065	0.297	0.192	1.213	0.772	1.469	0.269	-0.285	0.944	0.015
Skew corr. t	1.212	0.665	0.199	0.519	1.215	0.367	1.805*	0.519	0.230	0.398	0.480
Generalized sign z	-0.560	0.335	-0.112	-0.112	0.335	-0.112	1.230	-0.112	-1.007	0.783	-0.112
Rank z	0.355	0.363	-0.339	-0.146	0.824	0.041	1.253	-0.146	-0.498	0.287	-0.190
GRANK t	0.489	0.483	0.041	-	0.936	0.133	1.762*	-0.055	-0.389	0.602	-0.010
GRANK z	0.466	0.460	0.039	-	0.892	0.127	1.679*	-0.053	-0.370	0.574	-0.009

Notes: as of Table 11.

Source: Own calculation.

In the part of research devoted to CARs in the US market (Table 13), no significant results were observed; one of the nonparametric tests indicates a significant effect only for the event window AD(-2, +2). These findings were not corroborated when the market-adjusted model based on the sectoral indices was employed (Table 14). Those results indicate only a weak positive reaction of US stocks' rates of return in the maximum-length event window (AD-3, ED+3).

In the Polish market, we can take advantage of findings based on both parametric and nonparametric tests, because we found empirical evidence that almost all the ARs were normally distributed (except for AD(-2) in the market-adjusted model). We discovered a significant positive reaction of the market on AD(0) and two days later on AD(+2) (Table 15). Intriguingly, those outcomes are mostly confirmed when the expected returns were obtained when compared to the sectoral indices (Table 16). This time, the reaction was stronger on AD(+2). There was also a significant reaction on ED(-3) when employing Sharpe's model, although it was not confirmed in the market-adjusted model. In the latter case, some significant effects were observed on AD(+3).

Regarding the CAR analysis, the outcomes in the Polish market are much more ambiguous and differ concerning the assumed model of expected returns. In Sharpe's model, the CARs in the event window AD(0, +3) are significant (Table 17). Moreover, this result was confirmed when the sectoral conditions were taken into account (Table 18). Such an outcome is consistent with the results obtained for ARs that showed significance on days AD(0) and AD(+2). The occurrence of the significant effect of inclusion in the reputational index only after the AD may indicate the absence of information leakage.

Obtained findings support the first research hypothesis. We provided empirical evidence that the reaction of the developed market on including a company in a reputational index was significant and positive one and two days after the announcement day of inclusion and three days after the effective date of addition to the reputational index. The cumulative effect confirmed this outcome only in a five-day event window around the announcement day. The significant and positive response for emerging markets was confirmed immediately on the announcement day of inclusion and two days later. The cumulative market response in a four-day window corroborated these results. Thus, the second research hypothesis was negatively verified. Compared to emerging Polish, we did not observe the more substantial effect of the reputational index inclusion on the developed US market. Last, we considered the sectoral circumstances and discovered that they did not affect the results obtained for the emerging market but altered the outcomes for the developed market. Having acknowledged the sectoral conditions, we found that in developed markets the significant investors' reaction to corporate reputation improvement vanished. Thus, our third research hypothesis holds.

6. CONCLUSIONS AND DISCUSSION

In this study, we analysed inclusions into two reputational indices: the DJSI and the RESPECT Index (currently substituted by the WIG-ESG Index) from 2009 to 2019. We applied the event study methodology to contribute to previous literature by examining whether two factors—the stock market's maturity and the sector in which a company operates—affect the relationship between an improvement in a corporation's reputation and its stock returns. Regarding inconclusive results of previous studies in this relationship, we additionally proposed a more thorough companies' selection procedure using the trade-off between data quality and sample size.

Our results indicate that, in the US market, there is a strong positive effect of an improvement in corporate reputation as proxied by inclusion in the reputational index three days after the ED. This effect disappears when the sectoral conditions are taken into account. Companies that experienced higher ARs three days after the ED were doing no better than other companies in their sector. It suggests that significant returns in comparison to the whole US market are not affected by the inclusion in a reputational index but stem from some other events that could affect the particular sector.

These findings reveal the importance of sectoral context in event studies that were not previously examined and discussed in the literature. Our results for the US market are consistent with other studies that found no statistically significant impact of inclusion in reputational indices on market returns (Becchetti et al., 2012; Doh et al., 2010; Oberndorfer et al., 2013).

In the Polish market, a positive significant effect of inclusion in a reputational index was observed directly on the AD and two days later. The significant reaction of the market on AD(+2) persists even when the sectoral conditions are considered. The findings are in line with the results of Adamska and Dąbrowski's study of the Polish stock market for the years 2009–2014 (Adamska & Dąbrowski, 2016), but they are contrary to the outcomes of Białkowski and Sławik based on the analysis of inclusions to the RESPECT Index in years 2009–2019 (Białkowski & Sławik, 2021). The latter study revealed the insignificance of the cumulative average abnormal returns around the AD but confirmed the significance of the negative CAARs calculated within the wider event windows around the ED.

The above-mentioned results lead us to conclude that the reputational effect does not happen in the developed US market but is distinctly visible in the emerging Polish market. The impact of market maturity on the relationship between corporate reputation and stock prices seems to be more complex. In developed markets, such as the US stock market, well-known, large companies with established reputations are listed. A logarithmic perception of reality makes growth in a company's reputation, which was already great beforehand, irrelevant to investors. Consequently, despite investors' awareness of the importance of reputational factors (ESG, CSR), the inclusion of companies in the index does not significantly influence stock prices. In the developing Polish stock market, by contrast, there are relatively smaller companies listed, often of shorter existence. Thus, the company's inclusion in a reputational index in the Polish market is a notable signal to investors that the company is more appreciated by stock market analysts and worth investing in.

It is worth mentioning that market maturity is related to firms' characteristics such as size, visibility in markets, capitalization, etc. In less developed emerging markets, like Tunisia, the impact of an improvement in reputation on stock prices might be negligible due to the unawareness effect (Khemir, 2019). In more developed emerging markets, like Poland, the effect is considerable due to the relatively higher increase in recognition of a company. Investors tend to perceive positively the value of socially responsible activities commenced by firms. Finally, in developed markets, where bigger and more recognizable companies are listed, the impact of an improved reputation on stock prices is again negligible due to the effect of a substantial initial reputation.

The main limitation of our study results from our decision regarding the dilemma of the trade-off between data quality and sample size. Given the mixed results of previous studies, we decided to impose numerous restrictions on the companies to be included in our study. These limitations allowed us to obtain more reliable results. However, the other consequence is that the final samples comprised only 63 NYSE events and 20 WSE events—all the events that met our restrictive selection criteria.

Further studies could focus on a deeper insight into the mitigating effect of specific factors related to market maturity on the stock market reaction to changes in corporate reputation. Those factors could include market capitalization and characteristics of firms listed in such markets, such as size and visibility.

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