

Impact of the sustainability report on Hungarian stock prices

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ESG reporting has become increasingly significant for evaluating corporate sustainability. Our study examined firms that had been publicly listed for several years by 2023, and which had already engaged in ESG reporting voluntarily, showing an early, consistent commitment to sustainability despite the absence of regulatory requirements. We hypothesised that this group's market valuation metrics would reflect a more favourable and realistic investor assessment compared to a control group. However, our findings revealed that while statistically significant differences appeared primarily in the Price-to-Book Value (P/BV) ratios, overall, the investor assessments did not yet demonstrate a statistically significant divergence on average. This may suggest that ESG reports serve more as marketing tools than as indicators of genuine sustainable resource management, which some investors recognise from other mandatory financial disclosures. These insights can support further research on the Hungarian investment climate and aid in refining EU sustainability directives within Hungary's regulatory framework.

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1. Introduction

In the field of investments, sustainability considerations are fundamentally based on principles of value creation, which also represent a new attitude towards meeting the 2030 and 2050 Sustainable Development Goals (SDGs). Therefore, the environmental-social and governance sustainability areas are becoming increasingly important (KPMG, 2021).

In the 6th Report of the Intergovernmental Panel on Climate Change (IPCC) in 2021, UN-backed scientists warn that climate change is underway and its pace and severity will be determined by people's choices and behavioural changes. The past decade has been warmer than any other period in the past 125 000 years, due to increasing emissions of greenhouse gases (GHGs) - mainly carbon dioxide, methane and nitrous oxide - released primarily from the burning of coal, oil and gas (Ming et al, 2021). While these fossil fuels have driven dramatic economic growth in the world economy over the past century, they have also increased atmospheric CO₂ concentrations, causing global warming, and contributed to drought, famine, sea level rise, extreme weather events, flash floods - all of which cause material damage and severe disturbances and displacement within local communities with increasing frequency, and particularly in developing countries.

The favourable financing environment after 2008 has opened up bond markets to a wider range of issuers, including lower-rated governments and corporates, which are expanding into riskier market segments. This has also contributed to the development of a sustainable bond market. The total volume of government and corporate bond debt globally was close to USD 100 trillion at the end of 2023, an amount comparable to global GDP (OECD, 2024).

The post-2008 environment has also seen the emergence of sustainable bond markets. This market segment is still nascent, but growing rapidly. At the end of 2023, the outstanding amount of sustainable corporate bonds was USD 2.3 trillion and USD 2.0 trillion respectively (OECD, 2024). Despite the rapid growth of the sustainable bond market, there is no clear evidence that companies are systematically benefiting from the premium of sustainable bond issuance. At the end of 2023, the outstanding amount of sustainable bonds globally reached USD 4.3 trillion, compared to USD 641 billion five years earlier. Europe was the most active region in the sustainable bond market, both in the corporate and official sectors. Between 2014 and 2023, 45% of the global amount issued through corporate non-financial sustainable bonds was issued by European companies.

In terms of pricing, investors may not be willing to pay a premium for sustainable bonds, either because they do not value the potential sustainability impacts of their investments or, while investors may value such impacts, sustainable bond contracts may not represent a credible commitment on the part of the issuer. Investors may also be willing to pay a small premium for sustainability impacts, but this may be offset by liquidity discounts and transaction costs of the investment process (Bokor, 2022).

An analysis of a sample of Green-Social-Sustainable (GSS) bonds shows that two-thirds of the bond descriptions mention that the proceeds are allowed to refinance existing projects, and none of the prospectuses mention that the proceeds cannot be used for refinancing. This effectively means that many GSS bond proceeds cannot be used to finance new green or social projects. In addition, none

of the GSS bond prospectuses in the sample refers to a contractual penalty if the issuer does not use all proceeds to finance or refinance eligible projects, which could undermine investor confidence in the issuers' commitment to sustainability (Lakatos, 2023).

ESG (environmental, social and governance) reports provide investors with valuable information on a company's performance in the areas of sustainability, social responsibility and corporate governance. These reports can influence investor decisions in a number of ways:

- Risk assessment: ESG reports allow investors to assess the environmental, social and governance risks associated with an investment in a company. Factors such as environmental regulations, social controversies and governance practices can affect the long-term financial performance and viability of a company (Erdey, 2005; Popp et al., 2013; Fazekas–Becsky–Nagy, 2018; Rákos et al., 2022; Sereg, 2022; Senadheera et al., 2021; Hübel – Scholz, 2020.)
- Long-term sustainability: investors increasingly recognise that environmental and social factors can have a significant impact on a company's long-term financial performance. ESG reports provide insight into how well a company manages environmental risks, addresses social issues and maintains strong governance practices that are key to sustainable growth and resilience (Edmans, 2023; Silvola–Landau, 2020; Szepesi, 2020).
- Reputation and brand value: companies with strong ESG performance often have a better reputation and brand value, which can translate into greater customer loyalty, market share and competitive advantage. Investors may favour companies with a positive ESG profile, as they expect greater resilience and growth potential in the long term (Lee et al, 2022; Cziráki – Hackl, 2023; Kim et al, 2024).
- Access to capital: investors, especially those focused on sustainable and responsible investments, may prefer to invest in companies with strong ESG indicators. This can give these companies access to a wider range of capital and potentially lower borrowing costs (Ogachi–Zéman, 2020; Horváth, 2022; Ramirez, et al., 2022; Szemán, 2023; Priem–Gaballone, 2024).
- Regulatory compliance and legal risks: ESG reporting can highlight whether a company is complying with regulatory requirements and potential legal risks related to environmental, social or governance issues. Investors can take these factors into account when assessing the overall risk profile of their investment portfolio (Böcskei et al., 2017; Szekeres–Orbán, 2018; Szekeres–Orbán, 2019; Gyura, 2020; Krueger et al., 2021; Redondo Alamillos –de Mariz, 2022; Márkus, 2023).
- Stakeholder engagement: companies that actively engage with stakeholders on ESG issues demonstrate a commitment to transparency, accountabil-

ity and responsible business practices. Investors may view such companies more favourably as they are perceived to be in a better position to address emerging ESG challenges and exploit opportunities (Signori et al, 2021; Barkó et al, 2022; Füredi-Fülöp, 2022).

- Impact investing: in addition to financial returns, some investors seek to achieve positive social or environmental outcomes through impact investing. ESG reports provide valuable information for assessing the social and environmental impacts of investment opportunities and for tailoring investment decisions to specific impact objectives (Landier-Lovo, 2020; Till, 2021; Stempler, 2021; Hornberger, 2023).

Overall, ESG reports play a critical role in informing investor decisions by providing insights into a company's ESG performance, risk exposure and potential for long-term value creation. As sustainability considerations become more prominent in the investment community, ESG reporting is expected to increasingly influence investor preferences, allocation decisions and portfolio strategies.

2. Materials and methods

The research was based on a set of publicly available financial data of companies issuing shares on the Budapest Stock Exchange. From the set of issuers of securities available on the BSE website in May 2023, which comprised a total of 154 companies, only data of public companies were selected for our analysis on the basis that the best way to capture the change in market value judgements over time and the riskiness of equity financing is through equity returns. This covered 61 companies, representing around 40% of the issuer base. Financial institutions and insurance companies were also excluded due to the sectoral specificities of their management and their ESG reporting requirements, as well as companies that did not have market value indicators available due to the lack of trading in their shares, i.e. their shares are either not yet or are no longer traded on a stock exchange or have been formed within a year and, as a consequence, financial data relating to a financial year that has already ended is not yet available, or the size of their financial indicators still mostly reflects the high risk and less well-founded investor expectations that are typical of start-ups. For this reason, a total of 16 public limited companies were excluded, representing more than a quarter of the sample, resulting in a final database of 45 companies, of which around a quarter (24.44%) were listed in the EU; 11 companies) had made their sustainability report publicly available, while for more than 75% of the companies surveyed, such a summary report was either not publicly available or was merely a general, short, non-numerical summary of their sustainability commitment, as part

of their marketing strategy, available on a dedicated menu on their website. These latter cases were not included in the group of companies producing ESG reports, as they did not strictly follow the EU guidelines on the content of sustainability reporting.

The methodology of the study is based on a cross-sectional analysis of data for May 2023 from companies that prepare and publicly disclose ESG reports and those that do not. We formulated as a test hypothesis that the public availability of ESG reporting from the perspective of a company's stock market paper buyers will reflect better transparency of a company's management and its commitment to sustainability, thus contributing to stronger investor confidence and a greater willingness to finance, which may lead to a more positive and realistic investor value judgement, even in the short term.

To measure this, we have used the P/BV (Price to Book Value) ratio, which "relates the book value of a share, so the equity per share, to the share price" (Szepesti, 2020). The cross-sectional analysis did not require the removal of all distorting differences between the historical book value of assets and the current share price or the effects of macroeconomic phenomena to which the share price of the different industries, although equally sensitive, was not yet reflected in the historical asset values.

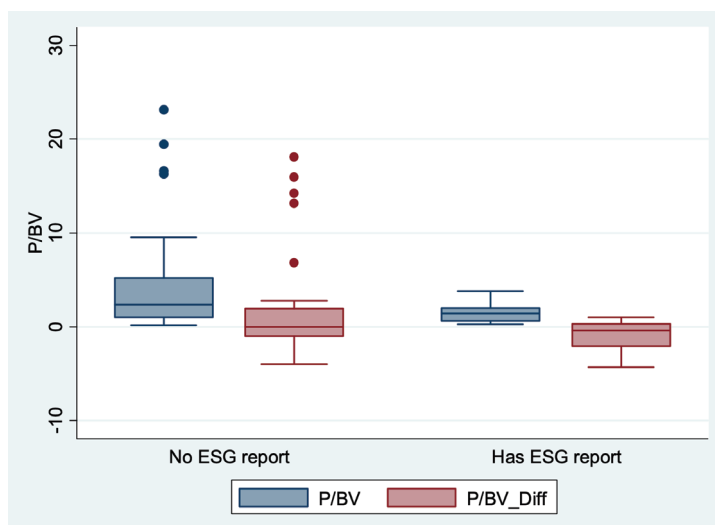
Since the indicators may be affected by different investor expectations due to the growth potential of each industry, the effects of the resulting differences in divergence are filtered out by calculating the difference between the industry P/BV indicators. The industry averages are taken from Aswath Damudaran's latest Western European data series for January 2022, available online, while the actual P/BV values for individual companies are taken from the BSE website. We wanted to measure the same investor valuation gap using the capitalisation/sales, or P/S (Price to Sales) ratio, which expresses the stock market capitalisation calculated using share prices relative to the sales volume and market conditions as they are now. Industry differences are typically already reflected in sales, which are followed by share prices in a short period of time, so in this case we have not taken the deviations from the industry average, but only the natural logarithms of the company values (to reduce the differences between extreme outliers).

Finally, we have also examined the beta values of each company, which express the sensitivity of its shares to market returns. Our hypothesis is that the beta of sustainability reporters indicates lower risk and return sensitivity, and that lower values are expected compared to industry betas, so investors do not perceive the equity financing to be higher risk relative to industry peers, or if they do, this detectable excess is significantly lower compared to companies that do not publish ESG reports. The significance of the differences in market value indicators was assessed using the non-parametric, paired-sample Wilcoxon rank sum test (also known as the Mann-Whitney U test), the results of which were generated using the statistical program Stata 13.0.

3. Results

Of the indicators examined, the stock market capitalisation to book value showed differences between the two groups of companies (Figure 1). When all the public companies included in the study were treated as a population, their average P/BV ratio was close to six times, although the extreme extreme values (min = 0.15; max = 91.64) meant that the data had a dispersion of around 2.5 times, making it less suitable for characterising the full data set. Another characteristic of the rightward skewness of the overall data set was that half of the 45 companies had share prices valued at twice the level (1.96) at which the same companies were listed on their books. This was reinforced by the case of Naturland Holding Plc. This was reinforced by the outstanding index value of 91 times, which has been omitted for better illustration in Figure 1. From the data set, which was separated into two groups for analysis purposes, it was found that, while there were no companies in either group with serious financial difficulties that could have led to a negative equity value, the shares of companies that did not report on sustainability were more likely to be overpriced compared to the value at which they were recorded in the books. Just under half of the non-reporters achieved a P/BV at least as high as the P/BV of the reporters, but none of the reporters (3.79) achieved a P/BV higher than this.

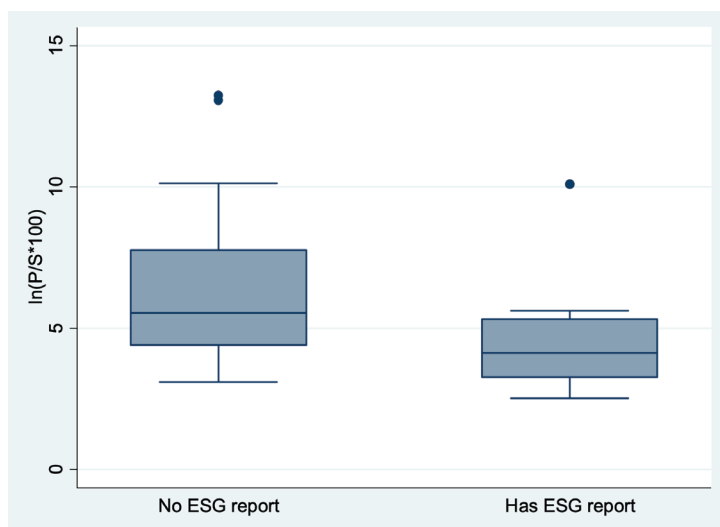
Figure 1. Distributions of P/BV values and their deviations from the industry average P/BV for public companies that publish and do not publish ESG reports, 2023



Source: own editing using SPSS

Although the latter result may have been influenced by the prior exclusion of financial institutions or insurance companies with traditionally higher P/BV values from the study, the most overvalued company by investors voluntarily disclosing its ESG report – excluding the extreme outlier mentioned above – is still quite highly outperformed by the most overvalued company in the non-reporting group by a factor of almost seven, which was also responsible for the rightward skew of the part-plot distribution. Based on the result of the Wilcoxon rank sum test ($z = 1.82$; $p = 0.06$), although the probability of the statistical error that would be committed by assuming a significant difference is less than 10% (and still insufficient at the 95% confidence level), this difference would include the effect of the fact that in certain industries where sustainability reporting is not widespread, investors see greater growth potential, which they reward with a higher demand for the shares of companies in these industries, generating a price premium. Taking into account the deviations from industry averages, the previously detectable differences in spreads between the two groups of companies also disappeared and although a larger proportion of companies without a report had shares that were overpriced above the industry average, this smaller difference in underpricing relative to the industry level was no longer detectable at all. The latter was also confirmed by the results of the Mann-Whitney U test ($z = 1.29$; $p = 0.19$), which showed that there was no statistically significant difference between the data adjusted for industry variation.

Figure 3. Distribution of capitalisation by turnover for public companies that publish ESG reports and those that do not, 2023

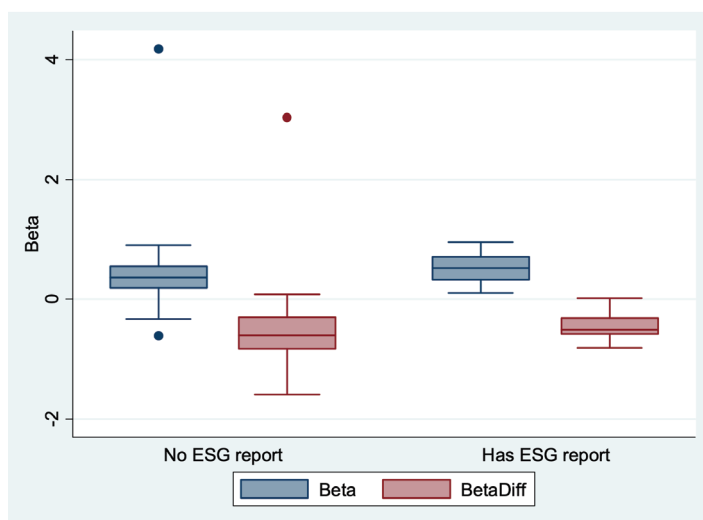


Source: own editing using SPSS

In the case of stock market capitalisation as a percentage of sales, we analysed the natural logarithms of 100 times the extreme values - by several orders of magnitude - and the resulting extremely high dispersion in the two groups of companies (Figure 3). This was justified, *inter alia*, by the fact that for all the companies included in the study, the outlier data for 5 companies resulted in an average share price 250 times higher than the sales per share, which was almost 145 times the median (1.73), while the top quarter of the data represented 99.7% of the total coverage. For the bottom quartile of companies, shares did not even reach half of their sales per share, which may indicate a negative profitability outlook in the eyes of investors. A logarithmic transformation of the data shows a similar trend to the P/BV indicator: companies that do not report on sustainability are also significantly valued higher relative to their actual market turnover. As the different growth prospects at industry level are reflected in the similarly different turnover levels across industries in the short term, we did not consider it necessary to further investigate the differences in the data from the industry averages. As the study included companies with at least one completed financial year, it can be concluded that investors did not value the shares of all but one company (Materplast Plc.) at a higher level of valuation relative to sales than the overstatement of at least 50% of the companies without ESG reporting. The latter threshold (2.62) was also several times higher than the median (0.62) for at least half of the reporters. The Wilcoxon rank sum test ($z = 2.03$; $p = 0.04$) showed at the 95% confidence level that the classification of companies based on the preparation and publication of ESG reports significantly influenced the extent to which investors overvalued or undervalued the shares of the company in relation to their turnover in the market.

Looking at the volatility of stock returns relative to the BUX index, for all the companies included in the study, the average beta was below 1 (0.46), so the volatility of the stock price was on average less than the market, and the same was true for the mean (0.40), so the data showed a near normal distribution in this respect. The high spread (min = -0.61; max = 4.18) was determined by the fact that there were also companies in the database with shares moving in the opposite direction to the market or in the same direction but more than 3 times more volatile than the market (ViVeTech Plc.), which was the only company with a beta value higher than 1, as is typical for the more limited Hungarian stock market. The results of the Mann-Whitney U test ($z = -1.74$; $p = 0.08$) indicate that no significant difference between the betas of the two groups of companies can be detected at the 95% confidence level, although the statistical probability that the difference between them could be attributed to chance and thus an error would be made in accepting the null hypothesis of zero difference is still lower than 10%. A slight leftward skew compared to normal was observed in the group of companies that did not

Figure 4. Distributions of ESG reporting and non-publishing public company betas and their deviations from industry betas, 2023



Source: own editing using SPSS

publish an ESG report, but overall both groups were mostly spread around averages below 1. In addition, the group with no sustainability disclosure included all companies with stock returns sensitive to the opposite direction of the market index movement, in addition to extreme outliers, while the other range of companies under study did not include any such companies.

At the same time, there were differences in their volatility towards the market across industries, and taking into account this effect, it could be stated that, except for 2 companies (namely ViVeTech Nyrt. and NordTelekom Telecommunications Service Provider Nyrt.) that did not publish an ESG report, all the companies examined either did not deviate from the average beta of companies in Western European industries or deviated from it to a varying extent, but below it, which can be explained by the lower average volatility of Hungarian listed companies compared to Western European companies. However, the larger negative deviation relative to the industry was clearly more pronounced for companies that did not disclose a detailed statement of their environmental responsibility, while those that did did not had a beta below the industry value by more than 1. Nevertheless, when industry effects are taken into account, the results of the Mann-Whitney U test ($z = -1.24$; $p = 0.21$) indicated more clearly that no statistically significant difference between the groups under investigation can be interpreted in comparison to the company betas. The results of the Wilcoxon rank sum test for the variables under study are summarised in Table 1.

Table 1. Summary results of the Wilcoxon rank sum test for ESG reporting and non-reporting public companies, 2023

Indicator	Value		z-value	p-value
	No ESG report	Has ESG report		
P/BV	851	184	1,822	0,068
P/BV_diff	831	204	1,294	0,195
ln(P/S*100)	859	176	2,034	0,042
Beta	716	319	-1,743	0,081
Beta_diff	735	300	-1,241	0,214

Source: own editing using SPSS

4. Discussion

Overall, based on the data analysed, if we distinguish between Hungarian public limited companies that have been operating as non-financial institutions for more than one year, based on the preparation and publication of ESG reports, then the companies that publish ESG reports are valued lower by investors compared to their book value, but this difference is not statistically significant when taking into account the differences between industries. Hence, the public disclosure of ESG commitments does not in itself influence investors if a company's shares are more sought after, and the difference observed for P/BV data is due to the fact that companies with high growth potential and higher intellectual capital (not shown in the balance sheet but recognised by investors in the share price) typically have not been forced to produce ESG reports, nor would this in itself have positively influenced investor demand for their shares.

As the removal of the industry effect also removed the weaker likelihood of variation, it can be assumed that it played a more important role in the differentiation, so disclosure of the report was rather absent in industries with more profitable prospects, while within the same industry investors did not differentiate only on the basis of disclosure of their corporate responsibility reports, so this kind of investor green awareness has not yet become dominant in Hungary, somewhat contradicting Signori et al. (2021), Barkó et al. (2022), Füredi-Fülöp (2022) and Hegedűs (2014).

Although there is a significant difference in terms of stock market capitalisation as a share of sales, this was more in favour of non-reporting companies, which would lead to the less logical conclusion that investors were more confident

in the sustainability of the profitability of the latter group of companies, generating higher share prices relative to their sales, which also varied across industries, without being able to publicly verify their actual commitment in the absence of detailed reporting. Moreover, the returns on the shares of the reporters are not less sensitive to market return developments, so they are not perceived as less risky or less justified, and this is also the case for deviations from industry averages, although the outliers are only seen within this group in both cases.

The latter results can therefore only confirm the findings of the P/BV indicator, that the behaviour, the more positive or more realistic value judgements of the investor community demanding Hungarian shares are not yet affected by the publicly available numerical data on the commitment of individual companies to economic, social and environmental responsibility in the period before the EU's planned mandatory introduction of such measures.

5. Summary

However, the conclusion drawn from the results of the statistical analysis had several methodological limitations. First of all, the data analysed refer to the spring of 2023, before the mandatory ESG reporting as set out in the EU directives, and are therefore less suitable for time-series inference. In addition, the averages used to filter out industry effects are based on a Western European company base, so differences between the characteristics of Hungarian and Western European companies, as well as differences between other characteristics (intellectual capital) of Hungarian companies in the same industry classification, are also ignored in the analysis, which also foreshadows the potential for future directions of this research.

In the light of the results, although expressing green awareness or a company's commitment to social equality in the form of a report does not influence investor behaviour, the reason for this, apart from ignoring other aspects that do not provide a financial return, may be that ESG reports themselves may serve more as a marketing tool to increase sales relationships, rather than as a serious mission, so that investors who are truly committed to sustainability do not actually see behind these reports resource management trends that would support the textual and numerical information they detail, and they do so by examining certain parts of the mandatory annual reports of the companies concerned (income statement, notes to the accounts). Overall, the results of the study could contribute to the findings of future research on the Hungarian investor environment and the influence of equity on the behaviour of companies in need of equity financing, as well as to the development of more informed standards for the transposition of EU sustainability directives into Hungarian law.

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