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# How has ESG investing impacted investment portfolios? A case study of the Malaysian civil service pension fund

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## ABSTRACT

Environment, social, and governance (ESG) criteria have become important in investment and risk management in recent years. ESG-mandated investment has also been trending among investors. In Malaysia, the ESG-related index known as the FTSE4Good Bursa Malaysia (F4GBM) index was first launched in December 2014. This index prompted fund managers to use the benchmark as a measure of performance. However, there has been a lack of research on ESG-related pension funds. Hence, this study examines the impact of ESG investing on the investment portfolio of the Malaysian civil service pension fund. This pension fund is managed by the Retirement Fund Incorporated (Kumpulan Wang Persaraan Perbadanan; KWAP). Using quarterly data from 2017Q3 to 2022Q3, our results show, first, that KWAP has had a higher proportion of ESG-rated securities than of non-ESG-rated securities over the last five years. Secondly, ESG-rated stocks provide higher returns than non-rated stocks in KWAP's portfolio. Thirdly, ESG-rated securities have lower risk levels than non-ESG-rated securities. This study also found that ESG-rated securities provide a higher return per unit of risk relative to non-ESG-rated stocks. As a policy implication, ESG-rated investment has impacted the pension fund by providing higher returns and lower risk. This study contributes to the awareness of the benefits of ESG investing among state-funded pension schemes.

**Contribution/ Originality:** This study examines ESG-related investment in the civil service pension fund. It fills the gap in the literature by comparing the performance of ESG and non-ESG-related securities held by the civil service pension fund. This study measures the securities return and return per unit of risk of ESG and non-ESG-related securities in the portfolios of the civil service pension fund. To the best knowledge of the authors, it is the first study of its kind to examine ESG-related portfolios in government-backed pension funds.

## 1. INTRODUCTION

Due to climate change, many countries have encountered various forms of natural disasters. According to EMDAT (2020), floods, extreme weather, drought, and extreme temperatures are some of the natural disasters related to weather. Figure 1 shows the rising trend of such weather-related disasters since 1970. Extreme weather conditions caused drought in some parts of China, while extreme rains caused a flash flood in Seoul during the summer of 2022. The rising sea level has already caused soil erosion of the coastal beaches of Pacific Island countries.

Scientific reports have shown that carbon dioxide emissions and the burning of fossil fuels are some reasons for climate change. Hence, the Paris Agreement,[1] a legally binding international treaty on climate change, was adopted by 196 parties at the 2015 United Nations Climate Change Conference (COP21) in Paris. The goal was to limit global warming to 1.5 degrees Celsius compared to pre-industrial levels.[2] However, investment in the leading fossil fuel companies by the 60 largest commercial and investment banks collectively stood at US$3.8 trillion between 2016 and 2020, according to Banking on Climate Chaos (2021).[3,4] Hence, there have been calls for more social responsibility in investing.

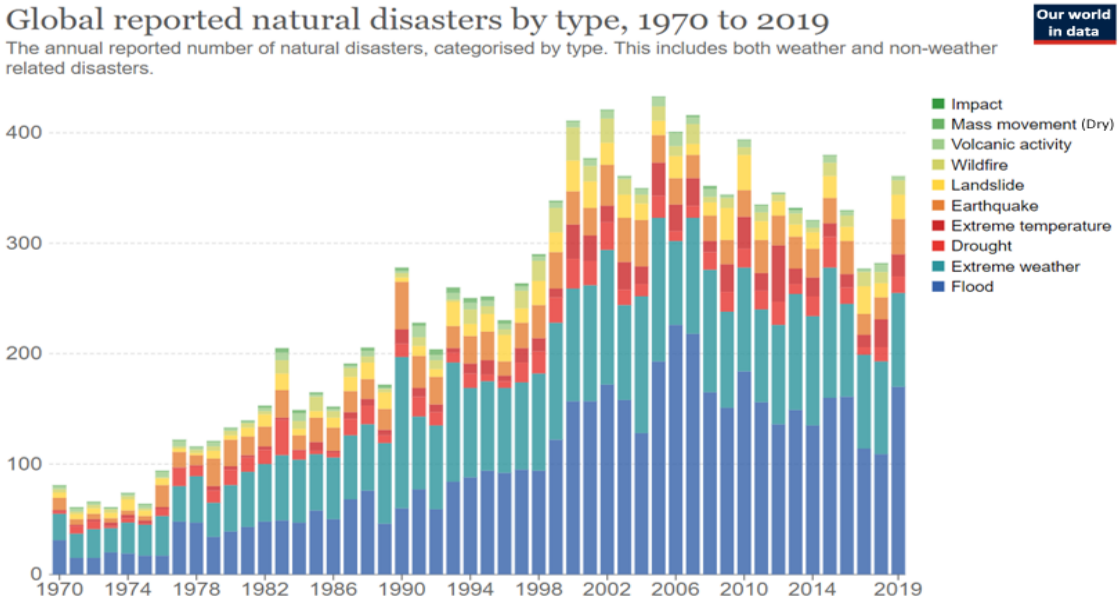


**Figure 1.** Global reported natural disasters by type, 1970 to 2019.[5]

**Source:** EMDAT (2020): OFDA/CRED International Disaster Database, Catholic University of Louvain-Brussels-Belguim OurWorldinData.ora/natural-disaster.

The idea of sustainability in the investment industry has recently been the subject of discussion and debate. Fund managers are mandated to maximize portfolio returns. On the other hand, the possibility that natural disasters will eventually impair the economic value of assets and render their investments worthless has triggered some awareness. Some scholars have argued that socially responsible investment (SRI) has existed since the early 1990s (De & Clayman, 2015). The United Nations' Sustainable Development Goal (SDG) 17, launched in 2015, aims to "strengthen the means of implementation and revitalize the global partnership for sustainable development."[6] The SRI concept has, therefore, slowly evolved into a more concrete idea of sustainable investment, presently known as environmental, social, and governance (ESG) investment. ESG is a set of standards for a company's operations that socially conscious investors use to screen investments. The environmental criteria look at how a company behaves as a steward of the natural environment. The social criteria examine how a company manages its relationships with employees, suppliers, customers, and the communities in which it operates. Finally, governance deals with a company's leadership, executive pay, audits, internal controls, and shareholder rights.[7]

[1] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement, as accessed on 30 Nov 2022.

[2] https://unfccc.int/process-and-meetings/conferences/past-conferences/paris-climate-change-conference-november-2015/cop-21, as accessed on 30 Nov 2022.

[3] https://www.cnbc.com/2021/03/24/how-much-the-largest-banks-have-invested-in-fossil-fuel-report.html, as accessed on 30 Nov 2022.

[4] https://www.bankingonclimatechaos.org/, as accessed on 30 Nov 2022.

[5] https://ourworldindata.org/natural-disasters, as accessed on 30 Nov 2022.

[6] https://sdgs.un.org/goals/goal17, as accessed on 30 Nov 2022.

[7] https://www.investopedia.com/terms/e/environmental-social-and-governance-esg-criteria.asp, as accessed on 30 Nov 2022.


**Figure 2.** Global assets under professional management (US$Trillion).[8]

**Note:** E: Estimated; F: Forecast.
**Source:** The proportion of ESG-mandated data through 2020 from the Global Sustainable Investment Alliance; DCFS analysis through 2025.

Figure 2 shows that the proportion of professionally managed ESG-mandated assets has increased yearly from 2016 to 2020. The Global Sustainable Investment Alliance has projected that ESG-mandated assets will make up half of all professionally managed funds globally by 2024. This study examines whether the Malaysian civil service pension fund, managed by a body known as Kumpulan Wang Persaraan Perbadanan (KWAP), follows the global investment trend by investing in ESG-related stocks.

The Malaysian civil service pension fund is an investment entity managing total equity assets valued at $11.7 billion. Figure 3 shows that the fund's largest current exposures are in the financial (30.6%) and industrial (11.2%) sectors. Over the last five years, from 2018 to 2022, its largest five-year increase has been in the financial sector. In contrast, its largest five-year decrease has been in the real estate sector. Based on data from Bloomberg from August 2022, its largest current exposures by geographic region are in Asia Pacific (Emerging) (98.2%) and Western Europe (1.8%). Its largest five-year increase has been in Asia Pacific (Emerging). By market cap, its largest current exposures are in mid-cap (41.7%) and large-cap (40%) stocks. The data is illustrated in Figure 3:

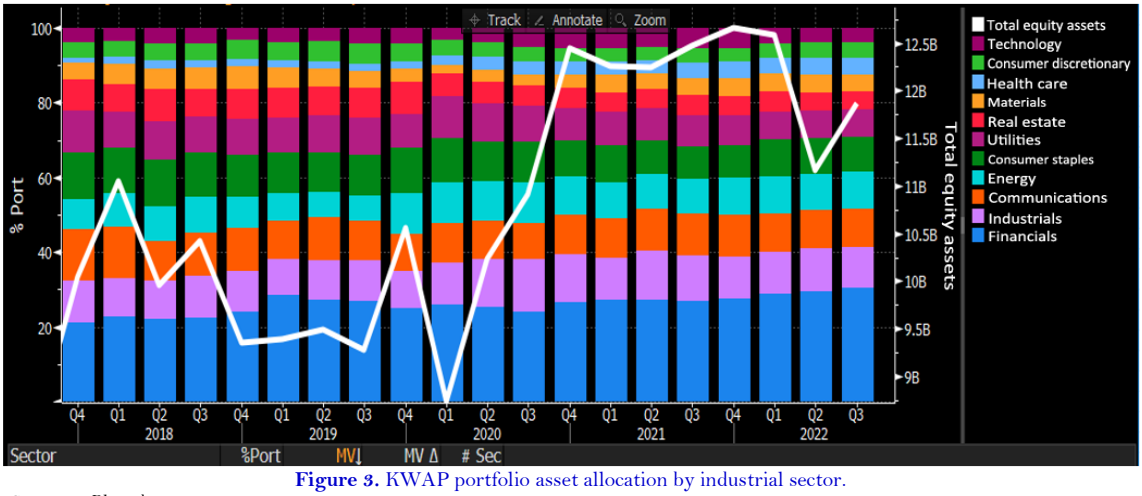


**Figure 3.** KWAP portfolio asset allocation by industrial sector.

**Source:** Bloomberg.

[8] https://www2.deloitte.com/us/en/insights/industry/financial-services/esg-investing-and-sustainability.html, as accessed on 30 Nov 2022.

### *1.1. MSCI ESG Ratings*

ESG investing standards provide a complete assessment of a company's long-term commitment to socially responsible investment through MSCI ESG ratings. The MSCI ESG ratings mainly concern companies' exposure to financially significant ESG risks.

ESG investment shows how important it is that businesses give back to their local area, the environment, and society. Socially responsible investors can narrow possible investments to match their objectives and values by scoring companies along ESG criteria.

This study classified stocks with MSCI ESG ratings from AAA to CCC as ESG-rated stocks and the remainder as non-ESG-rated stocks. An overview is presented in Table 1.

**Table 1.** MSCI ESG rating classification.

| MSCI's ESG rating | Rating indication | Category in this study |
|---|---|---|
| AAA | Leader | ESG rated stocks |
| AA | | |
| A | Average | |
| BBB | | |
| BB | | |
| B | Laggard | |
| CCC | | |
| Non-specified | Non-specified | Non-ESG rated stocks |

This study contributes to the literature by examining whether ESG-rated stock investment improves the fund's portfolio returns. In addition, it assesses whether ESG-rated stock investment reduces fund volatility. The remainder of this paper is organized as follows. Section 2 reviews the literature, while Section 3 details the data and methodology. Section 4 presents the results, and the last section concludes the study.

## 2. LITERATURE REVIEW

### *2.1. Origin of ESG Investment*

The concept of ESG investment is derived from socially responsible investment (SRI). It is generally believed that the SRI concept was born out of early religious activities, such as the Methodist Church's refusal to invest in tobacco, alcohol, gambling, or weapons businesses. This exclusive investment standard based on religious teachings was the original prototype for SRI.

With increasing social and environmental changes, as well as an increase in environmental awareness, human rights awareness, anti-war awareness, and ethnic minority awareness, some investors hope to see their socially responsible values reflected in their investment activities. The first investment fund with ESG principles was launched in the United States in 1971, and the first ESG index was established in 1990. In 2006, the United Nations established its Principles for Responsible Investment (PRI).[9]

The PRI is the world's leading framework for responsible investment. It works to increase the understanding of the investment implications of ESG factors. In addition, it supports an international network of investor signatories in incorporating these factors into its investment and ownership decisions. PRI promotes the long-term interests of financial markets and economies and safeguards the interests of the environment and society as a whole.

National leaders have a significant role to play in achieving the 2030 Agenda for Sustainable Development. According to the latest Morningstar report, more than 96% of sustainable funding originates in European and American countries (Morningstar, 2021)[10]. On the other hand, some studies have shown negative correlations

[9] https://www.unpri.org/about-us/about-the-pri, as accessed on 30 Nov 2022.

[10] https://www.morningstar.com/lp/global-esg-flows, as accessed on 30 Nov 2022.

between ESG sub-elements (Saygili, Arslan, & Birkan, 2022). The Korean National Pension System, one of the three largest pension funds in the world, plans to develop detailed ESG investment guidelines and significantly increase its proportion of ESG-related investments from 4% in 2019 to 50% in 2022 (Park & Jang, 2021). In short, government policies can accelerate the adoption of ESG policies by all industries.

### *2.2. Institutional Investors and Ethical Investing*

Perhaps the most important goal is to shape institutional behavior with respect to ESG investing in the long run. It is a known fact that listed firms must withstand the pressure of institutional investors, given that they form the major or block shareholders (Buchanan, Cao, & Chen, 2018). In addition, institutional investors will be able to positively or negatively differentiate or screen their portfolios when they invest in developing countries. Emerging markets still need to strengthen their policies and learn the best practices from Europe and the United States to develop their ESG systems and tools (Alexander, Lins, Lukas, & Wagner, 2018). The positive screening category applies to companies that benefit the environment or society, such as community programs. In contrast, negative screening assesses whether the company is harmful to society and the environment, such as through air or water pollution or by supplying tobacco or alcohol.

Ethical investing trends are at the core of institutional investing and dominate how investors select companies for their investment portfolio. Compared with individual investors, institutional investors are more inclined to long-term portfolios. They are, therefore, more willing to invest in companies that make ESG disclosures (Bofinger, Heyden, & Rock, 2022). Institutional investors prefer fundamental investment approaches to speculative investment approaches, and companies that disclose ESG are relatively less risky than companies that do not (Alexander et al., 2018). Even the higher share prices of existing companies do not affect their preference for ESG-reporting companies.

Institutional investment is thus primarily determined by the likelihood of long-term appreciation rather than by any current speculative component. Risk management is also a major factor in investment decisions. ESG disclosure reduces the risk of a future share price crash. However, the effectiveness and predictive power of ESG disclosure vary from region to region (Murata & Hamori, 2021).

### *2.3. Is ESG an Equity Factor or an Investment Guide?*

The academic and business literature strongly suggests that adding ESG credentials to a portfolio overlaps with other well-defined and well-known equity variables, notwithstanding several neutral and contradicting outcomes. Breedt, Ciliberti, Gualdi, and Seager's (2019) research examined the widely held belief that portfolios built using ESG ratings, or inclined toward stocks with higher ESG rankings, demonstrate superior risk-adjusted returns. Furthermore, according to Breedt et al. (2019), an ESG-inclined method does not produce greater risk-adjusted returns since, after adjusting for market cap and volatility bias, ESG has returns comparable to any equity factor.

Despite the increased acceptability of ESG, it appears that most fund managers do not fully or consistently include ESG in their decision-making process (Juravle & Lewis, 2008; Mooij, 2017). As demonstrated by Amel-Zadeh and Serafeim (2018), while many managers may acknowledge using or relying on ESG metrics to guide their investment decisions and view full ESG integration as the strategy most likely to have an impact on performance, the practice may not have permeated traditional asset management to the extent that many believe. The most likely cause of this situation, according to Cappucci (2017), is a "misalignment of ESG's long-term advantages and enterprises' short-term performance incentives." The literature lists other concerns and barriers to integration, such as data quality and contradictory measurement standards.

The research of Breedt et al. (2019) looked at individuals' E, S, and G pillars. The study showed that the G pillar, governance, shows superior profits and is less exposed to the influence of company size. However, the positive link between profitability and the G pillar is affected by the quality factor, and it may hold the explanation for the positive drift. ESG, therefore, cannot be regarded as a distinctive equity component.

Nevertheless, Breedt et al. (2019) do not argue that ESG-based or ESG-assisted investment methods are useless since they acknowledge that many of the current barriers to ESG investing, particularly the legitimacy of data, may be eliminated in the future. Bourghelle, Hager, and Louche (2009) stated that incorporating nonfinancial data, such as ESG, would not catch on or become mainstream until there was a shared belief among investors that ESG information was relevant.

### *2.4. Risk and Returns of ESG Investments*

Since only those businesses that outperform their counterparts in a thorough review of economic, environmental, and social factors are included in sustainability indexes, analysts and investors typically use them as an integrated indicator of a firm's sustainability performance. As a result, they are regarded as industry sustainability leaders (Miralles-Quiros, Miralles-Quiros, & Arraiano, 2017).

Firms prioritize all three ESG pillars equally to demonstrate their social and environmental responsibility to their stakeholders. A business's social and environmental responsibility increases goodwill towards it, serving as a form of insurance for the business in times of crisis (Godfrey, 2005). However, extensive research has discussed the predictive ability of ESG ratings, the connection between ESG ratings and subsequent stock performance, and whether utilizing ESG data in stock analysis and portfolio management adds or subtracts value.

De and Clayman (2010) discovered that ESG scores were positively correlated with financial performance as measured by future total stock returns and return on equity (ROE), although the influence on returns began to wane after roughly the year 2000, while the impact on ROE persisted. However, Kurtz (2011) argued that because market prices already properly take the ESG factor into account, its use may not give investors a performance advantage.

From another perspective, Huppé (2011) believed that ESG investment was part of a firm's corporate social responsibility (CSR) requirement. Firms experienced a CSR boost because investors historically ignored this information's importance and were shocked after earnings reports. However, investor interest in CSR data has grown, and the stock market now more accurately reflects the value of CSR data.

Risk and profit are the two most essential factors in choosing an investment (De & Clayman, 2015). A major component of managing a portfolio is controlling both returns and risks. Since the financial crisis of 2008, risk has taken center stage in the investment world. Compared to companies with low ESG ratings, those that perform ethically in this area show reduced volatility and thus a lower level of risk (Benlemlih & Girerd-Potin, 2017).

Borgers, Derwall, Koedijk, and Ter Horst (2013) found that shareholder information predicted risk-adjusted returns until 2004. Since then, however, stakeholder issues have received more attention, which has reduced investor expectation mistakes and eliminated mispricing. The fact that more S&P 500 Index firms are tracking ESG factors is supported by the rise in the percentage of companies filing sustainability reports from 20% in 2011 to 72% in 2013.

### *2.5. Hypotheses Development*

Based on KWAP's quarterly stock holding, this study developed and tested hypotheses on stock return, stock volatility, and return per unit of risk. Informed by the above discussion, the following hypotheses were developed:

*H1: ESG-rated stocks provide a higher return than non-ESG-rated stocks.*

*H2: ESG-rated stocks have lower risk relative to non-ESG stocks.*

*H3: ESG-rated stocks have a higher return per unit risk relative to non-ESG-rated stocks.*

## 3. METHODOLOGY

This study used the KWAP equity holdings obtained from the Bloomberg database. Using the quarterly data from 2017Q3 to 2022Q3, this study tabulated and compared the risk and return of KWAP investments in ESG-rated and non-ESG-rated stock holdings.

### 3.1. Stock Return

For each stock security owned by KWAP, this study computed the quarterly stock return and volatility for use in the analysis. The quarterly return was calculated as per Equation 1:

$$r_i = \frac{P_{t+1} - P_t}{P_t} - 1 \quad (1)$$

Where $r_i$ denotes the return on stock $i$, $P_t$ denotes the price at quarter $t$, and $P_{t+1}$ denotes the price at quarter $t+1$.

### 3.2. Stock Volatility

For the volatility, this study computed the volatility at a quarterly frequency. The idea was to measure the standard deviation of returns in a specified quarter, annualized by the square root of 252 annual trading days. Equation 2 represents stock volatility:

$$\sigma_i = \sqrt{252\ days}\ x\ \sqrt{Quarter\ Volatilty} \quad (2)$$

Where $\sigma_t$ denotes the annual volatility (standard deviation) of stock $i$.

### 3.3. Return per Unit of Risk

Based on the return and volatility of a stock, we computed the average return per unit of risk for each quarter. Equation 3 represents the return per unit of risk:

$$Return\ per\ unit\ of\ Risk_t = \frac{r_t}{\sigma_t} \quad (3)$$

Where $\sigma_t$ denotes the annual volatility (standard deviation) of stock $i$, and $r_i$ denotes the return on stock $i$.

### 3.4. Sub-Sample Period: Pre-COVID, COVID, and Endemic Periods

As this study utilized KWAP's stock holdings, we differentiated three sub-periods of the sample characterized by the impact of the COVID-19 pandemic. After two years of Movement Control Orders (MCO) beginning in March 2020, Malaysia was declared in an endemic phase of COVID-19 from April 2022 onwards, and all restrictions on business operating hours were removed.

The sample was divided into these periods to study whether the COVID-19 pandemic affected the performance of pension funds in the different phases. Table 2 shows how the sample was divided.

**Table 2.** Malaysia's COVID-19 phases.

| Phase | Period | Number of quarters |
|---|---|---|
| Pre-COVID-19 | 3Q2017 – 4Q2019 | 10 Quarters |
| COVID-19 | 1Q2020 – 1Q2022 | 9 Quarters |
| Post-COVID-19 (Endemic) | 2Q2022 – 3 Q2022 | 2 Quarters |

### 3.5. Statistical Test

This study used a t-test to determine whether there was a significant difference between ESG-rated and non-ESG-rated stocks and how these two groups were related. Since both groups (ESG-rated and non-ESG-rated) were taken from the same population – KWAP's equity stock holdings – the null hypothesis assumed that the two groups' means were equal.

## 4. ANALYSIS

This section presents the descriptive analysis, trend analysis, and hypothesis testing in three areas. Table 3 presents the number of ESG and non-ESG stocks held by KWAP from the third quarter of 2017 to the third quarter of 2022. The portfolios are managed by KWAP's fund managers. The number of ESG-rated stocks was around 25 to 30. In contrast, there were approximately four to five times as many non-ESG-rated stocks.

**Table 3.** Number of stocks held and market value in KWAP's portfolio.

| Quarter | Number of stocks held | Number of ESG-rated stocks | Number of non-ESG-rated stocks | Market value (USD million) |
|---|---|---|---|---|
| 3Q2017 | 204 | 25 | 179 | 8,502.74 |
| 4Q2017 | 214 | 26 | 188 | 10,040.38 |
| 1Q2018 | 221 | 26 | 195 | 11,054.25 |
| 2Q2018 | 227 | 26 | 201 | 9,949.53 |
| 3Q2018 | 227 | 26 | 201 | 10,414.62 |
| 4Q2018 | 220 | 25 | 195 | 9,354.26 |
| 1Q2019 | 208 | 23 | 185 | 9,385.30 |
| 2Q2019 | 204 | 24 | 180 | 9,484.77 |
| 3Q2019 | 202 | 25 | 177 | 9,278.75 |
| 4Q2019 | 197 | 26 | 171 | 10,562.17 |
| 1Q2020 | 180 | 26 | 154 | 8,734.86 |
| 2Q2020 | 187 | 28 | 159 | 10,227.08 |
| 3Q2020 | 184 | 28 | 156 | 10,914.35 |
| 4Q2020 | 178 | 28 | 150 | 12,447.66 |
| 1Q2021 | 168 | 29 | 139 | 12,256.07 |
| 2Q2021 | 166 | 29 | 137 | 12,240.20 |
| 3Q2021 | 158 | 28 | 130 | 12,473.91 |
| 4Q2021 | 156 | 28 | 128 | 12,658.56 |
| 1Q2022 | 151 | 30 | 121 | 12,576.74 |
| 2Q2022 | 146 | 28 | 118 | 11,167.07 |
| 3Q2022 | 146 | 28 | 118 | 11,745.42 |

### *4.1. Descriptive Analysis*

The number of stocks that KWAP held decreased from 2017 to 2022. Despite this trend, the number of ESG-rated stocks held by KWAP remained steady within the range of 20–30 during the 21 quarters. The number of ESG-rated securities represented, on average, 14% of the total securities in each quarter.

For non-ESG-rated securities, KWAP held 118–200, representing about 86% of the securities in each quarter. In terms of KWAP's equity investment, the market value of its investment increased from 2017 to 2022. However, the market value is subject to a market cycle. Figure 4 summarizes the details:

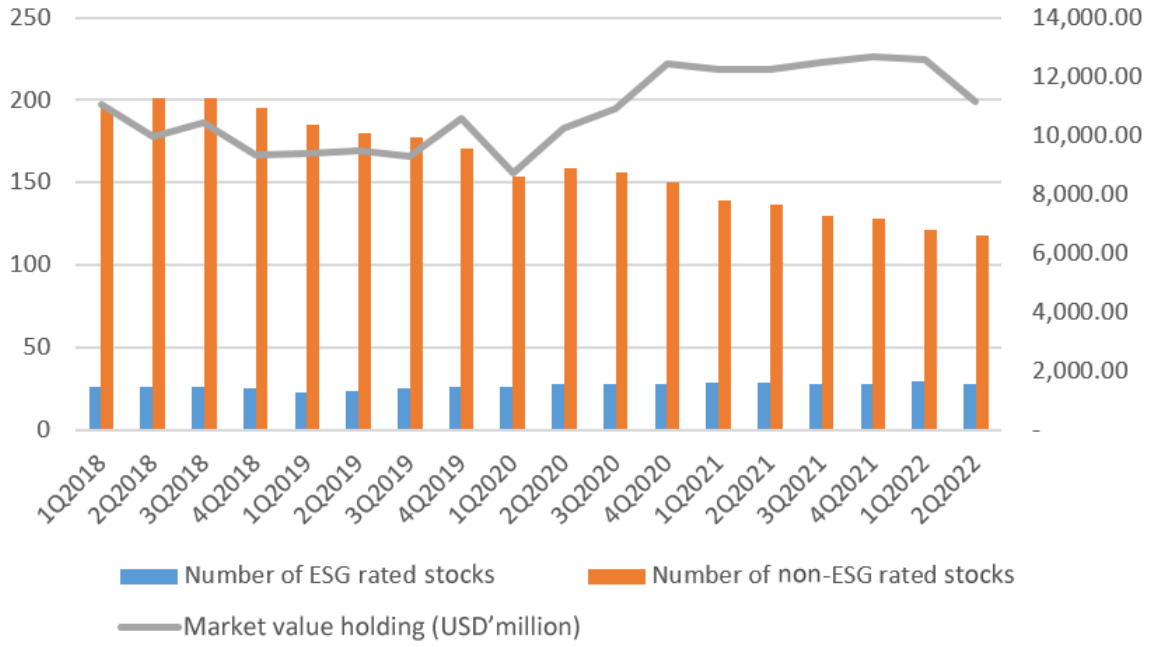


**Figure 4.** Number of stocks held and market value in KWAP's portfolio.

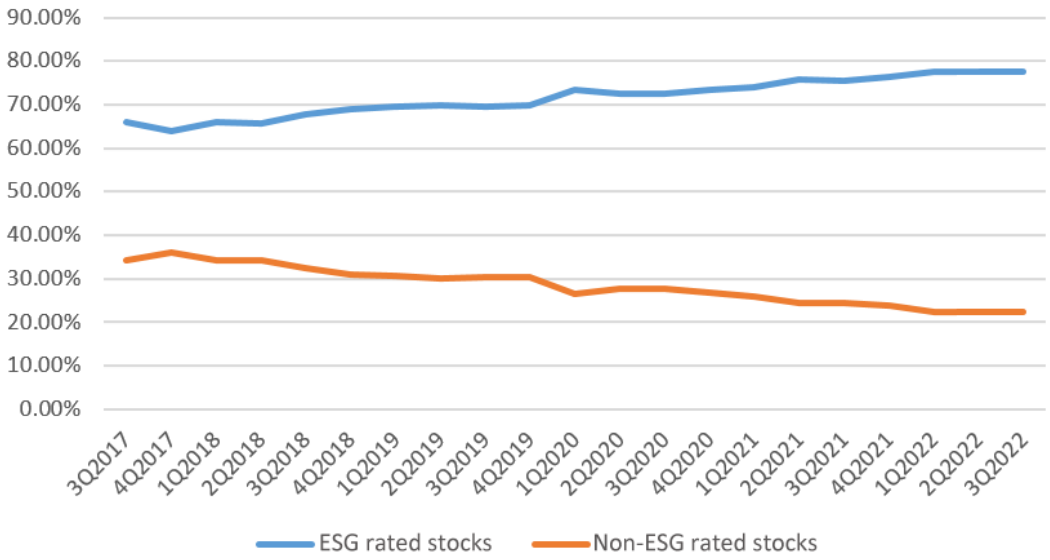


**Figure 5.** ESG-rated versus non-ESG-rated holdings in KWAP's portfolio.

### *4.2. Trend Analysis*

As Figure 4 shows, KWAP increased its investment in ESG-rated stocks from 66% in the second half of 2017 to 78% in the third quarter of 2022. This confirms that KWAP has invested more in ESG-rated equity stocks in recent years than previously. Figure 5 shows that ESG-rated stocks were around 60–80% of the portfolio, while non-ESG-rated stocks were around 20–30% of the portfolio.

Although only about 20% of KWAP's securities were ESG-rated, the value of its ESG-rated securities was more than 60% of its portfolio. The graph shows that the gap grew wider over the examined 21 quarters. Figure 6 shows the KWAP's latest equity investment portfolio according to ESG classification, where 77.7% of the portfolio value belongs to ESG-rated securities.

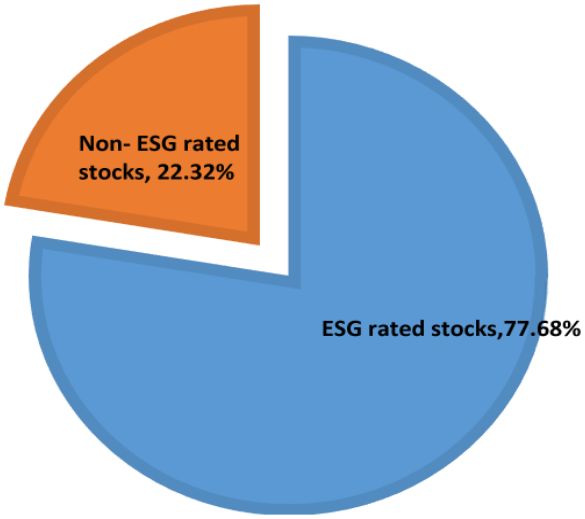


**Figure 6.** KWAP's equity portfolio value by ESG classification for 3Q2022.

### *4.3. Hypothesis Testing*

#### *4.3.1. Stock Return*

Table 4 shows the results of testing H1, which hypothesized that KWAP's ESG-rated stocks provided a higher return than KWAP's non-rated stocks.

**Table 4.** KWAP's ESG-rated stocks versus non-ESG stocks in terms of returns.

| Quarter | T-statistics value | P-value | Hypothesis (H1) |
|---|---|---|---|
| Panel A: Before COVID-19 | | | |
| 3Q2017 | 1.6524 | 0.0250 | Supported |
| 4Q2017 | 1.6521 | 0.0017 | Supported |
| 1Q2018 | 1.6518 | 0.0000 | Supported |
| 2Q2018 | 1.6517 | 0.3416 | - |
| 3Q2018 | 1.6517 | 0.0487 | Supported |
| 4Q2018 | 1.6519 | 0.0002 | Supported |
| 1Q2019 | 1.6523 | 0.0057 | Supported |
| 2Q2019 | 1.6524 | 0.2323 | - |
| 3Q2019 | 1.6525 | 0.3888 | - |
| 4Q2019 | 1.6527 | 0.1249 | - |
| Panel B: During COVID-19 | | | |
| 1Q2020 | 1.6535 | 0.0000 | Supported |
| 2Q2020 | 1.6531 | 0.1977 | - |
| 3Q2020 | 1.6533 | 0.1969 | - |
| 4Q2020 | 1.6536 | 0.0475 | Supported |
| 1Q2021 | 1.6541 | 0.0500 | Supported |
| 2Q2021 | 1.6542 | 0.3465 | - |
| 3Q2021 | 1.6547 | 0.3705 | - |
| 4Q2021 | 1.6548 | 0.0397 | Supported |
| 1Q2022 | 1.6551 | 0.1513 | - |
| Panel C: Endemic | | | |
| 2Q2022 | 1.6555 | 0.3159 | - |
| 3Q2022 | 1.6546 | 0.0276 | Supported |

In 11 of the 21 quarters (52%), the hypothesis that ESG-rated stocks provided a higher return than non-ESG-rated stocks was supported. However, the results differed by period. Only the pre-COVID-19 period supported the hypothesis, as during the COVID-19 period and the endemic period, the results showed that non-ESG-rated stocks had a higher return.

### *4.3.2. Stock Volatility*

Table 5 shows the results of testing H2, which stated that KWAP's ESG-rated stocks provided lower risk than KWAP's non-rated stocks.

**Table 5.** KWAP's ESG-rated stocks versus non-ESG stocks in terms of risk.

| Quarter | T-statistics value | P-value | Hypothesis (H2) |
|---|---|---|---|
| Panel A: Before COVID-19 | | | |
| 3Q2017 | 1.6524 | 0.0000 | Supported |
| 4Q2017 | 1.6521 | 0.0041 | Supported |
| 1Q2018 | 1.6518 | 0.0001 | Supported |
| 2Q2018 | 1.6517 | 0.0001 | Supported |
| 3Q2018 | 1.6517 | 0.0000 | Supported |
| 4Q2018 | 1.6519 | 0.0002 | Supported |
| 1Q2019 | 1.6523 | 0.0004 | Supported |
| 2Q2019 | 1.6524 | 0.0012 | Supported |
| 3Q2019 | 1.6525 | 0.0005 | Supported |
| 4Q2019 | 1.6527 | 0.0004 | Supported |
| Panel B: During COVID-19 | | | |
| 1Q2020 | 1.6535 | 0.0002 | Supported |
| 2Q2020 | 1.6531 | 0.0008 | Supported |
| 3Q2020 | 1.6533 | 0.0021 | Supported |
| 4Q2020 | 1.6536 | 0.0211 | Supported |
| 1Q2021 | 1.6541 | 0.0026 | Supported |
| 2Q2021 | 1.6542 | 0.0020 | Supported |
| 3Q2021 | 1.6547 | 0.0042 | Supported |
| 4Q2021 | 1.6548 | 0.0488 | Supported |
| 1Q2022 | 1.6535 | 0.0002 | Supported |
| Panel C: Endemic | | | |
| 2Q2022 | 1.6555 | 0.0487 | Supported |
| 3Q2022 | 1.6546 | 0.0474 | Supported |

All quarters (100%) supported the hypothesis that ESG-rated stocks provide a lower risk than non-ESG-rated stocks. Regardless of the period breakdown, the results still supported the hypothesis.

**Table 6.** KWAP's ESG-rated stocks versus non-ESG stocks in terms of return per unit of risk.

| Quarter | T-statistics value | P-value | Hypothesis (H3) |
|---|---|---|---|
| Panel A: Before COVID-19 | | | |
| 3Q2017 | 1.6524 | 0.0463 | Supported |
| 4Q2017 | 1.6521 | 0.0000 | Supported |
| 1Q2018 | 1.6518 | 0.0000 | Supported |
| 2Q2018 | 1.6517 | 0.2050 | - |
| 3Q2018 | 1.6517 | 0.0000 | Supported |
| 4Q2018 | 1.6519 | 0.0001 | Supported |
| 1Q2019 | 1.6523 | 0.0004 | Supported |
| 2Q2019 | 1.6524 | 0.0909 | - |
| 3Q2019 | 1.6525 | 0.2738 | - |
| 4Q2019 | 1.6527 | 0.4594 | - |
| Panel B: During COVID-19 | | | |
| 1Q2020 | 1.6535 | 0.0020 | Supported |
| 2Q2020 | 1.6531 | 0.3999 | - |
| 3Q2020 | 1.6533 | 0.3184 | - |
| 4Q2020 | 1.6536 | 0.0198 | Supported |
| 1Q2021 | 1.6541 | 0.0496 | Supported |
| 2Q2021 | 1.6542 | 0.4339 | - |
| 3Q2021 | 1.6547 | 0.1910 | - |
| 4Q2021 | 1.6548 | 0.0159 | Supported |
| 1Q2022 | 1.6551 | 0.1349 | - |
| Panel C: Endemic | | | |
| 2Q2022 | 1.6555 | 0.1174 | - |
| 3Q2022 | 1.6546 | 0.0004 | Supported |

#### *4.3.3. Return per Unit of Risk*

Table 6 shows the results of testing H3, which stated that KWAP's ESG-rated stocks provide a higher return per unit of risk than KWAP's non-rated stocks. Of the 21 quarters, 11 quarters (52%) supported the hypothesis that ESG-rated stocks provide a higher return per unit of risk than non-ESG-rated stocks. However, only the pre-COVID-19 period supported the hypothesis. The results during the COVID-19 period and the endemic period showed that non-ESG-rated stocks had a higher return per unit of risk.

## 5. CONCLUSION

This study examined the role of ESG performance on the price return and volatility of KWAP's securities over 21 quarters. It further examined how ESG-rated returns and risks were affected before, during, and after COVID-19. As investors are becoming more cautious of risk, this study provides investors with a better understanding of ESG from a risk perspective. Table 7 summarizes the results of hypothesis testing for the sub-periods. Before the COVID-19 pandemic, all three hypotheses were supported. ESG-rated stocks provided higher returns, lower risk, and higher returns per unit of risk than non-ESG stocks. However, during and after the COVID-19 pandemic, only H2 was supported. ESG-rated stocks provided lower risk than non-ESG stocks. Xu (2021) explained the adverse effect an increase in COVID-19 cases had on the stock market. The negative impact that reduced stock returns generally during the COVID-19 period might also have affected the return per unit of risk. Nevertheless, the endemic period included only two quarters; a more extended period must be tested.

**Table 7.** Summary of hypothesis test results for sub-periods and the whole period.

| Hypothesis | Before COVID-19 | During COVID-19 | Endemic | Whole period |
|---|---|---|---|---|
| H1 | Supported | - | - | Supported |
| H2 | Supported | Supported | Supported | Supported |
| H3 | Supported | - | - | Supported |

This study result aligns with that of Jain, Sharma, and Srivastava (2019). On average, over five years, the US large-cap ESG index offered the highest return of all the indexes used as references. On the other hand, MSCI ACWI was the least risky series, followed by MSCI World and MSCI USA. At the same time, the Europe ESG Index exhibited the highest variation in its values. The research identified the US large-cap ESG index as a promising investment opportunity, providing the maximum return at manageable risk.

These findings refute the widely held idea that sustainable investment options provide poorer financial returns than conventional investment options (Arias & Samanez, 2013; Hong & Kacperczyk, 2009; Lee, Humphrey, Benson, & Ahn, 2010; Lopez, Garcia, & Rodriguez, 2007). The results show that there is little to no performance difference between sustainable and conventional indices, with the former serving as a good substitute. This result is somewhat in line with the findings of other studies, such as those of Charlo, Moya, and Munoz (2017), De la Torre, Galeana, and Aguilasocho (2016), and Santis, Albuquerque, and Lizarelli (2016).

### *5.1. Policy Implications for Pension Management*

Managing assets for pension funds is a dynamic optimization process between strategic allocation and future liabilities obligations. A fund manager must consider several risk factors when managing a portfolio. A combination of different factors results in increased portfolio complexity. Currently, the market complexity has included low returns for some time. Investors have been looking for alternative sources of returns, primarily through private assets. The perception of the risk of inflation has also increased among investors.

It is difficult for fund managers to understand the various asset classes and their functions in a portfolio. It can be challenging to exercise oversight and consider the big picture. Investors need a holistic approach that balances their strategic and investment objectives. Hence, employing ESG indicators to strengthen portfolios adds complexity.

A continuous monitoring process is needed to ensure that the employed strategies do not deviate from the investment policy statement, that risk limits are not exceeded, and that the required returns are delivered. So it is essential to have sophisticated scenario models and robust performance attribution tools to deal with increased complexities. Assessing the exact returns of investment strategies is becoming more crucial.

Investors must ensure that the added complexity meets the required investment returns and that the risks taken remain within their tolerance band. It is also essential to ensure that risk and performance indicators keep up with a more complex portfolio. For these reasons, this study investigated the risk and return performance of the ESG-rated securities in KWAP's portfolio.

First, this study found that KWAP's equity investment trended toward ESG-rated securities. Secondly, ESG-rated securities provided a lower risk in the before, during, and after COVID-19 periods. However, ESG-rated securities only offered a higher return per unit of risk in the pre-COVID-19 period. From a performance attribution perspective, it is essential to understand the return on investment for decision-making purposes. This study has shown how the returns of ESG-rated securities differ from those of non-ESG-rated securities.

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