



CHULALONGKORN
BUSINESS SCHOOL
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MSF
Chula*

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“A study of potential factor investing strategy from ESG score and intangible capital in Thailand”

By Ms. Issaraphorn Voratavornviwat

Research advisor: Assoc. Prof. Kanis Saengchote, Ph.D.

Master of Science in Finance, Chulalongkorn Business School

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Agenda

- **Motivation & Research Questions**
- **Data**
- **Methodology & Result**
- **Key Takeaways**



The surge in sustainable investing and the dematerialized world trends has strengthened, drawing increased focus from various stakeholders.

Environment, Social and Governance (ESG)

Movement & agenda



Growing institutional and retail investors interest



Shifting consumer preferences and embedding in business



Increasing regulatory concern, both global & national level



Responding to climate change focus



Dematerialized world – the rise of Intangible capital



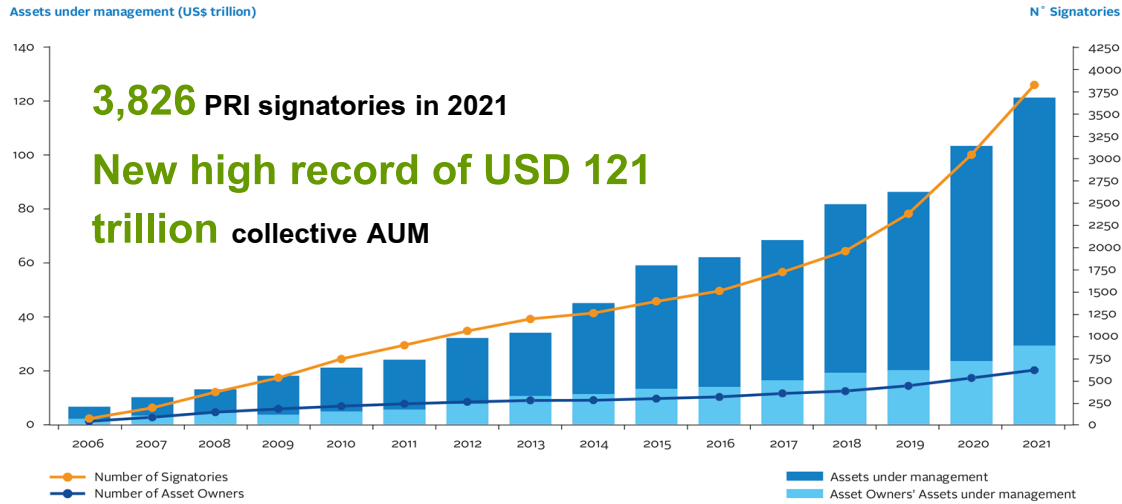
- ▶ **increasingly critical in the economy,**
 - Economy of knowledge
 - Services-based
 - innovation and digitalized based
- ▶ **contribution to competitive advantage & differentiating**



- ▶ **increasing global agenda focus** with importance of intangible capital in valuation
 - IMF's focus: the 10th IMF Statistical: Measuring the Tangible Benefits of Intangible Capital Topic

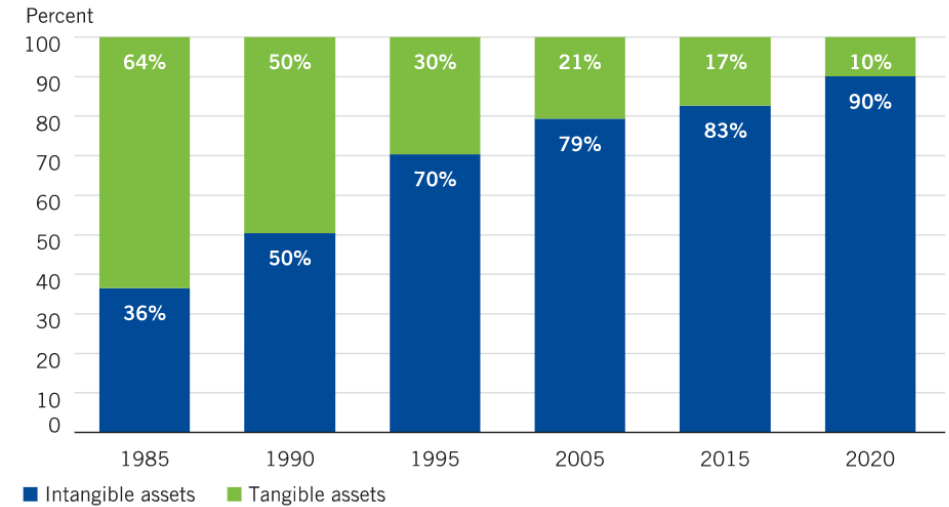
The rise of sustainable investing & the growing shift to intangible.

Global perspective: significance PRI Signatory growth in 2006-2021



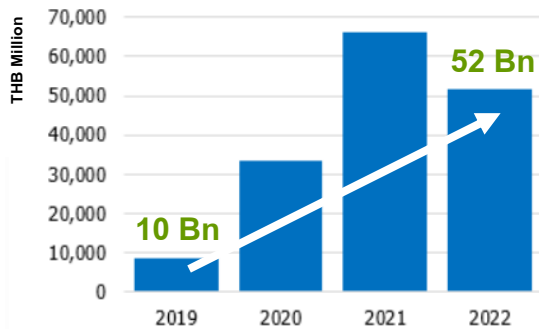
The growing shift to intangible as % of S&P 500 Index market Value

90% Intangibles portion of market capitalization in the S&P 500 in 2020



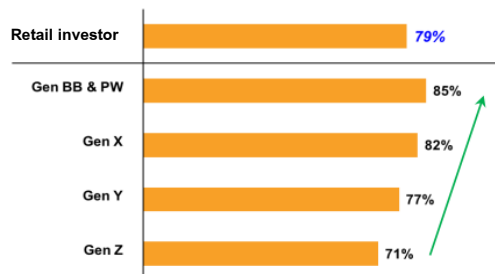
Thailand perspective:

NAV of sustainability Fund

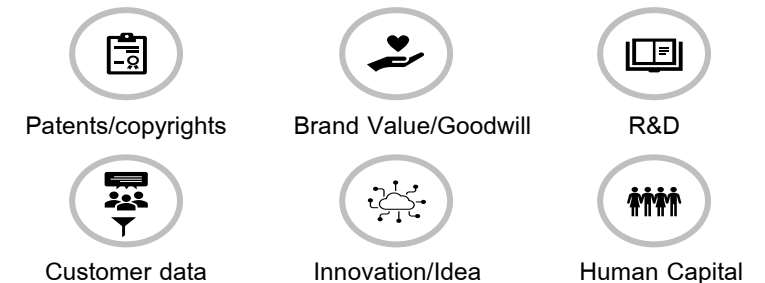


SET retail investor survey on ESG

80% traded at least 1 sustainable stock

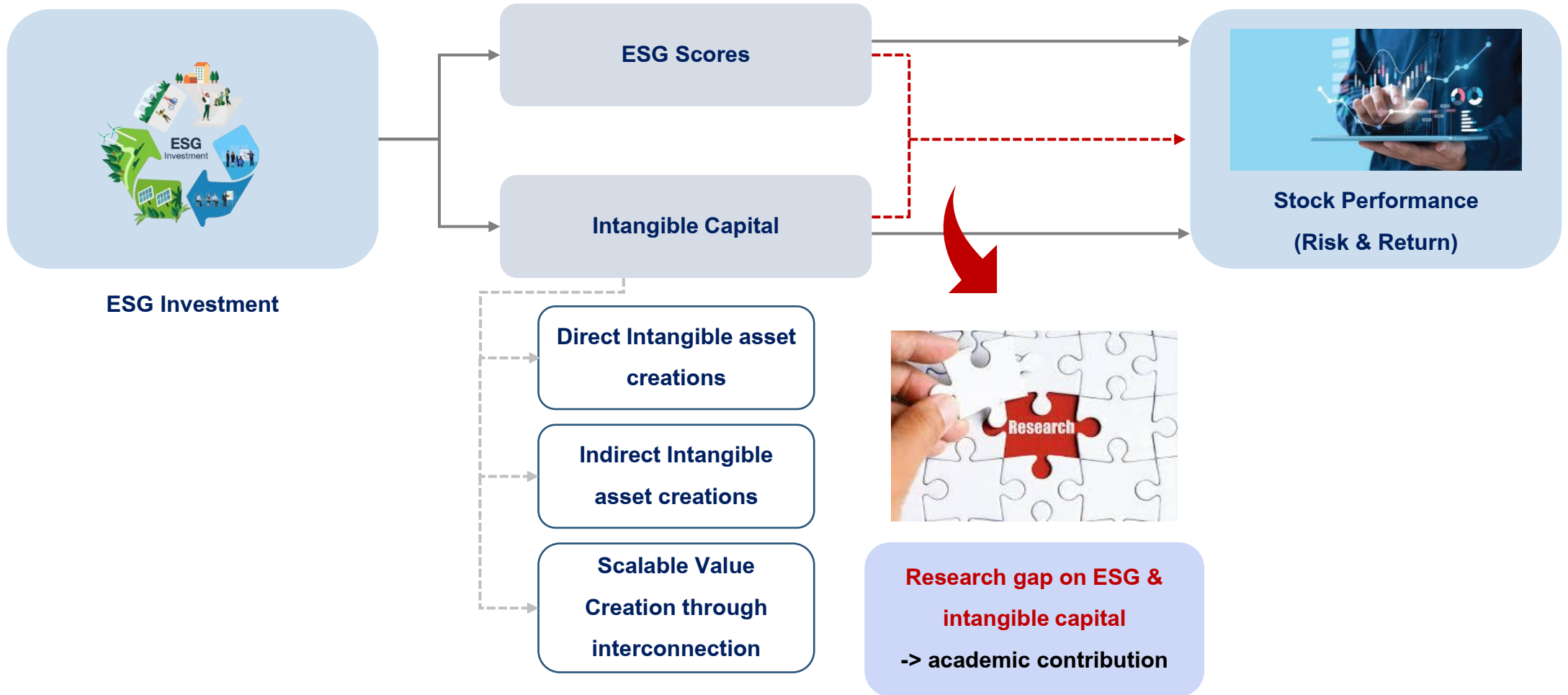


Example of intangible capital



The study would like to shed light on empirical link between ESG scores and intangible capital relationship.

Conceptual Summary Framework





01

Is there a relationship between ESG scores and intangible capital ratio?

ESG value creation Framework stated that investments in ESG lead to the creation of intangible value.
The aim of this study is to investigate the empirical findings regarding this association.

03

Can an investment strategy be formulated utilizing ESG scores and intangible capital? (Potential factor investing)

Is it feasible to develop a rule-based portfolio investment strategy that captures risk-adjusted returns and generates alpha?

02

Can the stock performance be influenced by ESG scores and intangible capital?

Academic research have discovered that both ESG impact and intangible capital linked to stock performance.
Does the interaction term have an impact on stock performance?

1 Data resources for ESG assessment results

REFINITIV

Alternative measurement
ESG Scores by Third Party
– Refinitiv

- **Evaluation scores:** 0-100 points
- There were **169 companies**
- Period of Study : **2018 – 2022** through Backfill on the missing data

2 Measurement of intangible capital

intangible capital from expense capitalization following Peters and Taylor (2017)

$$int_cap_{it} = EIM_{it} + OC_{it}$$

EIM_{it} **Externally purchased intangible capital**
in balance sheet

OC_{it} **Internally generated intangible capital**
Firm's organizational capital

3 Other financial data: from Refinitiv DataStream, CMDF and SET

Capitalize expenses as an investment



Balance sheet

SG&A

Most of the **expenditures** generating **organization capital** could not be capitalized into **balance sheet** according to accounting treatment.

Capitalize selling, General & administrative expenses (**SG&A**) as investment in organization capital (OC_{it})



accounting has lagged behind in valuing these forms of capital - the omission of in-house intangible investments

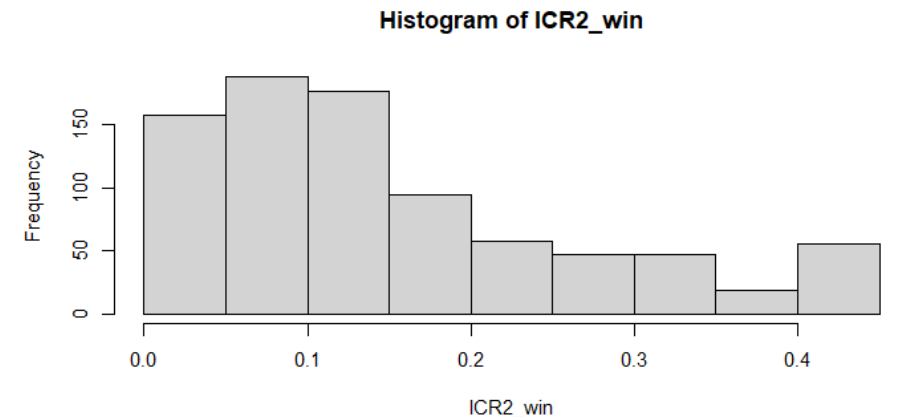
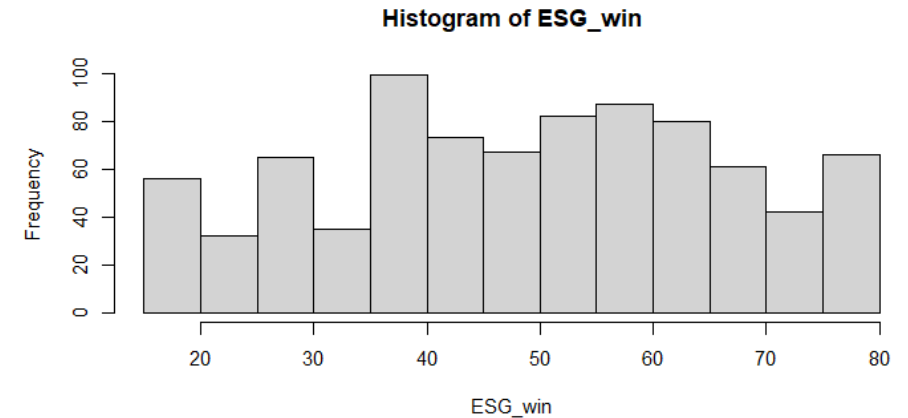
Data - Descriptive Statistics for ESG Score Companies

Descriptive statistics for ESG score companies
169 firms in 5 years period (2018-2022)

	Obs.	Mean	Median	Max	Min	Std Dev.
ICR2	845	0.150	0.120	0.420	0.020	0.110
ESG score	845	48.920	49.250	78.510	17.470	17.300
lnTotalAssets	845	17.340	17.320	20.370	14.760	1.600
DebtRatio	845	0.310	0.330	0.670	0.000	0.200
ROA	845	6.330	5.860	15.530	-1.020	4.450
BTM	845	0.660	0.570	1.640	0.100	0.450
RI	845	5.650	0.000	74.130	-36.270	28.690

Note: All data are winsorized at the 5% and 95% level.

- **Panel data** = 845 data observations
- **ICR2**: Mean at 0.15 Median at 0.12, right-skew (positive), low standard deviation
- **ESG score**: mean at 48.92, Median at 49.25, slight left-skew (negative)
- **For control variables** comprised of Ln of Total Assets, DebtRatio, Return on Assets (ROA), Book-to-Market Ratio (BTM)



Note: *_win* = after winsorized data

Hypothesis 1: Analysis relationship between ESG scores and intangible capital ratio result

Methodology



Research Objective 1: Is there a relationship between ESG scores & intangible capital ratio?

$$int_cap\ ratio_{it} = \beta_0 + \beta_1 ESG_{it} + \sum_1^n \gamma_k Control_{kit} + \varepsilon_{it}$$

Hypothesis 1: high ESG score will have high Intangible capital ratio (Positive correlation).

Model: ICR with ESG score (2018-2022)

	(1) ICR	(2) ICR
Constant	0.517*** (0.095)	0.725** (0.327)
ESG score	0.001** (0.0005)	0.00004 (0.0003)
Ln(Total Assets)	-0.022*** (0.006)	-0.019 (0.018)
DebtRatio	-0.003 (0.034)	-0.007 (0.035)
ROA	-0.0004 (0.002)	-0.0004 (0.001)
BTM	-0.058*** (0.017)	0.023* (0.012)
Fixed-Effects ¹		YES
Observations	845	845
R ²	0.1326	0.9500
Adjusted R ²	0.1274	0.9367

Clustered standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01

Note: 1). Fixed-Effect in terms of factor (Stock) factor (Year) and factor (Industry)



With Fixed effect: The ESG score was not statistically significant relationship to intangible capital ratio.

Hypothesis 2: Analysis of ESG scores, Intangible capital level and both factors on buy-and-hold returns regression

Methodology



Research Objective 2: Can the stock performance be influenced by ESG scores and intangible capital?

$$BHR = \gamma_0 + \gamma_1 ESG + \gamma_2 ESG_{no\ score} + \gamma_3 int_cap\ ratio + \gamma_4 ESG * int_cap\ ratio + \gamma_5 ESG_{no\ score} * int_cap\ ratio + \delta X + \varepsilon$$

Hypothesis 2: interaction term of ESG score & intangible capital ratio will provide high impact on the return

Return with ICR and ESG score	
	(1) RI
Constant	103.843* (40.767)
ESG score	-61.7966** (21.2335)
ICR	-95.8102*** (19.4076)
ICR*ESG	21.455 (36.699)
TA	-1.3403 (2.1720)
DebtRatio	-9.7190 (6.7400)
ROA	1.8580*** (0.1454)
BTM	-45.6095*** 2.0173
Fixed-Effects ¹	YES
Observations	3,025
R ²	0.5428
Adjusted R ²	0.4263

Clustered standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01

Note: 1). Fixed-Effect in terms of factor (Stock) factor (Year) and factor (Industry)



With Fixed effect: The interaction term between ICR and ESG also wasn't significant relationship to the retrun

**Research Objective 3: Can an investment strategy be formulated utilizing ESG scores and intangible capital?
(Rule-based investing strategy to captures risk-adjusted returns and generates alpha)**

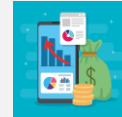
1

Categorize the data (3x2 matrix)

ESG Score	High ESG score Low <i>int_cap ratio</i>	High ESG score High <i>int_cap ratio</i>
	Low ESG score Low <i>int_cap ratio</i>	Low ESG score High <i>int_cap ratio</i>
	No ESG score Low <i>int_cap ratio</i>	No ESG score High <i>int_cap ratio</i>
	Intangible Capital Ratio	

- Gather data (SET)
- Categorize companies with ESG scores & intangible capital ratio into 6 groups (3x2 matrix)
 - No, Low, High ESG scores
 - Low & High intangible capital ratio (For Refinitiv ESG Score)

2



Run Buy & Hold Strategy for each port

3

Factor Loading analysis with

Fama-French three-factor (1993), Carhart four-factor (1997),
Fama French five-factor models (2015)
(Daily basis frequency)

$$r_{i,t} - r_{f,t} = \alpha_i + \sum_1^n \beta_{i,Factor} Factor_t + \epsilon_{i,t}$$

Factor data is obtained from Thailand's Factor Library, supported by Capital Market Development Fund (CMDf) and SETSMART Enterprise, SET

4

To analyze risk & return portfolio performance, compared with SETTRI

Alpha

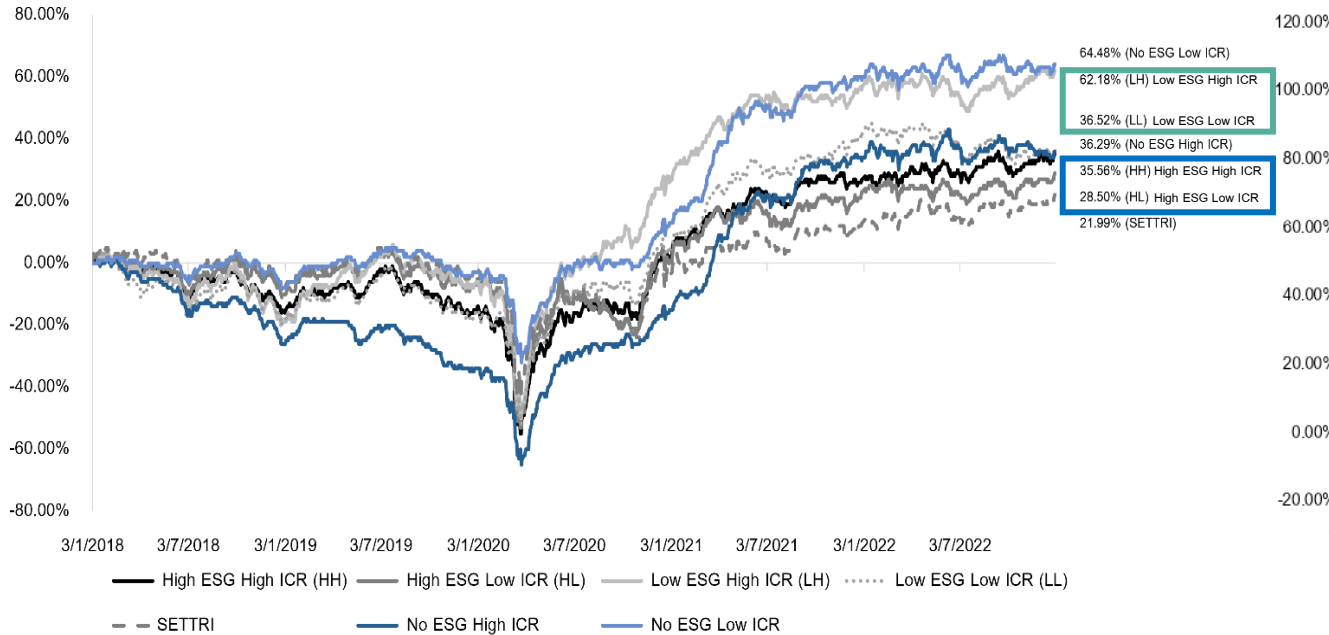
Cumulative Return

Sharpe/ Treynor Ratio

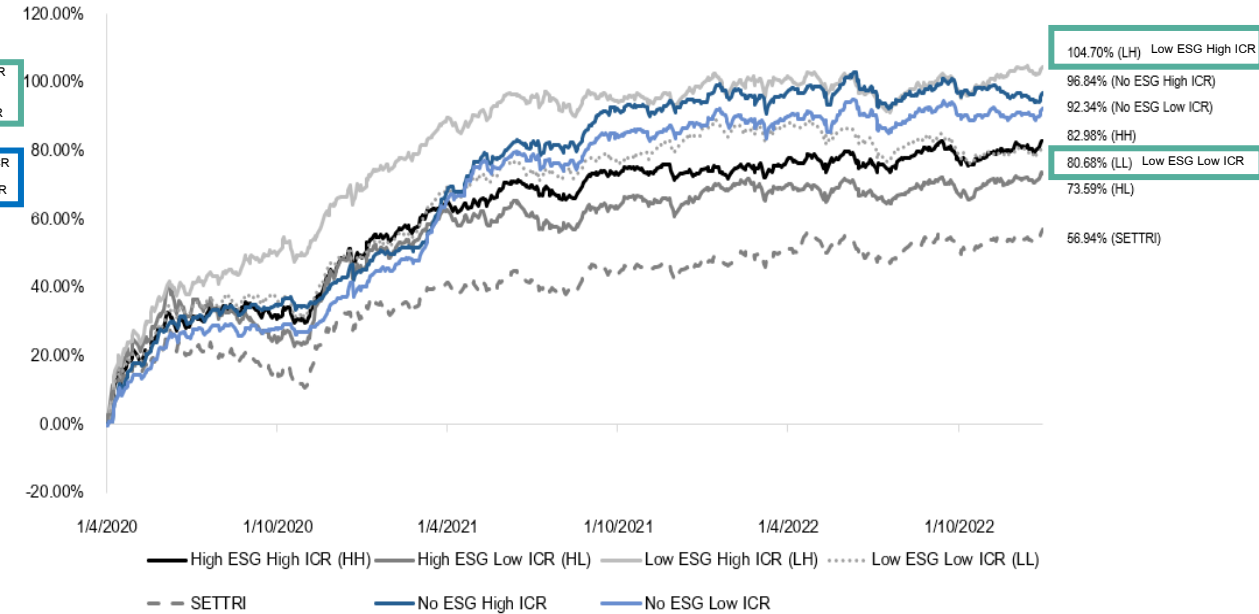
Hypothesis 3: Companies with High ESG score & high intangible capital ratio will provide greater abnormal return than companies with Low ESG score or Low intangible capital ratio.

Companies that participated in ESG disclosure & score assessment, higher ICR levels provide better returns. However, all factor portfolios outperformed SETTRI benchmark

Cumulative Return (2018-2022)



Cumulative Return (April 2020-2022)



Factor Loading analysis on alpha

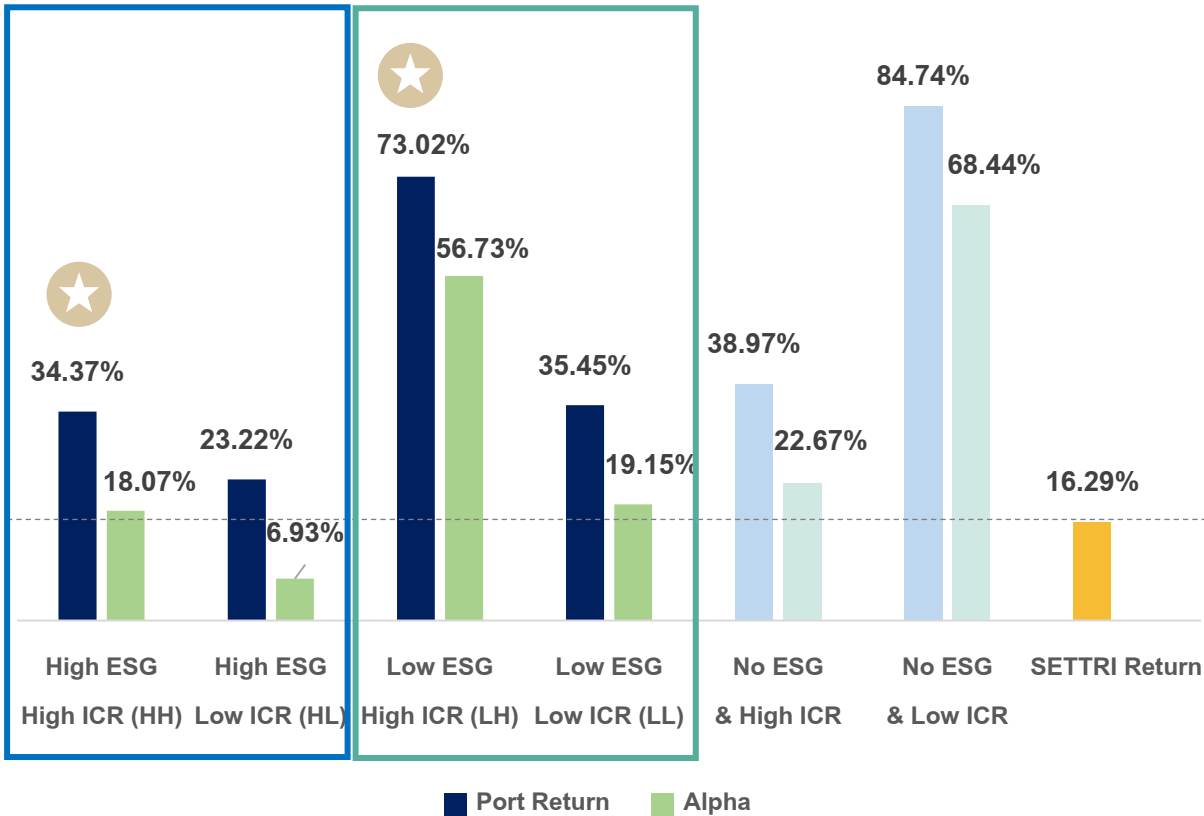


Results from each portfolio with the three-factor, four-factor & five-factor model

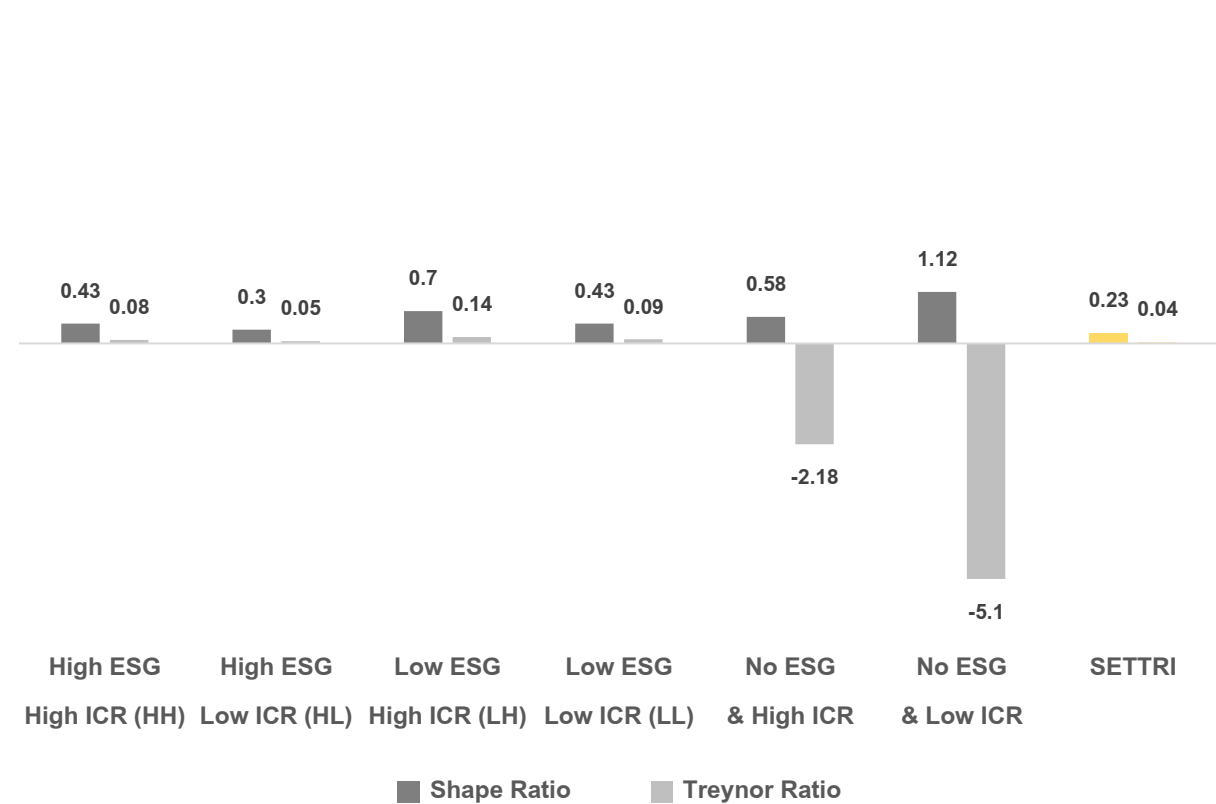
		Alpha
Low ESG Score	COEF	0.0735***
& High ICR (LH)	SE	(0.0001)
No ESG scores	COEF	0.1225**
& Low ICR	SE	(0.0002)

Considering Intangible capital provided higher risk & return than ESG factor.

Return



Risk



Note:
 Portfolio (H,H): High ESG score and High Intangible capital ratio Portfolio (L,H): Low ESG score and High Intangible capital ratio
 Portfolio (H,L): High ESG score and Low Intangible capital ratio Portfolio (L,L): Low ESG score and Low Intangible capital ratio

Key Takeaways

For Investor

- **Voice over** for better understanding on undisclosed information
- **Expand new investment opportunity & analysis** in ESG & Intangible capital aspects & relationship
- **Improve risk/return**, compared with SETTRI

For Business/Company

- Intangible capital plays a significant **role in firms' competitive advantage but is often missing from balance sheets & business accounts.**
- **Improve information disclosure** for investors to grasp growth & strategy drivers.
- **Emphasize understanding on ESG investment** should relate along business value chain & is considered as a long-term value
- **Develop ESG strategy** to create competitive advantages & protect downside risks

For policymakers & Regulators

- **Improve measurement of intangible capital for enhanced support** in investment, taxation, and macroeconomic analysis.
- Accurate intangible capital measurement is crucial for **understanding the drivers of company growth.**
- Advocate for increased disclosure and database development for ESG and intangible capital.



For Economy & Thailand

- To Support The National Economic and Social Development Plan no.13: Create economic value along with sustainable social development
- Innovation Policy for Sustainable Development: Digital/Creative Economy link to care and sustainability economy