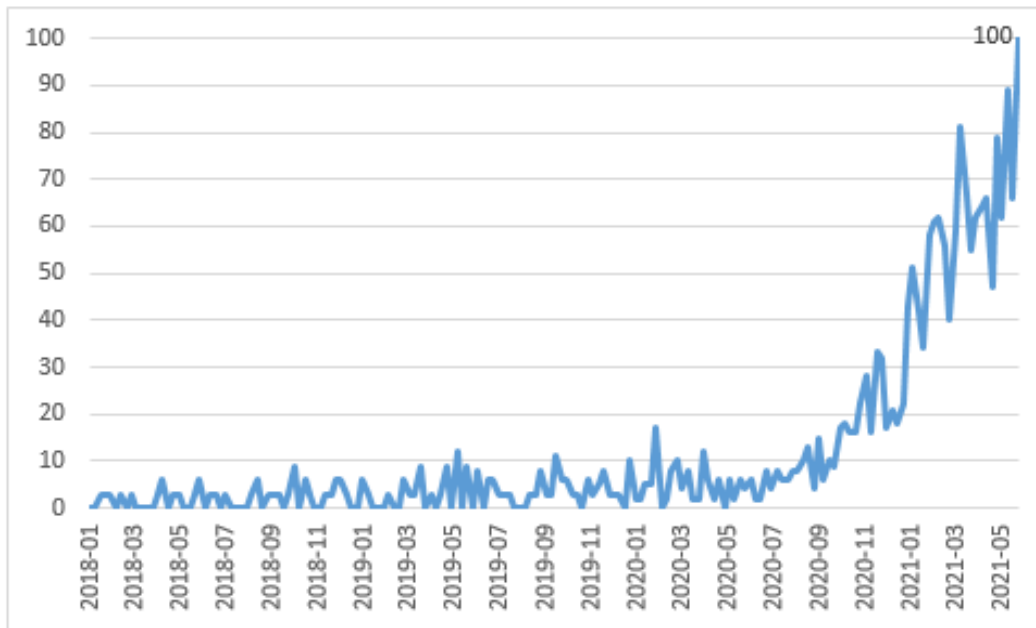




The Role of Derivatives Market in ESG Era

Hyo Seob Lee,
Korea Capital Market Institute

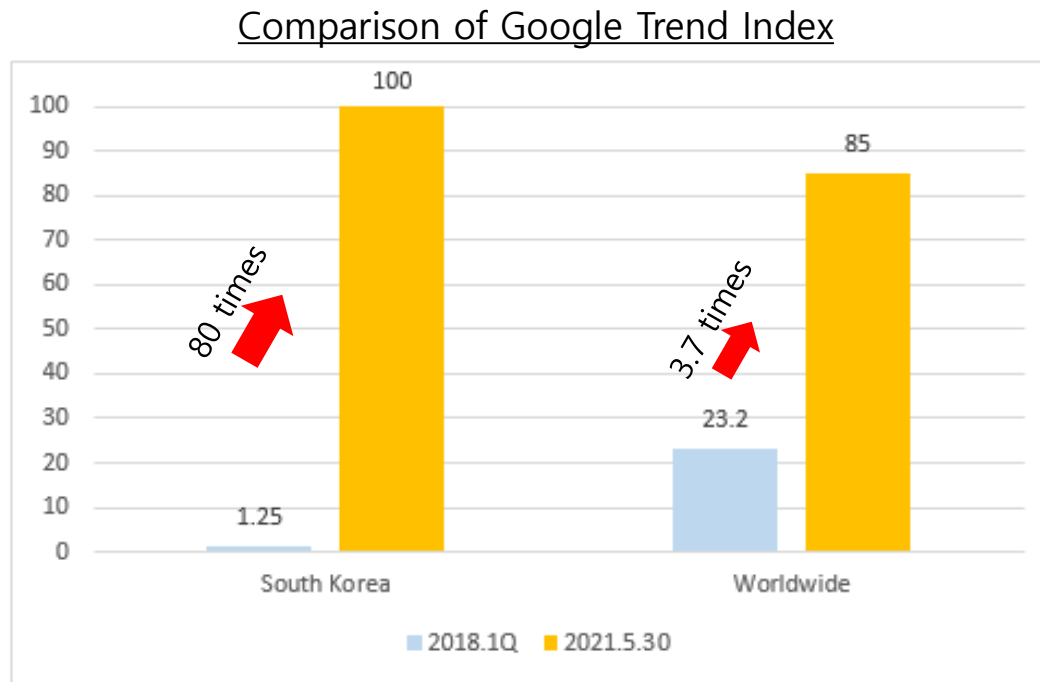
Can you guess what this graph implies?



Google Trend for 'ESG'

❖ Which area are you most interested in?

- Interests in ESG or ESG management has risen sharply in Korea
- Google trends index for ESG has increased 80 times in the past two years



Source: Google

Index

❖ Introduction of ESG

❖ ESG Investment Trend

❖ The Role of Derivatives Market in the ESG Era

Introduction of ESG

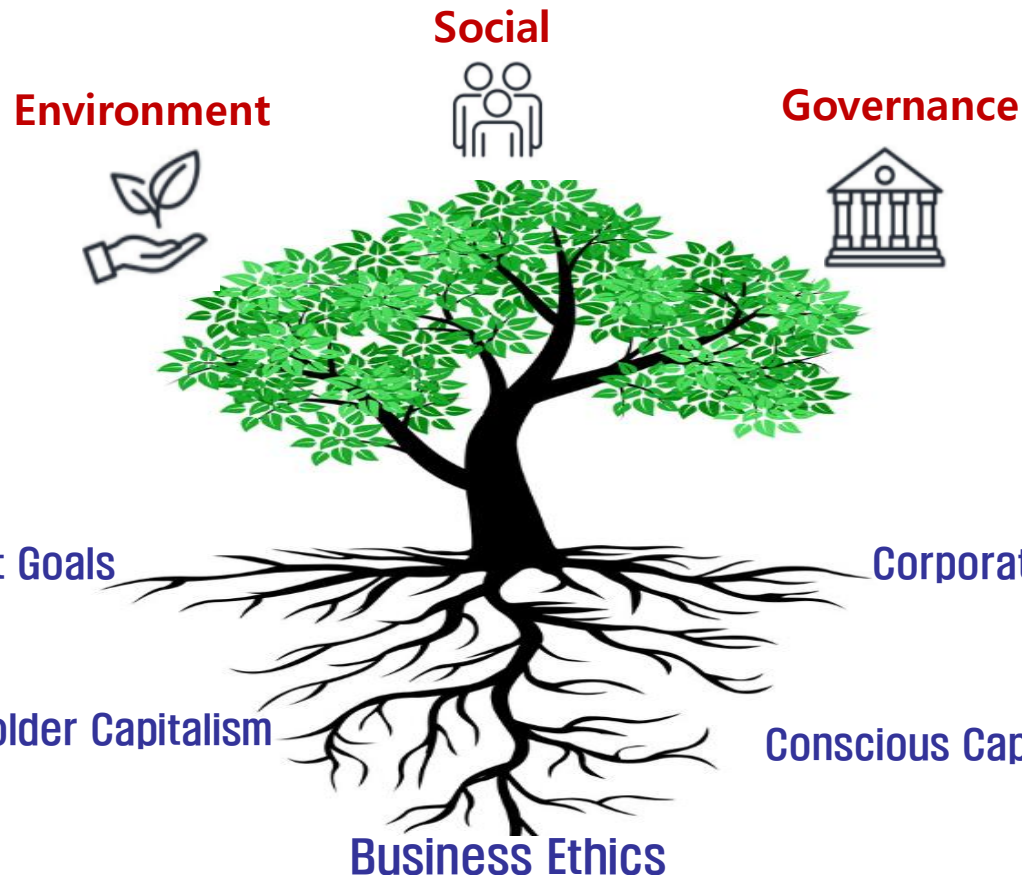
What is the meaning of ESG?

❖ ESG stands for

- Environment / Social / Governance

❖ Economic agents are increasingly considering non-financial factors such as ESG

- ESG includes ① Stakeholder Capitalism ② SDG(Sustainable Development Goals), ③ Business Ethics, ④ CSR(Corporate Social Responsibility), ⑤ Conscious Capitalism, ...



What factors comprise ESG?

Environment

- ✓ Climate Change
- ✓ Carbon Emission
- ✓ Protect Pollution
- ✓ Water Usage
- ✓ Fossil Fuel Reserve
- ✓ Energy Efficiencies

Social

- ✓ Human Rights
- ✓ Gender Diversity
- ✓ Customer Satisfaction
- ✓ Labor Satisfaction
- ✓ Supply-Chain Relations
- ✓ Community Relations

Governance

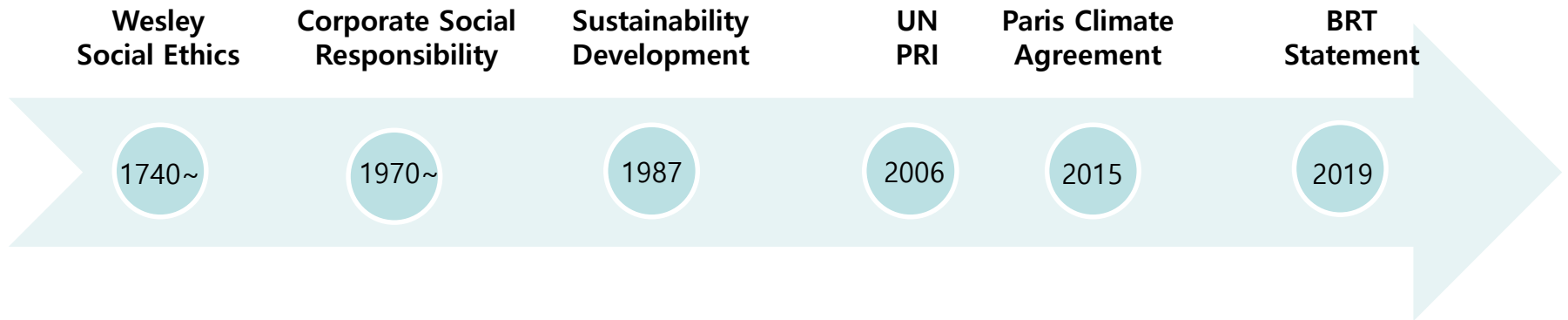
- ✓ Board Composition
- ✓ Audit Committee
- ✓ Monitor Corruption
- ✓ Incentive Scheme
- ✓ Internal Control
- ✓ Dividend Policy

**Stakeholder
Capitalism**

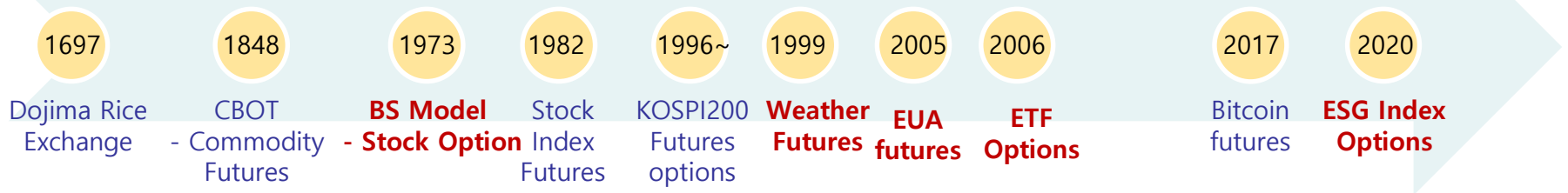
**Shareholder
Capitalism**

What is History of ESG? - Comparison to Derivatives History

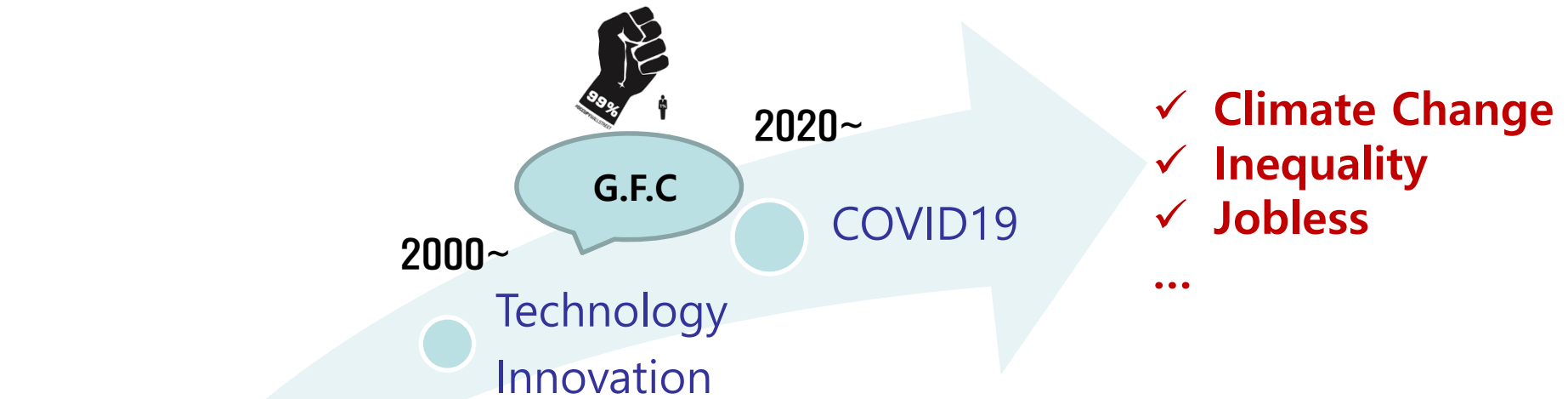
History of ESG



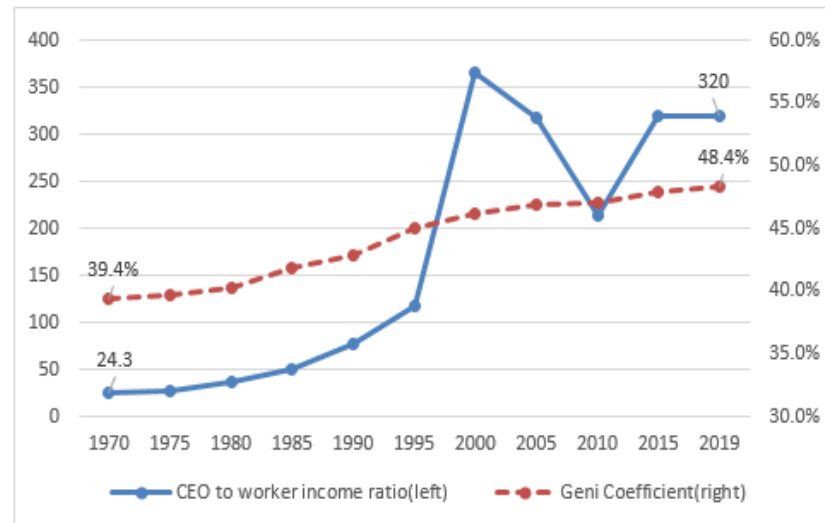
History of related Derivatives



Why is ESG so popular worldwide?

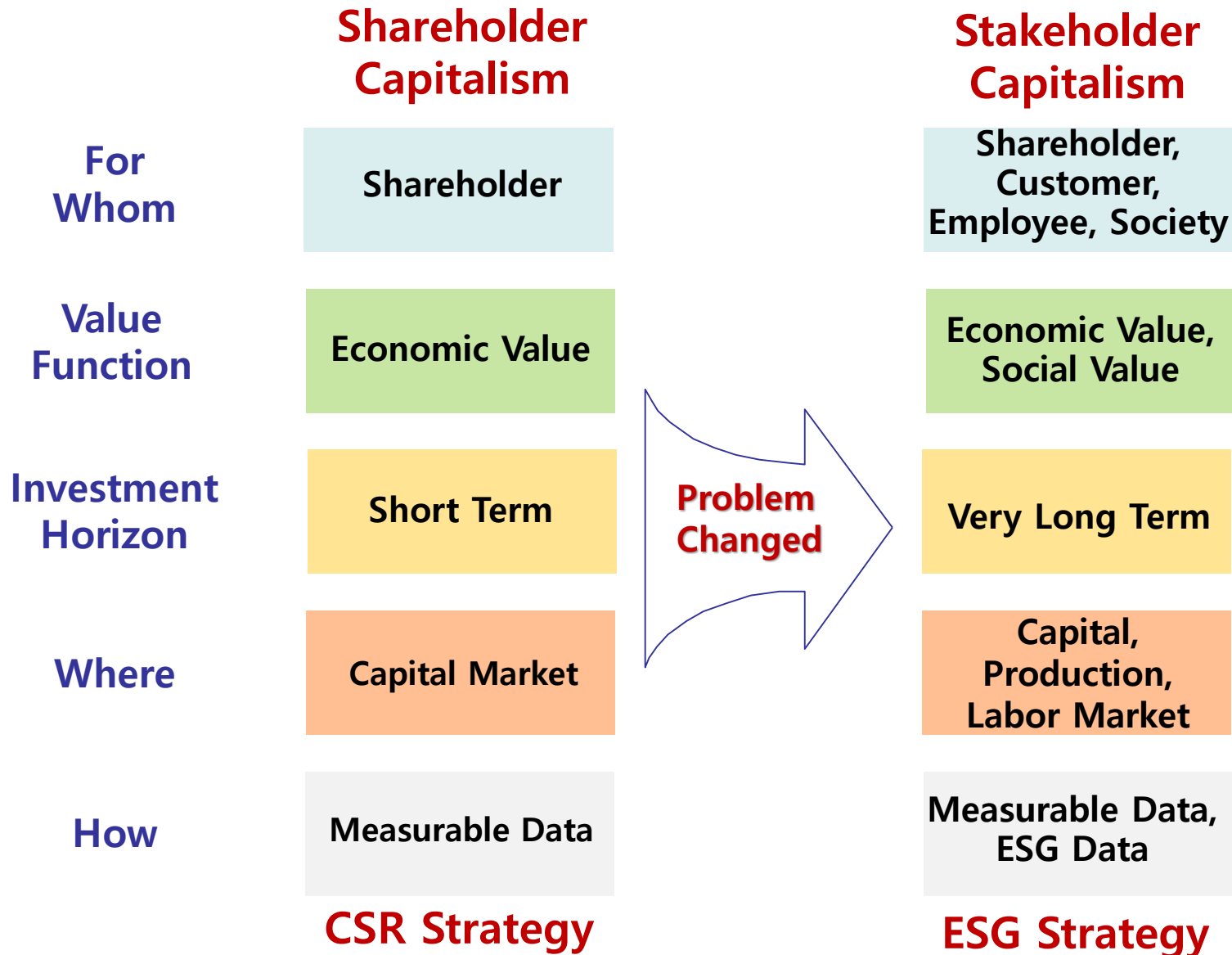


US Income/Wealth Inequality Trend



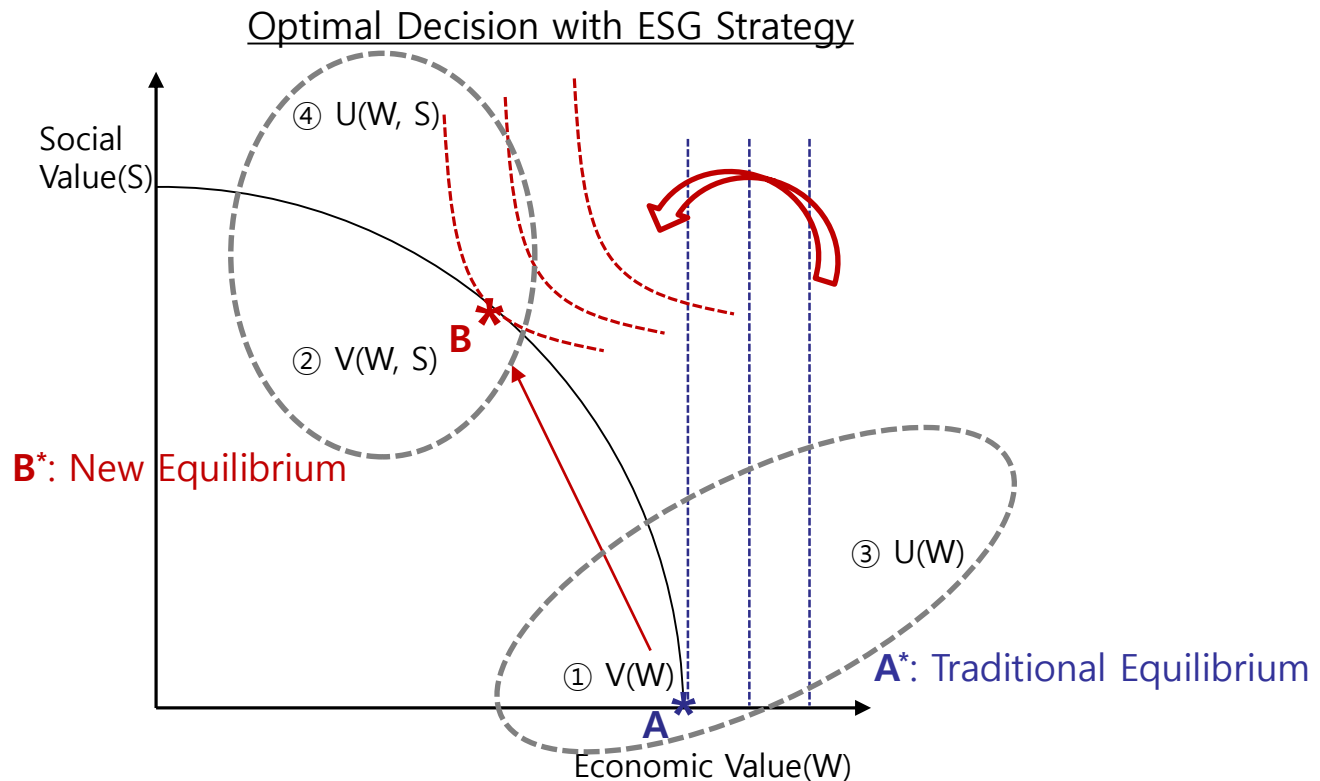
Source: US Census

Economic Model for the ESG strategy

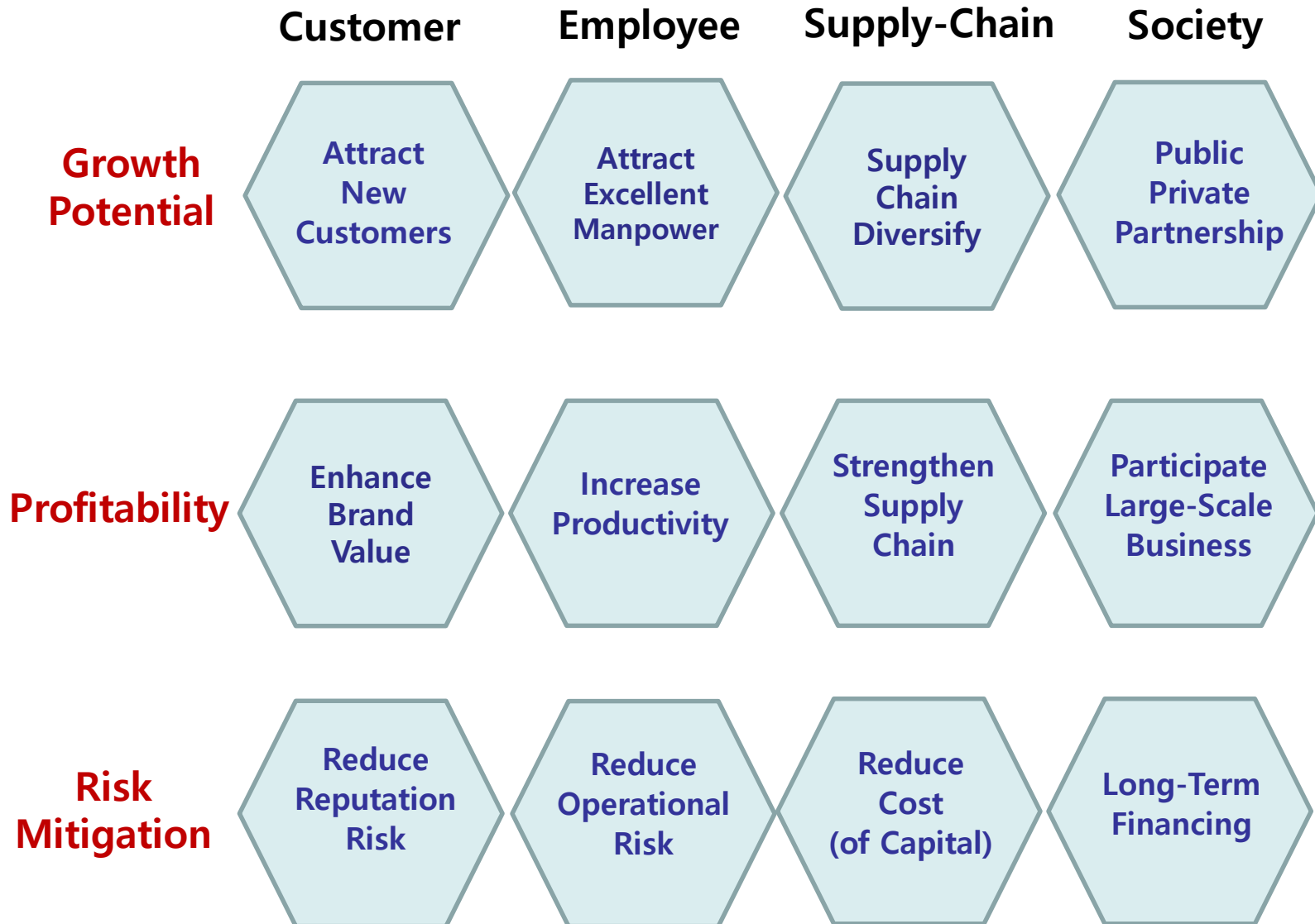


Economic Benefits of ESG: Increasing Social Values

- ❖ **Stakeholders have increasingly more utility to social values than Shareholders**
 - Increased inequality, reduced information asymmetry, tightened regulations have an impact
- ❖ **Implementing ESG strategy for stakeholders allocate more resources to social value**
 - Optimal decision is made at the intersection of the value set and the indifference curve
 - Traditional Equilibrium: A^* (intersection of ① $V(W)$ and ③ $U(W)$)
 - New Equilibrium: B^* (intersection of ② $V(W, S)$ and ④ $U(W, S)$)



How can ESG help the increase of Stakeholder's Welfare



Case Study of ESG strategy

ESG Strategy

Benefits of Social Value, Economic Value



- ✓ Supply-Chain Collaboration
- ✓ Technology, Financing Supports

- ✓ Income ↑, Water quality ↑
- ✓ Sales ↑, Coffee Quality ↑



- ✓ Inclusive Ecosystem
- ✓ Eco-friendly materials, CO2 ↓

- ✓ Renewable Energy ↑, Job ↑
- ✓ Sales ↑, New Clients ↑



- ✓ Low Carbon, Ecosystem
- ✓ Social Plastic, E-commerce

- ✓ Plastic ↓, CO2 ↓
- ✓ Sales ↑, Clean Tech Invest ↑



- ✓ Social Contribution
- ✓ Technology, Financing Supports

- ✓ Plastic ↓
- ✓ Sales ↑, Supply-Chain ↑

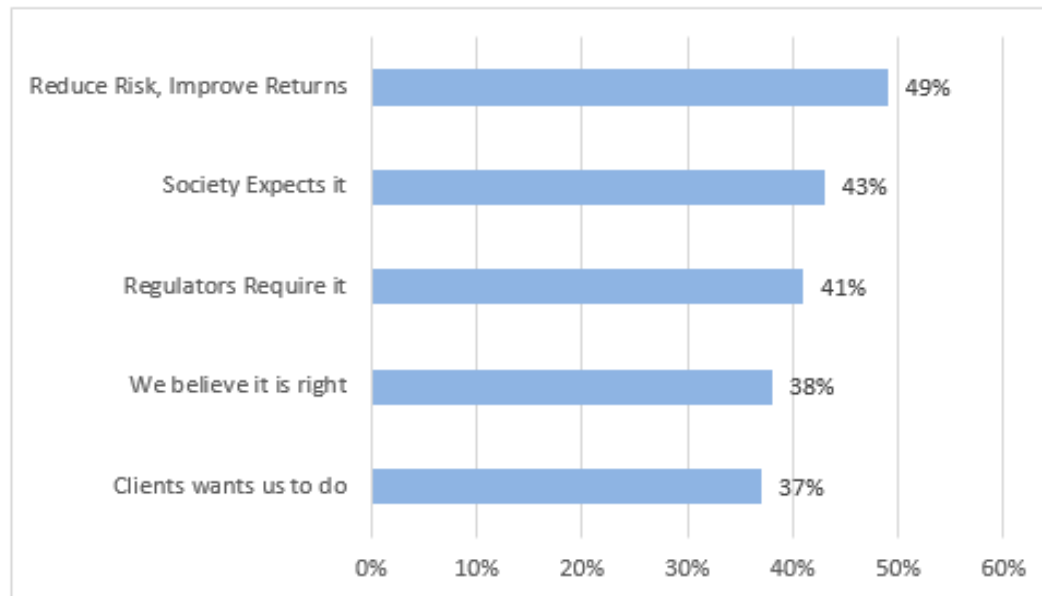
ESG Investment Trend:

Increased Demand for Managing Risks and Making Innovation

Reasons to consider ESG factors among investors

- ❖ 1. Minimize Risks & Improve Returns
- ❖ 2. Society Expects it
- ❖ 3. Regulators Require it

Reasons to consider ESG Factors



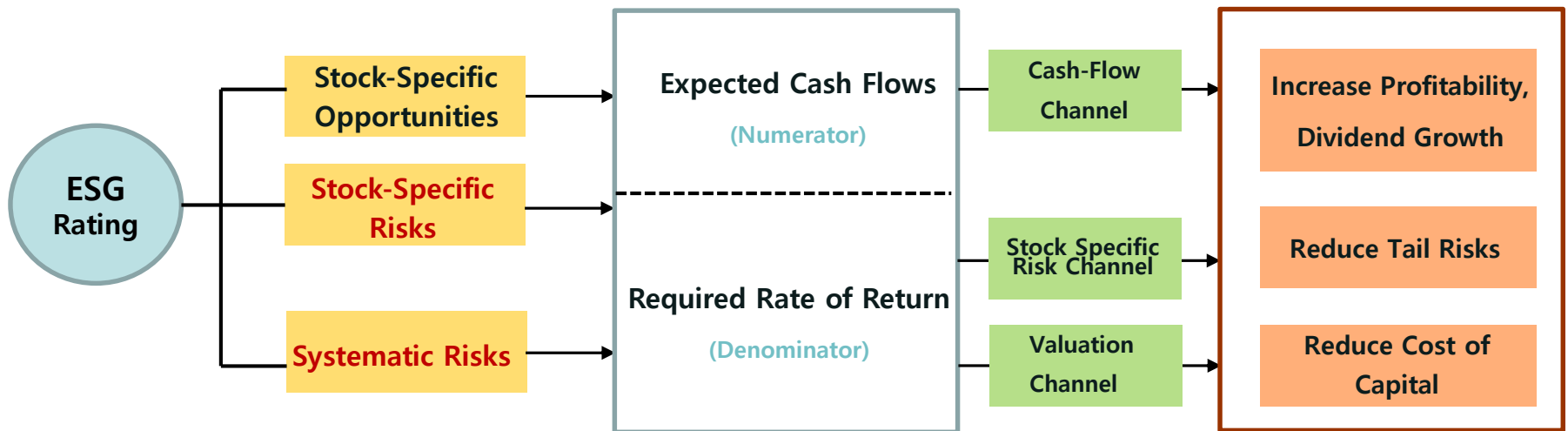
Source: HSBC, Euromoney, GlobalCapital

How can ESG strategy increase the firm's financial values?

❖ A Good ESG strategy helps increase the firm's financial value

- The higher ESG ratings, the greater the firm's growth and profitability by enhancing brand value
- The higher ESG ratings, the lower the cost of capital and systematic risks by lowering volatility

Transmission Channels from ESG to financial Values



❖ **Cash Flow Channel:** Good ESG Ratings → Higher Brand Value → Increase Profitability, Dividend Growth

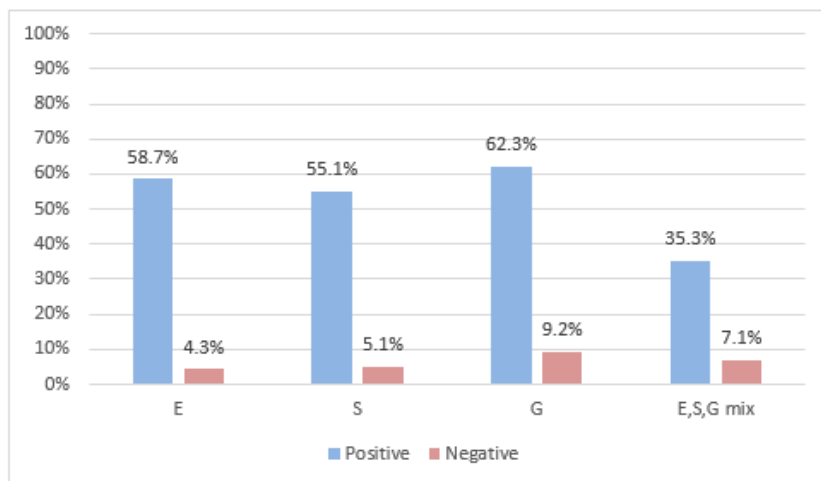
❖ **Idiosyncratic Risk Channel:** Good ESG Ratings → Lower Operational Risk → Reduce Tail Risks

❖ **Valuation Channel:** Good ESG Ratings → Lower Systematic Risk → Reduce Cost of Capital

Relationship between ESG and Corporate Financial Performance

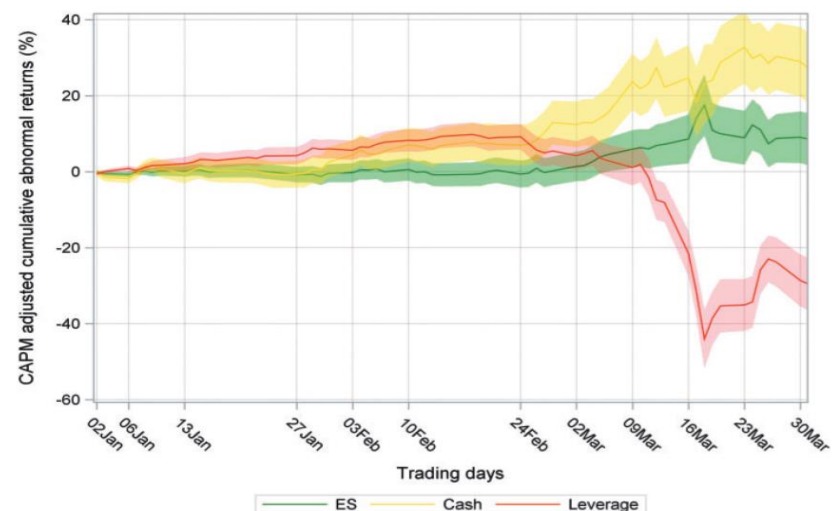
- ❖ **The higher the ESG ratings, the better the financial performance (Positive & Weak)**
 - Friede et al. (2015) examined 2,200 papers about the relationship between ESG and CFP since 1970s. They found that 90% of studies showed positive relationship between ESG and CFP
 - Xia et al. (2019) Governance disclosure is positive related to CFP, followed by Social and Environment disclosures
- ❖ **The higher the ESG ratings, the better performance in crisis situation(ex. COVID19)**
 - Albuquerque et al. (2020) showed that firms with good ESG ratings have higher excess returns and lower volatility after the COVID-19 crisis

Relationship between ESG and CFP



Source: Friede et al. (2015)

Excess returns of ESG portfolios after COVID-19 crisis

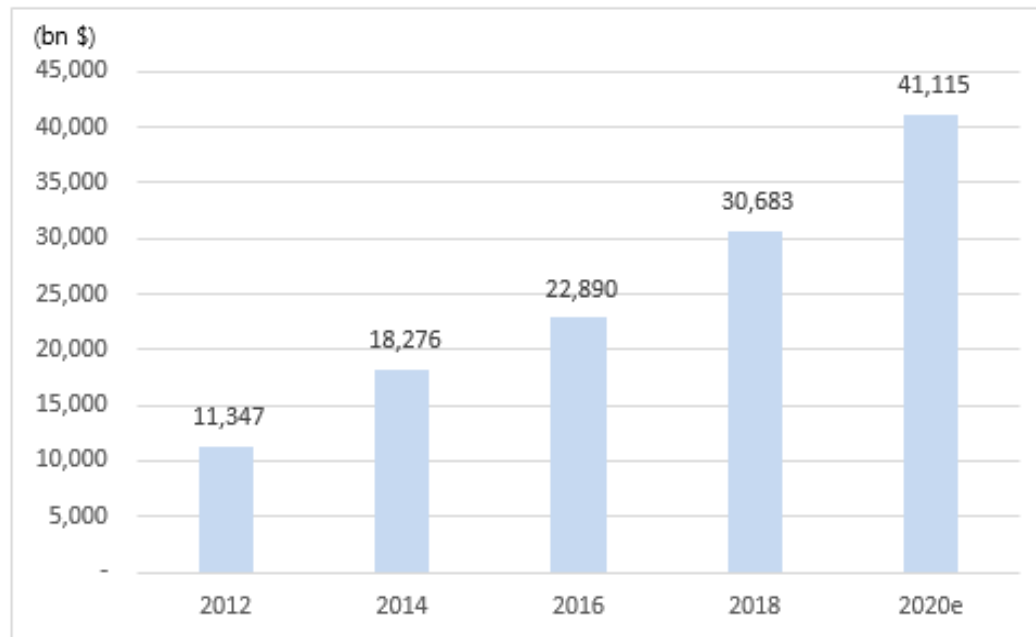


Source: Albuquerque et al. (2020)

Global investment on ESG is fast growing

- ❖ **Global Investment on ESG has increased by more than double digits by every year**
 - The global investment on ESG is estimated to be more than 41.1 trillion U.S dollars
 - The global ESG investment has increased considerably in the fast years from 11.35 trillion \$ in 2012 to 30.68 trillion \$ in 2018

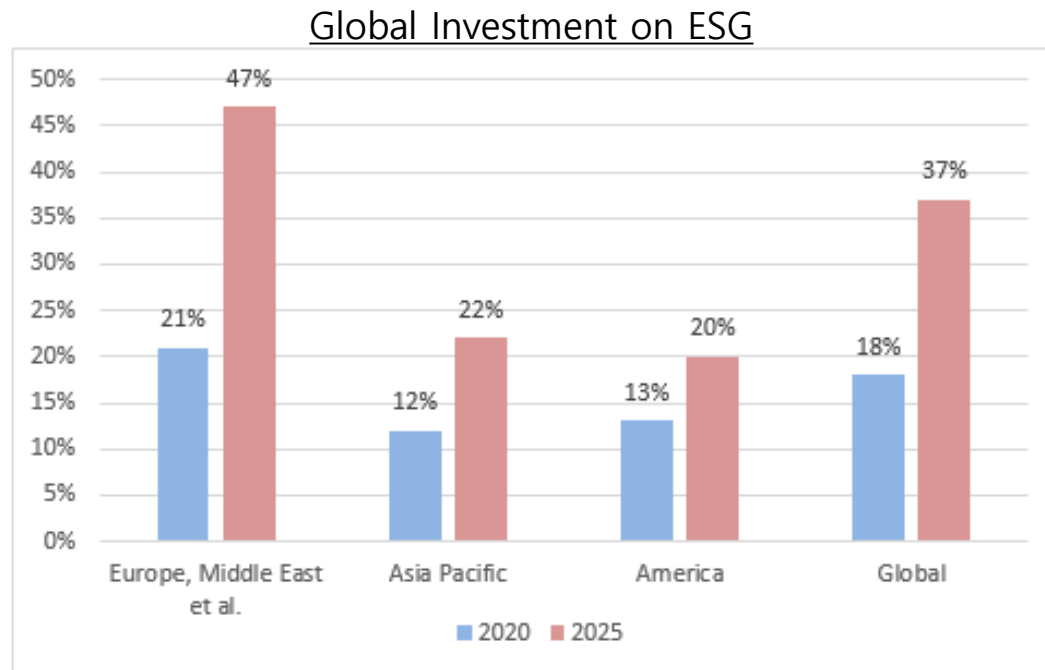
Global Investment on ESG



Source: GSIA(Global Sustainable Investment Alliance)

Share of ESG investments among investors by Region

- ❖ **The share of ESG investment in Europe and Asia is expected to increase rapidly**
 - Investors from all parts of the world expected to increase the share of assets which are ESG-focused invested by 2025 according to a Blackrock's survey from 2020
 - Investors answer that the share of ESG investment in Europe will increase 21%('20) to 47%('25), and the share in Asia will increase 12%('20) to 22%('25)
 - How to manage Risk in ESG investments?



Source: Blackrock, Global Sustainable Investing Survey

The issuance of ESG Bond is increasing

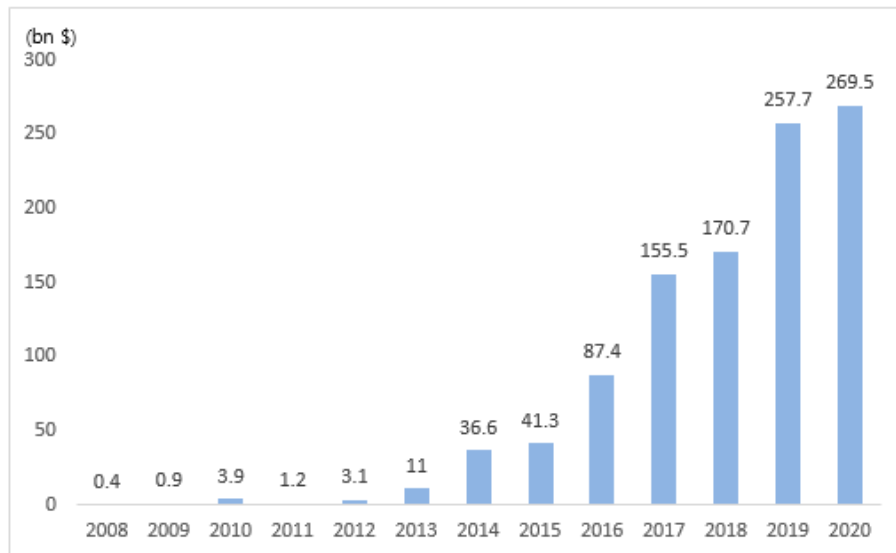
❖ Despite COVID19, global green bond issuance is grown

- The green bond issuance in 2020 is 270 billion U.S. dollar, about 7 times higher than the bond issuance in 2015
- In addition to green bond, ESG bond such as social performance-linked bonds and transition bonds has rapidly increased

❖ The issuance of ESG bond could increase the welfare of economic agents

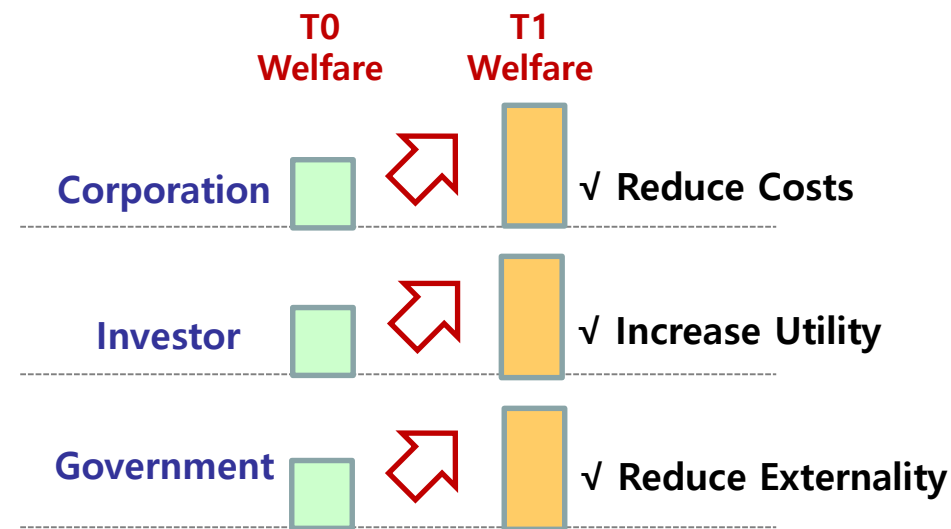
- ① Corporations can reduce interest costs, ② Investors have increased utility with social values, ③ Government can reduce externalities such as air pollution by issuing ESG bond

Global Green Bond Issuance



Source: Climate Bond Initiative

Benefits of ESG bond for economic agents

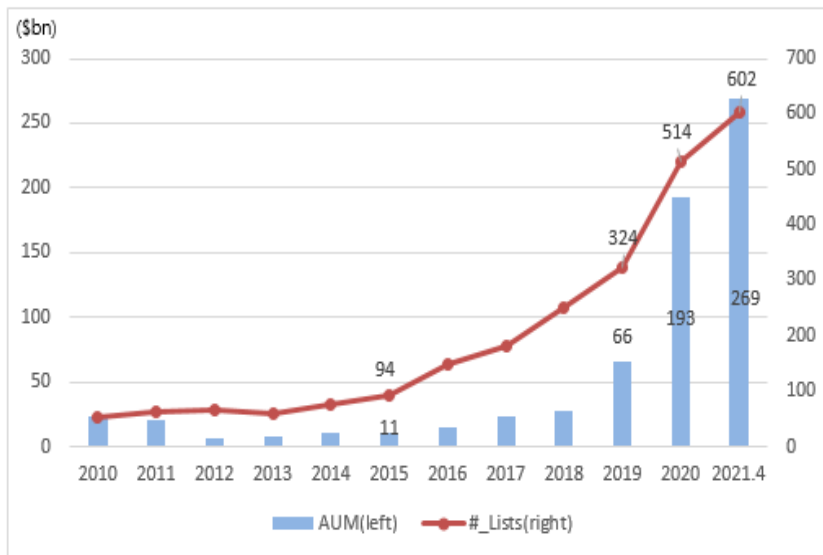


Assets invested in ESG ETFs are growing rapidly

- ❖ **AUM of ETFs that invests in ESG assets reach a record of \$269 bn**
 - The number of listed ESG ETFs (including ETPs) in 2021 is 602, 6 times more than in 2015
 - AUM of ESG ETFs in 2021 is \$269 bn, 25 times more than in 2015

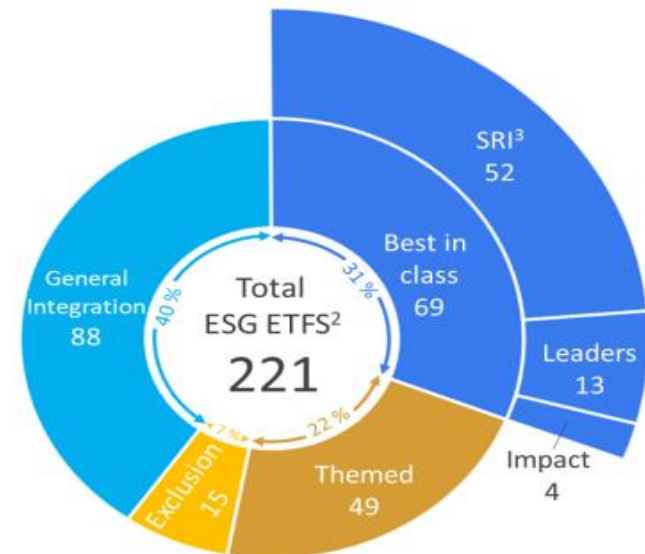
- ❖ **ESG ETFs mainly consists of integration, best-in, themed strategies**
 - UNCTAD divided into four groups such as
 - General Integration(40%), Best-in or Positive Screening(31%), Themed(22%), Exclusion(12%)

Global ESG ETF AUM & listed number



Source: ETFGI

ESG ETFs by Strategies



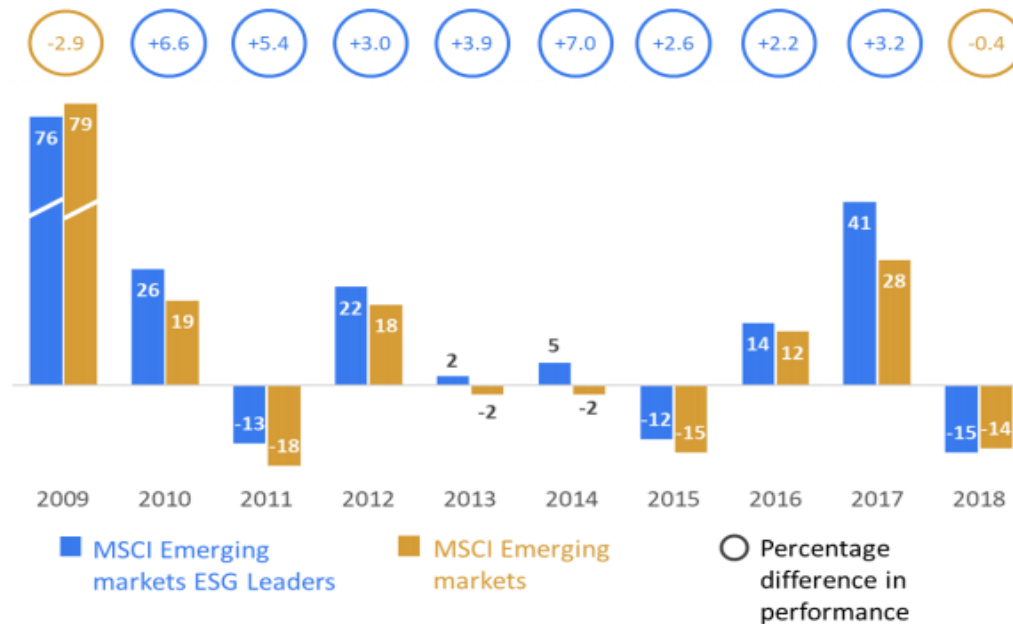
Source: UNCTAD

ESG ETFs outperform non-ESG ETFs

❖ ESG ETFs outperformed non-ESG ETFs during 2009 through 2018

- Average return of ESG ETFs is 3.9%, but the average return of non-ESG ETFs is 1.6%
- It is known that the volatility of ESG ETFs is lower than that of conventional index

Financial Performance of ESG index and conventional Index



Source: UNCTAD

Asset/Sector Birth of ESG Sector

❖ Green Technology

- Create values, products that are more environmental friendly such as recycle waste, conserve natural resources



❖ Clean Technology

- Any process, product, or services that reduces negative environment impacts



Environment

Social

Governance



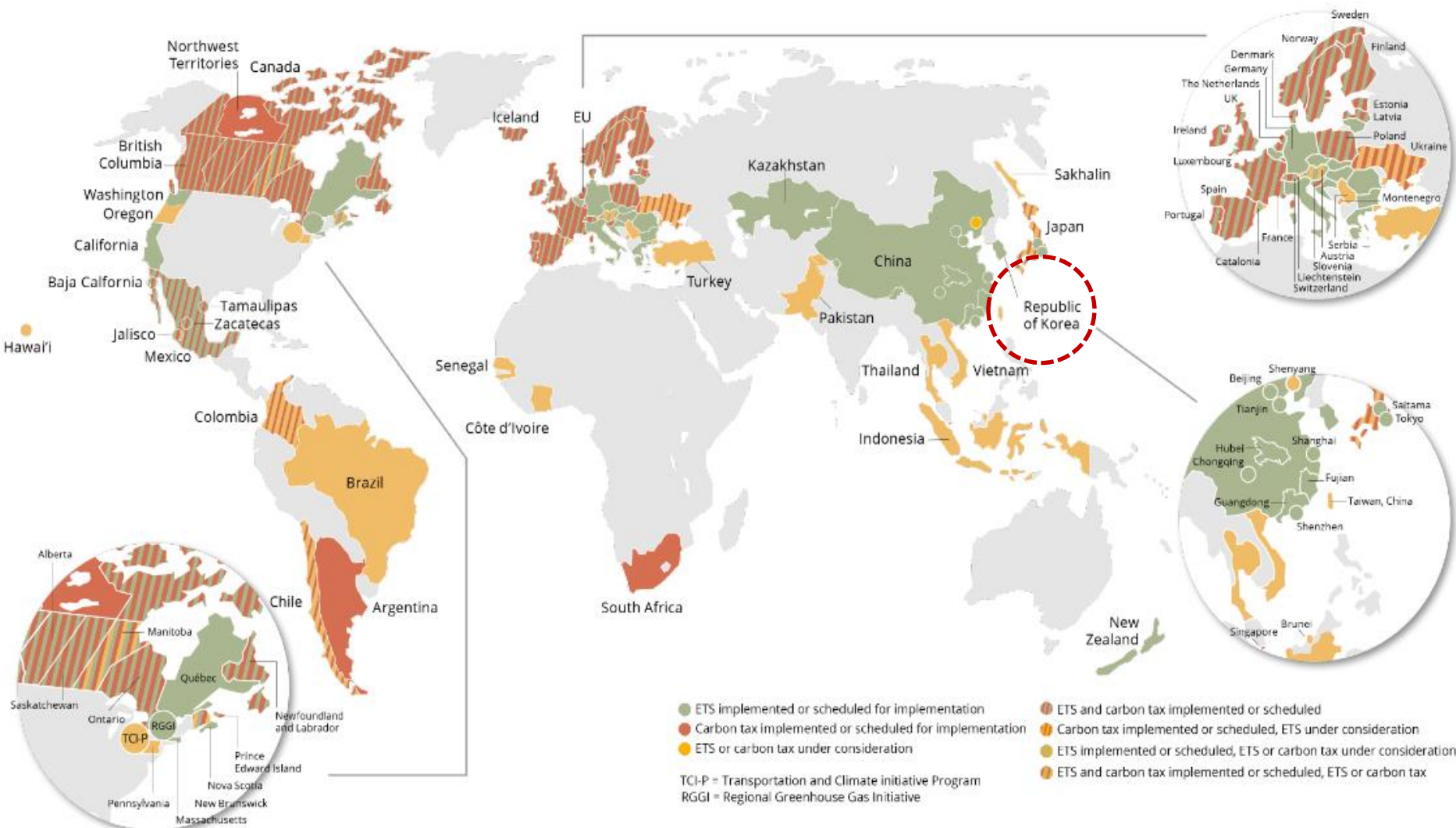
❖ Social Technology

- Way of using human, intellectual, digital resources in order to influence social processes

❖ Block-Chain Technology / Platform~

- Digital Ledger that is duplicated and equally distributed across the entire network

Global Status of ETS and Carbon Tax



Global Trading Volume of Carbon Market

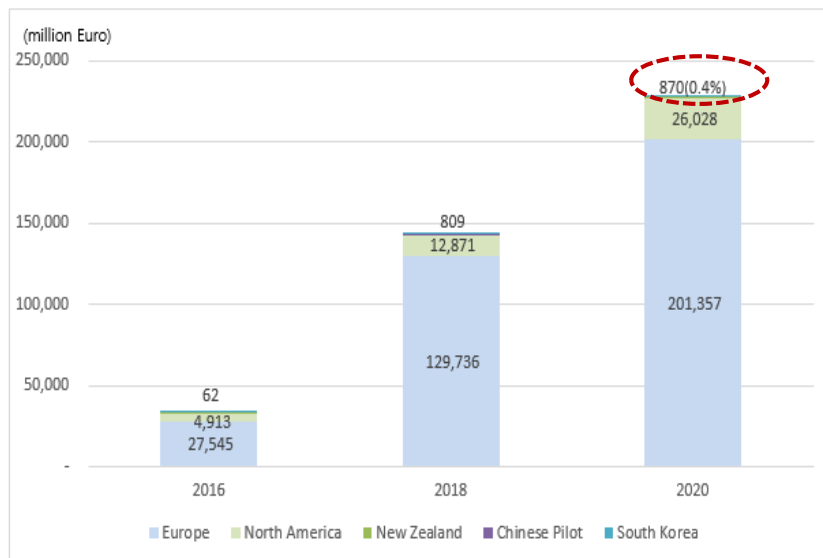
❖ European market accounts for 88% of the world

- The trading amount of global carbon market in 2020 is \$270 billion
- The European carbon market accounts for 88% of the world, while the Korean carbon market only accounts for 0.4%

❖ Fortunately, trading volume in Korean ETS market has increased

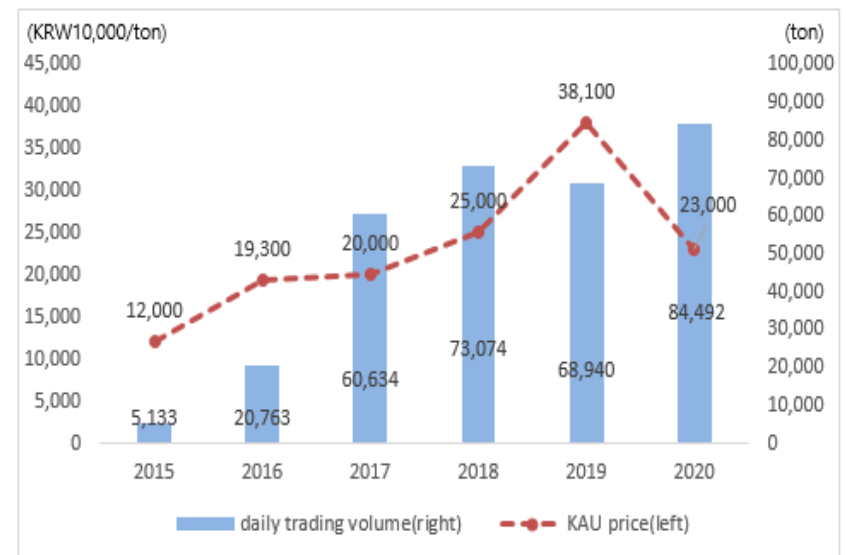
- The trading amount of KRX ETS market in 2020 is about \$0.6 billion
- Recently, the volatility of the Korean carbon market is rather high

Global Trading Volume of Carbon Market



Source: Refinitive

Trading Volume of KRX ETS market



Source: KRX

Europe Carbon Emission Futures Market

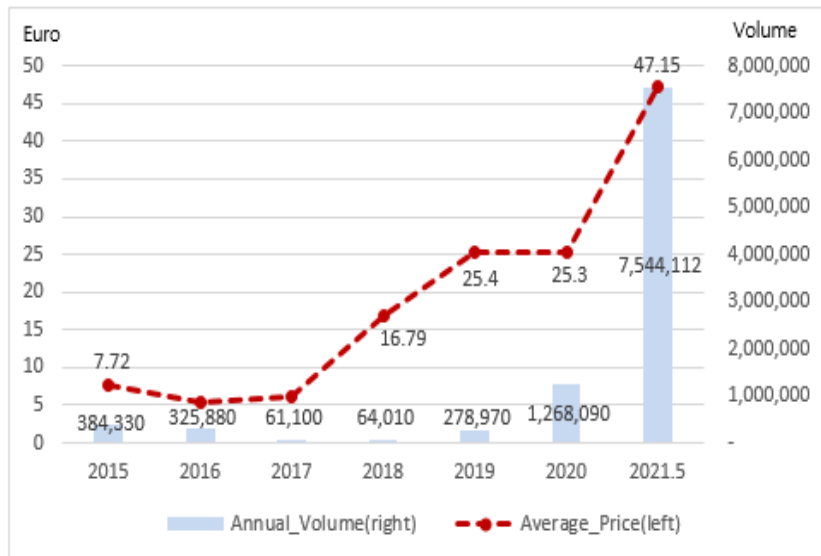
❖ Europe carbon emission futures market is very active

- The average monthly trading volume in 2021 is 6.3 million, 5 times higher than in 2020
- Thanks to the futures market, the volatility of European carbon market is not higher than the volatility of Korean carbon market

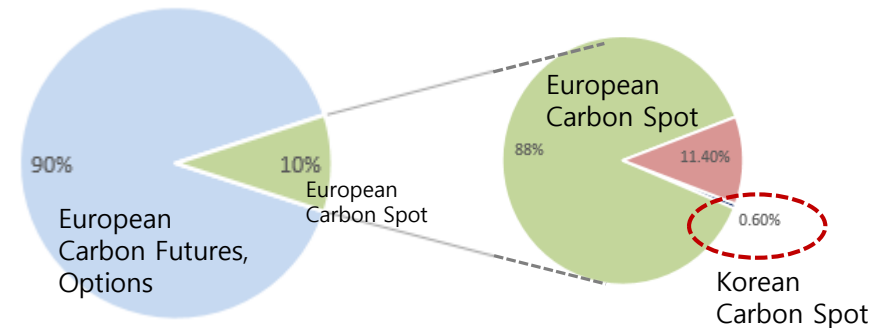
❖ European carbon futures market is about 10 times the size of carbon spot market

- Europe carbon futures market : Europe carbon spot market \approx 9 : 1
- Europe carbon spot market : Korean carbon spot market \approx 150 : 1

Trading Volume of EUA Futures Market



Comparison of carbon market in Europe & Korea



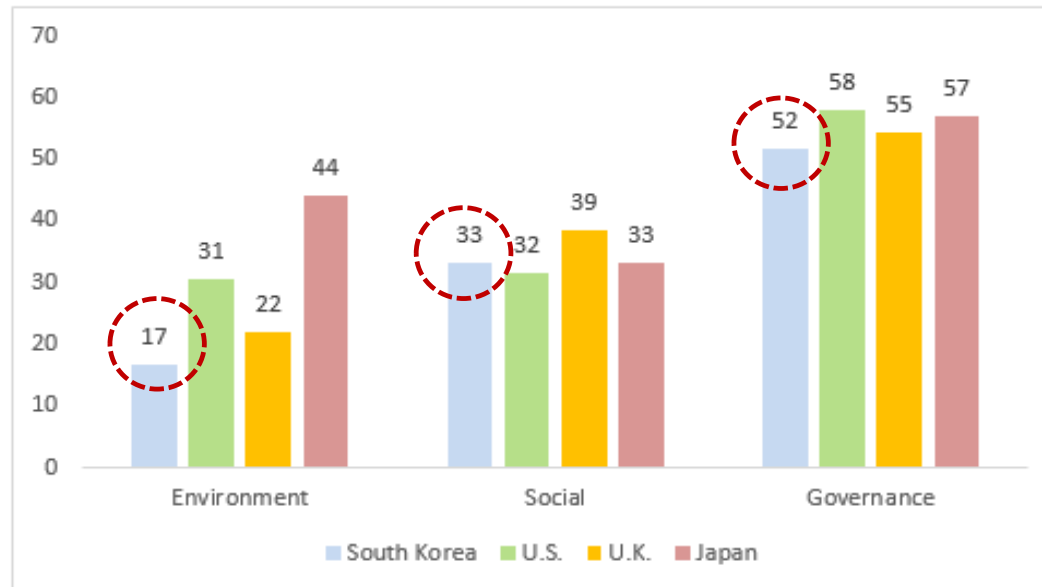
ESG Disclosure Scores by Country

❖ ESG Disclosure scores of KOSPI200 are generally low

- KOSPI200 companies have particularly low disclosure scores in the Environment scores
- ESG Disclosure scores of KOSPI200 are generally low in both the Social sector and Governance sector compared to U.S., U.K., and Japan

❖ Demand for managing ESG risks is increasing

ESG Disclosure Scores by Country



Source: Bloomberg(2010~2019), Korea Capital Market Institute

Summary of ESG Investment Trend

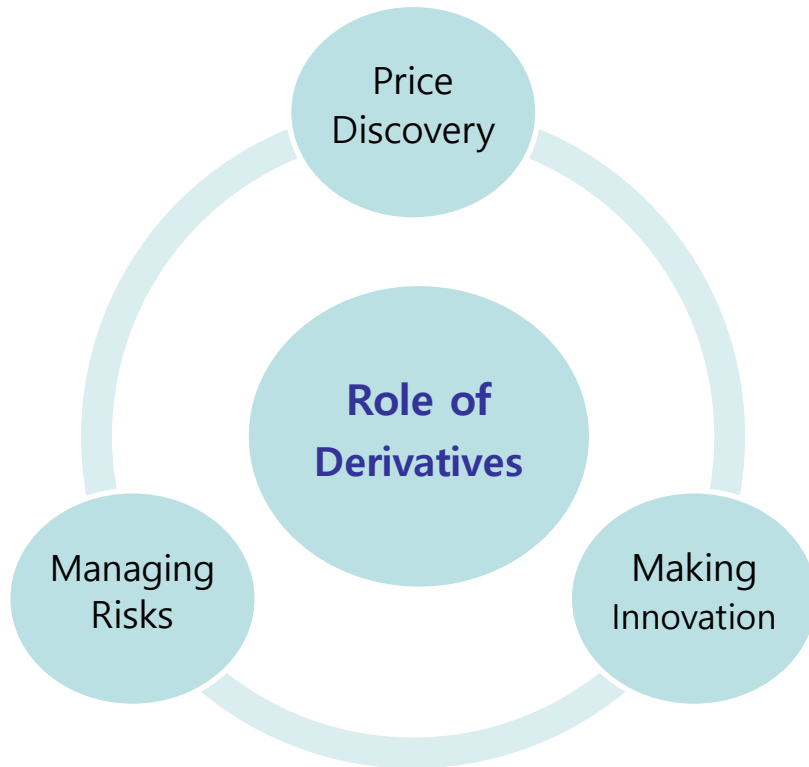
- √ Increased Demand in ESG Investment
 - Reduce risks, Improve returns, Regulators require it
- √ Increased Demand for ESG-linked financing
 - Increased issuance of green bonds, social impact bonds, transition bonds, ...
- √ Recognizing ESG as a new industry
 - Green technology, clean technology, social technology, ...
- √ Growing interests in social value exchange
 - Emission Trading System
- √ Increased demands for ESG derivatives
 - Carbon market futures, electricity market futures, ...

The Role of Derivatives Market in the ESG era

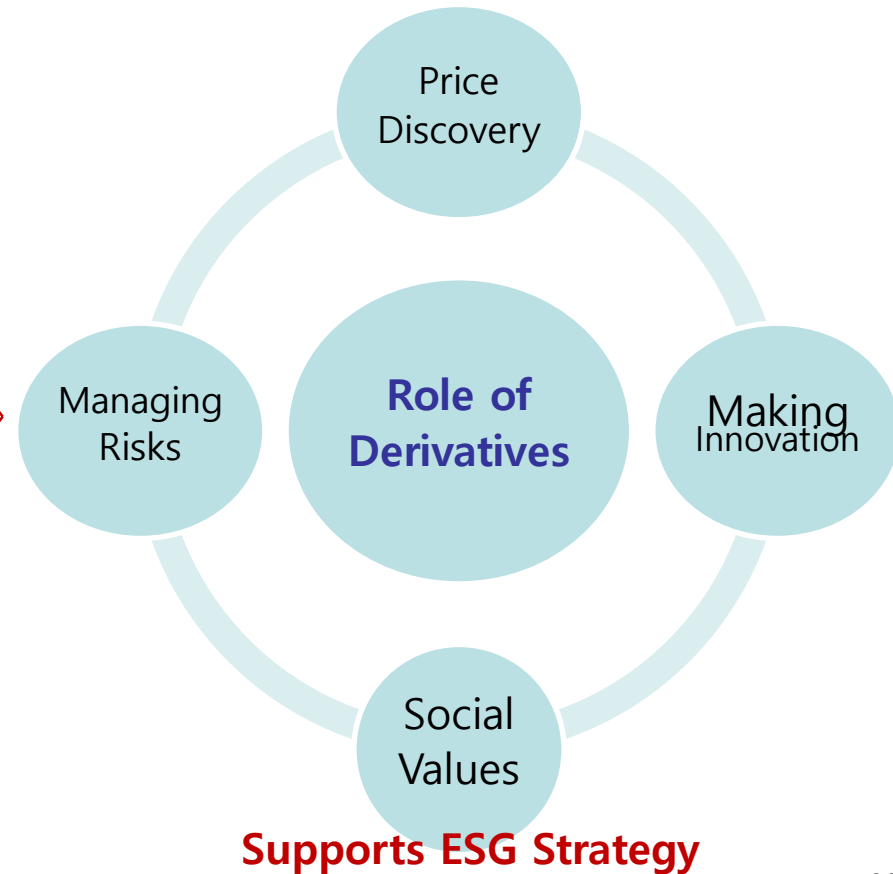
The Role of Derivatives in the ESG Era

- ❖ (Past) Managing Risks, Making Financial Innovation, Price Discovery, ...
- ❖ (Future) Supports ESG Strategy, Managing Risks, Making Innovation, Price Discovery

Role of Derivatives (Past)



Role of Derivatives (Future)



Transition to Stakeholder Capitalism

Supports ESG Strategy

Managing Firm-Specific Risks

- Activate single stock options
- Activate single stock warrants
- Activate Sector-based futures

Managing ESG market Risks

- Introduce Carbon Emission Futures
- Introduce Electricity Futures
- Introduce Weather futures, Reusable Plastic Futures, ...

Supports ESG Innovation

- Introduce ESG Index
- Introduce ESG ETFs/ETNs
- Activate ETF options

Managing Firm Risks - Activate Single Stock Derivatives



..... ✓ Effectively Manage Firm-Specific ESG Risks



..... ✓ Manage Firm-Specific ESG Risks & provide liquidity

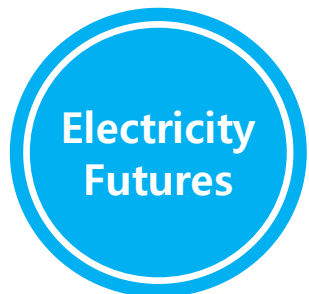


..... ✓ Effectively Manage Firm & Industry based ESG Risks

Managing ESG Market Risks: Introduce ESG Derivatives



..... ✓ Supports carbon neutral 2050, carbon market stabilization



..... ✓ Induce energy savings, electricity price stabilization



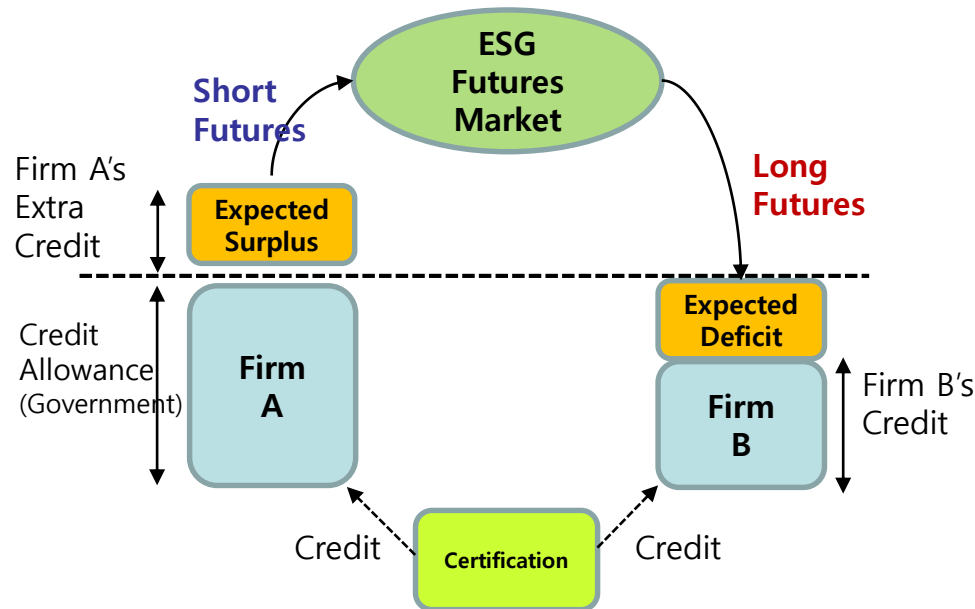
..... ✓ Effectively manage environmental (ex. climate-change) risks

Market Structure of ESG related Futures

- ❖ **ESG Futures play a role in risk sharing about ESG values or social values**
 - Firms with ESG value surplus manage the risk of price decrease by selling ESG futures
 - Firms with ESG value deficit manage the risk of price increase (meeting requirements) by buying ESG futures

- ❖ **A lot of ESG futures are listed on global exchanges**
 - Carbon emission futures are listed on ICE ECX and are actively traded
 - Electricity futures, CAT(Cumulative Average Temperature) Weather futures, Water futures are listed respectively TOCOM(Japan), CME(U.S), and NASDAQ(U.S)

Market Structure of ESG Futures



Listed Products of ESG Derivatives

Product Name	Listing Date	Exchange
EUA Carbon Emission Futures	2005.4	ICE ECX
Global Emissions Offset Futures	2021.3	CME
Electricity Futures	2019.9	TOCOM
Tokyo Cat Weather Futures	2019.11	CME
California Water Futures	2020.12	NASDAQ

Source: Individual Exchanges, KRX

Supports ESG Innovation: Activate ESG ETFs & derivatives



..... ✓ Build ESG Infrastructure, Supports ESG related Innovation



..... ✓ Promote ESG investments, Supports Shareholder Capitalism



..... ✓ Manage ETF Risks, Manage ESG ETF Risks

Thank you very much.