

# Climate change and corporate finance: Carbon border adjustment mechanism effects

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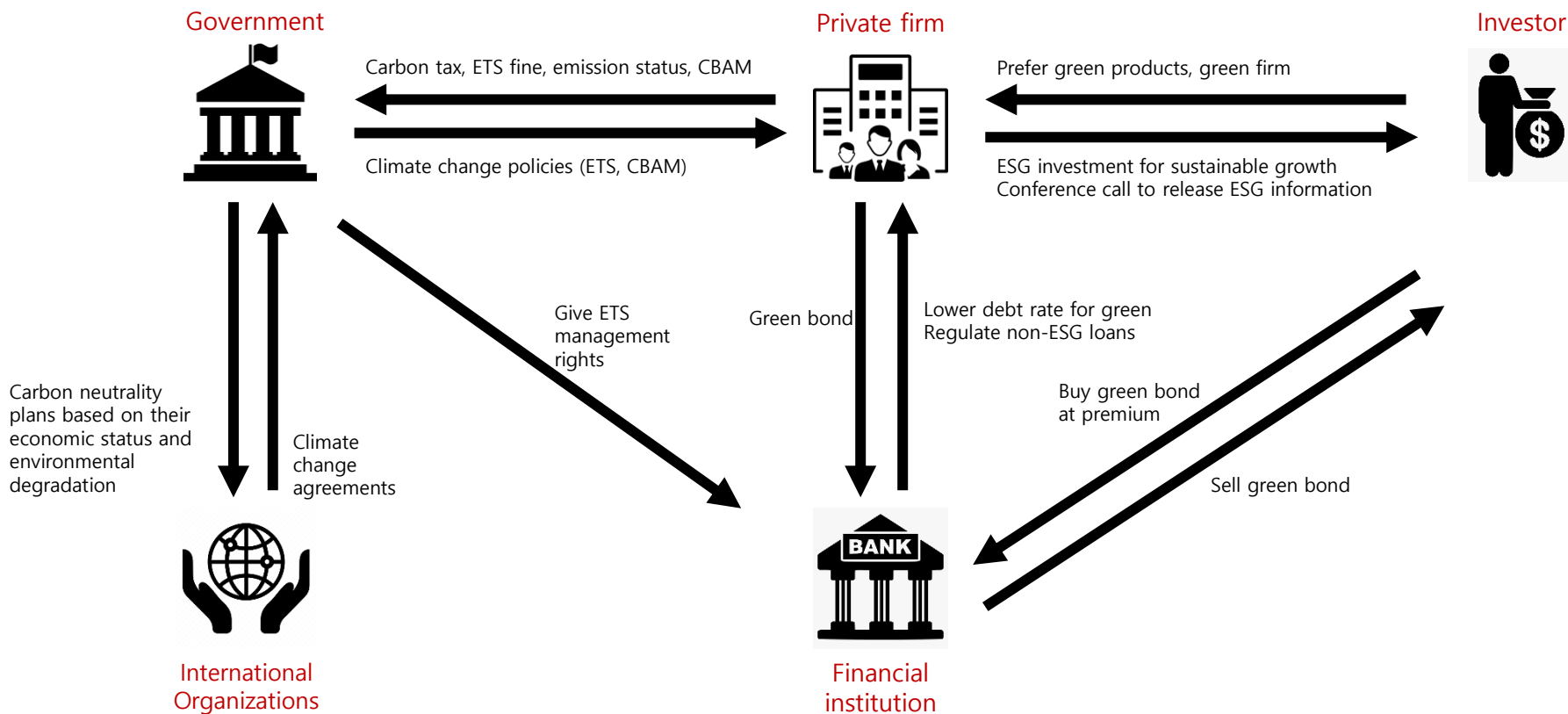
# Climate change and corporate finance

## How is climate change related to firm's business?

- The World Economic Forum (2018) highlighted that climate change is an important factor that affects corporate performance; thus, environmental resource preservation should be considered in a firm's business activities.
- Climate change may affect a firm's supply chain, damage facilities and infrastructure, energy costs, and consumer and investor behavior.
  - ✓ **Productivity:** extreme weather events, such as hurricanes, droughts, and floods, can disrupt the production and delivery of raw materials and finished products. They may also destroy facilities leading to lost productivity.
  - ✓ **Cost:** companies may need to invest in cooling systems and energy-efficient technologies, leading to increased energy costs.
  - ✓ **Market:** as consumers and investors become more environmentally conscious, there may be a shift in the demand for environmentally friendly products, which can affect the competitiveness of companies that are not adaptable.
- Climate change can result in **decreased productivity and profitability** for companies and **increased risk and uncertainty** in their operations.
- Some firms also **strategically use climate change** (ESG, autonomous vehicle, battery. Etc)
- Managers are considering climate change as an important decision-making factor.



# Climate change sanction flow chart



# Climate change regulations

## Governments are starting to regulate firm's climate actions

### Physical sanctions

- Emission Trading Scheme (ETS)
- **Carbon Border Adjustment Mechanism (CBAM)**
- How will CBAM affect firm's capital structure? How will firms react to CBAM?

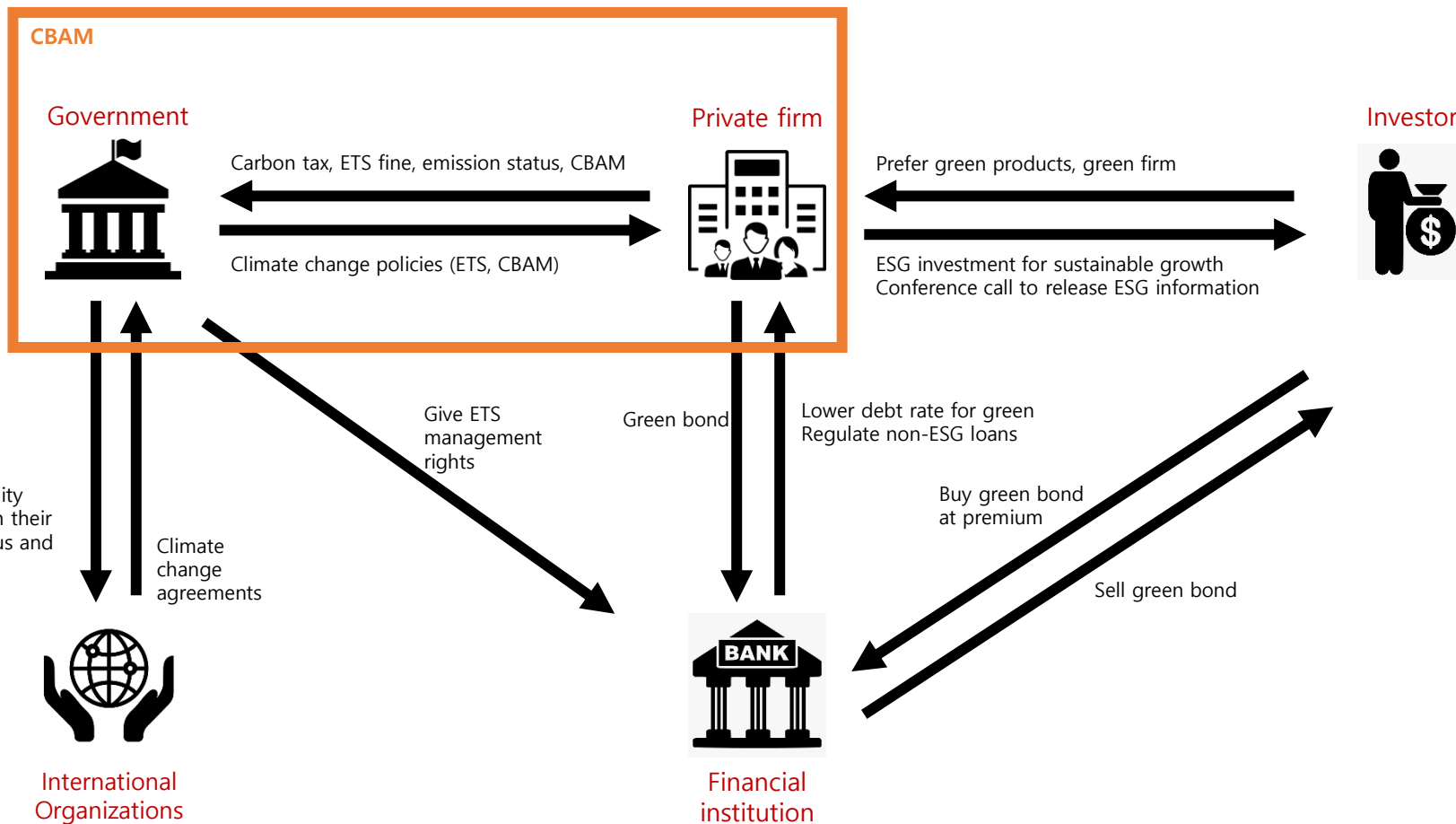
### ESG / Emission disclosure regulations

- US: Reporting Scope 1 and Scope 2 emissions for all public firms
- Korea: ('25) Large-sized enterprises ('30) All Korea Exchange listed firms
- How will disclosure regulations affect firm's reporting quality? How will ESG disclosure affect firm value?

Climate change regulations yield various research questions



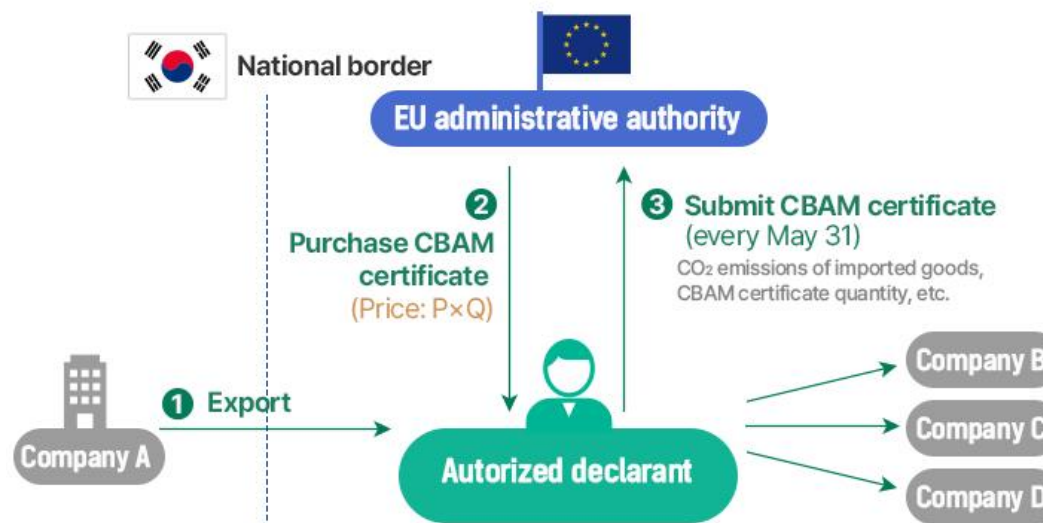
# Upcoming "shock": Carbon border adjustment mechanism



# What is Carbon Border Adjustment Mechanism (CBAM)?

## CBAM definition and mechanism

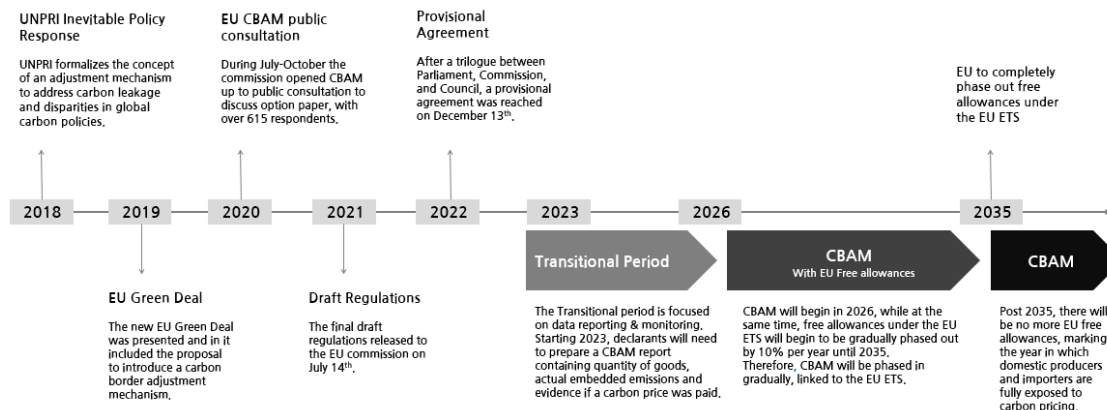
- Tax imposed on 6 carbon-intensive imports (**electricity, cement, aluminum, fertilizer, iron, and steel products**) from non-EU countries to EU.



# How will CBAM work in place?

## CBAM enactment background and highlights

- The EU is introducing the CBAM to protect industries at risk of carbon leakage and to ensure a level playing field between EU and non-EU companies.
- The CBAM was formalized in July 2021 with the publication of the European Commission's "Fit for 55" proposal to reduce greenhouse gas emissions in Europe by 55%.
- In December 2022, the EC reached a provisional agreement on CBAM legislation, although the specific outcome of the agreement has not yet been announced.
- CBAM will enter a transitional period in October 2023. From January 2026, CBAM will be fully implemented, **requiring companies to purchase and submit CBAM certificates.**
- Shen et al. (2023, BAR) find that companies that export their products to the EU experience a more negative cumulative abnormal return around EU CBAM events than their counterparts





# Why CBAM?

## Why is EU proposing CBAM?

- The July 2021 package in support of the EU's climate targets is an integral part of the strategy to achieve EU's reputation as a global climate leader.
- CBAM is a climate measure that should prevent the risk of carbon leakage and support the EU's increased ambition on climate mitigation, while ensuring WTO compatibility.
- **Carbon leakage is the major reason for CBAM!**

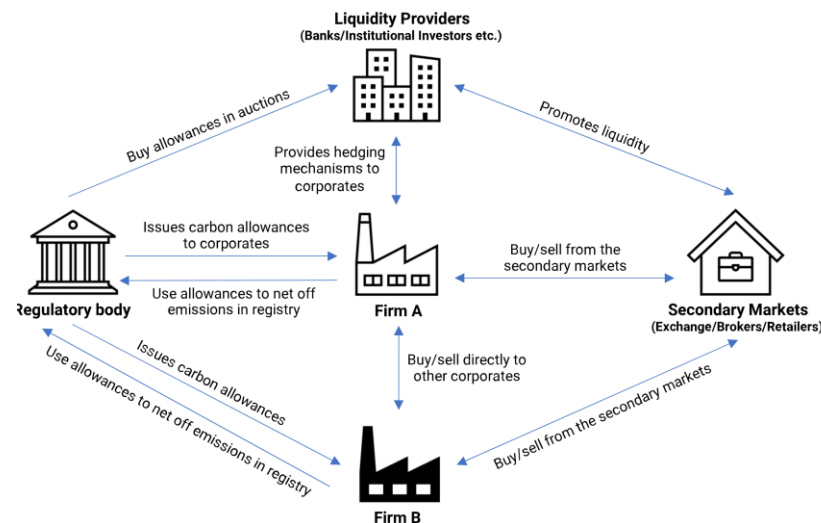
## Isn't carbon leakage already addressed by Emission Trading Scheme?

- Allowances must be bought on the ETS trading market, though a certain number of free allowances is distributed to prevent carbon leakage.
- That system has been effective in addressing the risk of leakage but it also dampens the incentive to invest in greener production at home and abroad.

# Emission Trading Scheme and CBAM

## Emission Trading Scheme (ETS) overview

- ETS is a cap-and-trade mechanism in which **emitters are allowed a certain level of emissions (the cap) and can buy or sell allowances with other firms (the trade)** to maintain their emissions within the given allowances.
- Countries provide free allocation in the initial stage and reduces them to lead firms to reduce their carbon emissions
- Firms participating in the ETS make strategic choices to optimize performance, ideally by reducing emission levels while maintaining or increasing production levels.
- ✓ Study shows that the ETS participation significantly increased carbon productivity (Jung et al., 2022)



# Comparing ETS to CBAM

## How CBAM works (ETS point of view)

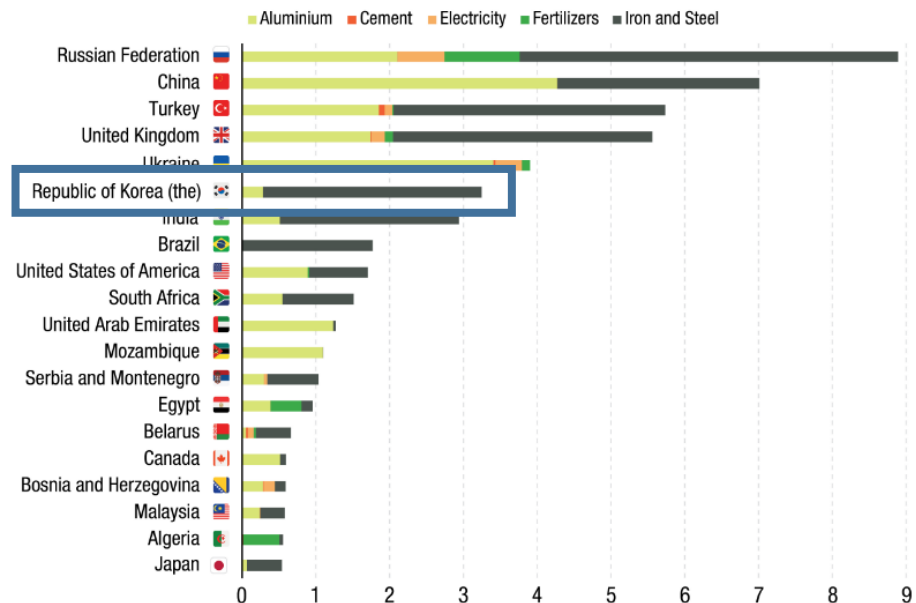
- The price of the certificates is linked to the weekly average auction price of the EU-ETS trading market.
- The MRV scheme of the EU-ETS also shares similarities but is not completely identical.
- While CBAM requires the calculation of the amount of carbon contained in each product, the EU-ETS is calculated on a site-by-site basis.
- **Korea does not qualify for the exemption because it has a large emissions quota and is not directly linked to the EU-ETS.**

	EU-ETS	K-ETS
2005-2007	1 <sup>st</sup> Commitment Period 95% free allocation 5% auctioned allowances	
2008-2012	2 <sup>nd</sup> Commitment Period 90% free allocation 10% auctioned allowances	
2013	3 <sup>rd</sup> Commitment Period 57% auctioned allowances	
2014		
2015		
2016		1 <sup>st</sup> Commitment Period 100% free allocation
2017		
2018		2 <sup>nd</sup> Commitment Period 97% free allocation 3% auctioned allowances
2019		
2020		
2021	4 <sup>th</sup> Commitment Period 100% auctioned allowances (2027→2032)	3 <sup>rd</sup> Commitment Period 90% free allocation 10% auctioned allowances
2022		
2023		
2024		
2025		
2026		
2027		
2028		
2029		
2030		
2035		

# CBAM and South Korea

## Impact on the South Korean industries

- Kim and Son (2021) showed that the **CBAM will affect South Korea's input structure more than it will affect that of China and Japan, as South Korea tends to import intermediate goods from overseas.**
- In steel/iron industry, the most affected sector of EU CBAM, Korea is the 5th largest exporter to the EU. All 5 sectors account for 5.6% (3.6 bn usd) of Korea's total exports to EU in 2021.
- South Korea would need to spend considerable effort and funds to re-optimize the structure of its total output of basic metal manufacturing due to the change in the related Global Value Chain (GVC) after CBAM introduction.



# Major challenges related to the CBAM enactment

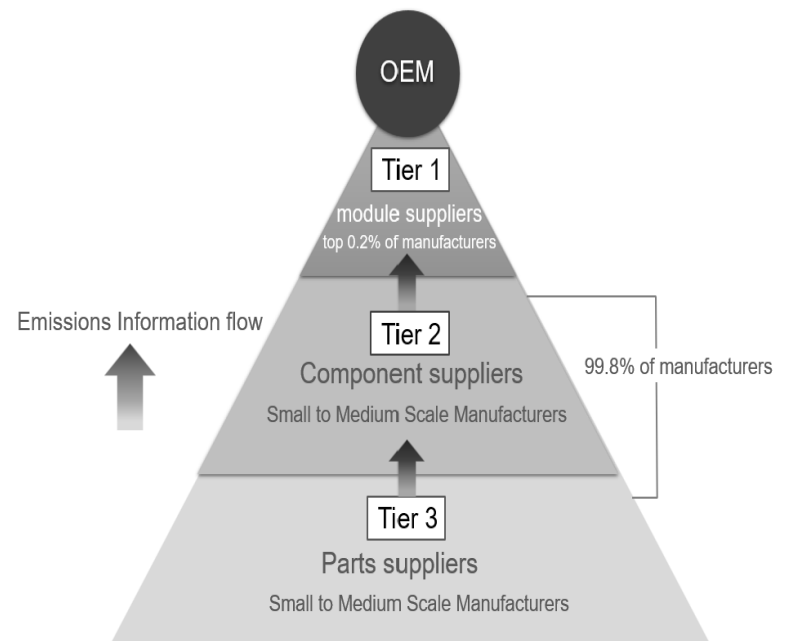
## Lack of EC certified accreditation institutions in South Korea

- Accurately quantifying the carbon content of imported goods requires reliable data on the carbon intensity of production processes across different countries.
- To address this challenge, the EU has proposed that both certification and accreditation bodies participate in CBAM.
- South Korea faces following challenges:
  - EU Commission has restricted the evaluation of the underlying emissions of CBAM-eligible goods to EU ETS verifiers, and only EC-recognized accredited certification entities can attest to emissions without requiring a separate verification procedure. Unfortunately, there are currently **no EC-recognized accredited certification bodies operating in Korea.**
  - Sharing actual emission data certified by product type with importers and requiring third-country producers to report to importers who then forward the information to the EU raises security concerns such as trade secret leakage, as producer information is kept and submitted by the importer.
  - If the results of the Korean verification are cross-checked by EC verifiers, the **costs for Korean companies could escalate, including time delays.**

# Major challenges related to the CBAM enactment

## Challenges in calculating product-level carbon emission

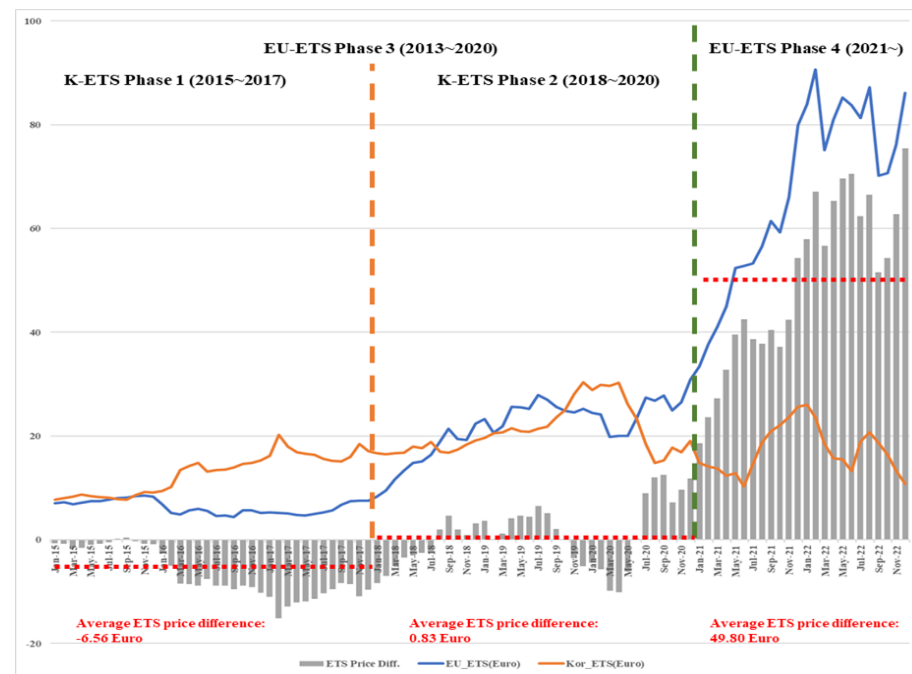
- Determining the amount of **embedded carbon accurately is highly challenging**.
  - It requires comprehensive understanding of the value chain, environmental standards, and production costs associated with a given product.
- In cases where actual emissions data is unavailable, embedded emissions are calculated using a default value (EC).
  - The default value is determined by using the **average of the top 10% of emissions in the EU for the corresponding product**, if country-specific data is unavailable.
- Compliance costs associated with CBAM are relatively higher for SMEs than for larger companies.



# Major challenges related to the CBAM enactment

## ETS price gap between the EU and South Korea

- Huge ETS price gap between the EU and South Korea will lead to **higher CBAM costs** for the Korean companies.
- Why is EU ETS more expensive?
  - Tighter supply of free allowance
  - Market Stability Reserve (MSR), which withdraws surplus allowances from the market
  - Strong demand for carbon allowances in the EU ETS due to the increasing ambition of the EU's climate targets



# Potential policies

## How to reduce (or hedge) CBAM shock?

- Ensuring international recognition of carbon emission accreditation
  - To enable internationally recognized verification outcomes from a nationally recognized accreditation body, KOLAS needs to sign an MLA with the IAF
  - To sign the IAF MLA, a comprehensive accreditation system must be established that incorporates accreditation bodies, certification bodies, and training institutes that conform to global standards
- Facilitating a two-pronged strategy to advance carbon accounting
  - Government support for carbon measuring at product level
  - Government support for greenhouse gas reduction tools and mechanism
- Incentives for the South Korean firms
  - Financial assistance such as vouchers to manufacturing firms affected by CBAM



# Literature review

## Criticism

- Lim et al. (2021) have raised concerns that the policy could trigger a **vicious cycle of trade retaliation** and cause trade distortions that drive up costs for global economies.
- Clora et al. (2023) evaluated the impact of the CBAM design. Their modeling results pointed to significant carbon leakage and emissions reductions in the EU's EITE sector. They are concerned that the **complexity of CBAM will create a significant administrative burden** for both EU importers and exporters from other countries
- Zhong and Pei (2022) have cautioned that the **burden of the CBAM will fall unevenly** on regions, with countries like China, Russia, and India being hit hardest.

## Complement

- Morsdorf (2022) have proposed complementary measures that could help mitigate the adverse effects of the CBAM. These measures could include **reducing carbon leakage** rates, providing benefits to energy-intensive industries, and increasing government revenues.
- Huang et al. (2022) argue that carbon markets need to be improved at the government level, including lowering the threshold to enter the carbon markets by introducing practical rules and regulations and expanding the scope of participation.



# Summary

## Key takeaways

### General

- The lack of uniformity in global climate policy has raised concerns about competitiveness and carbon leakage, where carbon emissions are shifted to countries with less stringent environmental policies.
- The aim of the CBAM is to counteract the negative impact of unilateral climate policies on competitiveness and incentivize other countries to participate in combating climate change.
- **Studying how CBAM would change firm's behavior and well-being is needed.**

### Impact on South Korea

- As there is no accredited organization that has signed a MLA with the International Accreditation Forum (IAF) for product-level carbon emissions, the Korean government needs to develop a certification, verification, and training organization that meets global standards.
- Necessary policies and researches are thus needed.



# Q&A

# Thank You

