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6º CONGRESO INTEGRADO DE  
**LOGÍSTICA,  
ZONAS FRANCAS  
Y PUERTOS 2023**

Transición exportadora: el camino hacia la diversificación y la internacionalización.

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

**UNCTAD**



# Puertos y transporte marítimo: Tendencias claves y perspectivas futuras

Jan Hoffmann

Head, Trade Logistics Branch, UNCTAD

[Jan.Hoffmann@UNCTAD.org](mailto:Jan.Hoffmann@UNCTAD.org) -

19 mayo 2023

- 1) BC:  
Long term trends  
**Before Corona**
  
- 2) DC:  
Supply chain crisis  
**During Corona**
  
- 3) AC:  
Long term perspectives  
**After Corona**



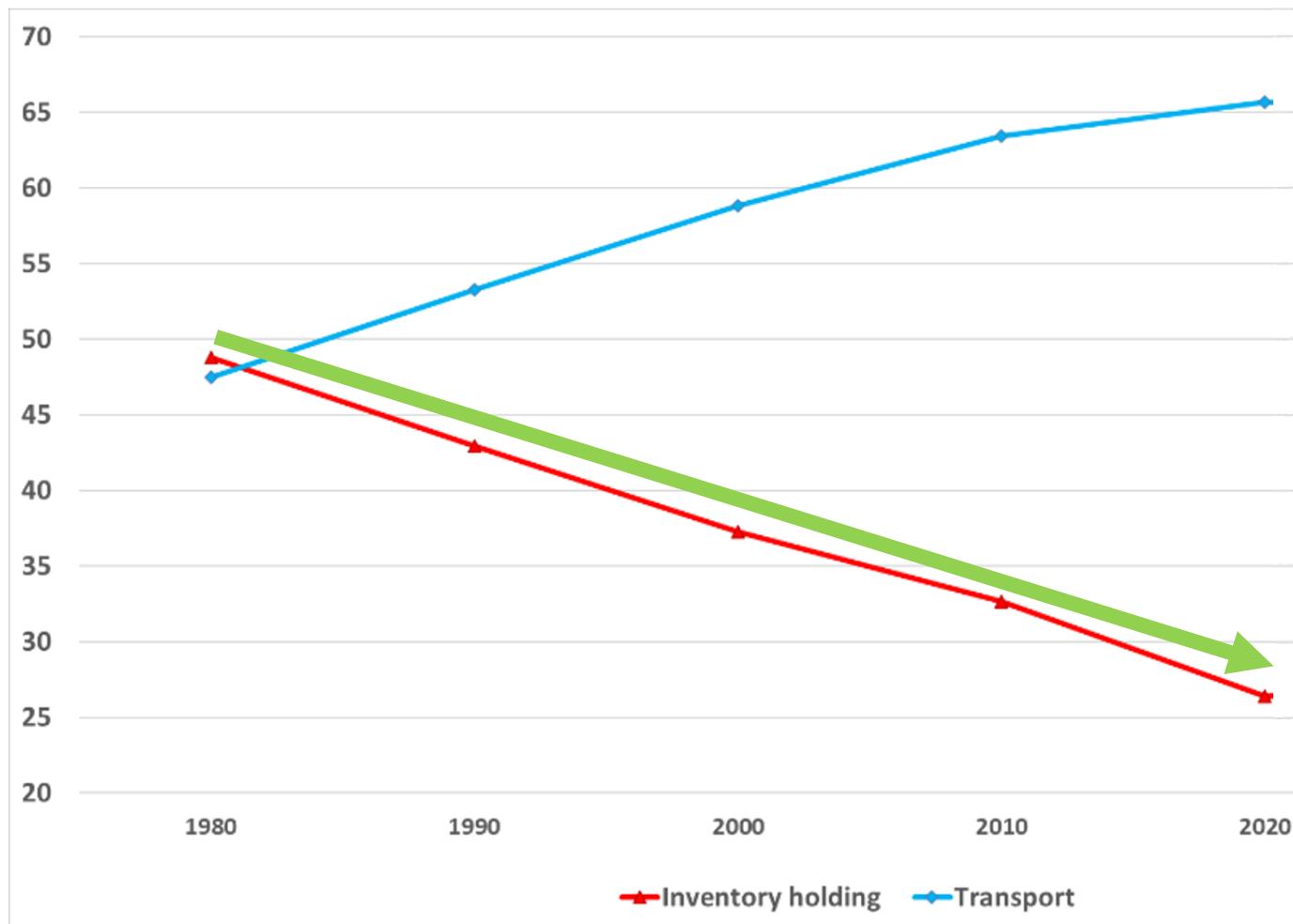
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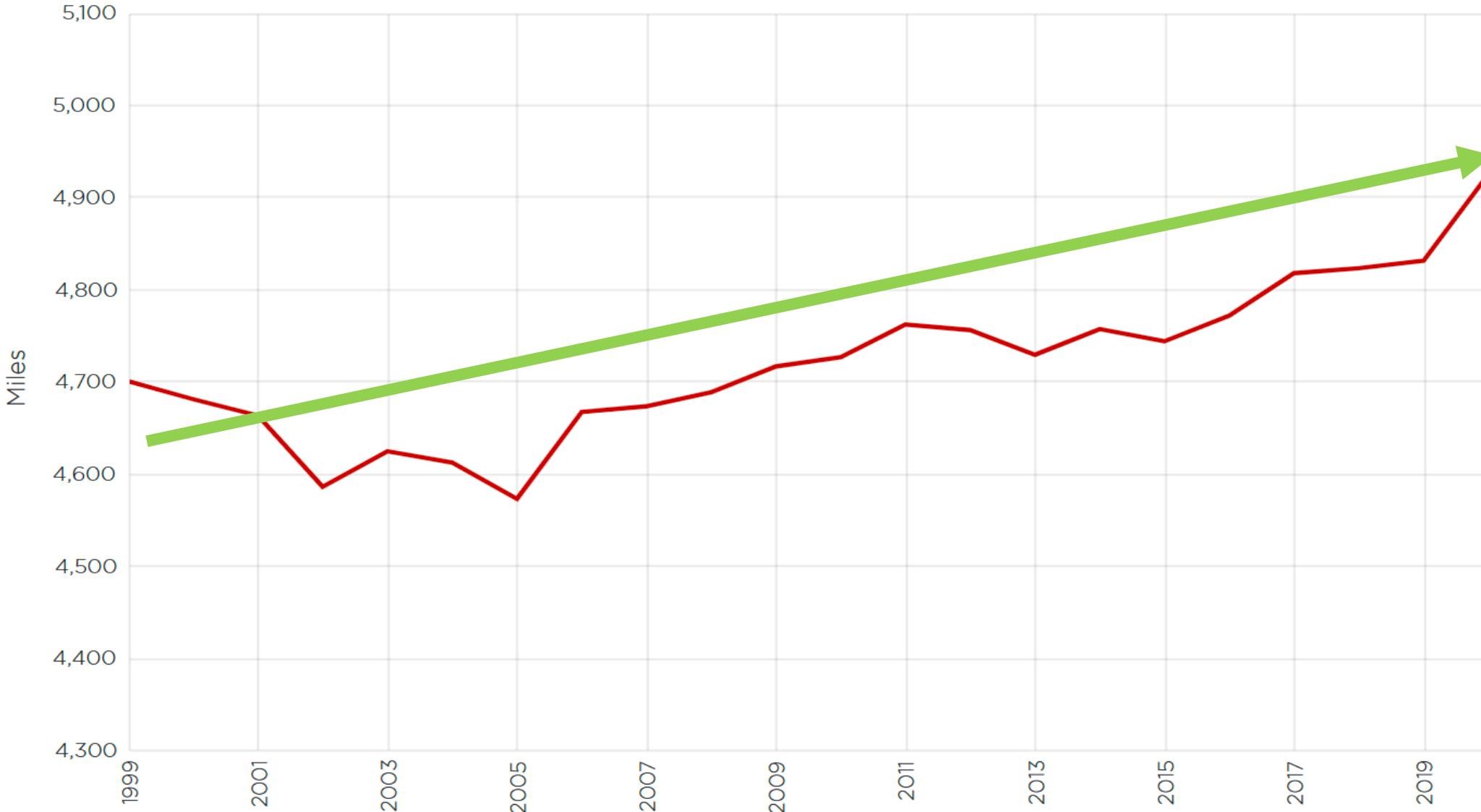


## Share (per cent) of transport and inventory holding expenditure within total logistics expenditure, United States



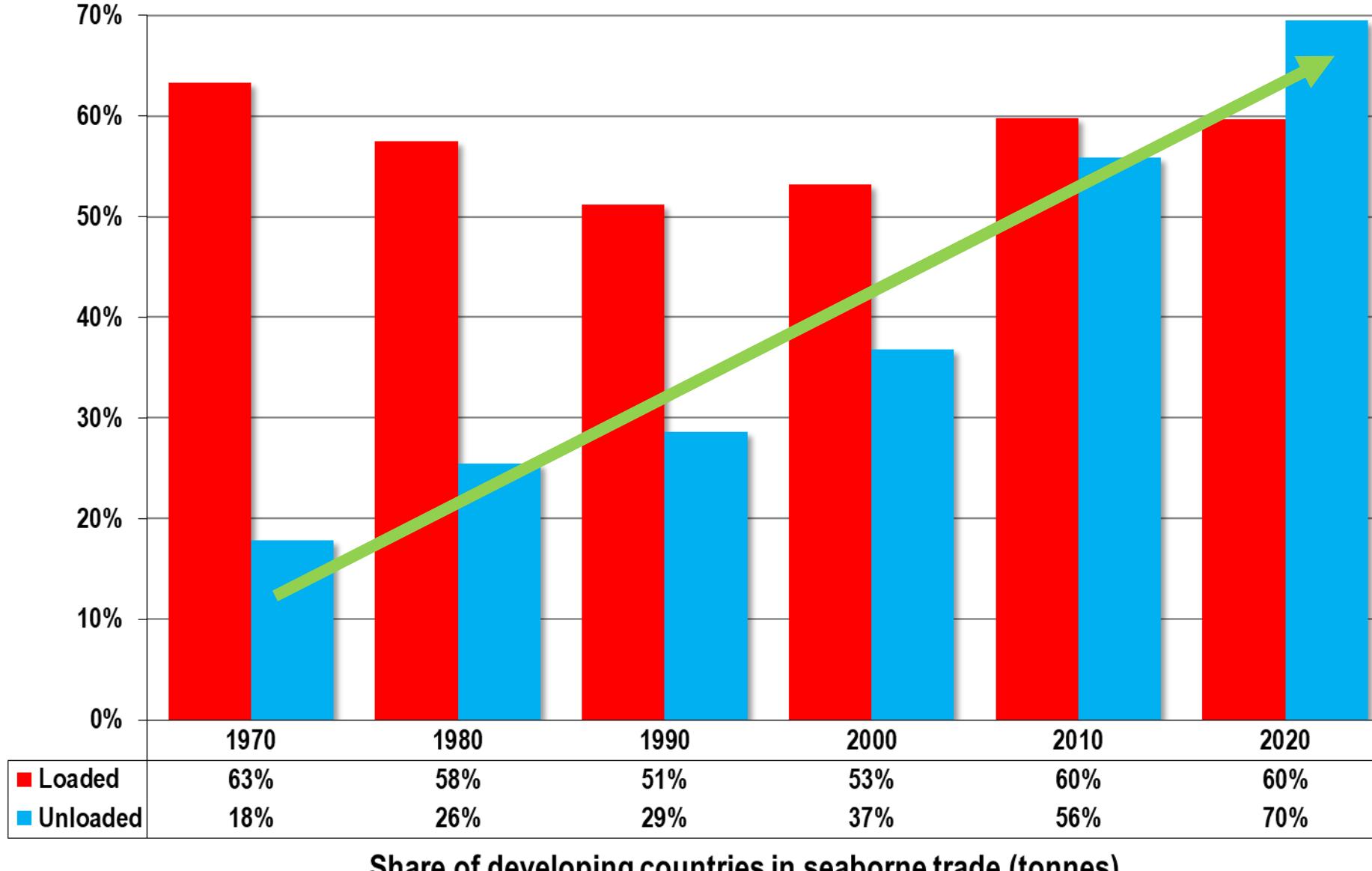
Source: UNCTAD, based on data from CSCMP Annual State of Logistics Report.  
Presented in Issues Note on Geography of Trade, TDB

### World Seaborne Trade Average Haul Miles



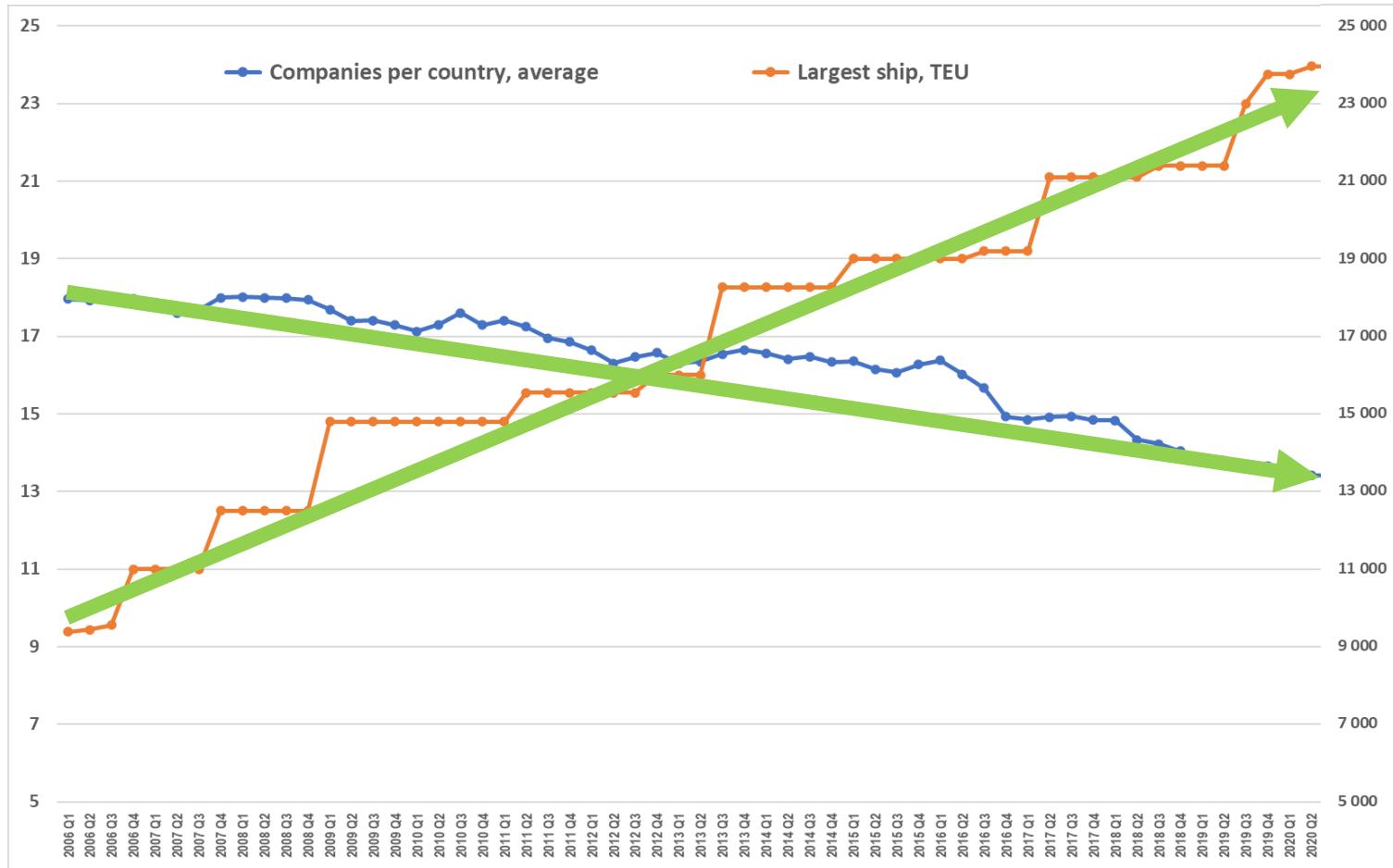
Source: Clarksons Research

## Seaborne trade: share of developing countries



Source: Review of Maritime Transport 2021

# Bigger ships – fewer companies two sides of the same coin

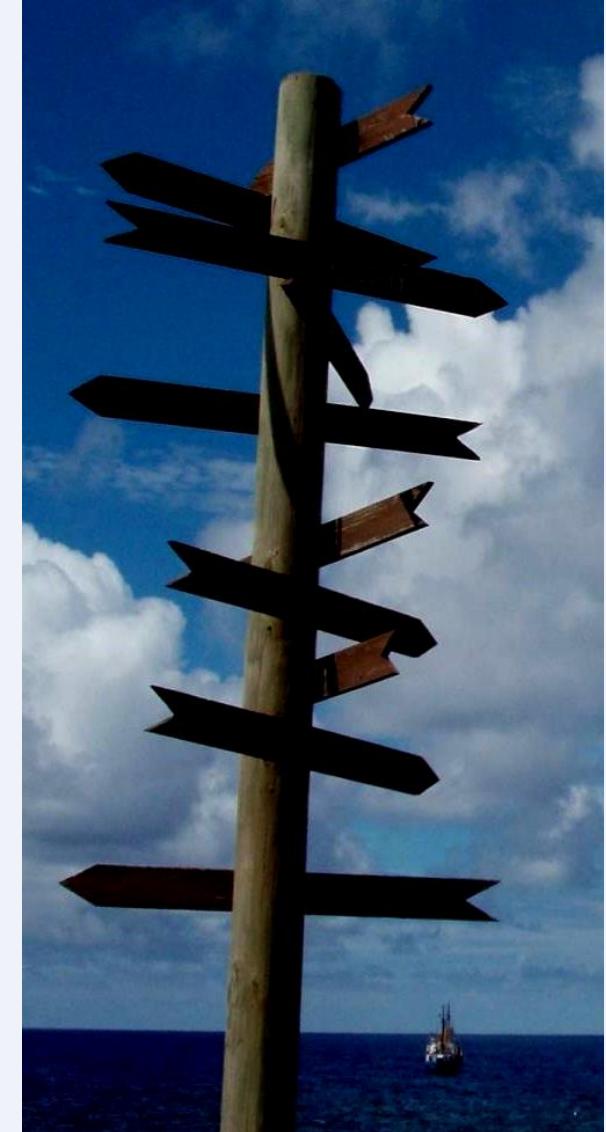


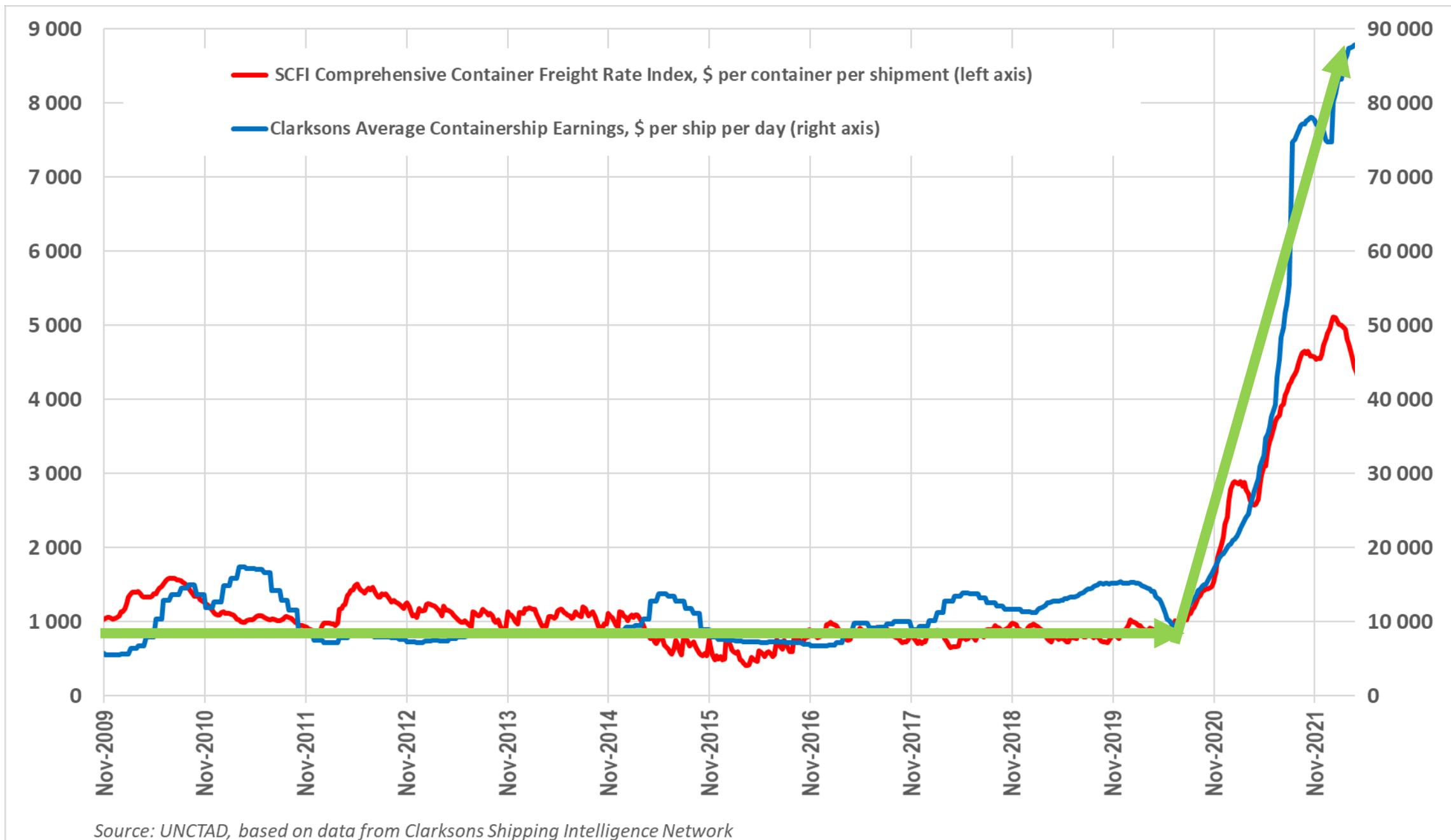
Source: UNCTAD, RMT 2022, based on data provided by  
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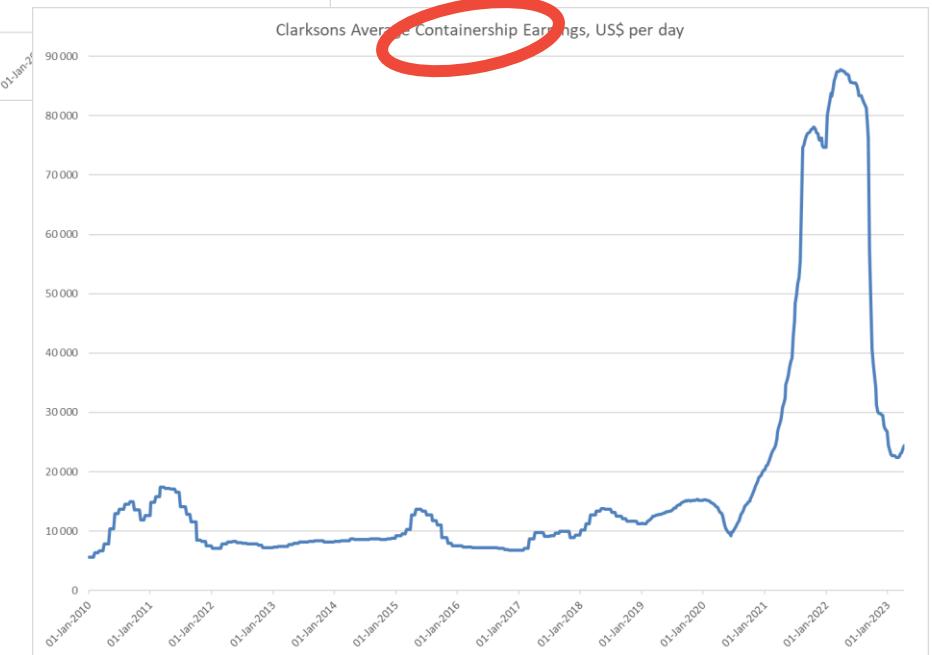
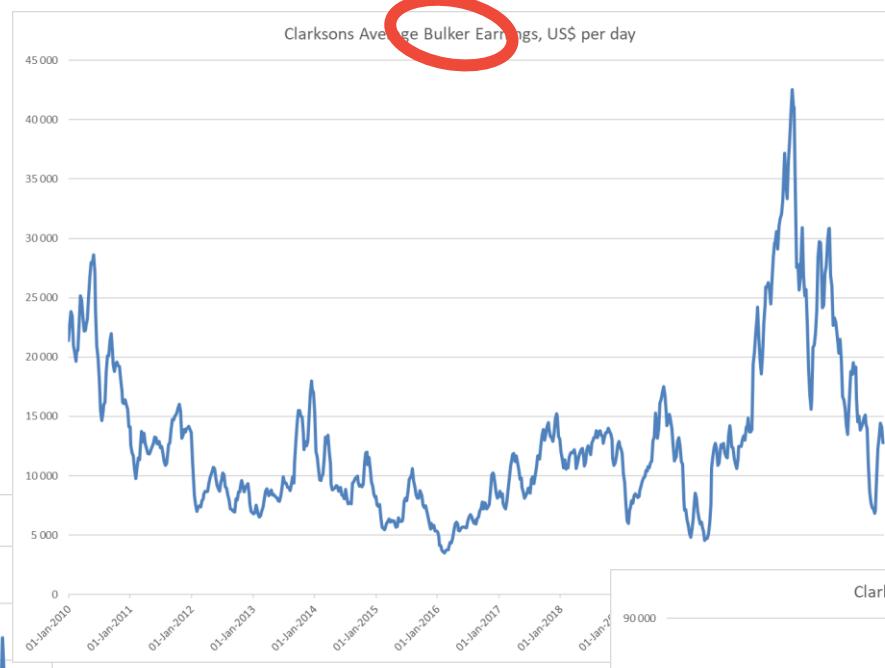
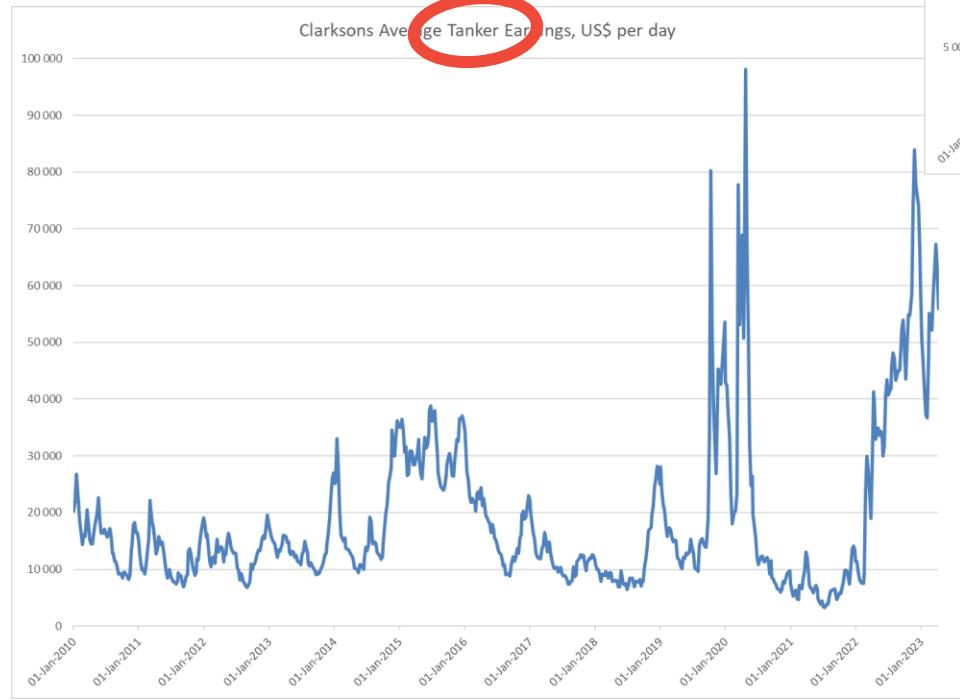
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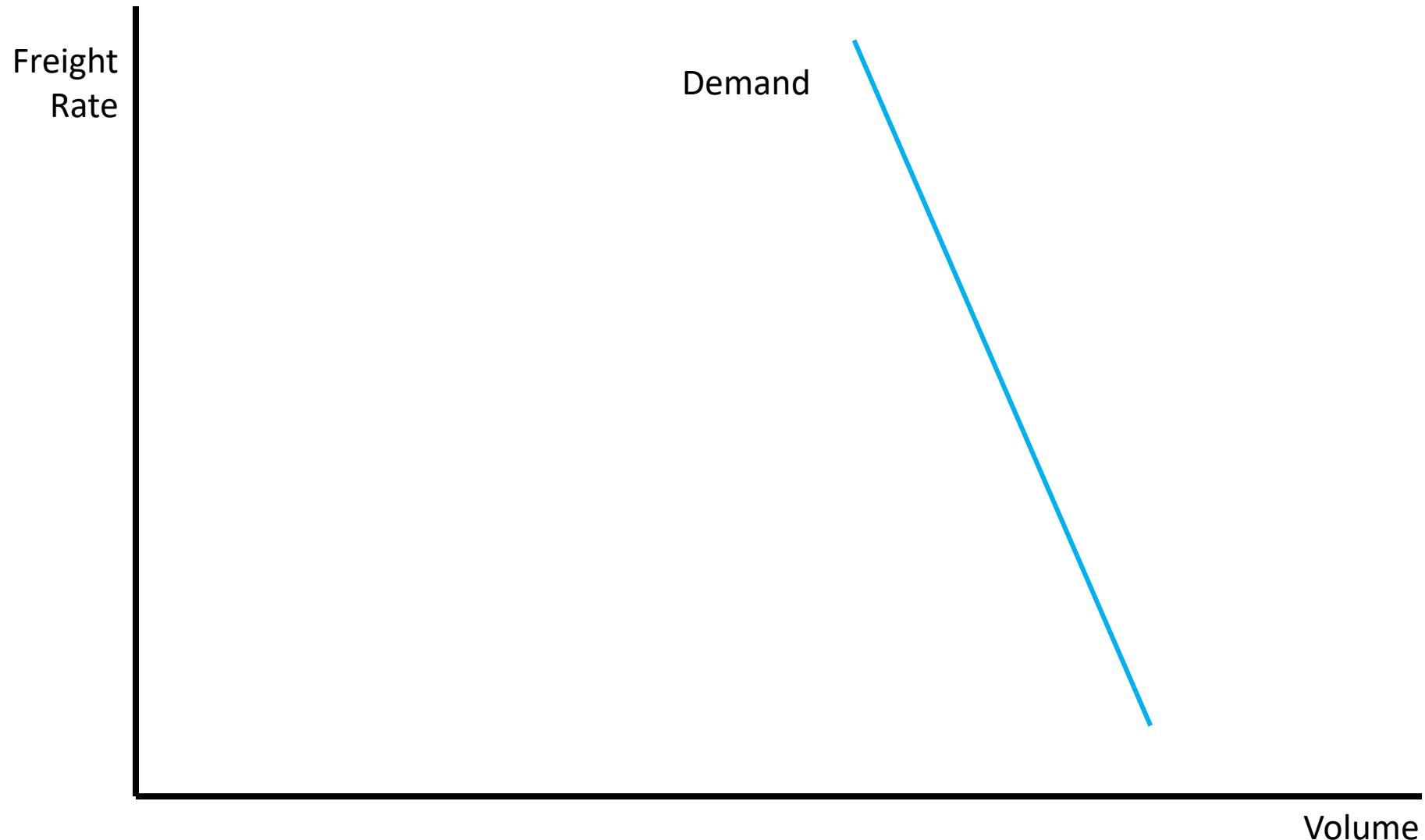


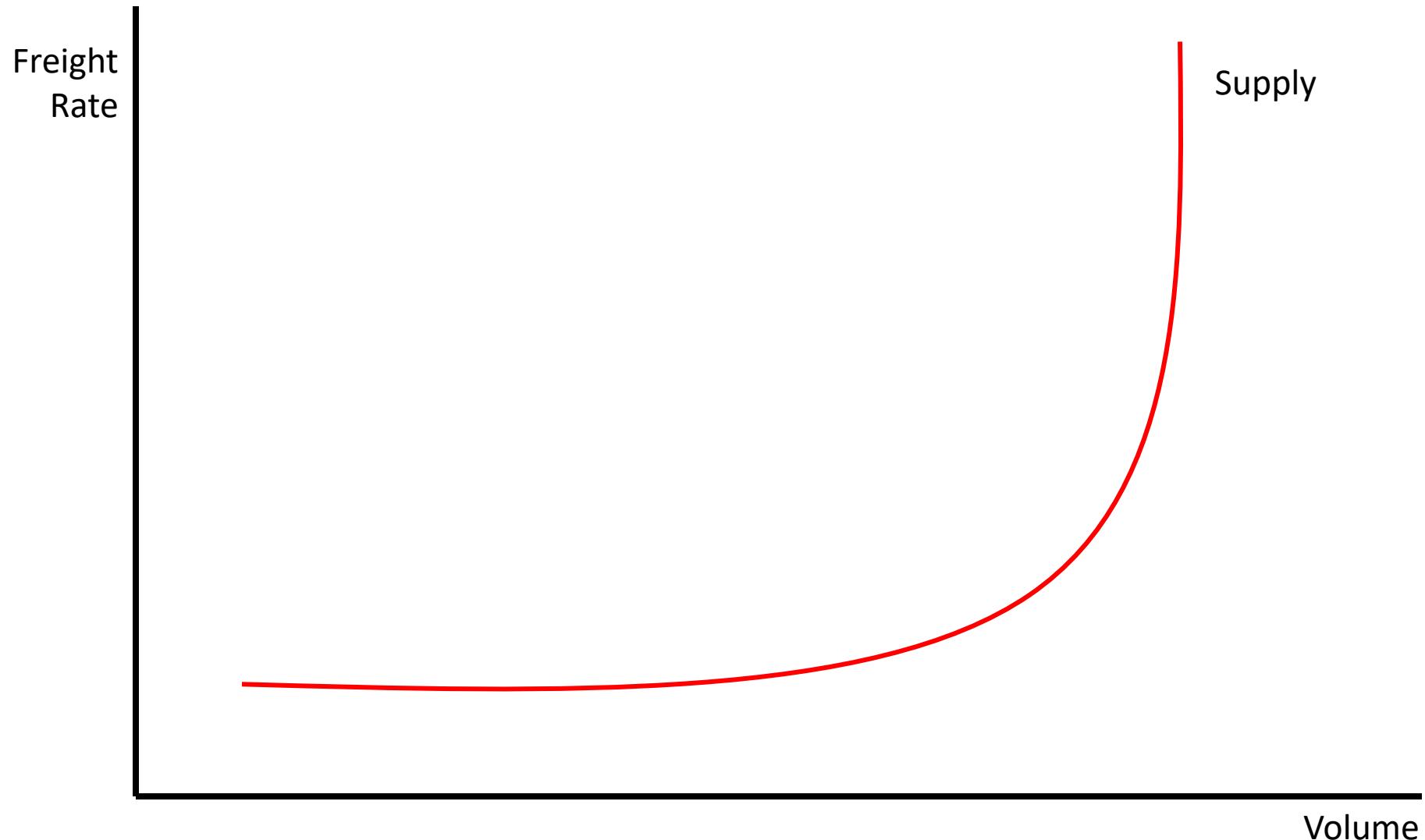


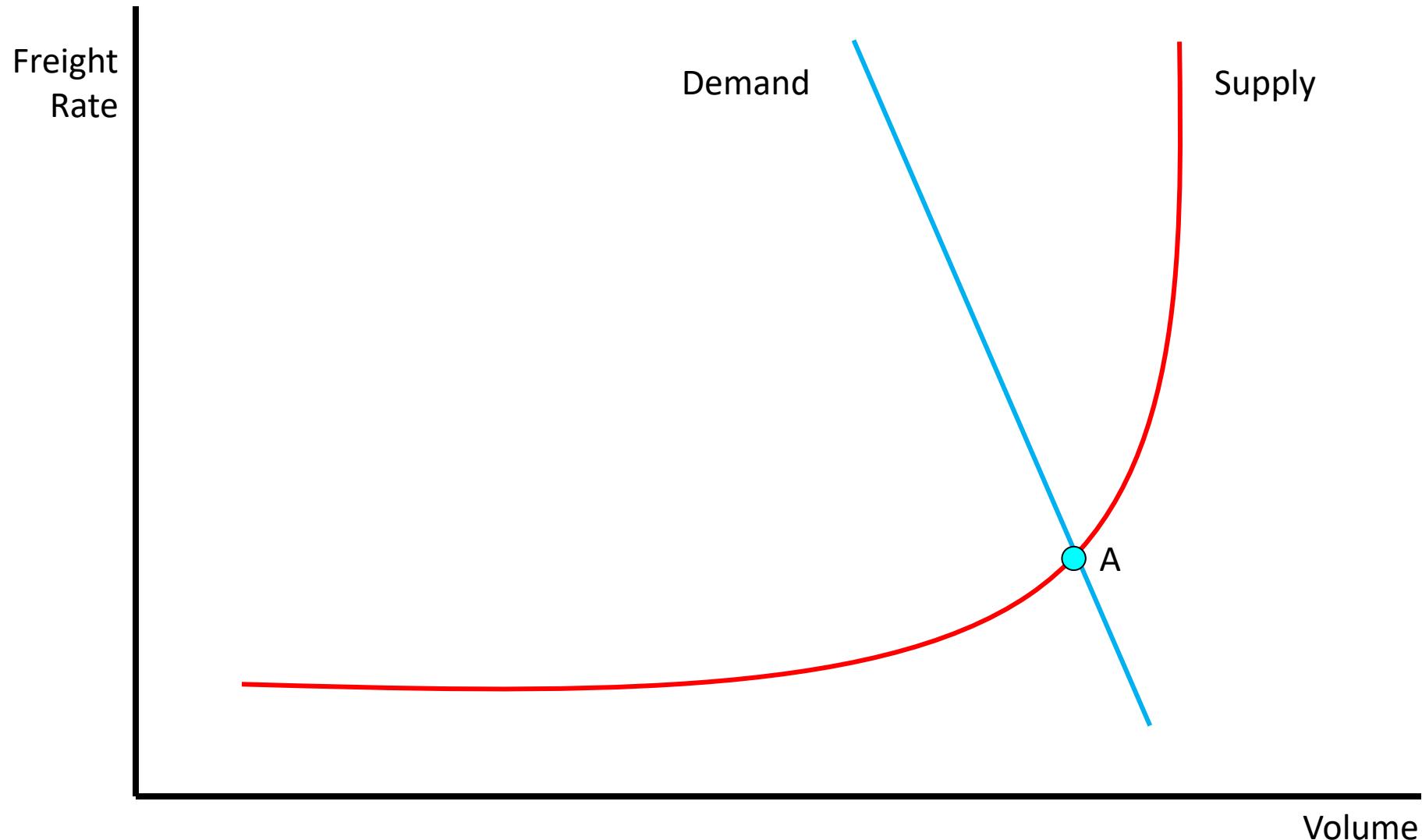
# Different markets

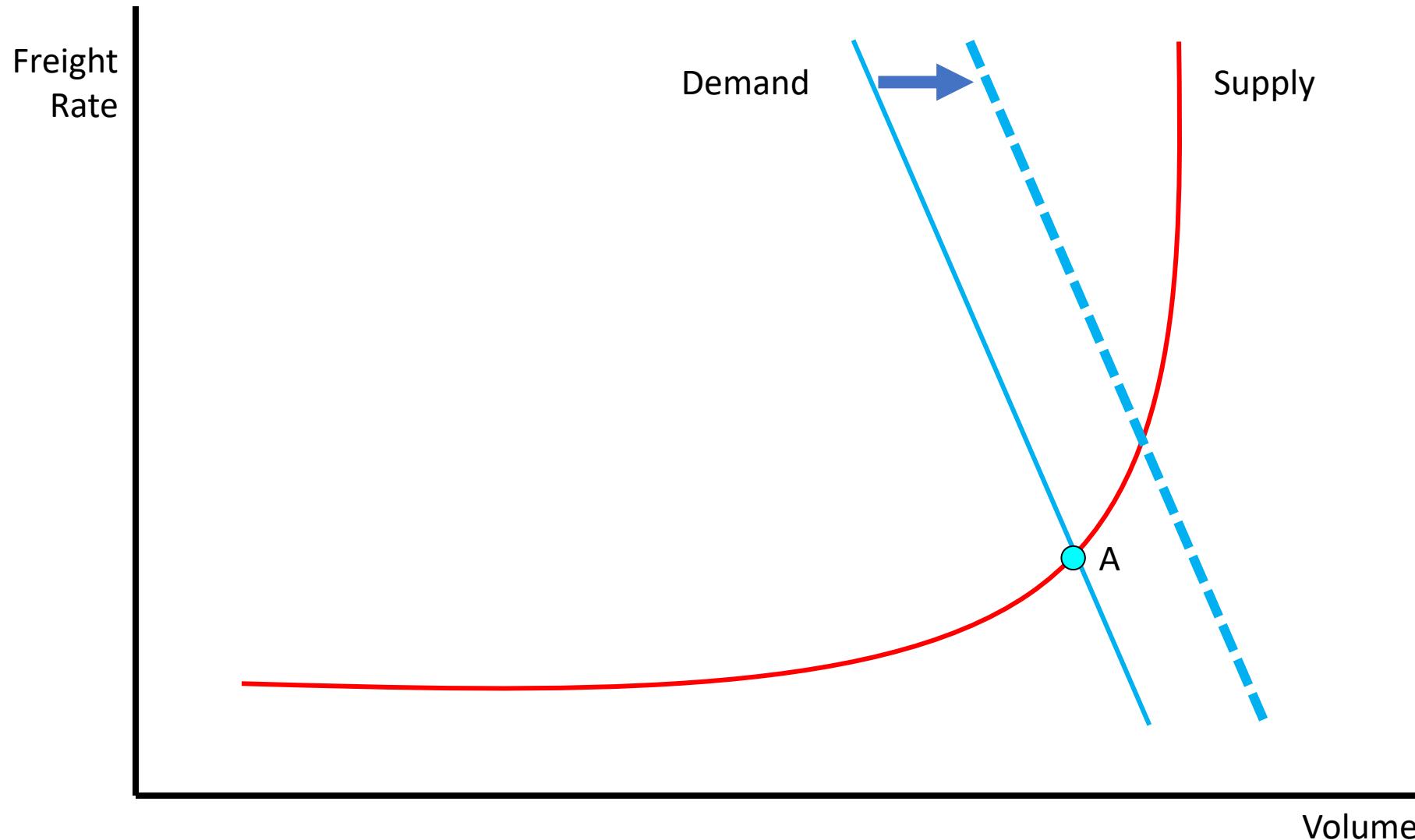


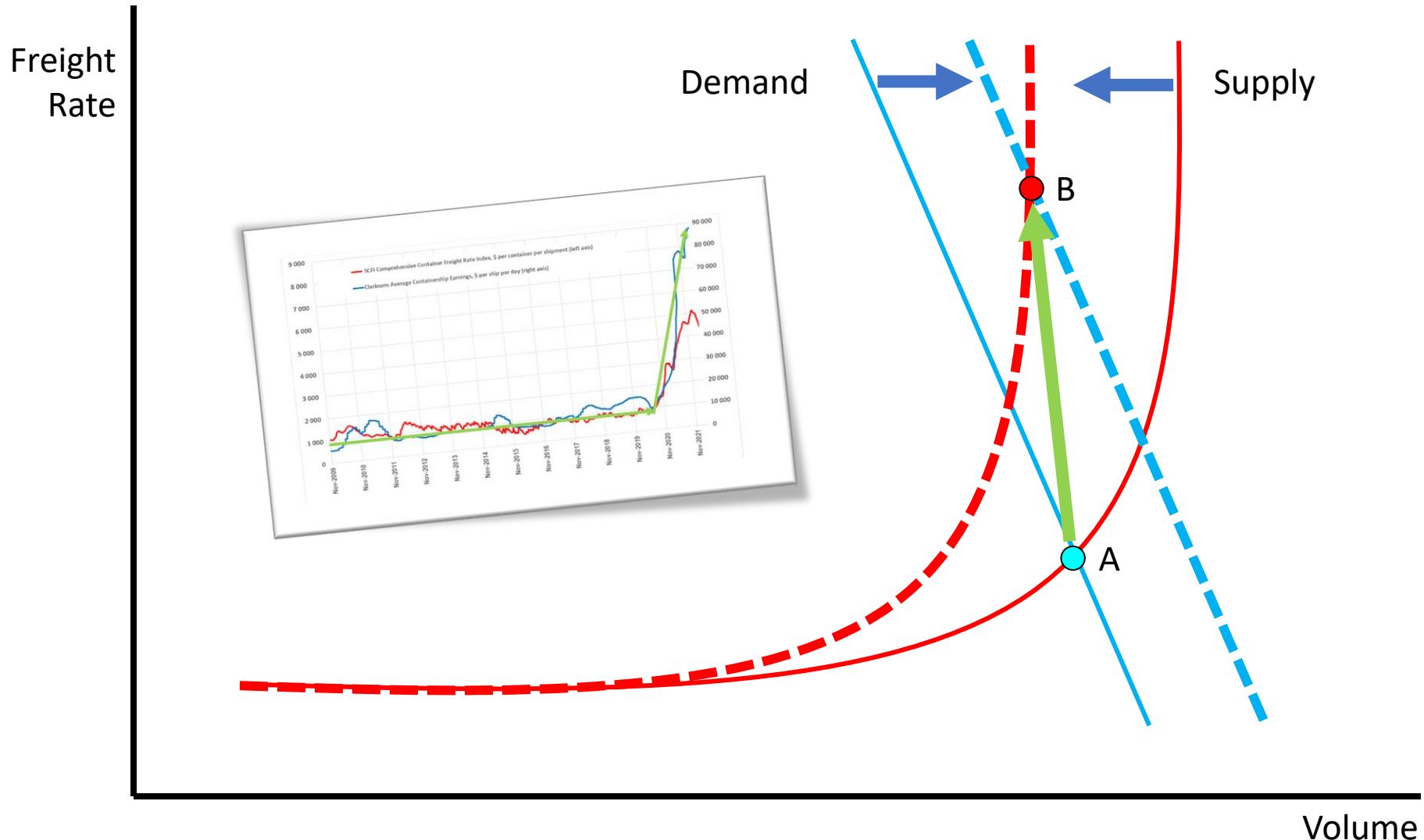
Source: UNCTAD, based on data provided by Clarksons Research Shipping Intelligence Network (SIN)  
January 2010 to April 2023









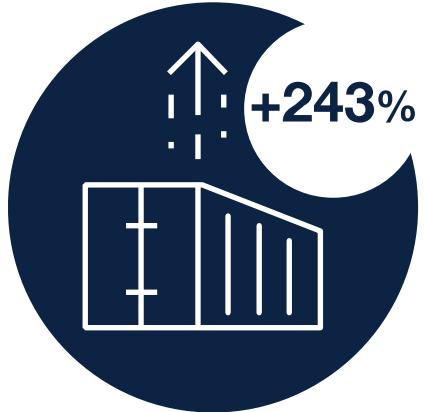


# SIMULATED IMPACT OF CONTAINER FREIGHT RATE SURGES

## Hardest hit will be SIDS

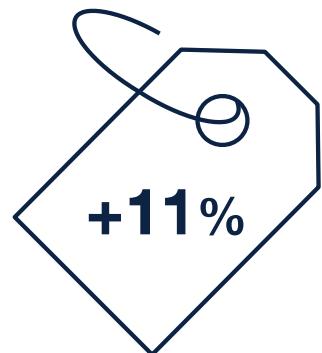
### Simulation assumption:

Sustained increase in container freight rates

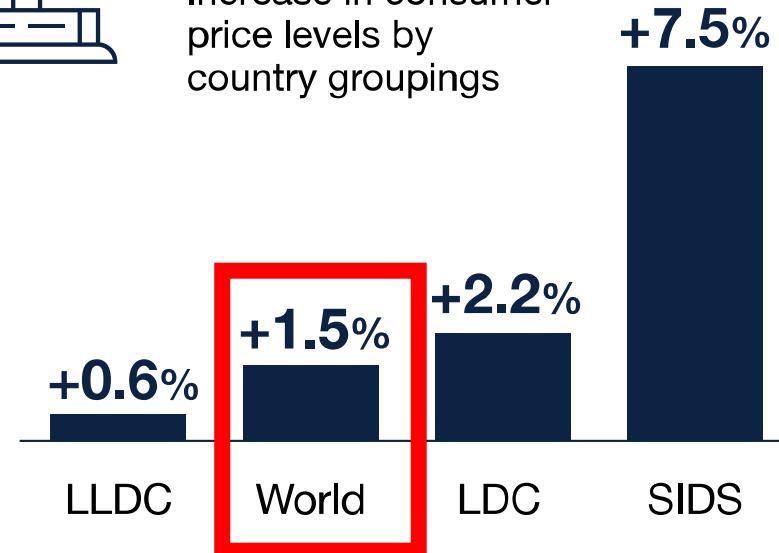


### Simulation results:

Increase in global import price levels



Increase in consumer price levels by country groupings



# SIMULATED IMPACT OF CONTAINER FREIGHT RATE SURGES

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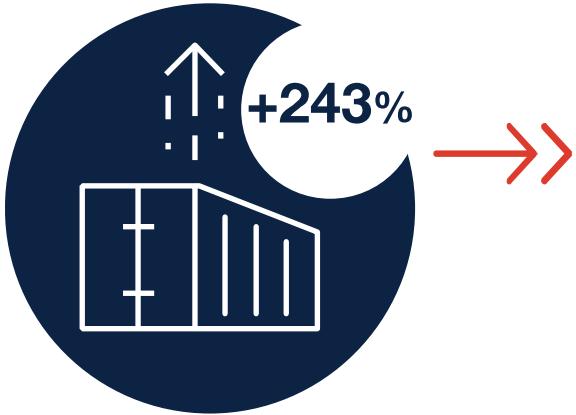
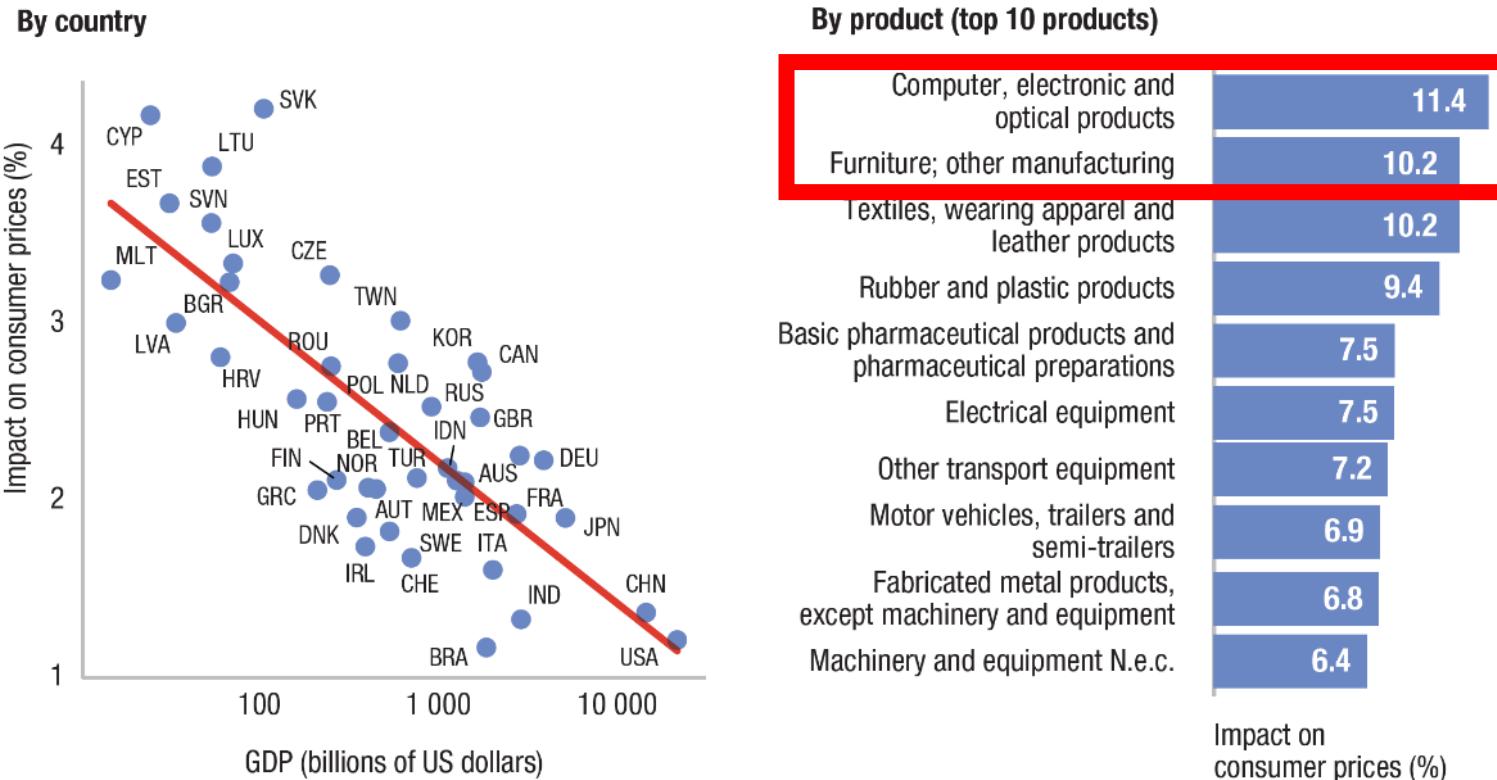
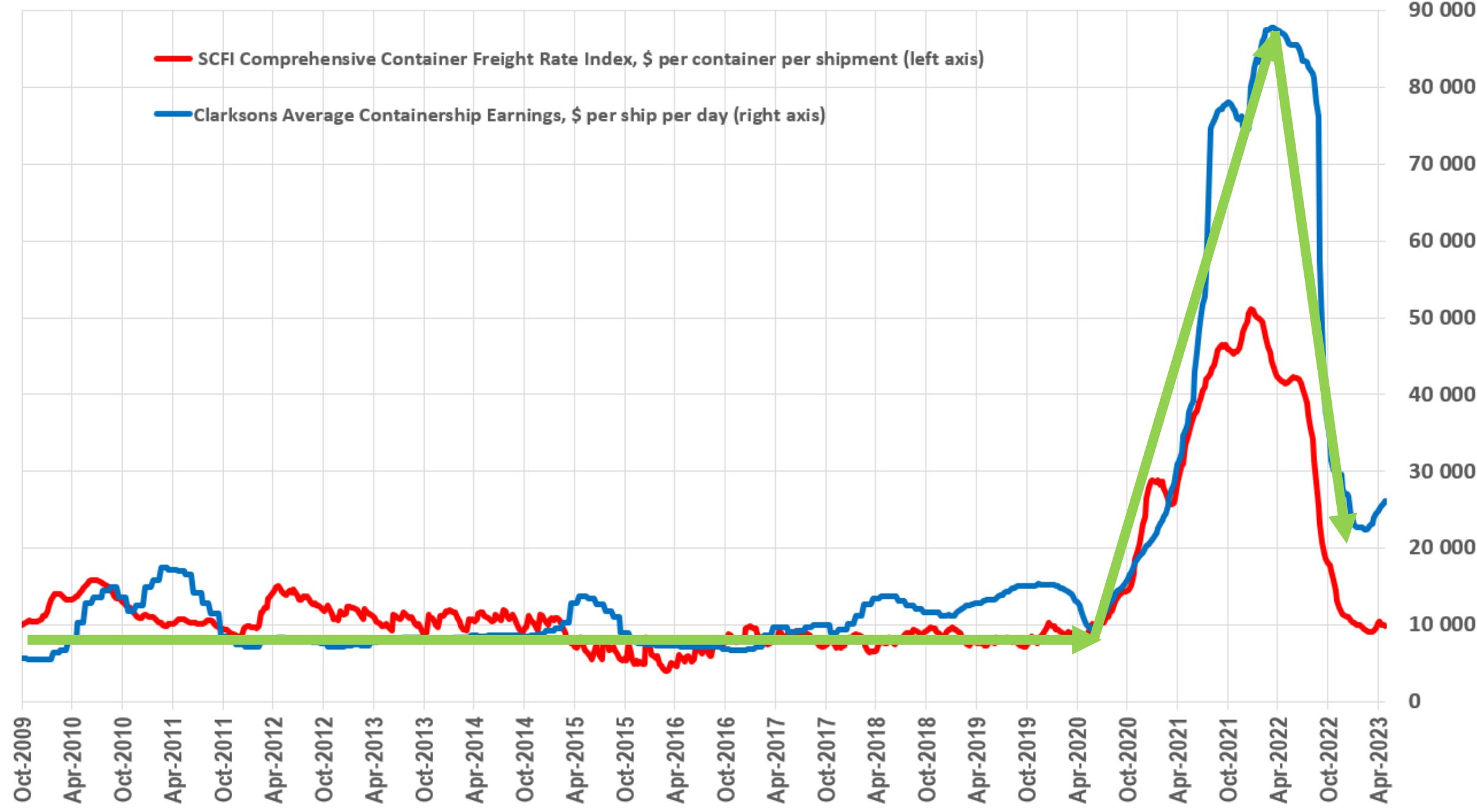


Figure 3.9 Simulated impacts of the container freight rate surge on consumer price levels, by country and by product



Sources: UNCTAD calculations based on the WIOD (accessed 7–8 June 2021) developed by Timmer et al., 2015, Clarksons Research, *Shipping Intelligence Network* (accessed 2 September 2021), UNCTADstat (accessed 24 June 2021), and the Centre d'Études Prospectives and d'Informations Internationales, *Gravity Database* (accessed 21 May 2021).

Note: The impacts of the container freight rate surge on prices are based on a 243 per cent increase in the CCFI between August 2020 and August 2021. The simulated impacts on price levels are long-term impacts, i.e., the simulation assumes that the current container freight rate surge and the corresponding increases in production costs are fully passed to consumers. See technical note 2 for the detail of the methodology.



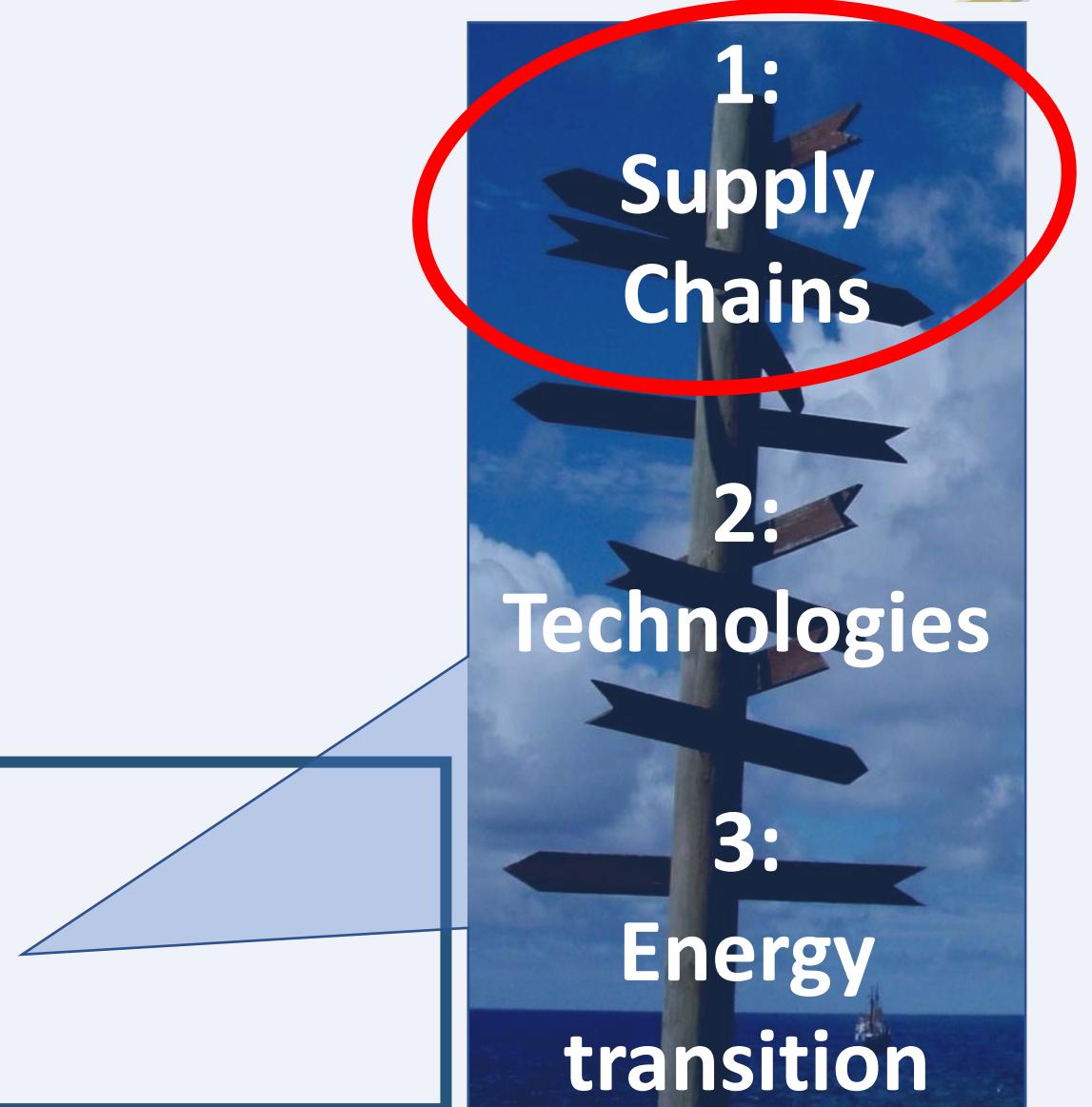
Source: UNCTAD, based on data from Clarksons Shipping Intelligence Network,

up to 18 May 2023

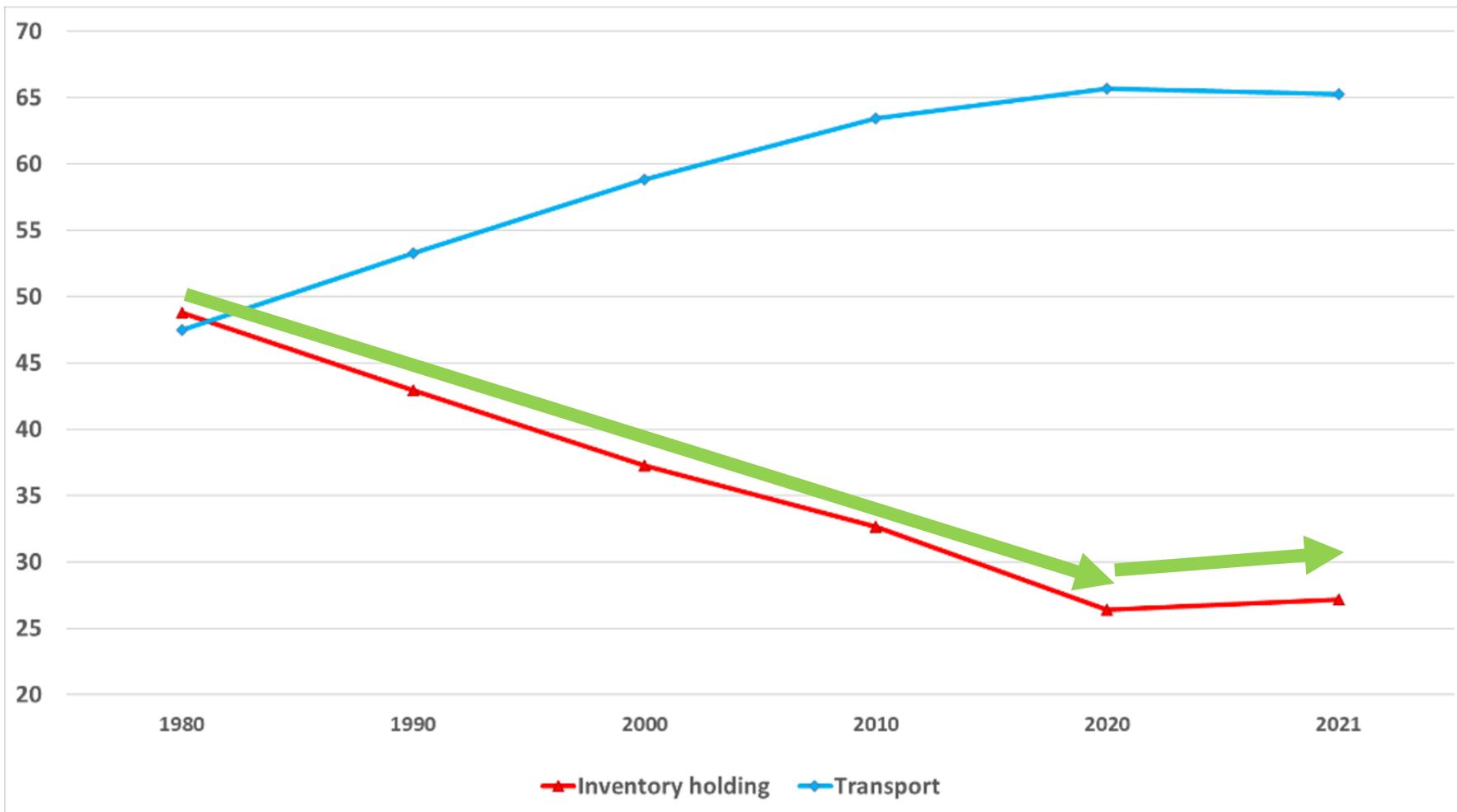
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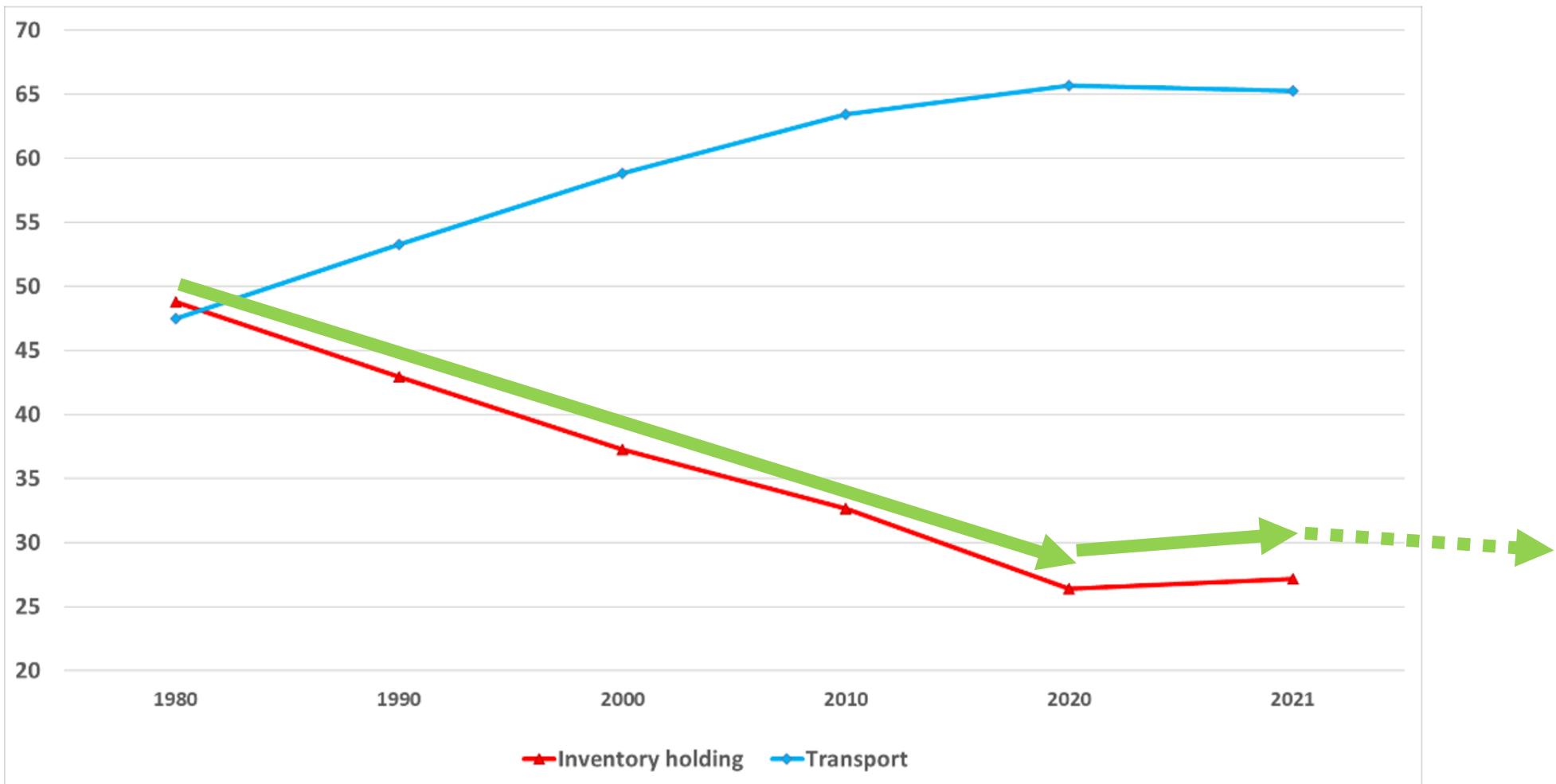


## Share (per cent) of transport and inventory holding expenditure within total logistics expenditure, United States, 1980 - 2021



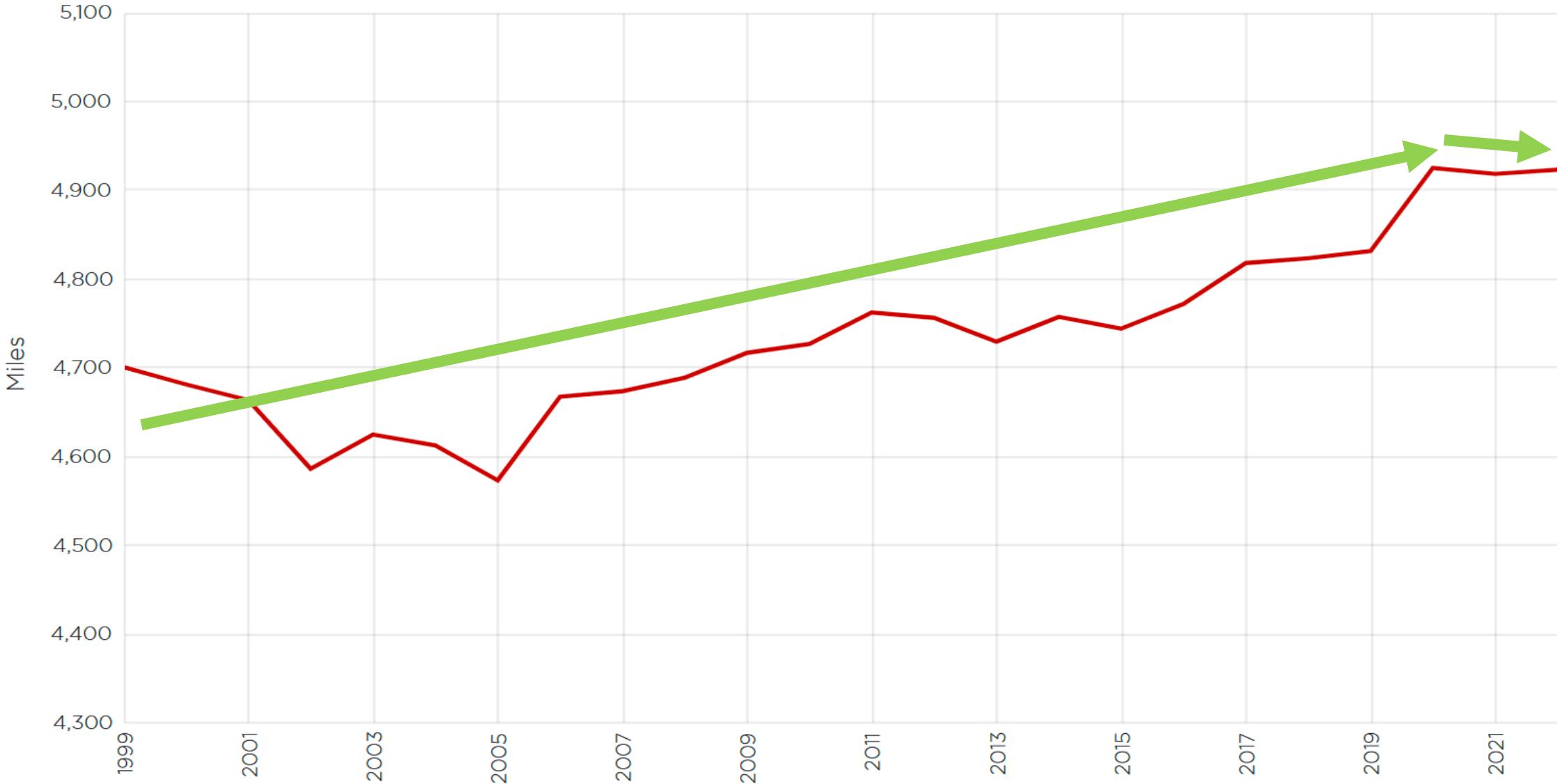
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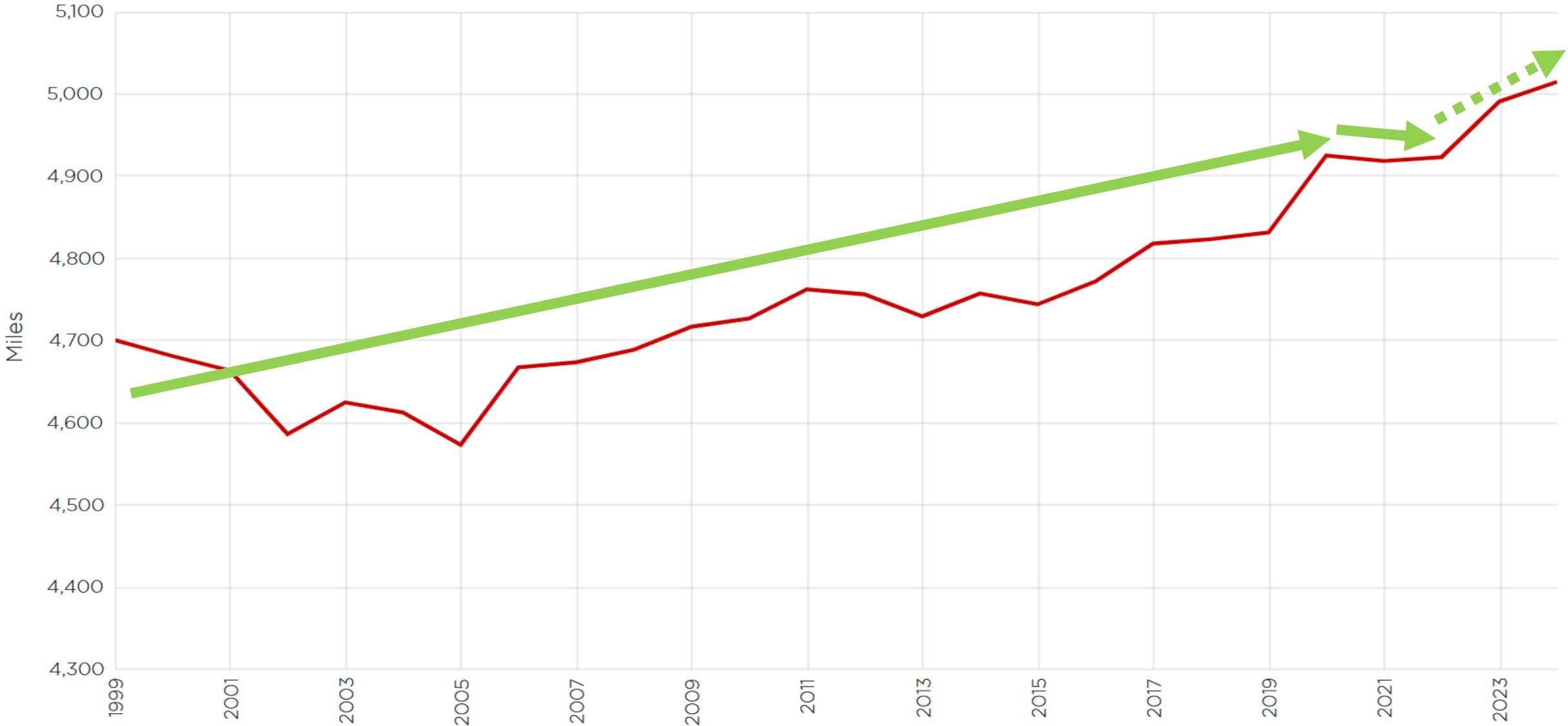
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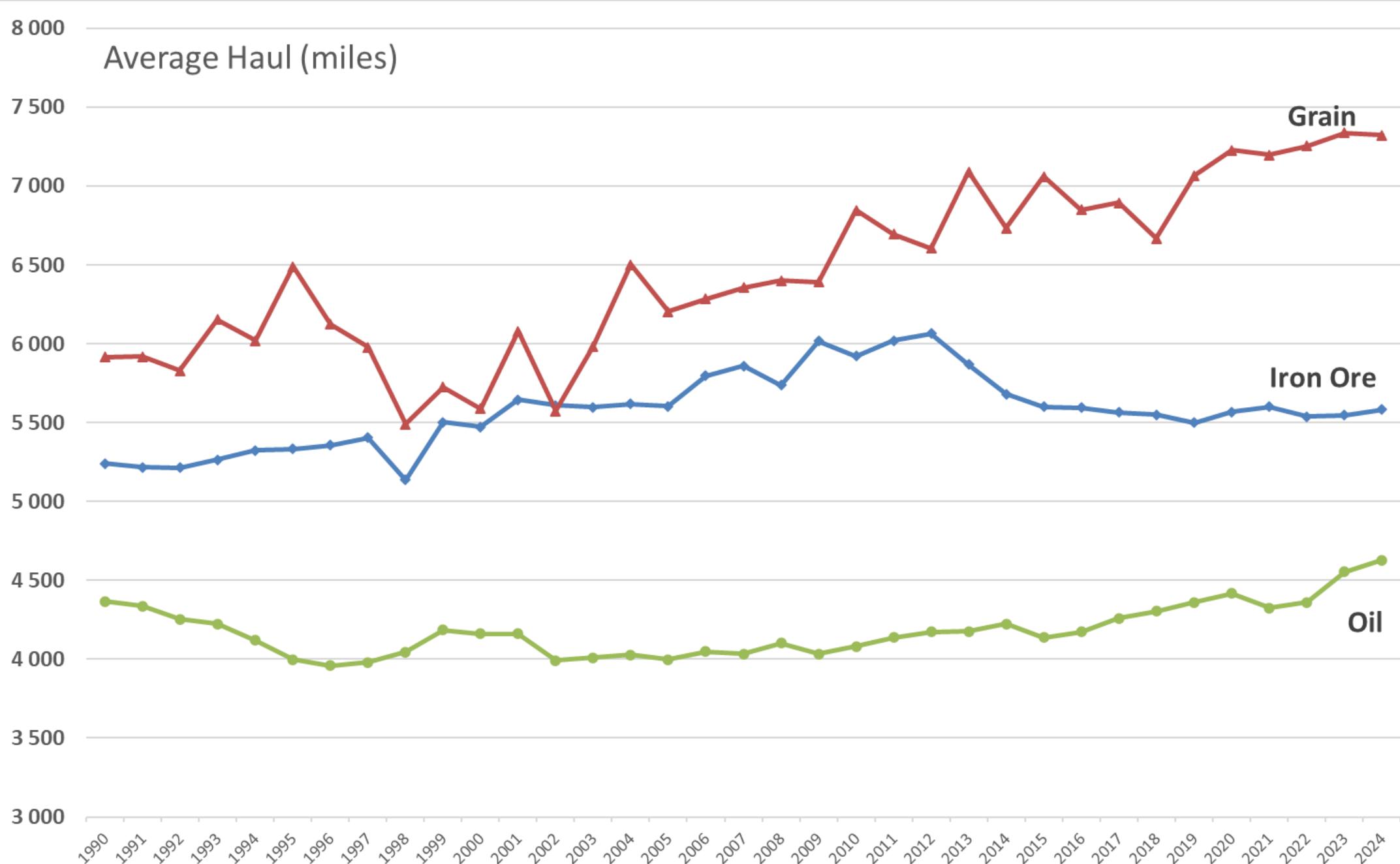


Source: Clarksons Research

### World Seaborne Trade Average Haul Miles

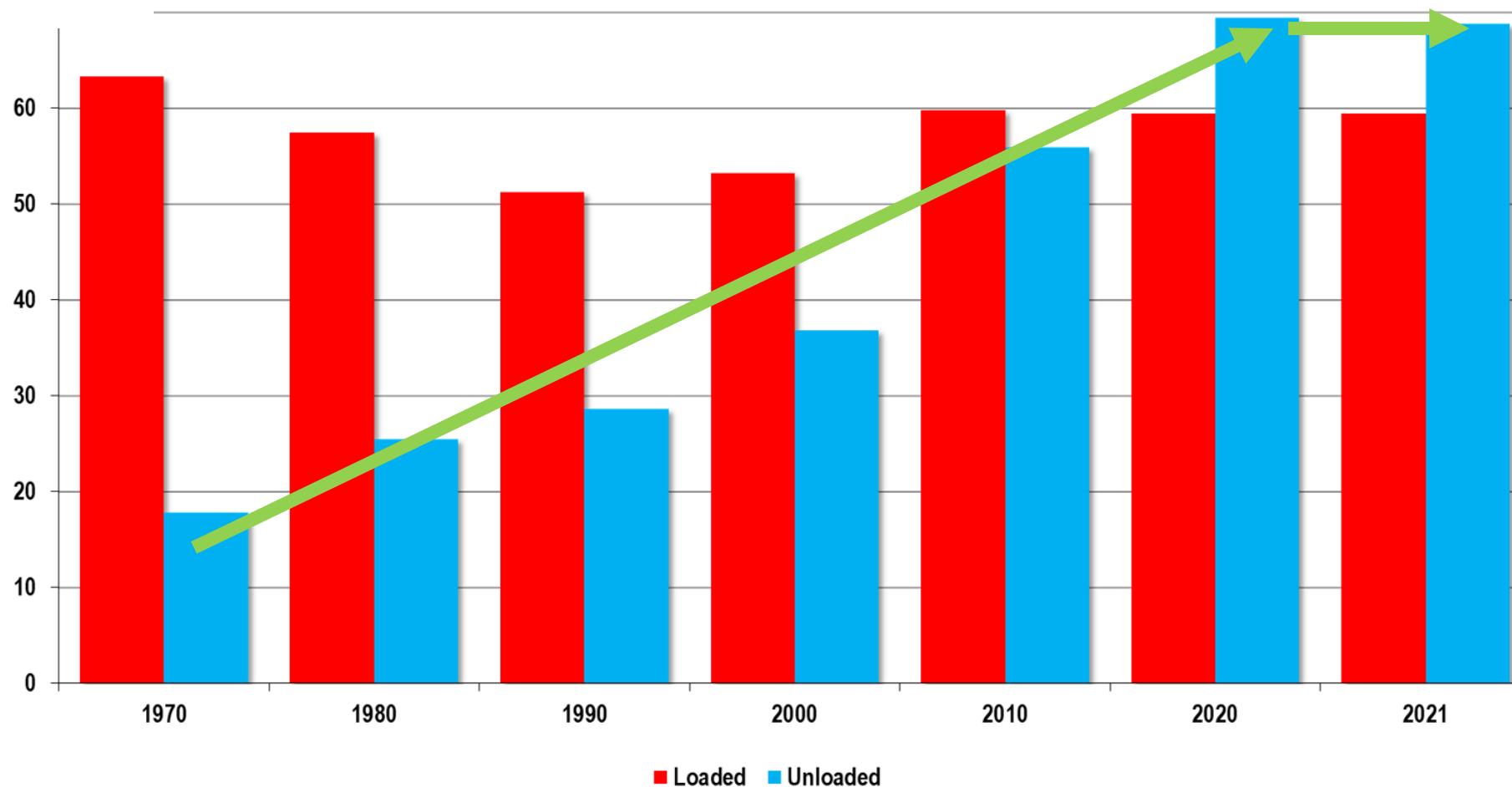


Source: Clarksons Research

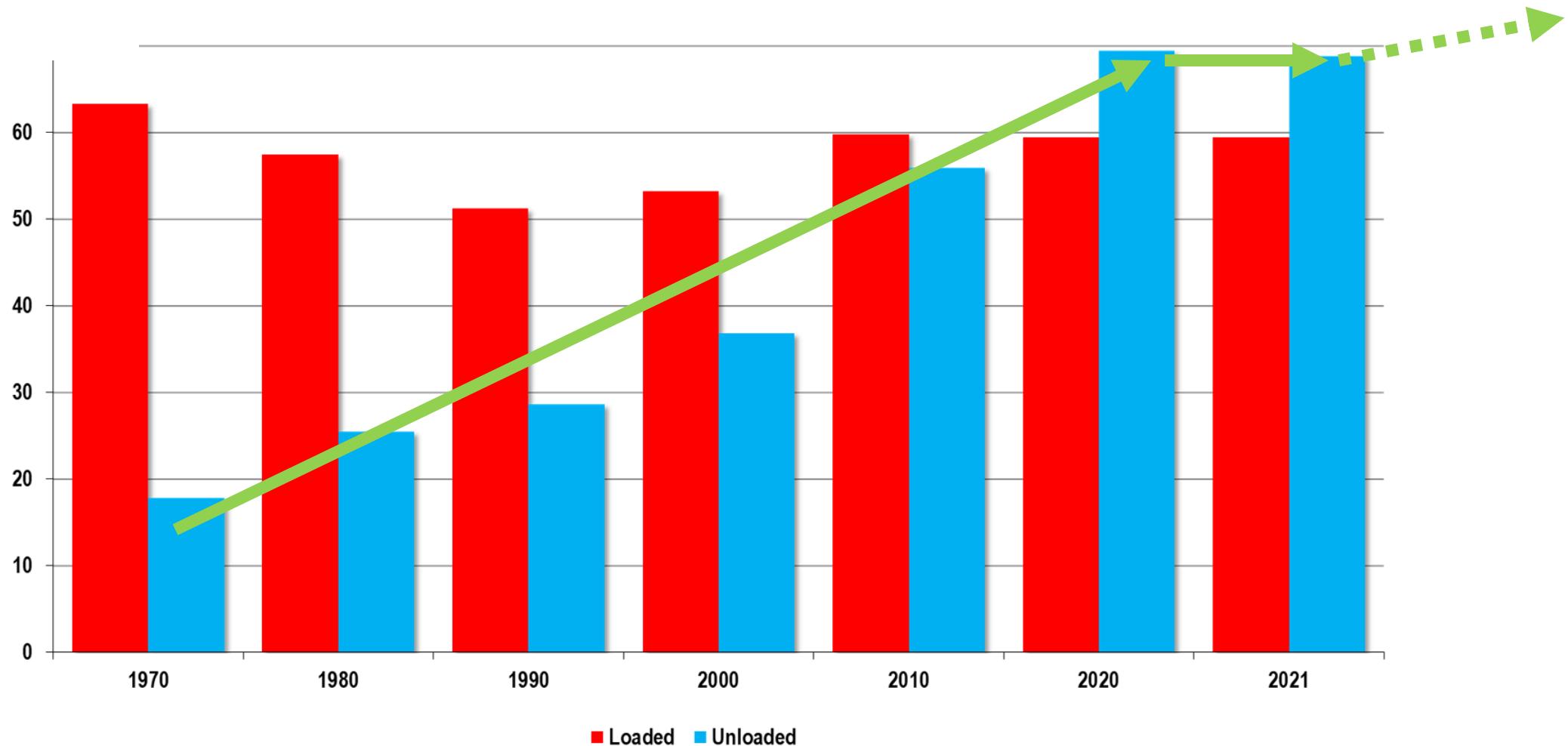


Source: UNCTAD calculations, based on data from Clarksons Shipping Intelligence Network. 2023 and 2024: forecasts

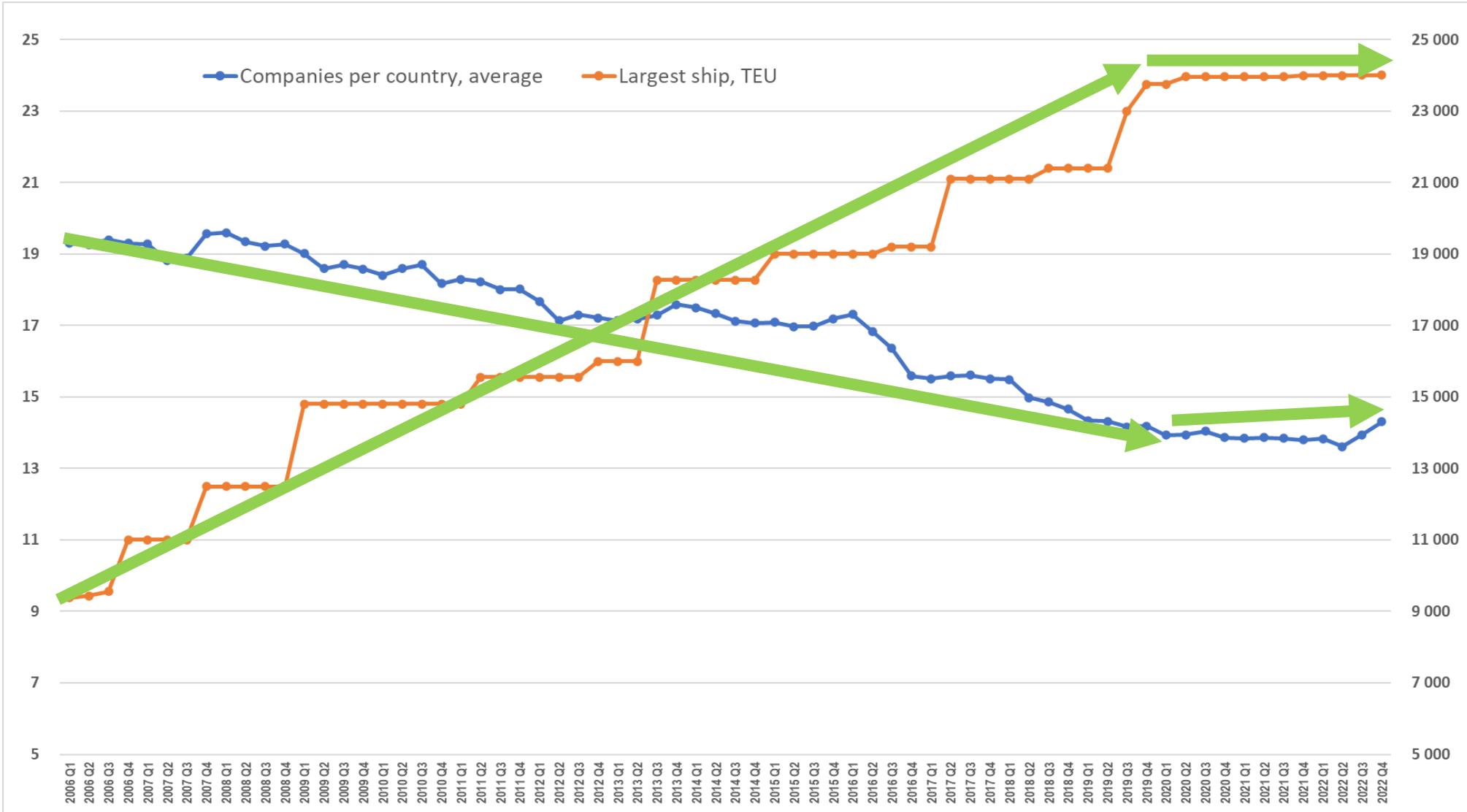
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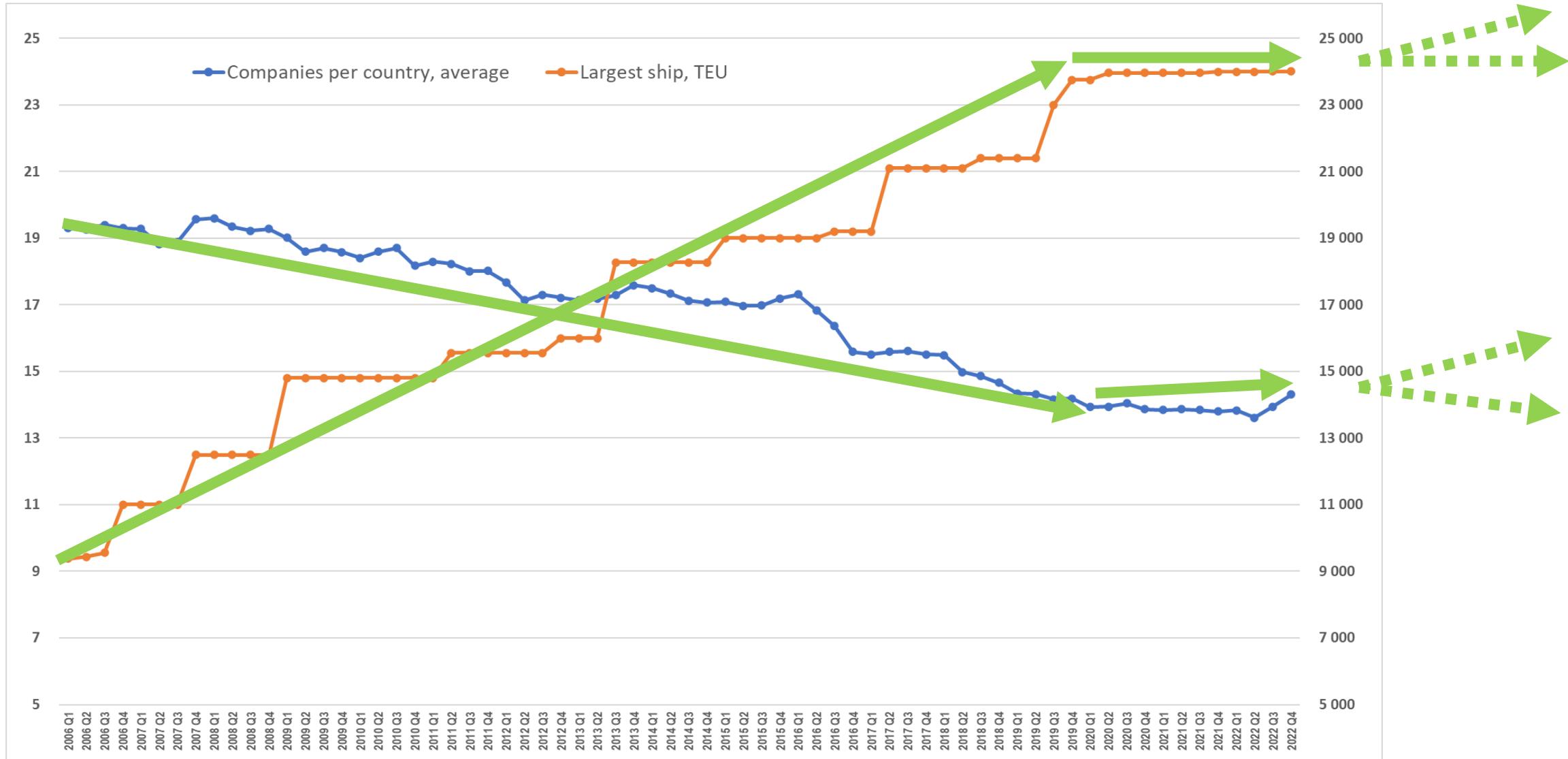


# Bigger ships ?



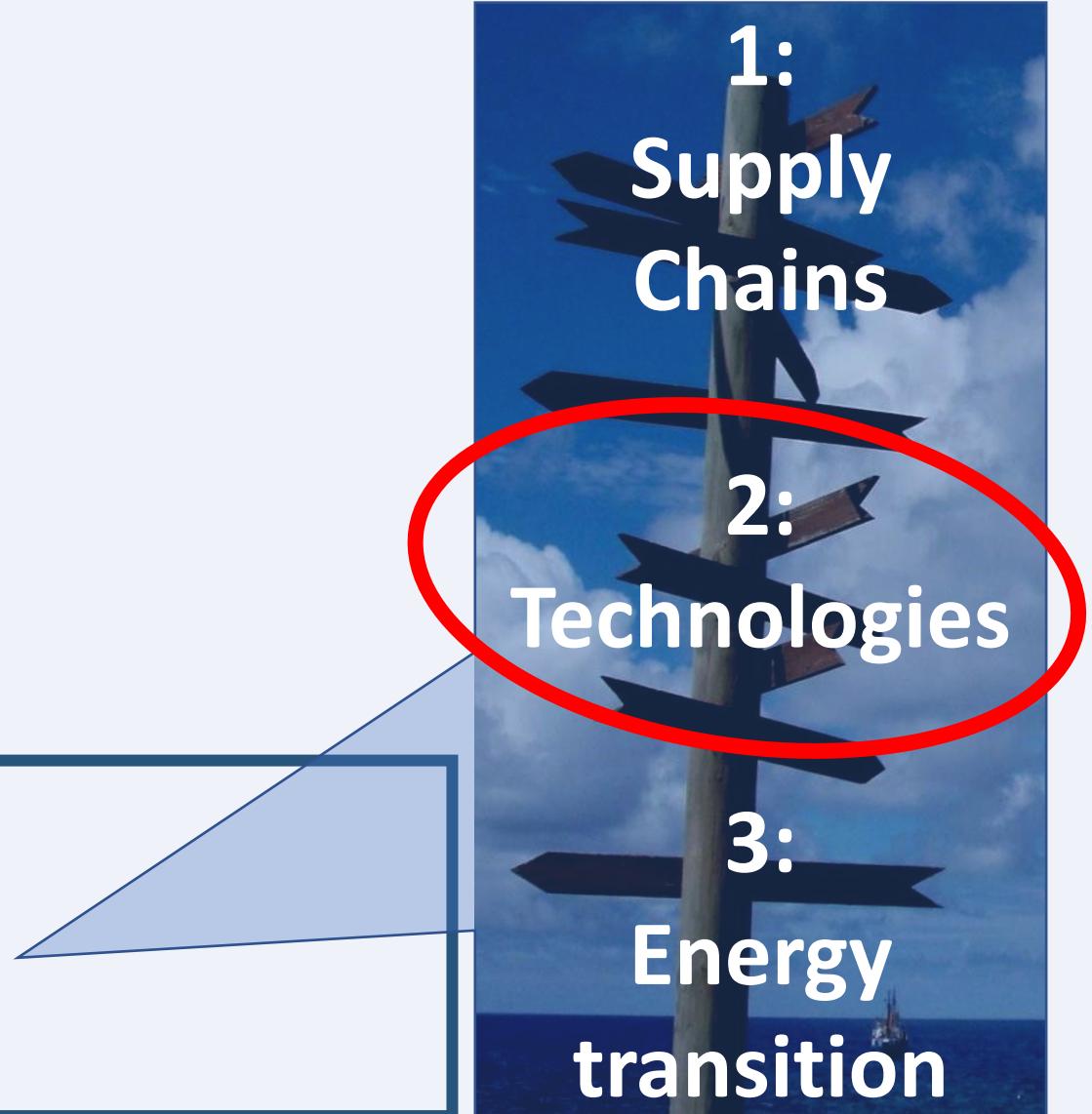
Source: UNCTAD, RMT 2022, forthcoming, based on data provided by MDS Transmodal, <https://www.mdst.co.uk>

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# Dos desarrollos claves

1. La crisis de la logística del 2020-2022 incentivó la digitalización.
2. Crecimiento exponencial en nuevas tecnologías, incluyendo la inteligencia artificial.

# Who leads the IT reforms in your company?

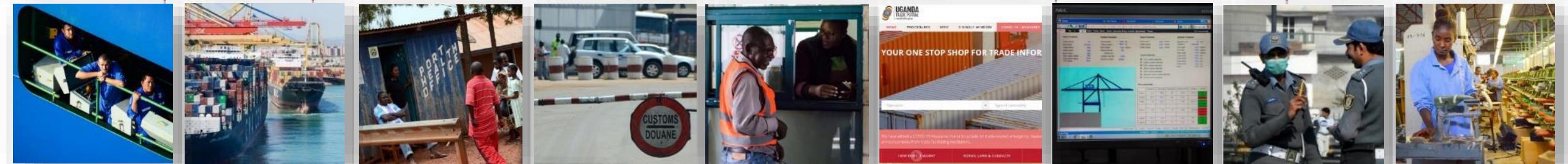
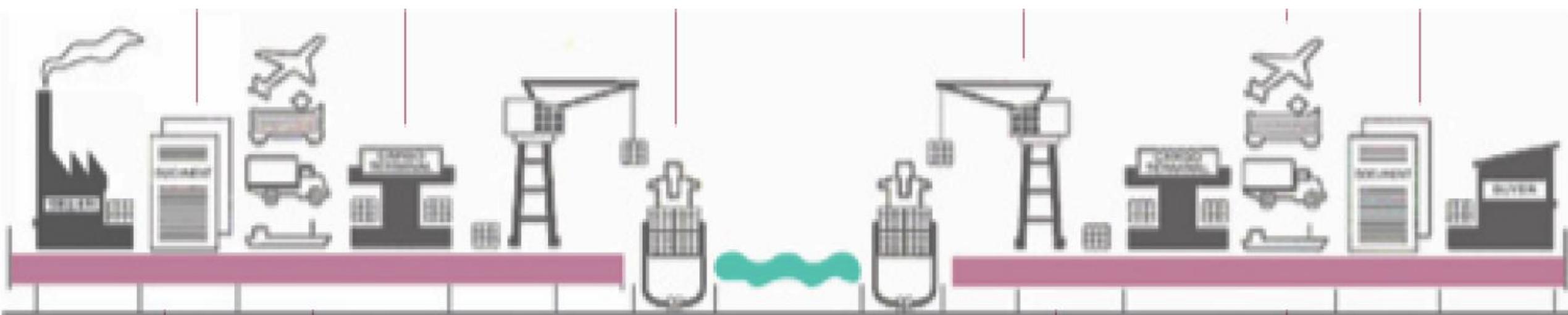
- The CEO
- The CTO
- Covid-19



# Transport in times of COVID19

A 10-point action plan

<https://unctad.org/en/pages/PublicationWebflyer.aspx?publicationid=2713>



# Is there a trade-off between controls and trade facilitation?



The concrete measures proposed in this policy brief help to facilitate transport and trade **and** to protect the population from COVID-19.

No.79  
APRIL 2020

## POLICY BRIEF

**Key points**

- There is a need to keep shipping lines moving and coordinate truck flows to ensure that border agencies can safely undertake all necessary controls.
- Facilitating trade and ensuring the transport of goods has become more important than ever to avoid the collapse of economies worldwide.
- The concrete measures proposed in this policy brief help to facilitate transport and trade and to protect the population from COVID-19.

### COVID-19: A 10-POINT ACTION PLAN TO STRENGTHEN INTERNATIONAL TRADE AND TRANSPORT FACILITATION IN TIMES OF PANDEMIC

The coronavirus disease (COVID-19) pandemic is substantially impacting people's lives and livelihoods and putting extreme stress on socioeconomic systems. International collaboration, coordination and solidarity among all is going to be key to overcoming this unprecedented global challenge. As part of efforts aimed at reducing the international spread of the virus and to mitigate the potentially crippling longer-term consequences of the pandemic, especially for the most vulnerable countries, policymakers need to take a number of measures to ensure the facilitation of international trade and the transport of goods. It is crucial to keep ships moving, ports open and cross-border and transit trade flowing, while ensuring that border agencies can safely undertake all necessary controls.

#### Challenges for international trade logistics<sup>1</sup>

Border agencies face the challenge of exporting imports, exports and transit, including of necessary medical supplies, donations and relief contingencies, while ensuring epidemic prevention and providing adequate customs clearance and compliance controls of goods and transport documentation.

The concrete measures proposed in this policy brief help to facilitate transport and trade and to protect the population from COVID-19.

The challenge affects goods and services that are necessary for the preservation of many jobs in manufacturing, on which modern society depends. Particular efforts need to be made on the part of governments to seek and encourage the innovation and development of new products needed to contain and combat the pandemic (such as medical supplies and equipment) and to secure basic needs (including food and energy).

Relevant service providers and the supporting infrastructure need to be protected as a matter

of priority. This includes ensuring that transport services, ports and border agencies not only remain operational but are effectively strengthened to cope with the exceptional challenges they face.

Governments need to adopt common approaches to addressing these issues across the global network of supply chains to avoid widespread economic collapse and to ensure supply chain resilience in the short term. In particular, like regard, the post-pandemic economic recovery may be severely hampered, potentially worsening long-term sustainable development prospects, particularly for the world's poorest and most vulnerable populations.

Regional cooperation on these points is vital, as protectionism may significantly exacerbate the global health crisis and delay a post-pandemic economic recovery. Effective collaboration, coordination and cooperation among public and private stakeholders at all levels will also be key.

<sup>1</sup> Note: All websites referred to in this document were accessed in April 2020.



# Three stages of digitalization

## 1. Optimization

Maximizing efficiency and reliability in existing processes

## 2. Extension

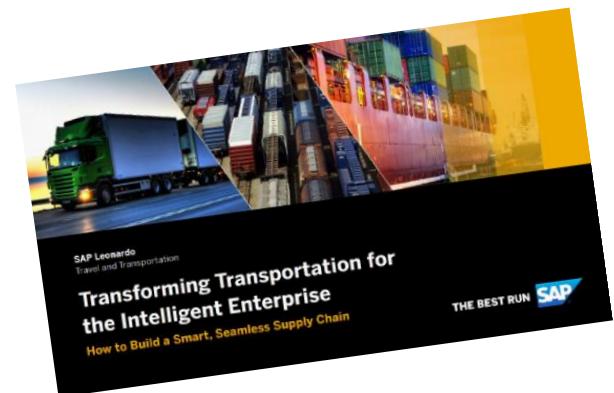
Moving beyond efficiency to capture new sources of value

## 3. Transformation

Reinventing logistics, trade and business models, based on data-driven revenue streams

Source and further reading:

<https://t.co/vbHAdYaSWf>



# 1: Optimization

## Example: Port call optimization

“Port Call Optimization is about optimizing speed, draught and port stay, leading to lower costs, cleaner environment, more reliability and safety for Shipping, Terminals and Ports”.



<https://portcalloptimization.org/>

## 2: Extension

“Action opportunities”



**GLOBAL MARITIME FORUM** | Unleashing the potential of the global maritime industry

**DIGITAL DISRUPTION IN MARITIME**

**Action opportunities**

25 APRIL 2018, SINGAPORE & 31 MAY 2018, HAMBURG

During 2018, the Global Maritime Forum in partnership with Rainmaking conducted workshops around opportunities arising from digital innovation. One of the ambitions was to identify concrete action opportunities to help improve the performance of the maritime industry and thus contribute to a more sustainable industry in economic, social and environmental terms.

Inspired by the presentations and discussions on collaborative approaches from other industries and startups, participants started developing ideas for the maritime industry. Some of the key ideas will be shared here in a series where we address them one by one. The action opportunities vary in their focus, complexity and purpose. Some could be taken up immediately by a few partners working together while others would require cross-sectoral and multi-stakeholder collaboration.

We invite you to engage and respond back with feedback or interest in participation.

**Blockchain for cargo tracking**

Challenge: Today, the tracking of cargo in cases of incorrect delivery is nearly impossible. It is also hard to identify where in the chain the issue occurred. This is due to a number of missing mechanisms, e.g. reliable record of identity, transparent and verifiable trail of ownership and up to date cargo traceability information.

Solution: Participants hypothesised Blockchain can be used to solve some of these challenges by creating an electronic immutable transparent and verifiable record around cargo documentation. Additional benefits from such a solution would include access to reliable information that can be used for risk management or financial purposes, the creation of automated smart contracts around container documentation and a reduction of human errors due to automated processes.

Barriers: Implementing an early stage technology brings a number of risks, including cyber security, resistance to adoption and the need to retrain people to work with the new technology. There are also challenges related to regulation in particular related to the legal validity of electronic documents.

Way forward: One way forward could be to build on existing blockchain initiatives and engage maritime stakeholders in developing commercial pilots focusing on specific applications for instance related to the misdelivery of cargo. Alternatively 2-3 industry partners and a venture builder could launch an explorative phase to identify problems to solve commercially with multiple partners or become a non-profit infrastructure.

**Smart Capacity Management Platform**

Challenge: Today the capacity on board ships is not fully utilized since no mechanism exists to dynamically match cargo with unused capacity across operators. This means that more resources in the form of ships, fuel and port infrastructure etc. is required to transport the cargo than necessary, which increases operating costs and environmental impact.

Unleashing the potential of the global maritime industry

RAINMAKING INNOVATION

06/09/18

Page 1

Further reading: <http://globalmaritimeforum.org>

# 3: Transformation

The screenshot shows a news article from Big Think. At the top, there's a navigation bar with the Big Think logo, a search icon, and links for "DISCOVER", "VIDEO", and "BIG THINK FOR BUSINESS". The main headline reads: "Human-like A.I. will emerge in 5 to 10 years, say experts". Below the headline, a subtext states: "A survey conducted at the Joint Multi-Conference on Human-Level Artificial Intelligence shows that 37% of respondents believe human-like artificial intelligence will be achieved within five to 10 years." The author's name, "STEPHEN JOHNSON", and the date, "26 September, 2018", are at the bottom. An orange circle highlights the date. Below the text is a photograph of a woman interacting with a humanoid robot.

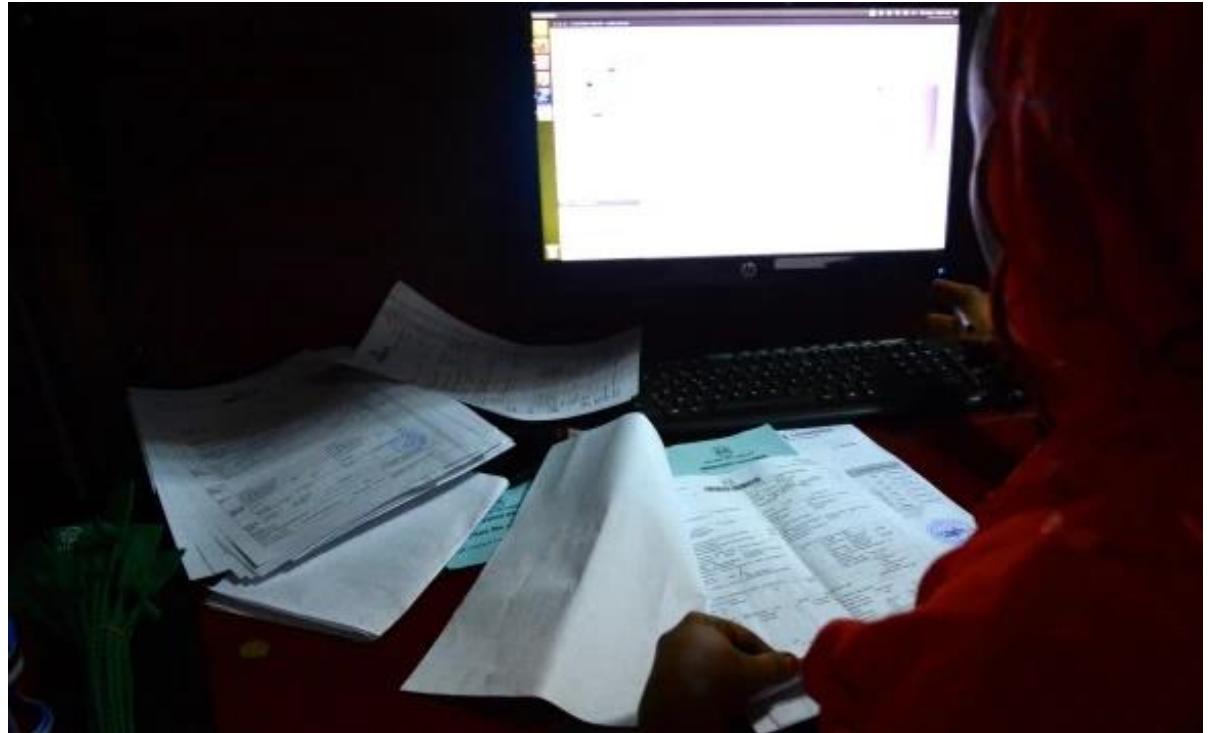


Further reading: <https://www.linkedin.com/pulse/what-read-times-chatgpt-jan-hoffmann/>

# What is the impact of Artificial Intelligence (AI) on the **future** of international transport and logistics?

AI is expected to have a significant impact on the future of international transport and logistics in various ways.

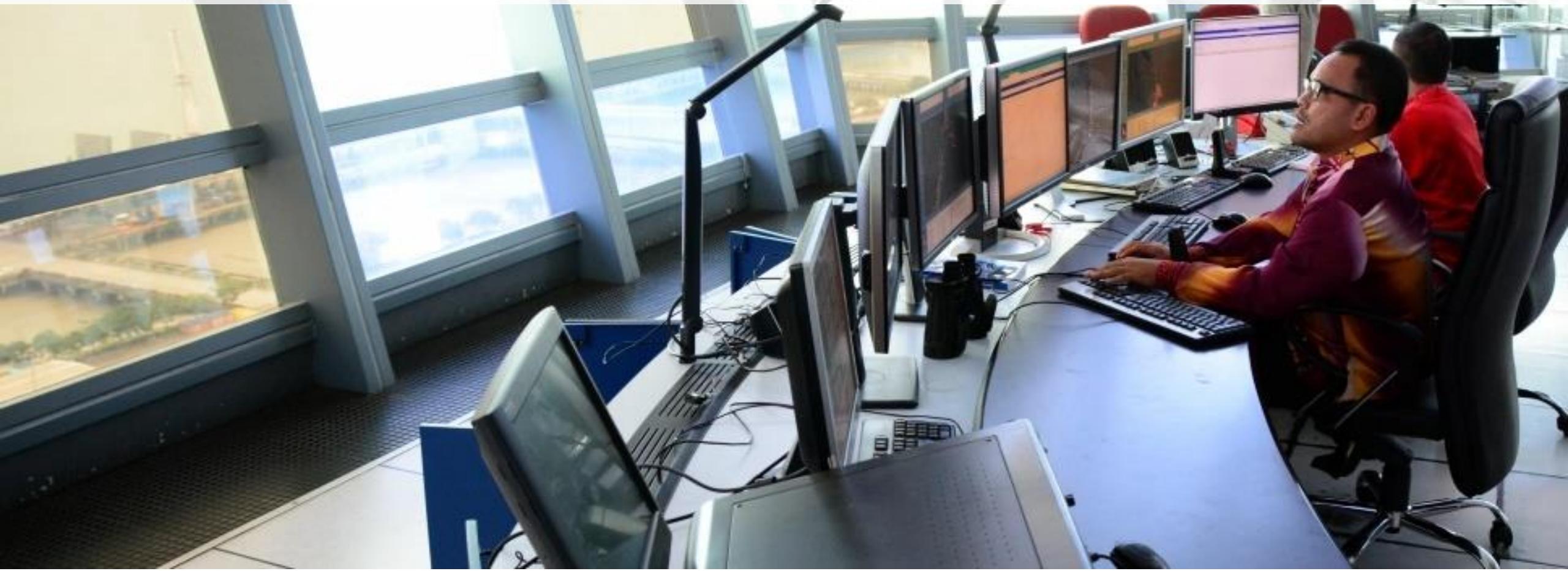
**7** key areas where AI can transform the industry



## 1. Rutas y programación optimizadas

Los algoritmos de IA pueden analizar grandes cantidades de datos para encontrar las rutas más eficientes, considerando factores como el consumo de combustible, la distancia, el tráfico y las condiciones climáticas.

Esto permitirá entregas más rápidas y rentables; y reducirá las emisiones.



## 2. Vehículos autónomos y drones

Camiones, buques y drones autónomos impulsados por IA desempeñarán un papel importante en el transporte de mercancías a nivel internacional.

Los vehículos autónomos pueden funcionar las 24 horas del día, los 7 días de la semana, con una intervención humana mínima, mejorando la productividad y reduciendo los costos laborales.

También pueden aumentar la seguridad al reducir la probabilidad de accidentes causados por errores humanos.



### 3. Pronóstico de demanda y gestión de inventario

Los sistemas impulsados por IA pueden analizar datos históricos, tendencias del mercado y otros factores para predecir la demanda y optimizar los niveles de inventario. Esto permite a las empresas reducir las faltas de stock, el exceso de inventario y los costos de almacenamiento, mejorando la eficiencia general de la cadena de suministro.





#### 4. Mejora en el despacho aduanero

Los sistemas impulsados por IA pueden facilitar un despacho aduanero más rápido y preciso mediante la clasificación automática de mercancías, el cálculo de aranceles y la identificación de posibles riesgos o violaciones.

Esto puede reducir el tiempo que se pasa en la aduana, lo que lleva a entregas más rápidas y costos reducidos.

## 5. Puertos y almacenes **inteligentes**

La IA puede optimizar las operaciones de los puertos y almacenes mediante la automatización de tareas como el apilamiento, carga y descarga de contenedores.

Los sistemas robóticos impulsados por IA pueden realizar estas tareas de manera más eficiente, reduciendo los tiempos de espera y mejorando el rendimiento general.





## 6. Mayor visibilidad de la cadena de suministro

La IA puede proporcionar actualizaciones en tiempo real sobre el estado de los envíos, permitiendo a las empresas rastrear sus productos y tomar decisiones basadas en datos.

Esta mayor visibilidad puede ayudar a prevenir retrasos y mejorar la satisfacción del cliente.



## 7. Mayor seguridad

La IA puede analizar patrones y detectar posibles amenazas a la cadena de suministro, como ataques cibernéticos o robos de carga.

Al identificar estos riesgos temprano, las empresas pueden tomar medidas preventivas para proteger sus activos.



# Por último

## 8. La IA puede ayudar en el análisis sobre “que implica la IA para el futuro de la logística y el transporte internacional”

Fuente:

<https://chat.openai.com/?model=gpt-4>

What is the impact of AI on the future of international transport and logistics?

AI is expected to have a significant impact on the future of international transport and logistics in various ways. Some of the key areas where AI can transform the industry include:

1. Optimized routes and scheduling: AI algorithms can analyze massive amounts of data to find the most efficient routes, considering factors such as fuel consumption, distance, traffic, and weather conditions. This will enable quicker, more cost-effective deliveries and reduce overall carbon emissions.
2. Autonomous vehicles and drones: Self-driving trucks, ships, and drones powered by AI will play a major role in transporting goods internationally. Autonomous vehicles can operate 24/7 with minimal human intervention, improving productivity and reducing labor costs. They can also lead to increased safety by reducing the likelihood of accidents caused by human error.
3. Demand forecasting and inventory management: AI-driven systems can analyze historical data, market trends, and other factors to predict demand and optimize inventory levels. This enables businesses to reduce stockouts, overstocks, and warehousing costs, improving overall supply chain efficiency.
4. Enhanced customs clearance: AI-powered systems can facilitate faster, more accurate customs clearance by automatically classifying goods, calculating duties, and identifying potential risks or violations. This can reduce the time spent in customs, leading to faster deliveries and reduced costs.
5. Smart ports and warehouses: AI can optimize port and warehouse operations by automating tasks such as container stacking, loading, and unloading. Robotic systems powered by AI can perform these tasks more efficiently, reducing dwell times and improving overall throughput.
6. Improved supply chain visibility: AI can provide real-time updates on the status of shipments, allowing businesses to track their goods and make data-driven decisions. This increased visibility can help prevent delays and improve customer satisfaction.
7. Enhanced security: AI can analyze patterns and detect potential threats to the supply chain, such as cyberattacks or cargo theft. By identifying these risks early, businesses can take preventative measures to protect their assets.

In summary, the impact of AI on international transport and logistics is poised to improve efficiency, reduce costs, increase safety, and enhance overall supply chain performance. However, it's important to consider potential challenges such as job displacement, regulatory issues, and data security concerns. As AI technologies continue to develop, the industry will need to adapt to these changes to fully harness the benefits AI has to offer.

Very good. Can you repeat the same (translate) into Spanish?

Claro, aquí tienes la misma respuesta en español:

La IA se espera que tenga un impacto significativo en el futuro del transporte y la logística internacionales de diversas maneras. Algunas de las áreas clave en las que la IA puede transformar la industria incluyen:

1. Rutas y programación optimizadas: Los algoritmos de IA pueden analizar grandes cantidades de datos para encontrar las rutas más eficientes, considerando factores como el consumo de combustible, la distancia, el tráfico y las condiciones climáticas. Esto permitirá entregas más rápidas y rentables, y reducirá las emisiones de carbono en general.
2. Vehículos autónomos y drones: Camiones, barcos y drones autónomos impulsados por IA desempeñarán un papel importante en el transporte de mercancías a nivel internacional. Los vehículos autónomos pueden funcionar las 24 horas del día, los 7 días de la semana, con una intervención humana mínima, mejorando la productividad y reduciendo los costos laborales. También pueden aumentar la seguridad al reducir la probabilidad de accidentes causados por errores humanos.
3. Pronóstico de demanda y gestión de inventario: Los sistemas impulsados por IA pueden analizar datos históricos, tendencias del mercado y otros factores para predecir la demanda y optimizar los niveles de inventario. Esto permite a las empresas reducir las faltas de stock, el exceso de inventario y los costos de almacenamiento, mejorando la eficiencia general de la cadena de suministro.
4. Mejora en el despacho aduanero: Los sistemas impulsados por IA pueden facilitar un despacho aduanero más rápido y preciso mediante la clasificación automática de mercancías, el cálculo de aranceles y la identificación de posibles riesgos o violaciones. Esto puede reducir el tiempo que se pasa en la aduana, lo que lleva a entregas más rápidas y costos reducidos.
5. Puertos y almacenes inteligentes: La IA puede optimizar las operaciones de los puertos y almacenes mediante la automatización de tareas como el apilamiento, carga y descarga de contenedores. Los sistemas robóticos impulsados por IA pueden realizar estas tareas de manera más eficiente, reduciendo los tiempos de espera y mejorando el rendimiento general.
6. Mayor visibilidad de la cadena de suministro: La IA puede proporcionar actualizaciones en tiempo real sobre el estado de los envíos, permitiendo a las empresas rastrear sus productos y tomar decisiones basadas en datos. Esta mayor visibilidad puede ayudar a prevenir retrasos y mejorar la satisfacción del cliente.
7. Mayor seguridad: La IA puede analizar patrones y detectar posibles amenazas a la cadena de suministro, como ataques cibéricos o robos de carga. Al identificar estos riesgos temprano, las empresas pueden tomar medidas preventivas para proteger sus activos.

En resumen, el impacto de la IA en el transporte y la logística internacionales está preparado para mejorar la eficiencia, reducir costos, aumentar la seguridad y mejorar el rendimiento general de la cadena de suministro. Sin embargo, es importante considerar los posibles desafíos, como la desaparición de empleos, problemas regulatorios y preocupaciones de seguridad de datos.



¿Cómo desarrollar  
las reglas para las  
tecnologías del  
futuro?



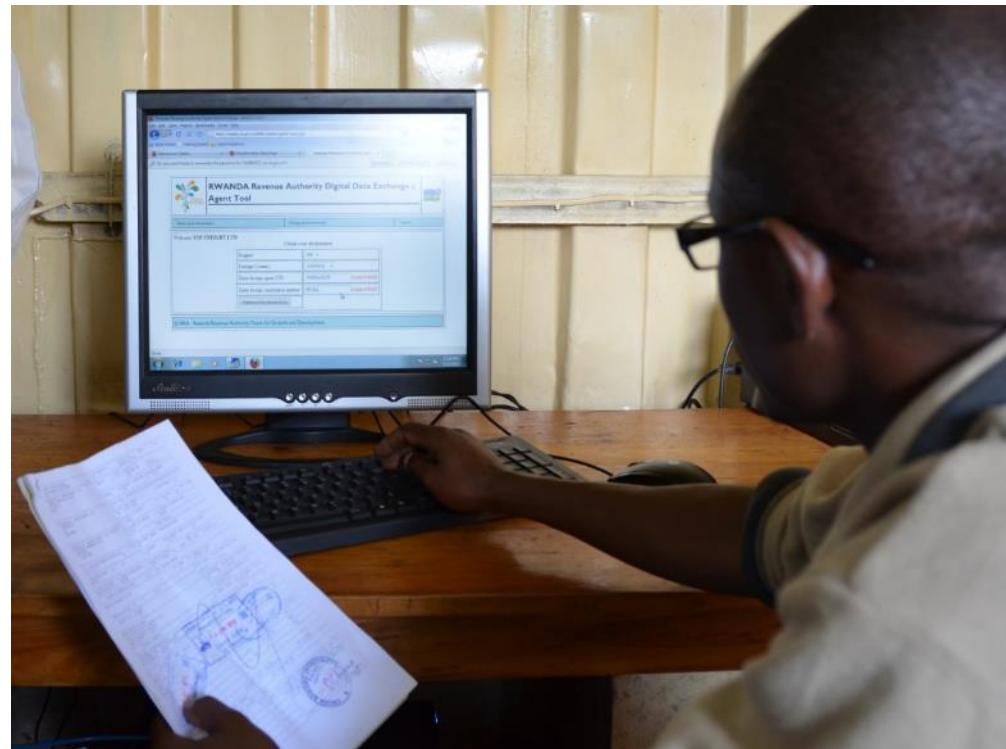
**WTO OMC**

- The negotiation, ratification and implementation of conventions take time
- Need to commit to whatever is the best [future] technological solution



# Out of date already?

- In the future the concept of “copies” versus “originals” as per Article 10.2 TFA will become obsolete as processes focus on **data** rather than on documents.



# A dynamic dimension in the TFA

- In the **long term**, Article 10.1 will gain in importance, it does not prescribe any specific technological solution.

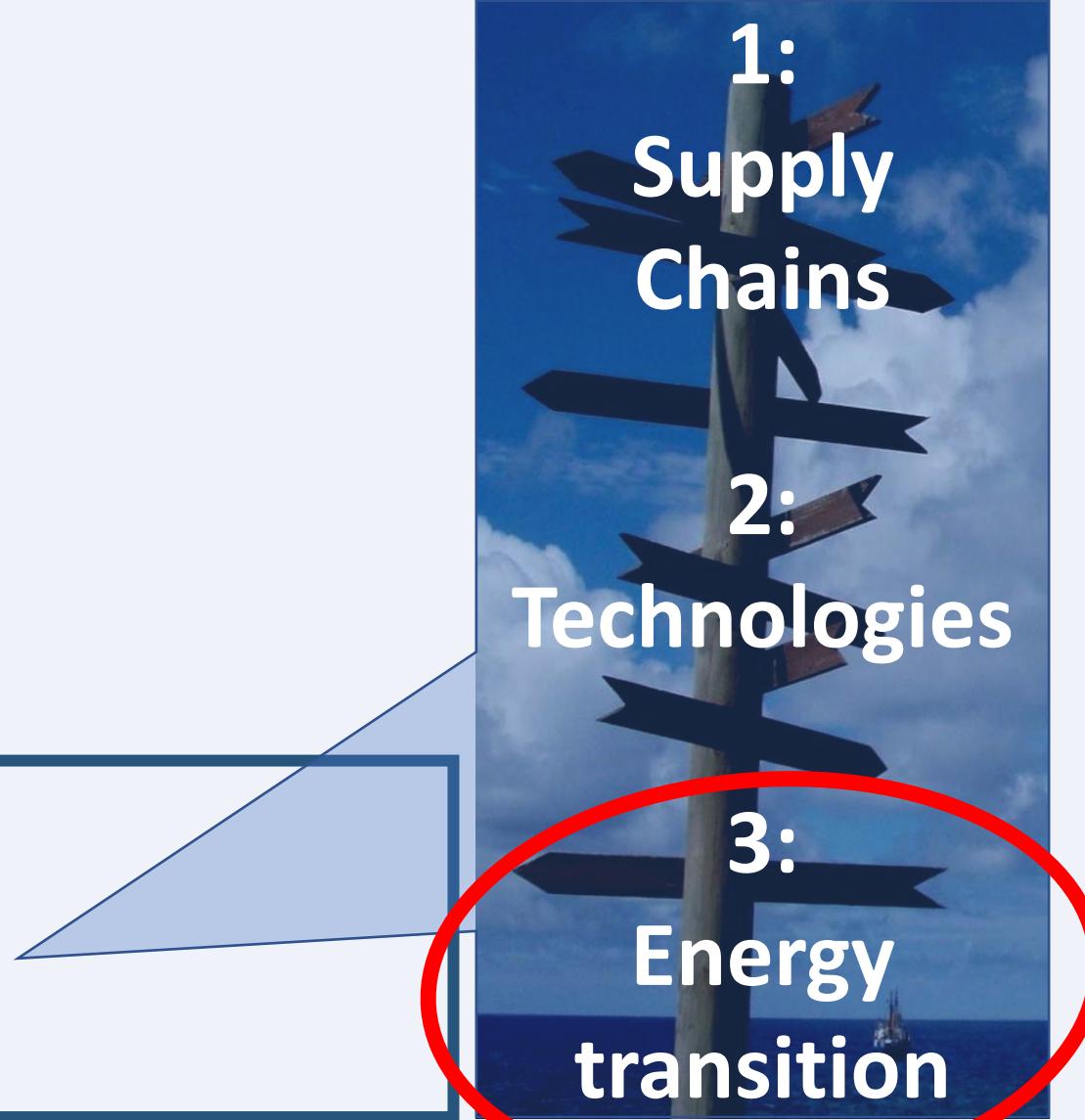


# A dynamic dimension in the TFA

- In the long term, Article 10.1 will gain in importance, it does not prescribe any specific technological solution.
- Progressively, various provisions will become antiquated or obsolete and we will just want to *minimize* “the incidence and complexity of import, export, and transit formalities”; continuously “*review*” requirements; keep “*reducing* the time and cost of compliance for traders and operators”; and always choose “the *least* trade restrictive measure” (10.1 TFA)

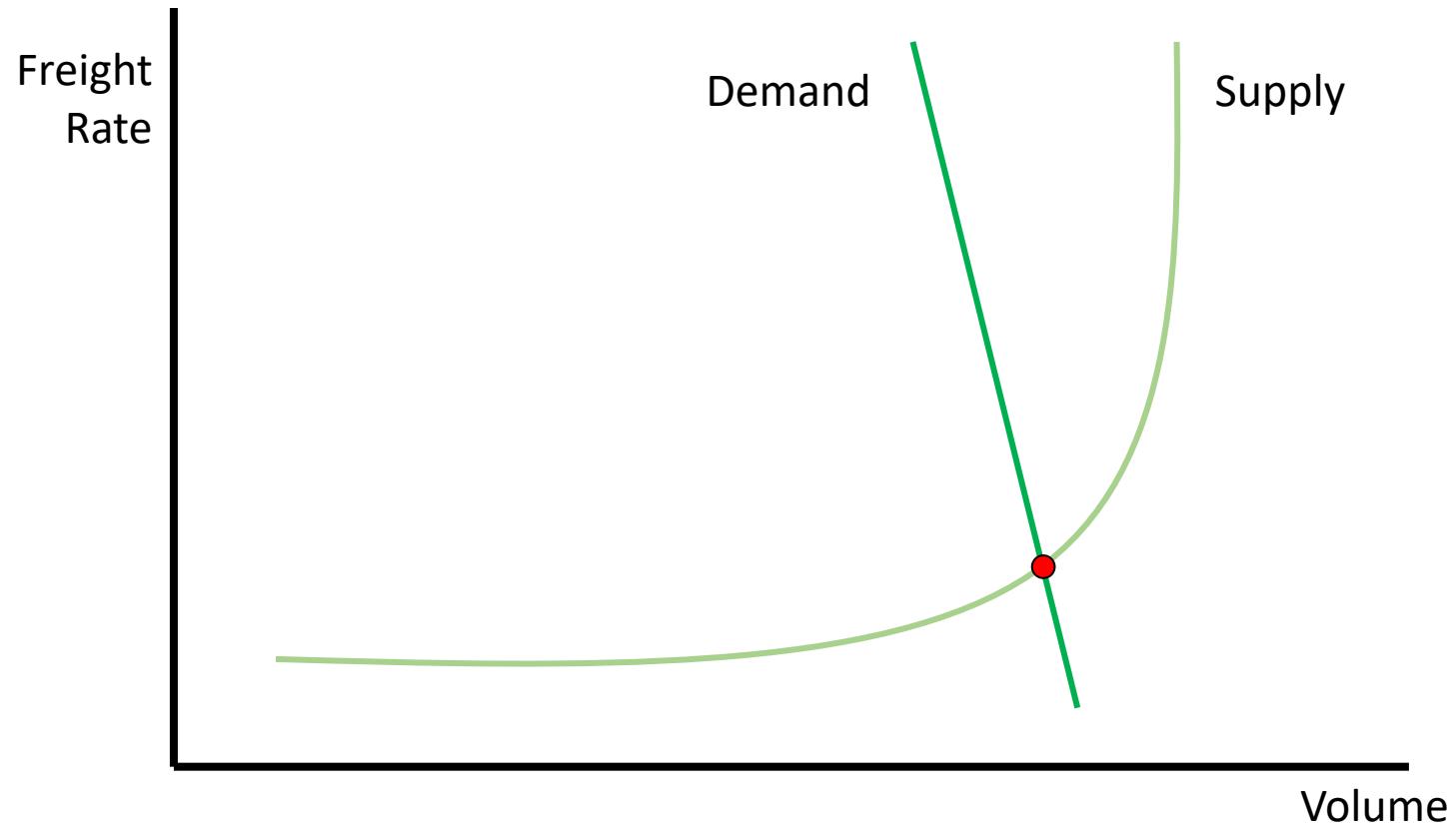


- 1) BC:  
Long term trends  
Before Corona
  
- 2) DC:  
Supply chain crisis  
During Corona
  
- 3) AC:  
Long term perspectives  
After Corona

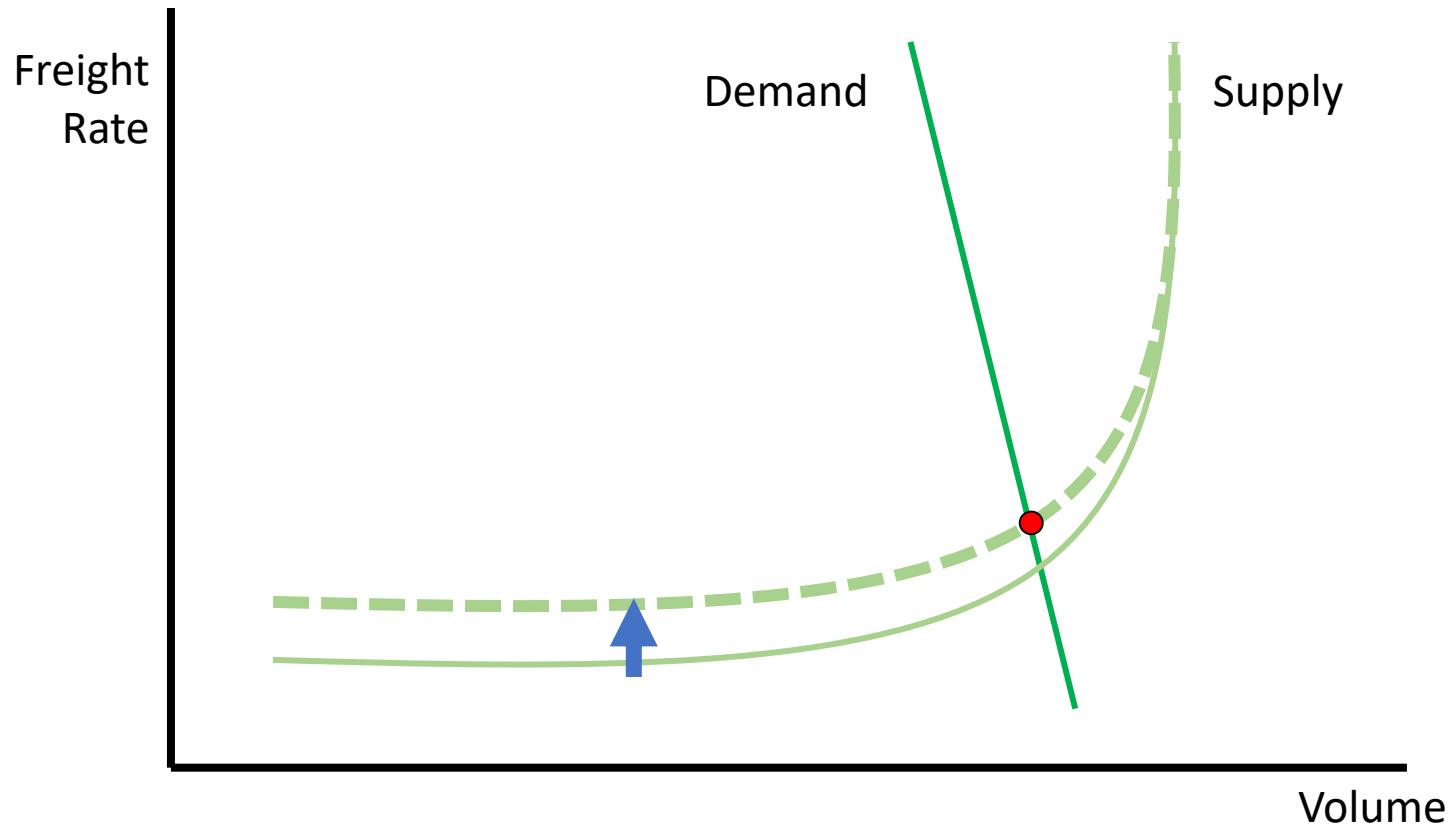


# The decarbonization of maritime transport

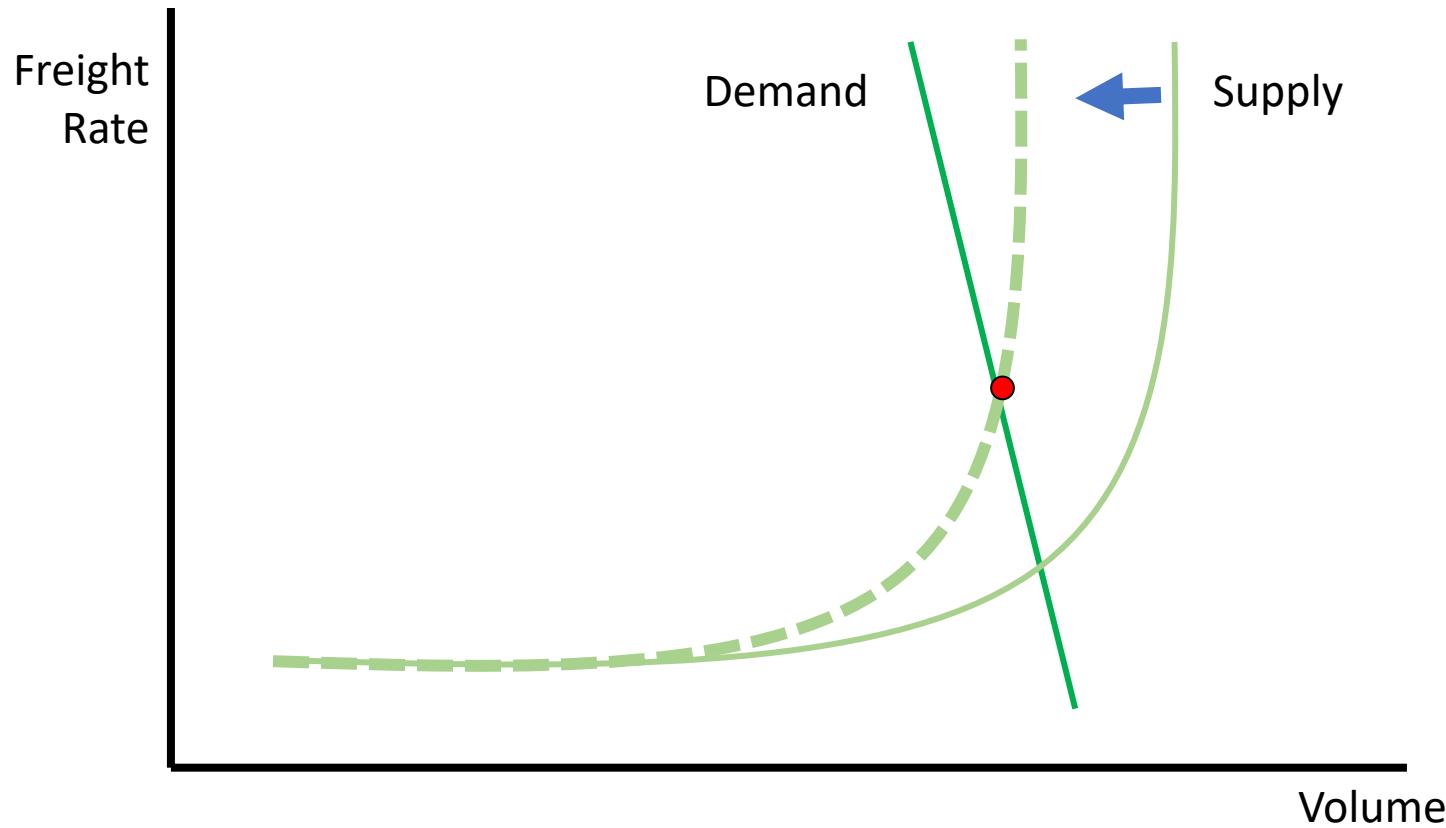
## The starting point



Decarbonization leads to a slightly higher supply curve



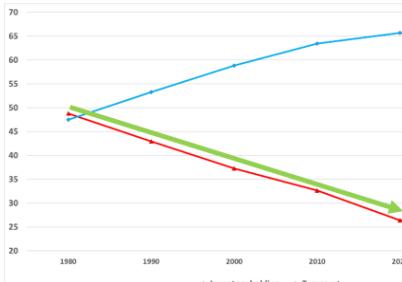
Uncertainty leads to  
a shift of the supply curve to the left



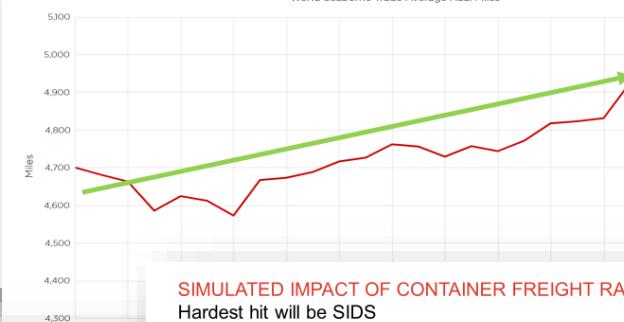
The decarbonization of maritime transport:  
Delaying the transition is more costly than the transition

# 1) BC: Long term trends Before Corona

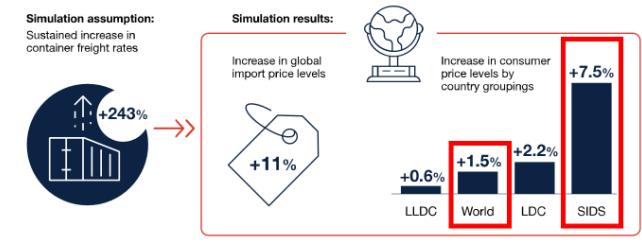
Share (per cent) of transport and inventory holding expenditure within total logistics expenditure, United States



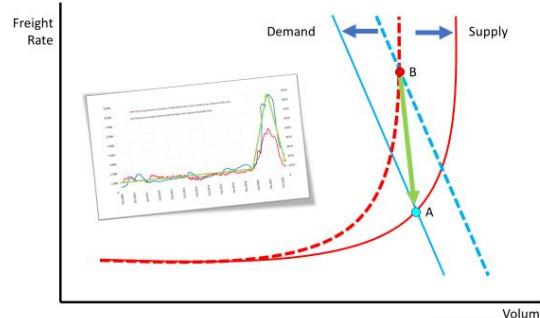
Source: UNCTAD, based on data from CSCMP Annual State of Logistics Report.  
Presented in Issues Note on Geography of Trade, TDB



SIMULATED IMPACT OF CONTAINER FREIGHT RATE SURGES  
Hardest hit will be SIDS



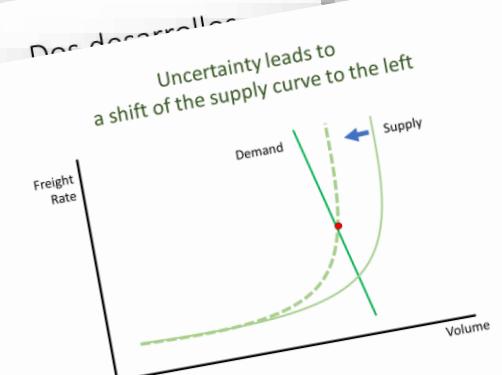
# 2) DC: Supply chain crisis During Corona



# 3) AC: Long term perspectives After Corona



Source: UNCTAD, based on data from CSCMP Annual State of Logistics Report.  
Presented in Issues Note on Geography of Trade, TDB





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6º CONGRESO INTEGRADO DE  
**LOGÍSTICA,  
ZONAS FRANCAS  
Y PUERTOS 2023**

Transición exportadora: el camino hacia la diversificación y la internacionalización.

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

**UNCTAD**



# Puertos y transporte marítimo: Tendencias claves, y perspectivas futuras

Jan Hoffmann  
Head, Trade Logistics Branch, UNCTAD  
[Jan.Hoffmann@UNCTAD.org](mailto:Jan.Hoffmann@UNCTAD.org) -

19 mayo 2023