UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UNCTAD

The potential impact of *decarbonization measures in shipping* on States

UNCTAD Ad Hoc Expert Meeting[1]

Thursday, 24 August 2023, 15:00 – 17:30 CET Geneva time, Platform: Teams

INTRODUCTION

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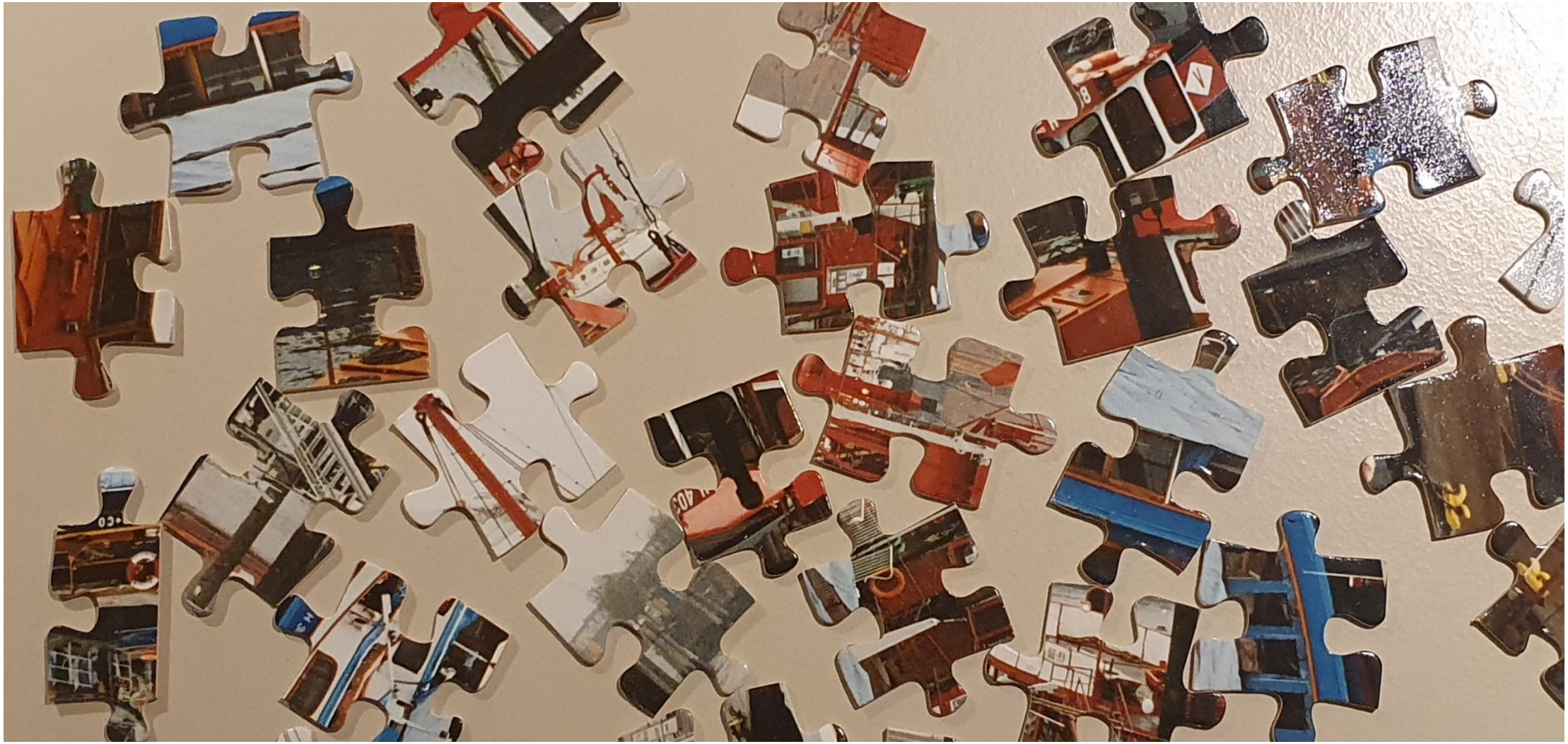
Background

- IMO negotiates a "short-term measure" to reduce CO2 emissions from ships
- The measure affects the cost and speed of existing ships by 2030 (not new fuels, not long-term, not new and different ships and technologies, also not any market based measure like levies)
- Before Members were willing to agree on this short-term measure, they insisted on having a comprehensive impact assessment undertaken
- By doing [a part of] the impact assessment, UNCTAD helped
  - a) to include the perspective of developing countries, and
  - b) IMO members to even consider/ agree on the measure

A puzzle with many pieces



1) The impact on ships

DNV

SUPPORT FOR IMO IMPACT ASSESSMENT

Cost impact of approved IMO GHG regulations

International Maritime Organization (IMO)

10 The Steering Committee noted that the draft workplan was structured in seven distinct but interrelated tasks, as follows:

Task 1	Literature review
Task 2	Assessment of the impact of the measure on the fleet
Task 3	Assessment of the impact of the measure on States
Task 4	Stakeholder analysis
Task 5	Identification of areas of missing data
Task 6	COVID-19 considerations
Task 7	Disproportionately negative impacts

DNV output is our input

(a) change in shipping **costs**, and

(b) change in **speed**, by vessel type

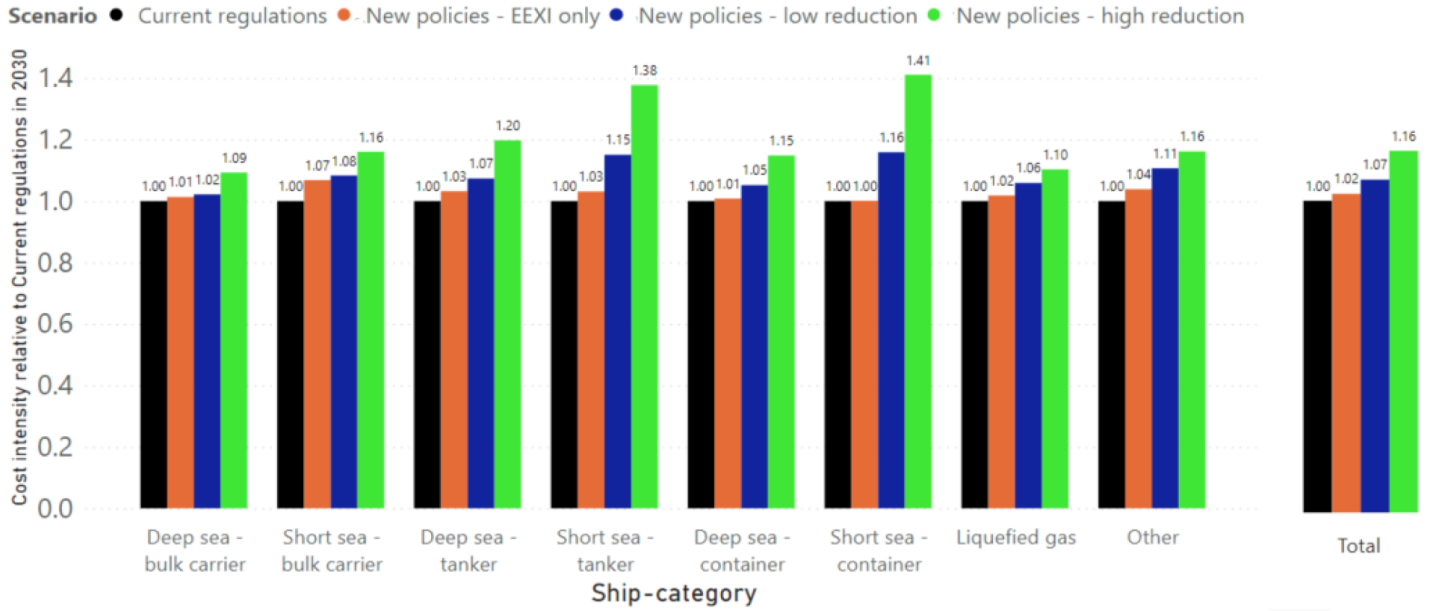
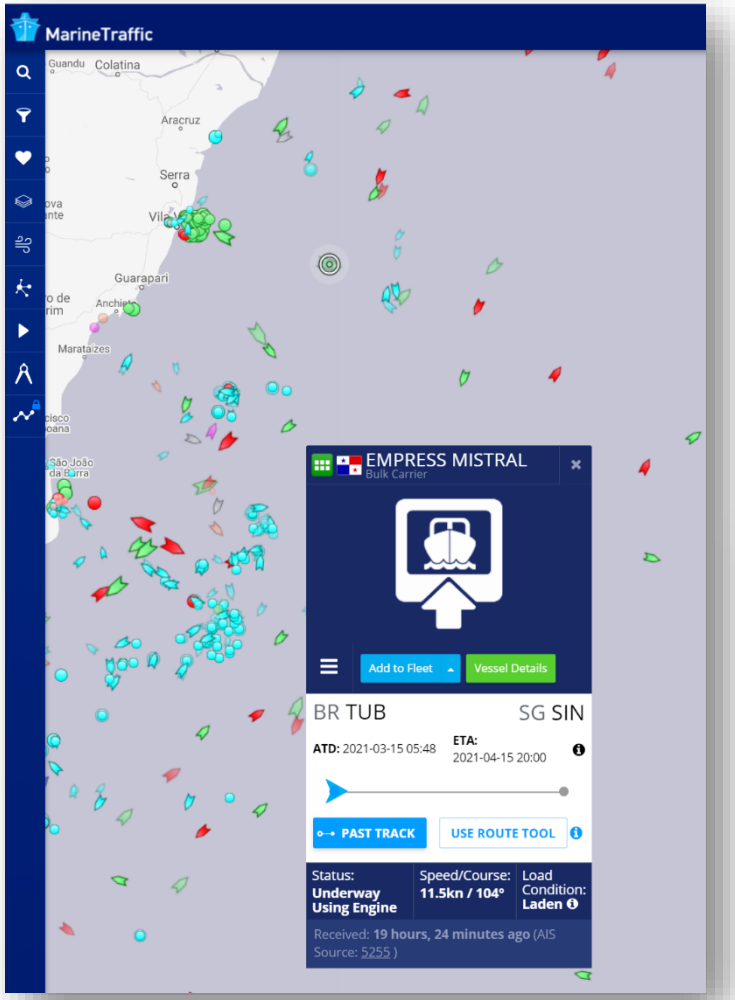


Figure 4-4 Relative cost intensity of ship categories compared to *Current regulations* in 2030. The cost intensity is set to 1 for each ship category based on *Current regulations* in 2030.

2) The ships and their journeys

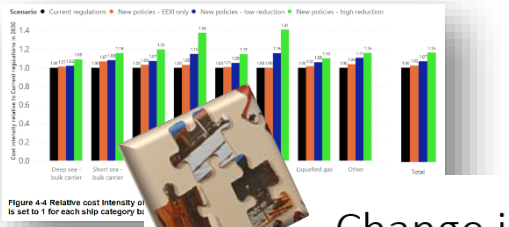
MarineTraffic



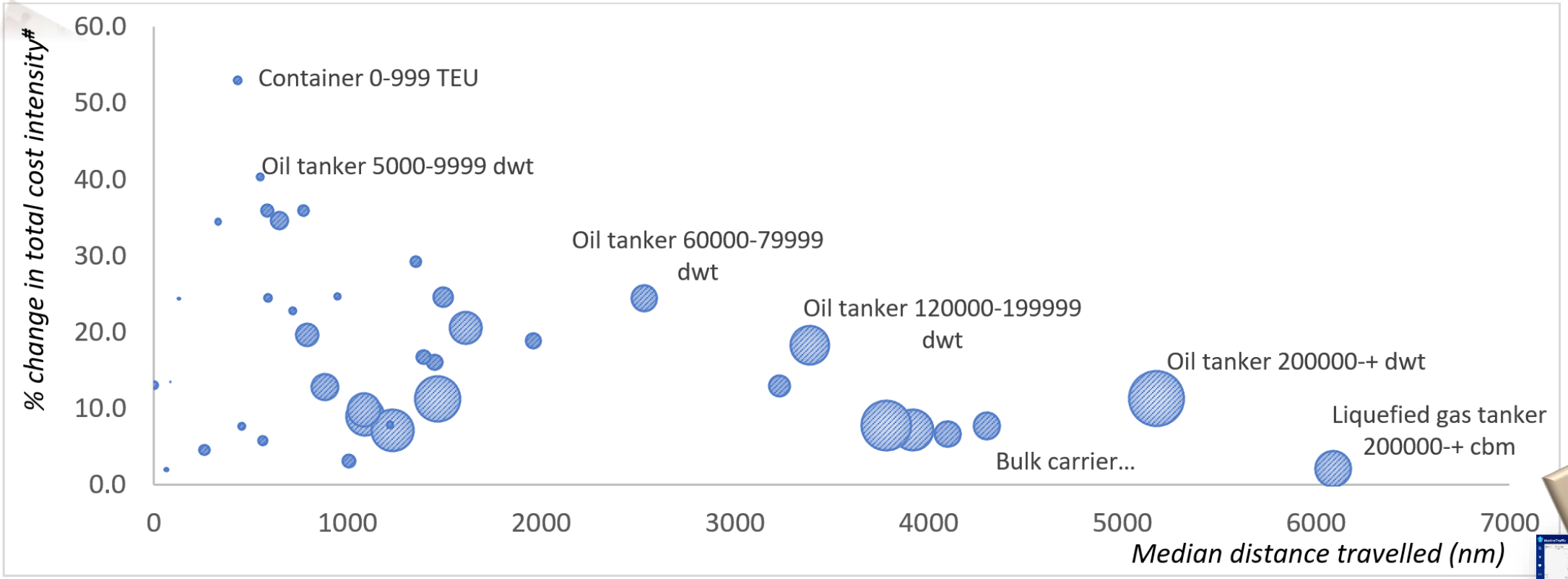
Connect impact on ship types to

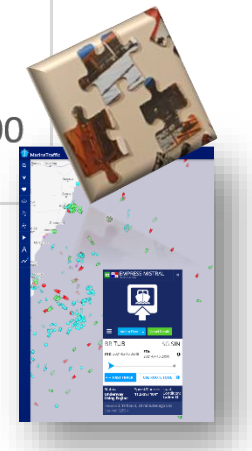
- More than 34 000 ships;
  27 420 ships w laden international journeys
- Several million journeys;
  489 241 laden international journeys (2019)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Q	R
1		IMO	TYPE	DWT	PORT NAME	PORT COUNTRY	UN LOCODE	TIMESTAMP UTC	Move type	DRAUGHT	Distance travelled upon arrival	Distance	Destination country	Load condition	Days	Speed
2	1	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	10/01/2019 02:14	ARRIVAL	228	8627	8627		LADEN		
3	2	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	14/01/2019 10:03	DEPARTURE	140	0	8546	BR	PARTIALLY_LADEN	35.50	10.03
4	3	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	18/02/2019 22:04	ARRIVAL	103	8546	8546		IN_BALLAST	1.70	-
5	4	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	20/02/2019 14:52	DEPARTURE	229	0	8058	OM	LADEN	40.13	8.37
6	5	8420804	Ore Carrier	364767	SOHAR	OM	OMSOH	01/04/2019 18:04	ARRIVAL	228	8058	8058		LADEN	6.60	-
7	6	8420804	Ore Carrier	364767	SOHAR	OM	OMSOH	08/04/2019 08:26	DEPARTURE	118	0	7952	BR	NULL	29.32	11.30
8	7	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	07/05/2019 16:07	ARRIVAL	102	7952	7952		IN_BALLAST	2.07	-
9	8	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	09/05/2019 17:54	DEPARTURE	225	0	8332	MY	LADEN	49.46	7.02
10	9	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	28/06/2019 05:02	ARRIVAL	224	8332	8332		LADEN	4.66	-
11	10	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	02/07/2019 20:48	DEPARTURE	150	0	10211	BR	PARTIALLY_LADEN	37.90	11.22
12	11	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	09/08/2019 18:31	ARRIVAL	102	9226	9226		IN_BALLAST	1.75	-
13	12	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	11/08/2019 12:27	DEPARTURE	229	0	8952	MY	LADEN	32.95	11.32
14	13	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	13/09/2019 11:08	ARRIVAL	228	8952	8952		LADEN	3.99	-
15	14	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	17/09/2019 10:58	DEPARTURE	150	0	9130	BR	NULL	39.84	9.55
16	15	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	27/10/2019 07:10	ARRIVAL	103	9130	9130		IN_BALLAST	2.35	-
17	16	8420804	Ore Carrier	364767	TUBARAO	BR	BRTUB	29/10/2019 15:27	DEPARTURE	227	0	8473	MY	LADEN	35.94	9.82
18	17	8420804	Ore Carrier	364767	TELUK RUBIAH	MY	MYTRB	04/12/2019 13:56	ARRIVAL	227	8473	8473		LADEN	6.79	-



Change in cost intensity by ship segment, average size* and median distance travelled



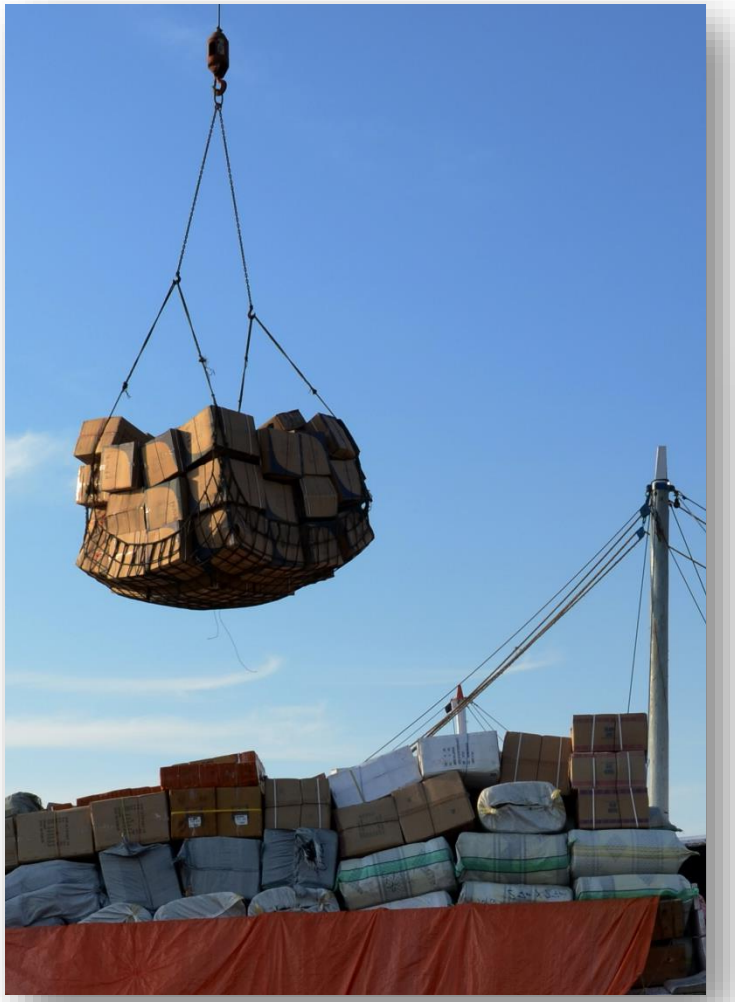


Source: UNCTAD compiled from DNV and MarineTraffic data

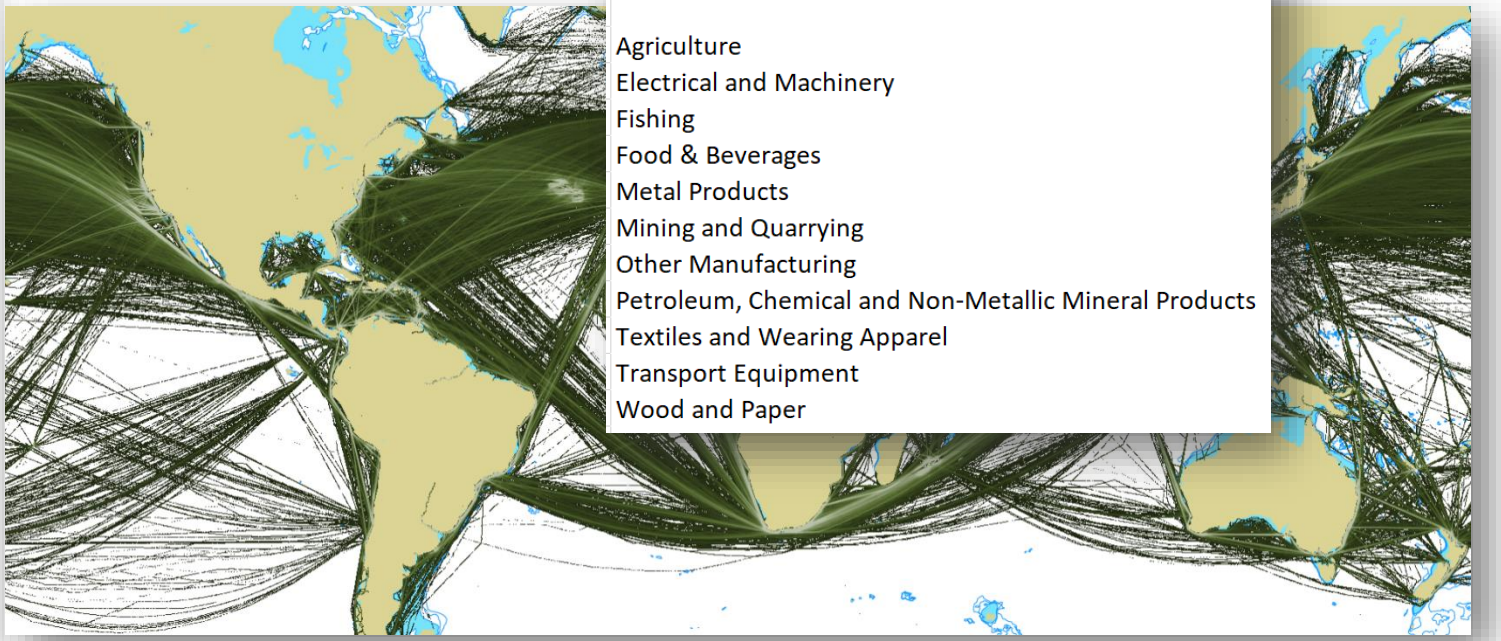
**: Size of the bubbles represents the average ship size per DWT*

#: % change in total cost intensity in high reduction scenario compared to the current regulation scenario in 2030

3) The trade carried by those ships



- Connect trade 185 x 184 countries x 11 sectors = 374 440, to 27 420 ships and their journeys.
- Taking out zero maritime trade cases = 130 236 cases



Row Labels
Agriculture
Electrical and Machinery
Fishing
Food & Beverages
Metal Products
Mining and Quarrying
Other Manufacturing
Petroleum, Chemical and Non-Metallic Mineral Products
Textiles and Wearing Apparel
Transport Equipment
Wood and Paper

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4) Convert shipping costs to trade costs

MDS Transmodal

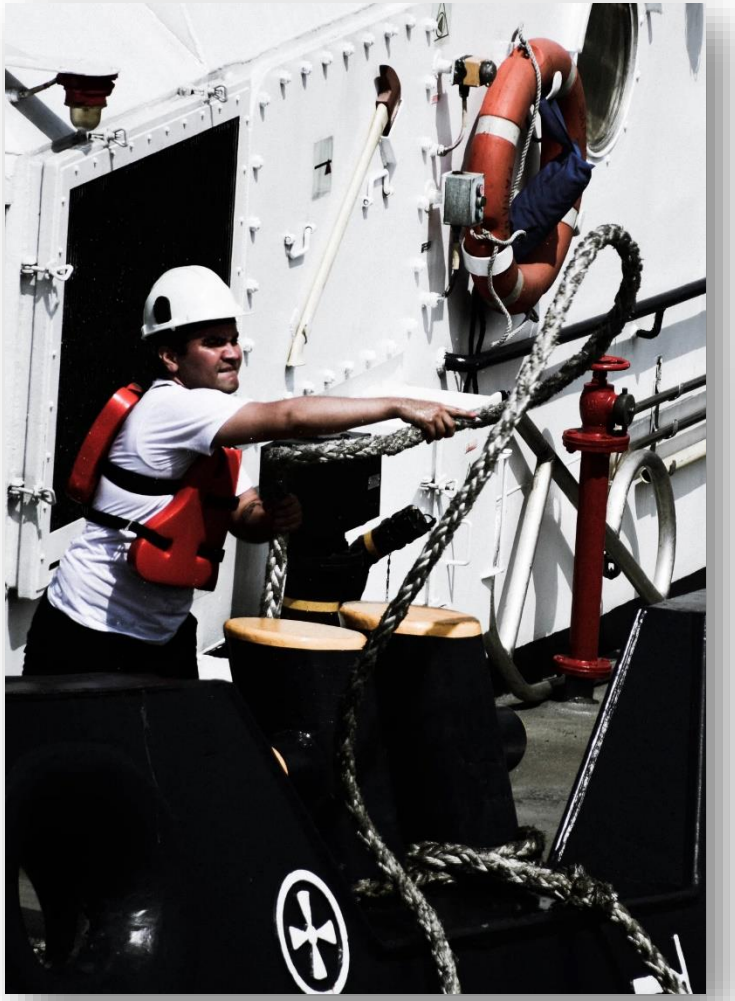
EQUITABLE MARITIME CONSULTING

For each one of the 130236 cases calculate

- Change in shipping costs
- Change in inventory holding costs (lower speed)

	Tonnes by sea	Unit value ('000s US$) Tonnes by sea	Mean cost, 2030 Current regulations	Mean cost, New policies - EEXI only	Mean cost, New policies - high reduction	Mean cost, New policies - low reduction	Mean time at sea (hours), 2030 Current regulations	Mean time at sea (hours), New policies - EEXI only	Mean time at sea (hours), New policies - high reduction	Mean time at sea (hours), New policies - low reduction
Average	62 222.30	28.44	64.59	64.69	70.24	66.35	717.35	725.24	776.21	746.31
Median	126.93	2.25	26.66	26.77	28.47	27.21	753.73	765.57	814.81	786.24
Max	714 999 174.14	439 504.24	1 425.95	1 428.56	1 550.34	1 465.24	2 025.33	2 037.97	2 148.99	2 037.97
Min										
Average				0.10	5.65	1.76		7.89	58.86	28.96
Median				0.10	1.80	0.55		11.84	61.09	32.51
Max				2.61	124.40	39.29		12.64	123.66	12.64
Average				0.16%	8.75%	2.73%		1.10%	8.20%	4.04%
Median				0.39%	6.76%	2.05%		1.57%	8.10%	4.31%
Max				0.18%	8.72%	2.76%		0.62%	6.11%	0.62%
Variance	5 501 136 201 805	2 308 131	16 693	16 744	19 701	17 559	87 757	89 475	102 729	94 660

5) Change in maritime trade costs



Combine (converted lower speed into more $)

- 130236 changes in shipping costs and
- 130236 changes in inventory holding costs

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Origin Country_Destination Country_EEF	Mean cost, current regulations 2030	Mean cost, New policies - EEXI only	Mean cost, New policies - high reduction	Mean cost, New policies - low reduction	Unitised Tonnes	Unit Value Unitised Tonnes ('000s US$)	Mean Time at sea (hours), current regulations 2030	Mean Time at sea (hours), New policies - EEXI only	Mean Time at sea (hours), New policies - high reduction	Mean Time at sea (hours), New policies - low reduction	Value of time (US$)	Current regulations 2030 vs New policies - EEXI only % chan	Current regulations 2030 vs New policies - high reduction	Current regulations 2030 vs New policies - low reduction
50595	Guatemala_South Korea_Textiles and Wearing App	485	486	529	498	88.34	36	863	867	939	896		0.1%	9.1%	2.6%
50596	Guatemala_South Korea_Wood and Paper	485	486	529	498	3 055.10	0	863	867	939	896		0.1%	9.1%	2.6%
50597	Guatemala_Spain_Agriculture	145	145	161	151	5 459.41	1	739	744	804	770		0.1%	11.2%	3.7%
50598	Guatemala_Spain_Electrical and Machinery	145	145	161	151	66.14	2	739	744	804	770		0.1%	11.2%	3.7%
50599	Guatemala_Spain_Fishing	145	145	161	151	21 521.94	2	739	744	804	770		0.1%	11.2%	3.7%
50600	Guatemala_Spain_Food & Beverages	145	145	161	151	38 082.05	1	739	744	804	770		0.1%	11.2%	3.7%
50601	Guatemala_Spain_Metal Products	145	145	161	151	23.02	2	739	744	804	770		0.1%	11.2%	3.7%
50602	Guatemala_Spain_Mining and Quarrying	145	145	161	151	213.23	2	739	744	804	770		0.1%	11.2%	3.7%
50603	Guatemala_Spain_Other Manufacturing	145	145	161	151	48.01	1	739	744	804	770		0.1%	11.2%	3.7%
50604	Guatemala_Spain_Petroleum Chemical and Non-M	145	145	161	151	1 417.57	1	739	744	804	770		0.1%	11.2%	3.7%
50605	Guatemala_Spain_Textiles and Wearing Apparel	145	145	161	151	553.23	2	739	744	804	770		0.1%	11.2%	3.7%
50606	Guatemala_Spain_Transport Equipment	145	145	161	151	1.68	6	739	744	804	770		0.1%	11.2%	3.7%
50607	Guatemala_Spain_Wood and Paper	145	145	161	151	151.49	2	739	744	804	770		0.1%	11.2%	3.7%
50608	Guatemala_Sri Lanka_Food & Beverages	25	25	27	25	12 488.85	1	899	905	980	935		0.1%	9.2%	2.6%
50609	Guatemala_Sri Lanka_Mining and Quarrying	25	25	27	25	0.41	0	899	905	980	935		0.1%	9.2%	2.6%
50610	Guatemala_Sri Lanka_Petroleum Chemical and Noi	25	25	27	25	1.56	50	899	905	980	935		0.1%	9.2%	2.6%
50611	Guatemala_St Helena_Agriculture	12	12	16	14	32.54	2	653	656	704	682		-0.3%	29.0%	12.5%
50612	Guatemala_St Kitts & Nevis_Food & Beverages	1	1	1	1	2 681.81	0	15	15	16	16		0.0%	20.3%	9.6%
50613	Guatemala_St Kitts & Nevis_Wood and Paper	1	1	1	1	65.16	2	15	15	16	16		0.0%	20.3%	9.6%
50614	Guatemala_St Lucia_Food & Beverages	1	1	1	1	6 198.93	0	15	15	16	16		0.0%	20.3%	9.6%
50615	Guatemala_St Lucia_Other Manufacturing	1	1	1	1	356.40	1	15	15	16	16		0.0%	20.3%	9.6%
50616	Guatemala_St Lucia_Petroleum Chemical and Non-	1	1	1	1	43.84	1	15	15	16	16		0.0%	20.3%	9.6%
50617	Guatemala_St Pierre & Miquelon_Petroleum Chem	18	18	20	19	11.76	2	609	613	661	633		0.1%	10.9%	3.6%
50618	Guatemala_St Vincent_Food & Beverages	1	1	1	1	2 742.29	0	15	15	16	16		0.0%	20.3%	9.6%
50619	Guatemala_St Vincent_Other Manufacturing	1	1	1	1	9.87	2	15	15	16	16		0.0%	20.3%	9.6%
50620	Guatemala_St Vincent_Wood and Paper	1	1	1	1	4.93	5	15	15	16	16		0.0%	20.3%	9.6%
50621	Guatemala_State of Palestine_Agriculture	145	145	161	151	251.84	1	739	744	804	770		0.1%	11.2%	3.7%
50622	Guatemala_State of Palestine_Food & Beverages	145	145	161	151	4 016.63	1	739	744	804	770		0.1%	11.2%	3.7%
50623	Guatemala_Sudan_Agriculture	39	39	42	40	490.30	4	888	890	965	921		0.1%	8.0%	2.0%
50624	Guatemala_Suriname_Electrical and Machinery	1	1	1	1	126.66	0	15	15	16	16		0.0%	20.3%	9.6%
50625	Guatemala_Suriname_Food & Beverages	1	1	1	1	13 688.65	0	15	15	16	16		0.0%	20.3%	9.6%
50626	Guatemala_Suriname_Metal Products	1	1	1	1	110.98	0	15	15	16	16		0.0%	20.3%	9.6%
50627	Guatemala_Suriname_Other Manufacturing	1	1	1	1	150.53	0	15	15	16	16		0.0%	20.3%	9.6%
50628	Guatemala_Suriname_Petroleum Chemical and No	1	1	1	1	215.65	2	15	15	16	16		0.0%	20.3%	9.6%
50629	Guatemala_Suriname_Transport Equipment	1	1	1	1	0.30	1	15	15	16	16		0.0%	20.3%	9.6%
50630	Guatemala_Suriname_Wood and Paper	1	1	1	1	61.64	1	15	15	16	16		0.0%	20.3%	9.6%
50631	Guatemala_Swaziland_Agriculture	12	12	16	14	3.70	2	653	656	704	682		-0.3%	29.0%	12.5%
50632	Guatemala_Sweden_Agriculture	158	158	178	165	409.50	8	650	655	706	677		0.1%	12.8%	4.6%
50633	Guatemala_Sweden_Electrical and Machinery	158	158	178	165	5.48	68	650	655	706	677		0.1%	12.8%	4.6%
50634	Guatemala_Sweden_Food & Beverages	158	158	178	165	276.44	8	650	655	706	677		0.1%	12.8%	4.6%
50635	Guatemala_Sweden_Metal Products	158	158	178	165	6 306.98	5	650	655	706	677		0.1%	12.8%	4.6%

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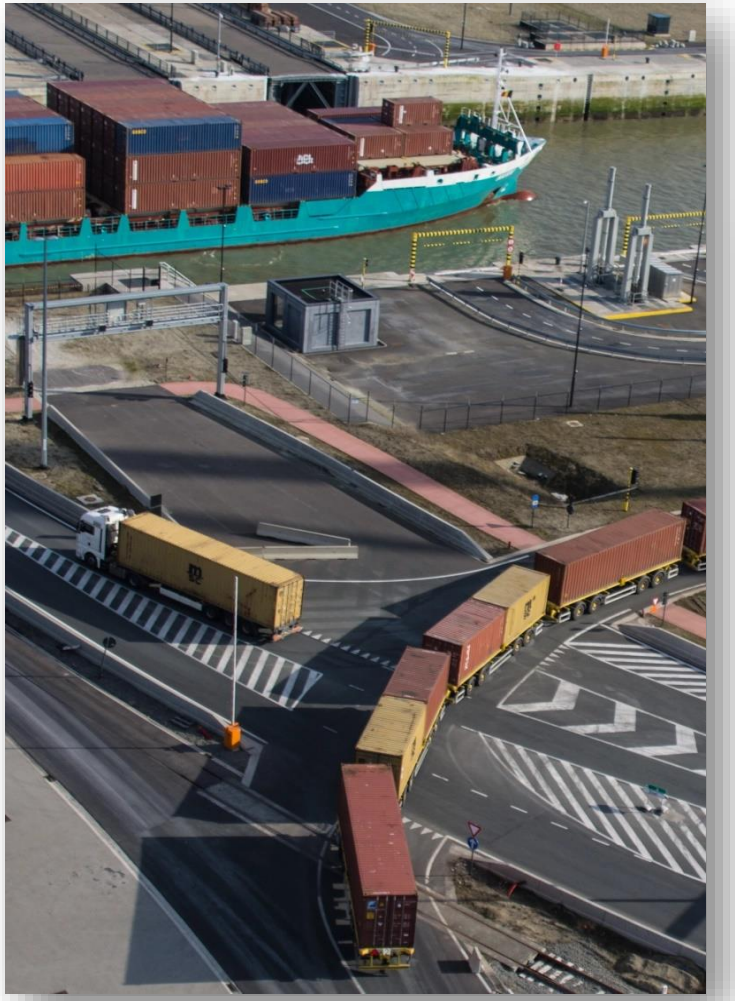
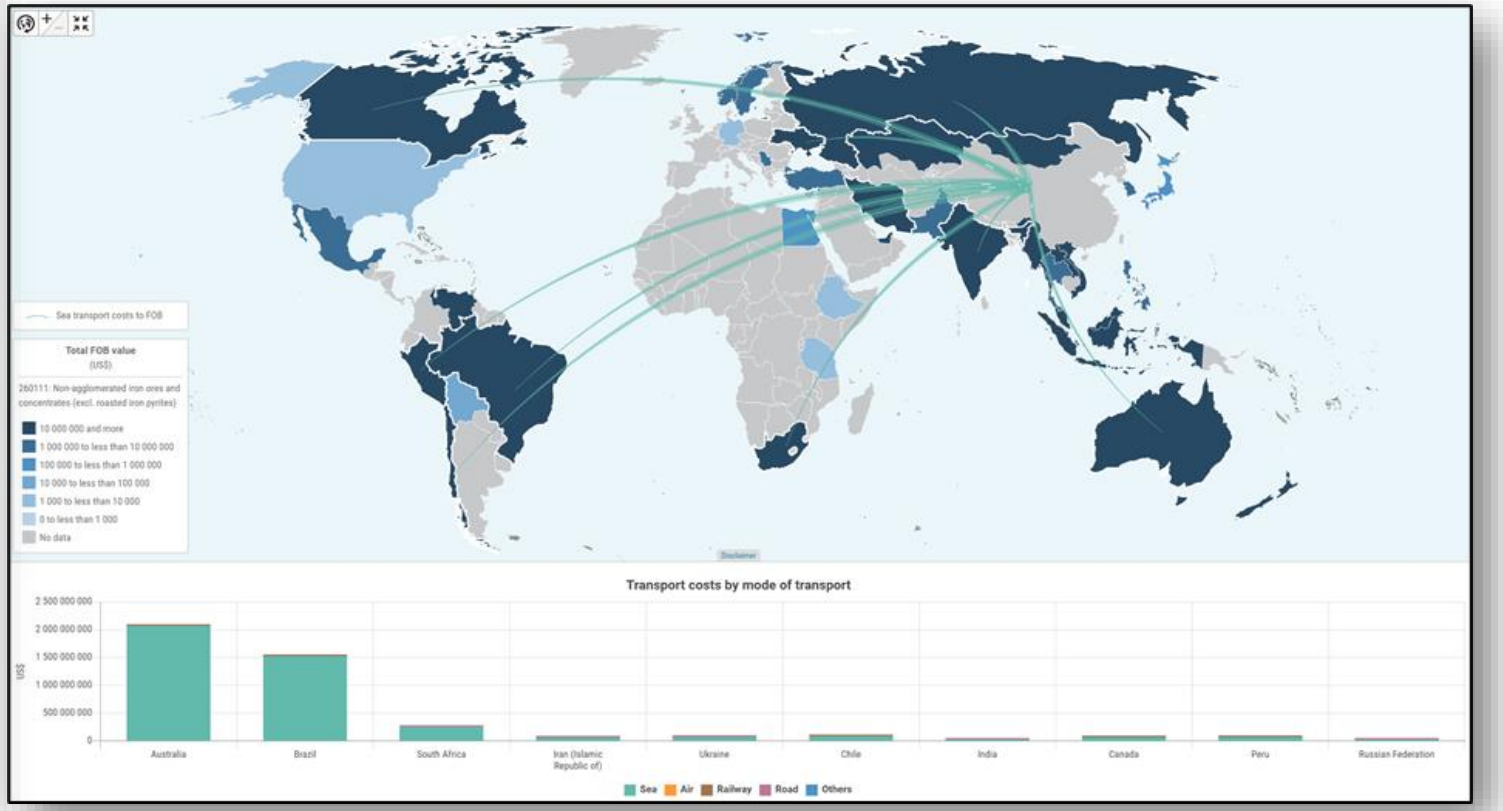
MDS Transmodal

EQUITABLE MARITIME CONSULTING

6) Change in total trade costs



- For each one of the 130236 cases, provide share of maritime trade



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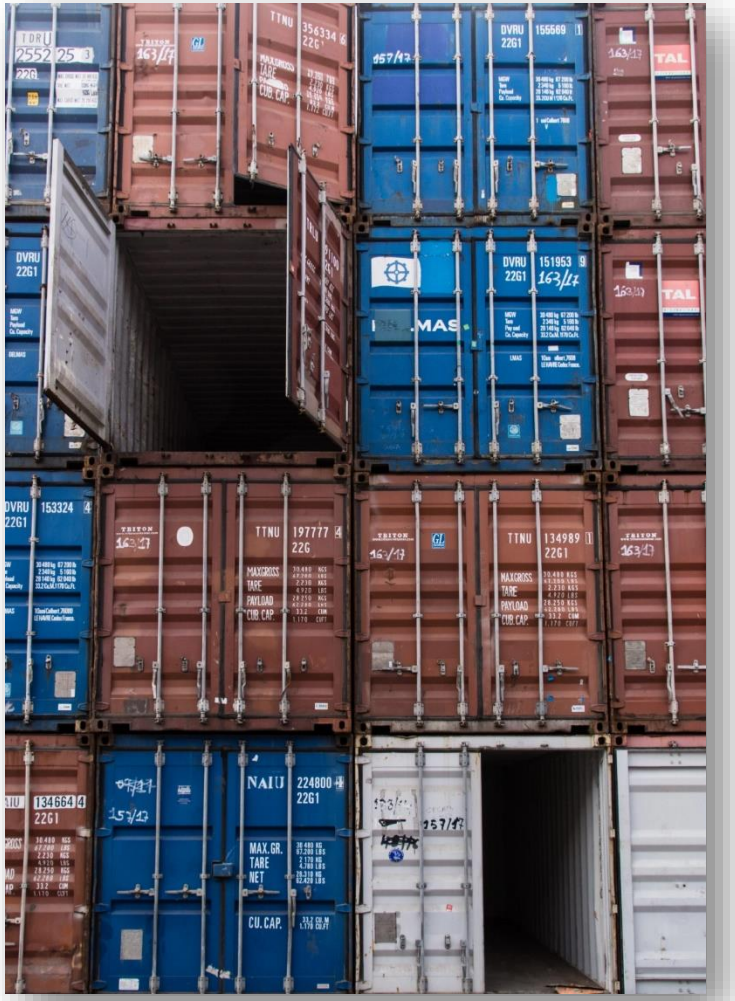
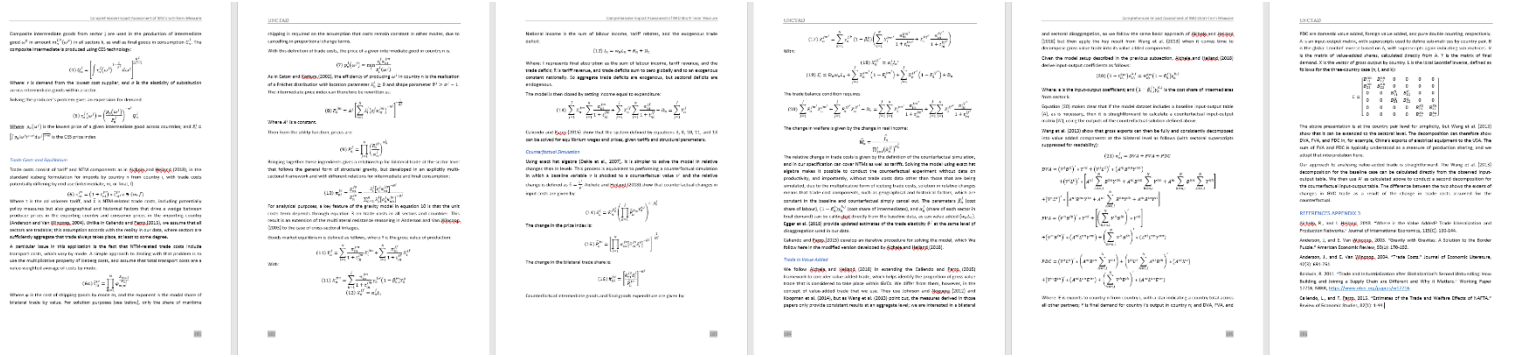
developing trade consultants

7) Trade model simulation





Input: Change in trade costs for 130236 cases

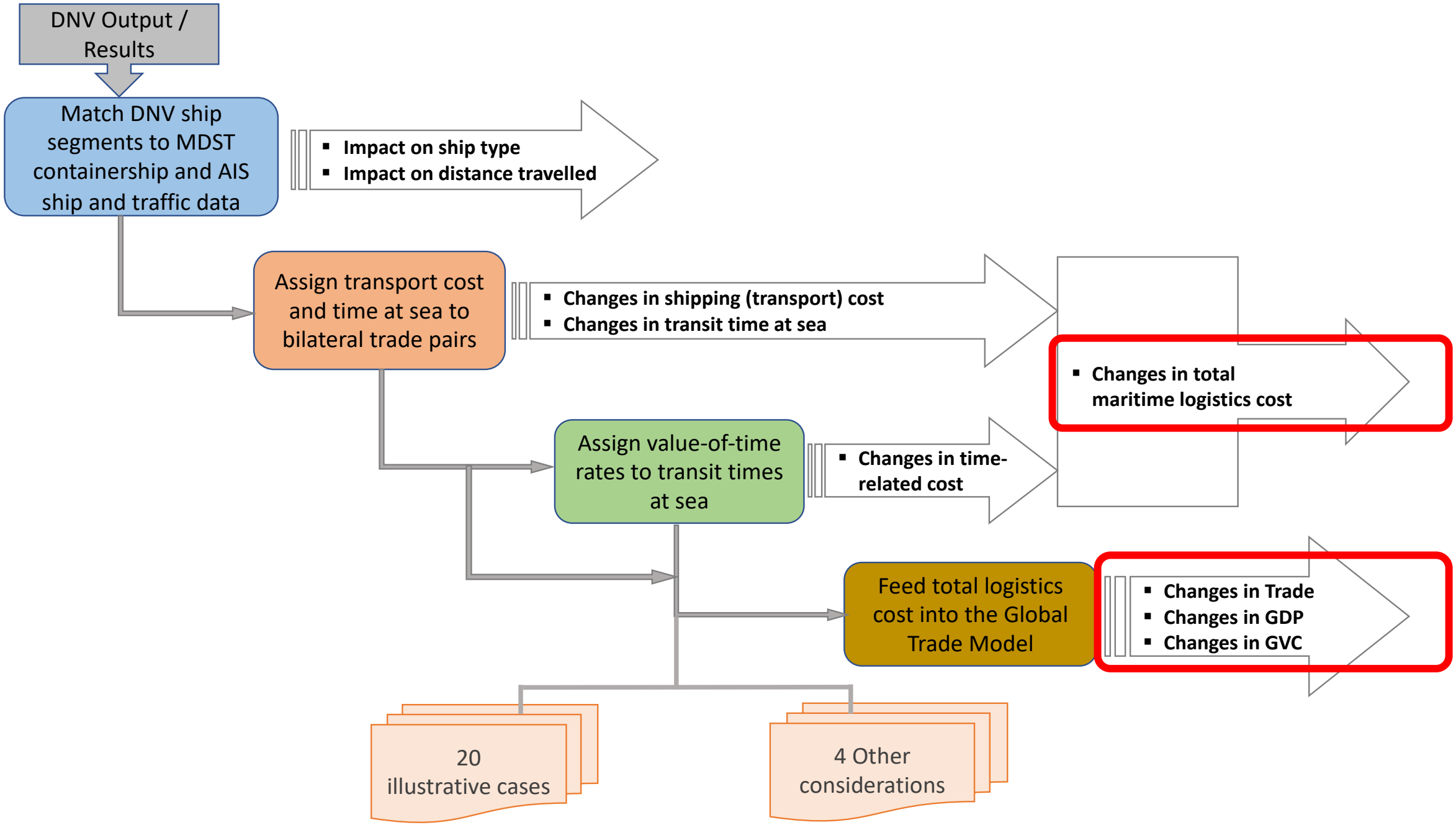
Output: **the impact on States**

- Change in trade (exports and imports)
- Change in GDP (plus change in participation in value chains)

for 185 countries

Annexes/ boxes

I. Supply/demand balance
II. Adaptation, substitution
III. Modal shifts
IV. Illustrative case studies


DNV Output / Results
Match DNV ship segments to MDST containership and AIS ship and traffic data
Impact on ship type
Impact on distance travelled
Assign transport cost and time at sea to bilateral trade pairs
Changes in shipping (transport) cost
Changes in transit time at sea
Changes in total maritime logistics cost
Assign value-of-time rates to transit times at sea
Changes in time-related cost
Feed total logistics cost into the Global Trade Model
Changes in Trade
Changes in GDP
Changes in GVC
20 illustrative cases
4 Other considerations

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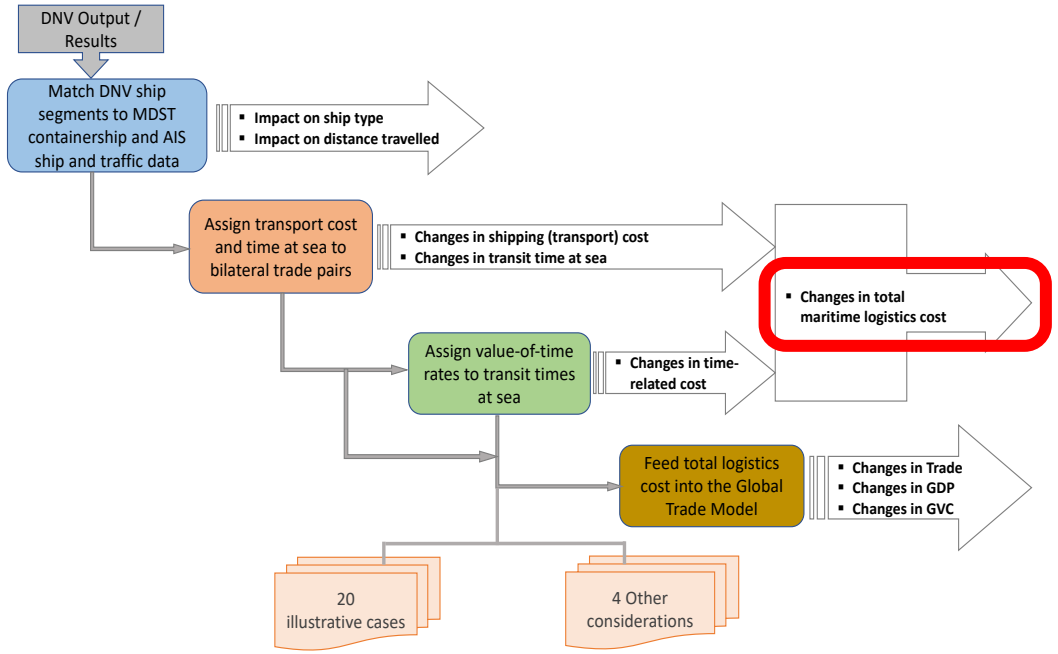
Comprehensive Impact Assessment of IMO short-term measures

A) Methodology

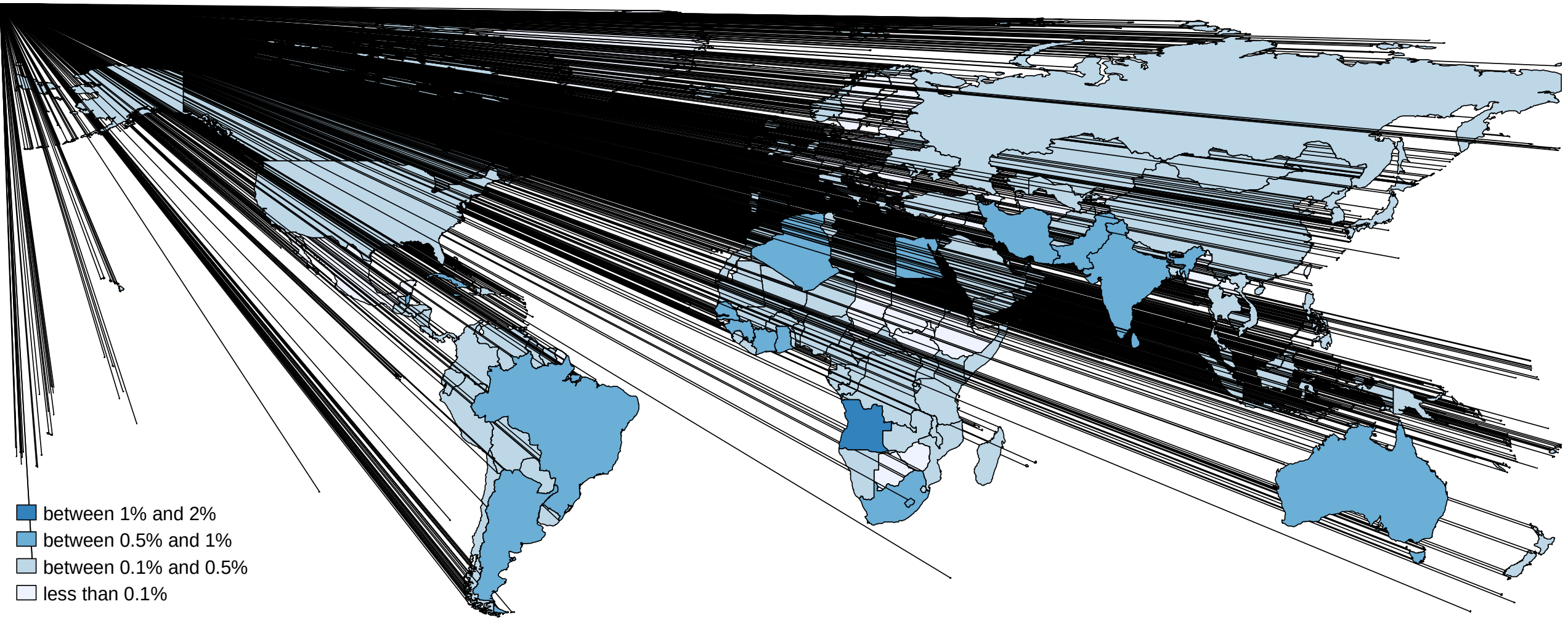
B) Results

C) Conclusions



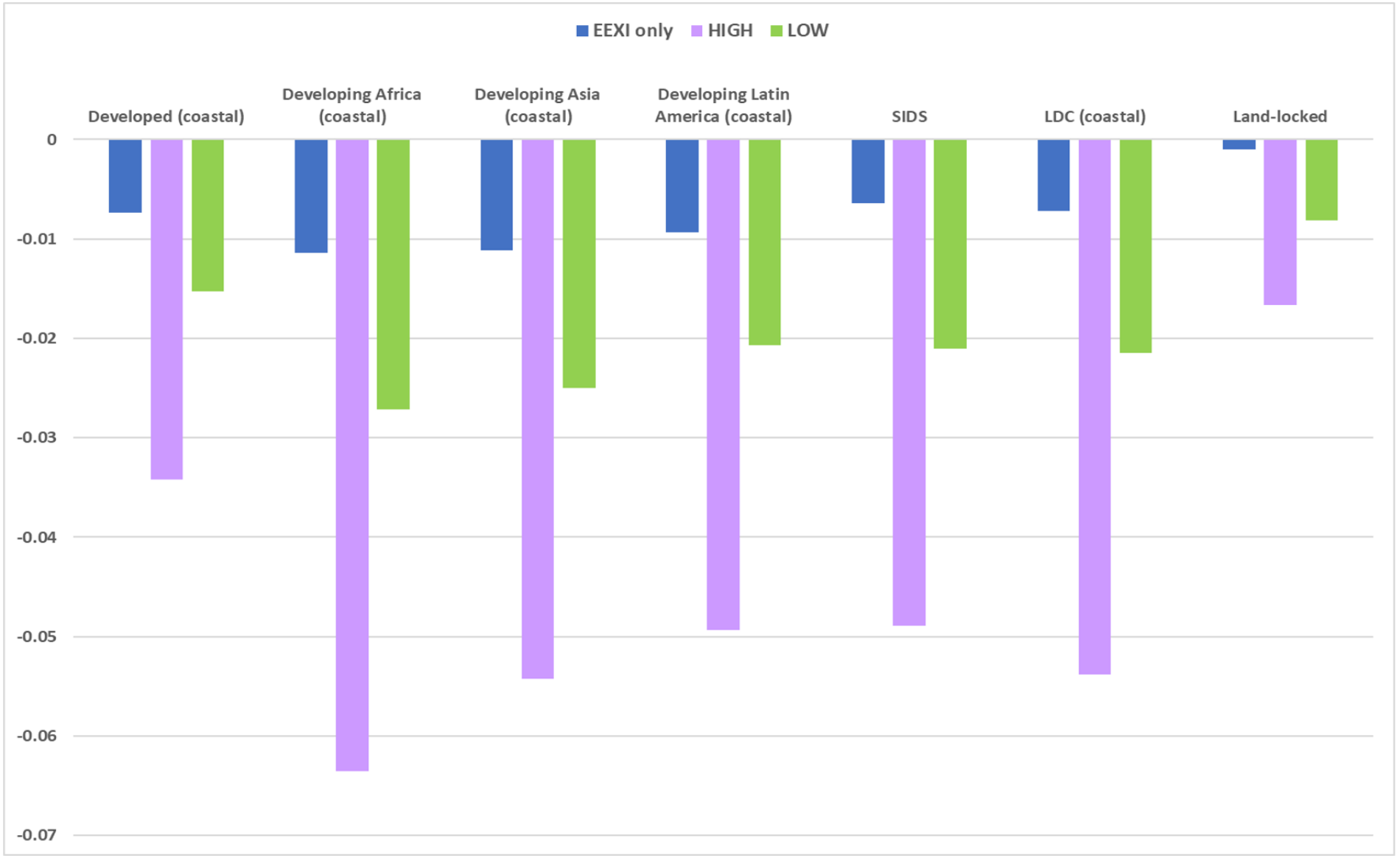
	Change in time at sea, %			Change in transport costs, %			Change in total maritime logistics costs, %		
EXPORTING ECONOMY	EEXI only	High case	Low case	EEXI only	High case	Low case	EEXI only	High case	Low case
Vanuatu	1.6	8.5	2.6	-0.6	6.5	1.5	1.2	8.2	2.3
Vatican City	0.9	8.0	3.7	0.2	9.0	2.8	0.6	8.5	3.4
Venezuela	2.9	8.0	2.9	2.2	8.3	2.5	2.6	8.1	2.9
Vietnam	2.4	7.6	3.5	-0.7	5.0	1.0	1.6	6.9	2.8
Wallis & Futuna	0.8	8.7	4.0	0.3	9.9	3.0	0.5	9.4	3.5
Yemen	2.7	8.3	3.1	1.2	4.3	1.7	2.1	7.0	2.8
Zambia	1.9	8.4	2.6	-0.7	4.8	1.1	1.8	8.1	2.6
Zimbabwe	2.1	8.3	3.0	-1.3	3.1	0.3	1.3	7.3	2.6
World total	**2.2**	**7.8**	**2.8**	**0.4**	**5.6**	**1.5**	**1.7**	**7.2**	**2.7**

Decline in trade (imports + exports) % change "**Low**" scenario



Source: UNCTAD, based on data from DTC (based on data generated by UNCTAD, MDST, MarineTraffic, EMC, DNV)

Figure 38: Simulated change in income (per cent of GDP), different country groups



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Comprehensive Impact Assessment of IMO short-term measures

A) Methodology
B) Results
C) Conclusions

Aggregate global impacts of the proposed IMO short-term measure on maritime logistics costs can be considered small when compared to typical market variability of freight rates. Also, the global impact on GDP and trade flows can be considered small when compared to the long-term impact of other disruptions such as a pandemic or climate change factors.

However, for some countries, the negative impacts of the IMO measure assessed in this report are relatively higher than for others. Aware of the resource constraints of some developing countries, including SIDS and LDCs, UNCTAD expects that some countries will likely require support to mitigate the increased maritime logistics costs and alleviate the consequent negative impact on their respective real income and trade flows.