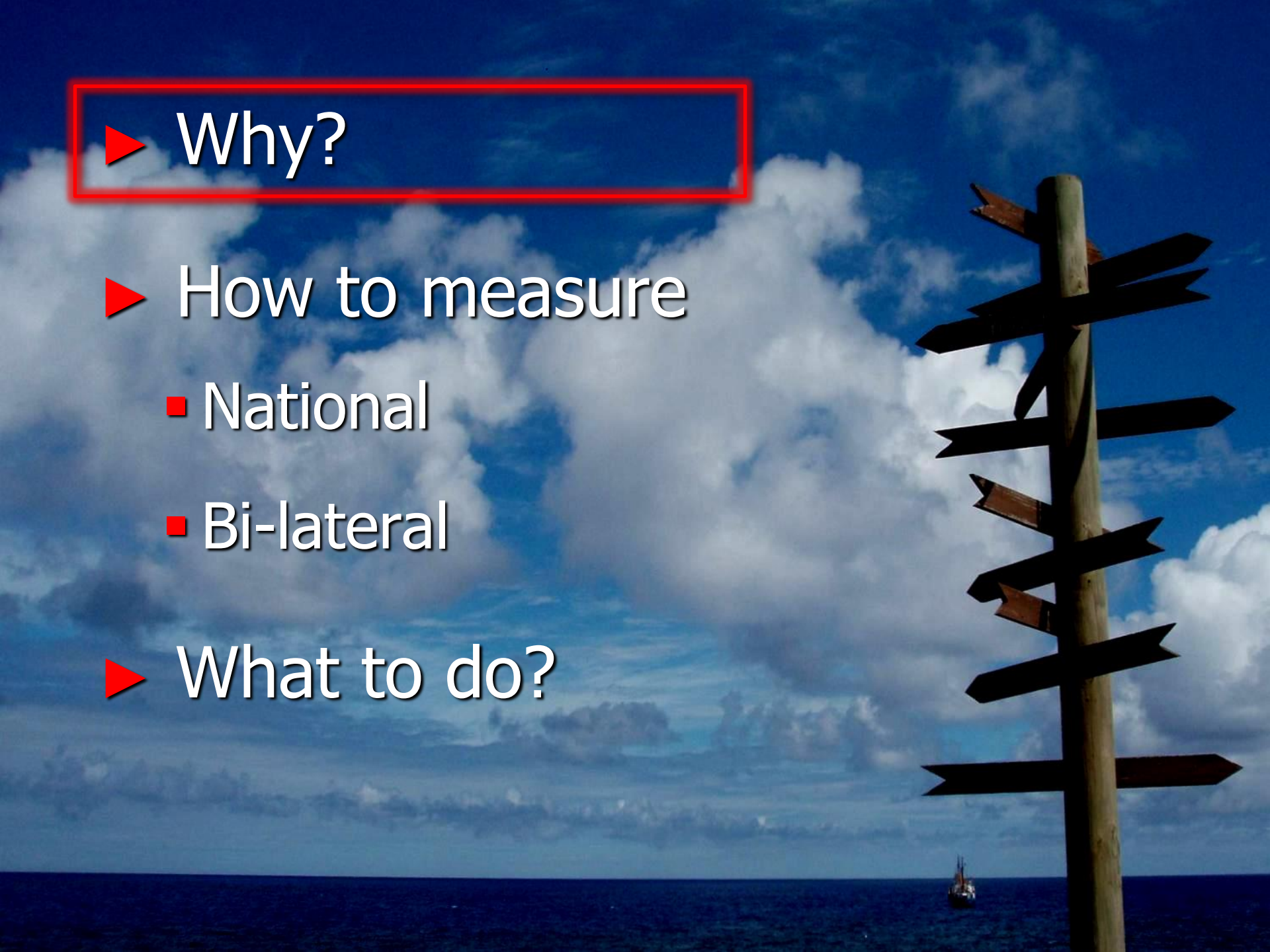
Maritime connectivity

UNITED NATIONS
UNCTAD

Geneva, IMSF, May 2017, Jan.Hoffmann@UNCTAD.org

- Why?
- How to measure
  - National
  - Bi-lateral
- What to do?

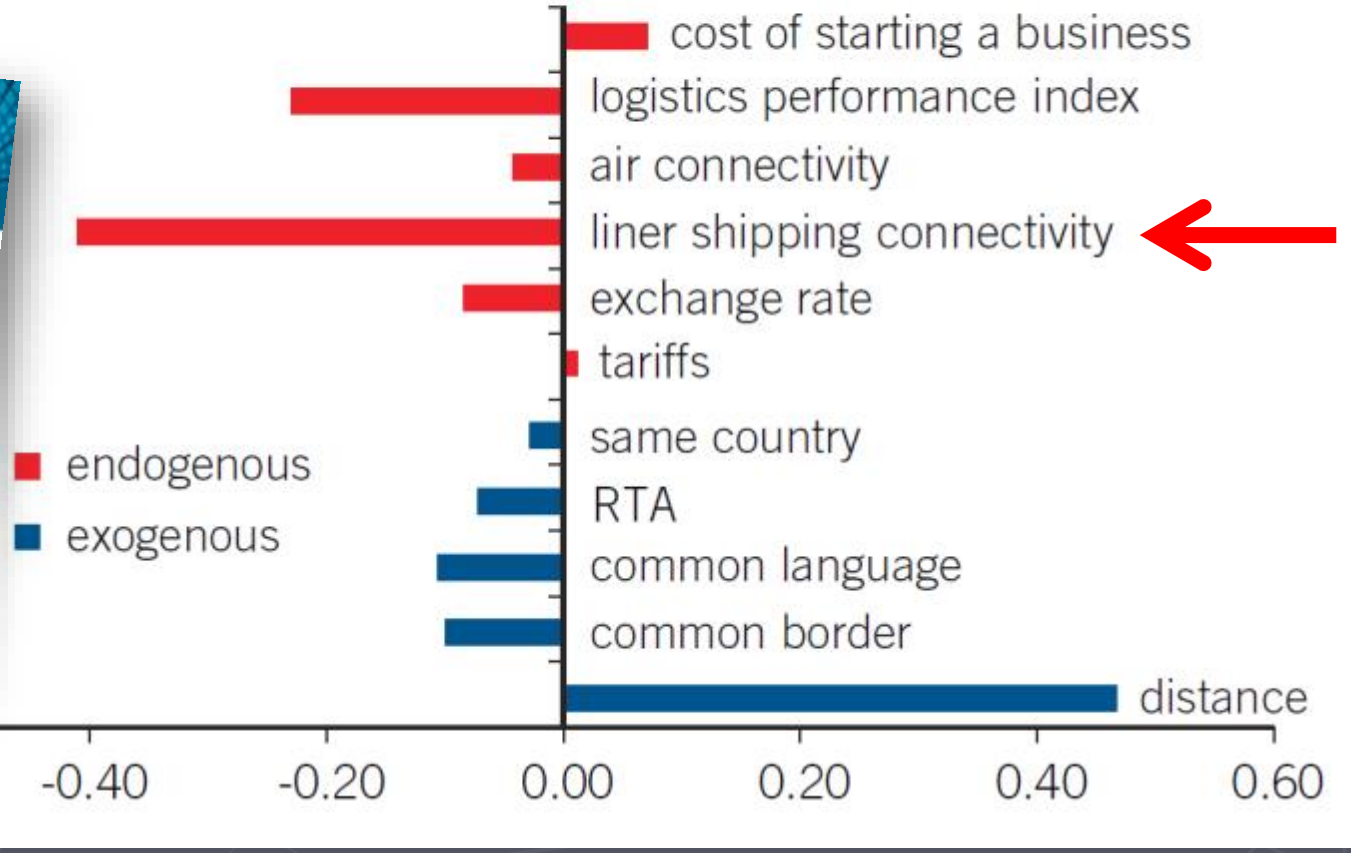

Why?
How to measure
National
Bi-lateral
What to do?

Why “connectivity”?

Higher Liner Shipping Connectivity leads to lower trade costs

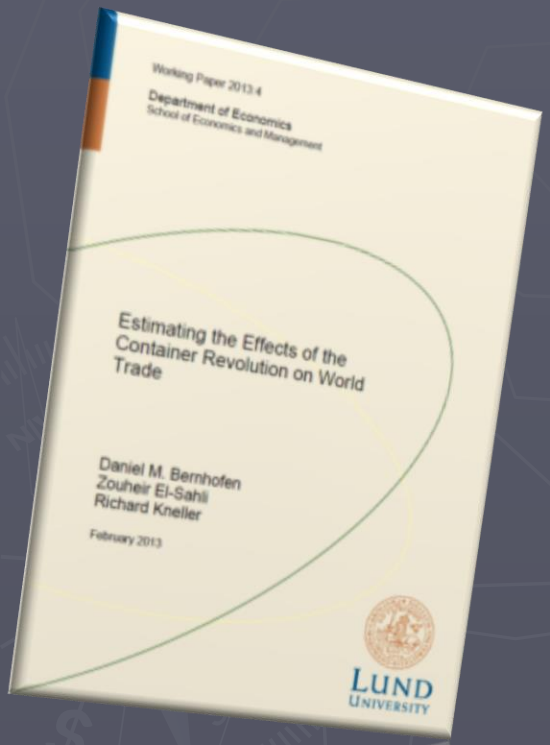
Figure 1. Relative Impact of Different Sources of Trade Costs

(normalized regression coefficients ["betas"] against the indicator measuring the cost component)



(Arvis et al, 2013)

Introducing containerization leads to more trade



(Bernhofen et al, 2013)

The Economist

Log in | Register | Subscribe

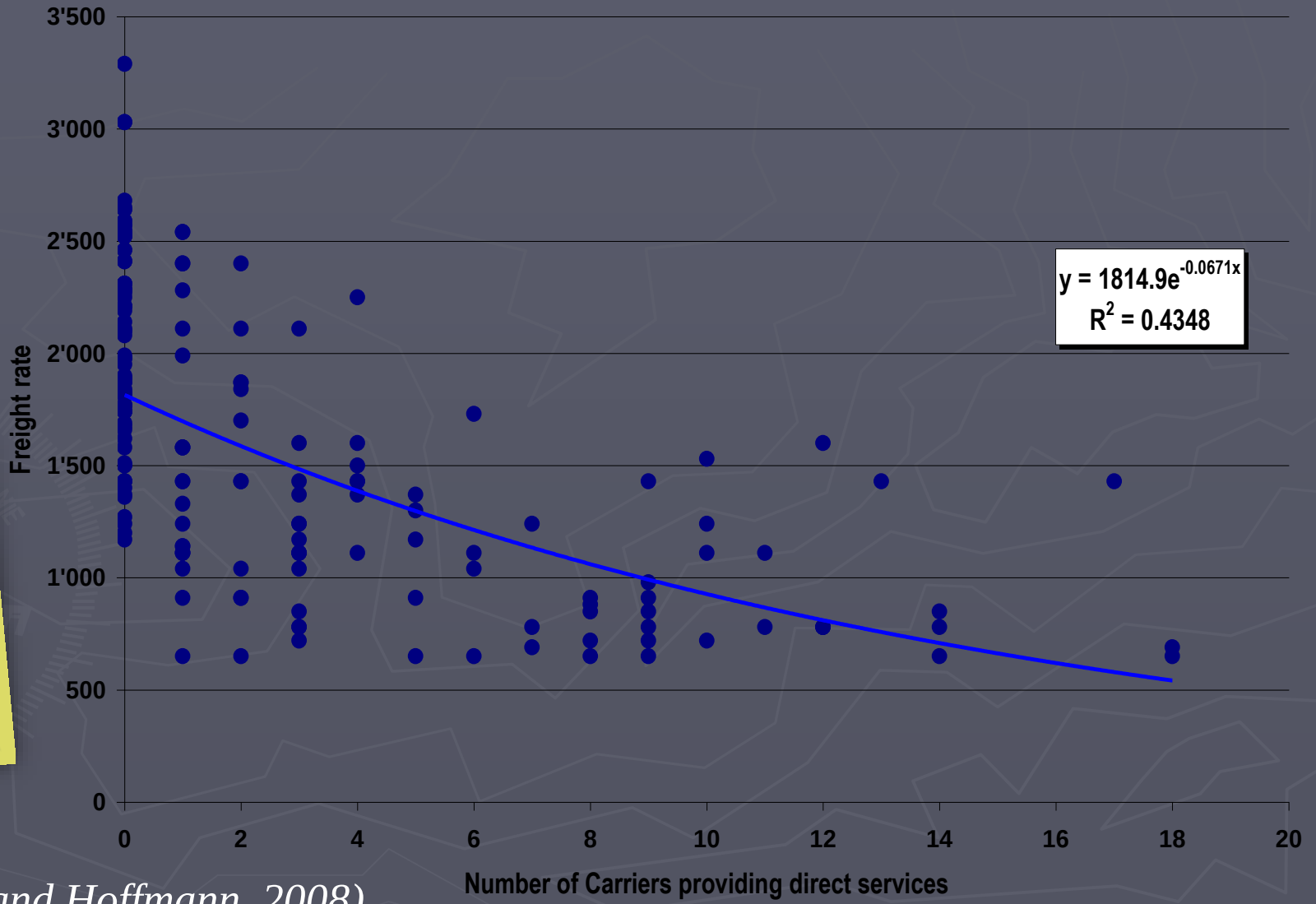
World politics | Business & finance | Economics | Science & technology | Culture

Free exchange

The humble hero

Containers have been more important for globalisation than freer trade

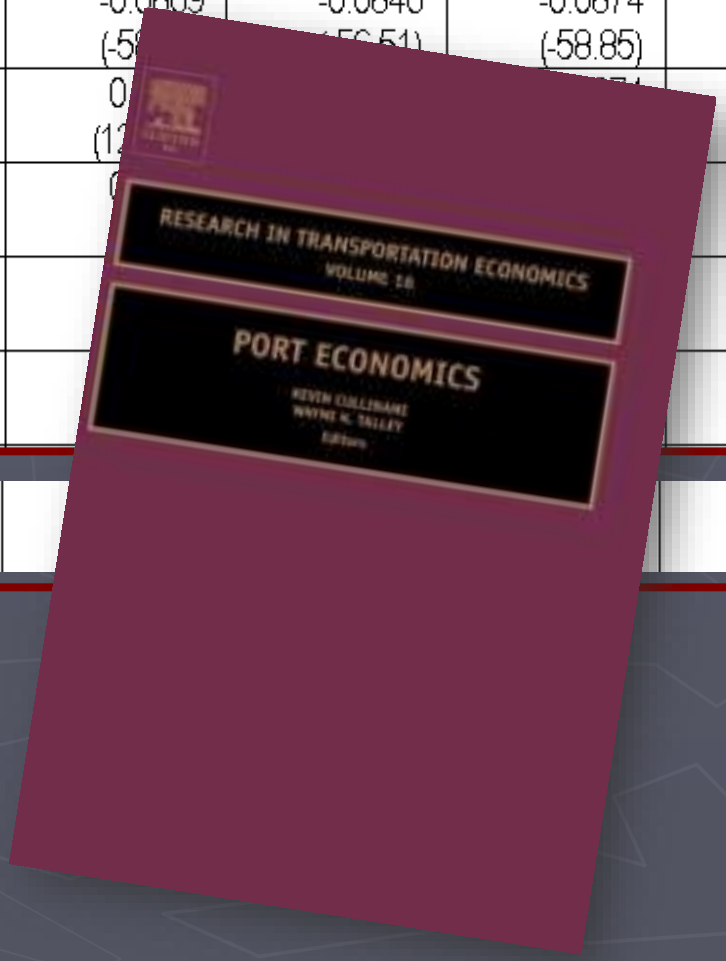
Better connectivity leads to lower freight rates



(Wilmsmeier and Hoffmann, 2008)

More liner services lead to lower maritime transport costs

Variable	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13
Observations	N = 75 928	N = 75 928	N = 75 928	N = 75 928	N = 75 928	N = 35 438	N = 73 818
$TONS_k$	-0.0863 (-57.65)	-0.0863 (-57.67)	-0.0869 (-5	-0.0846	-0.0874 (-58.85)	-0.0632 (-29.15)	-0.0857 (-57.00)
$VALUEPERTON_k$	0.3422 (128.74)	0.3416 (128.82)	0 (12			0.4665 (113.19)	0.3447 (129.16)
$DISTANCE_{ij}$	0.3716 (95.80)	0.3698 (97.26)				0.3380 (55.36)	0.1769 (30.28)
$BILATERALVOLUME_{ij}$	-0.0100 (-4.46)	-0.0109 (-5.53)				-0.0794 (-23.74)	0.0256 (10.91)
$BALANCEROUTE_{ij}$	0.00020 (1.73)	0.00027 (2.40)				0.00082 (5.06)	0.00228 (14.31)
$LINERSERVICES_{ij}$							-0.1129 (-32.60)



(Wilmsmeier et al 2006)


More trade
-> More shipping supply
-> More competition
-> lower freights
-> More trade


Better services
-> More trade
-> More income to finance infrastructure
-> Better services


Lower Transport Costs
-> More trade
-> Economies of scale
-> Lower Transport Costs

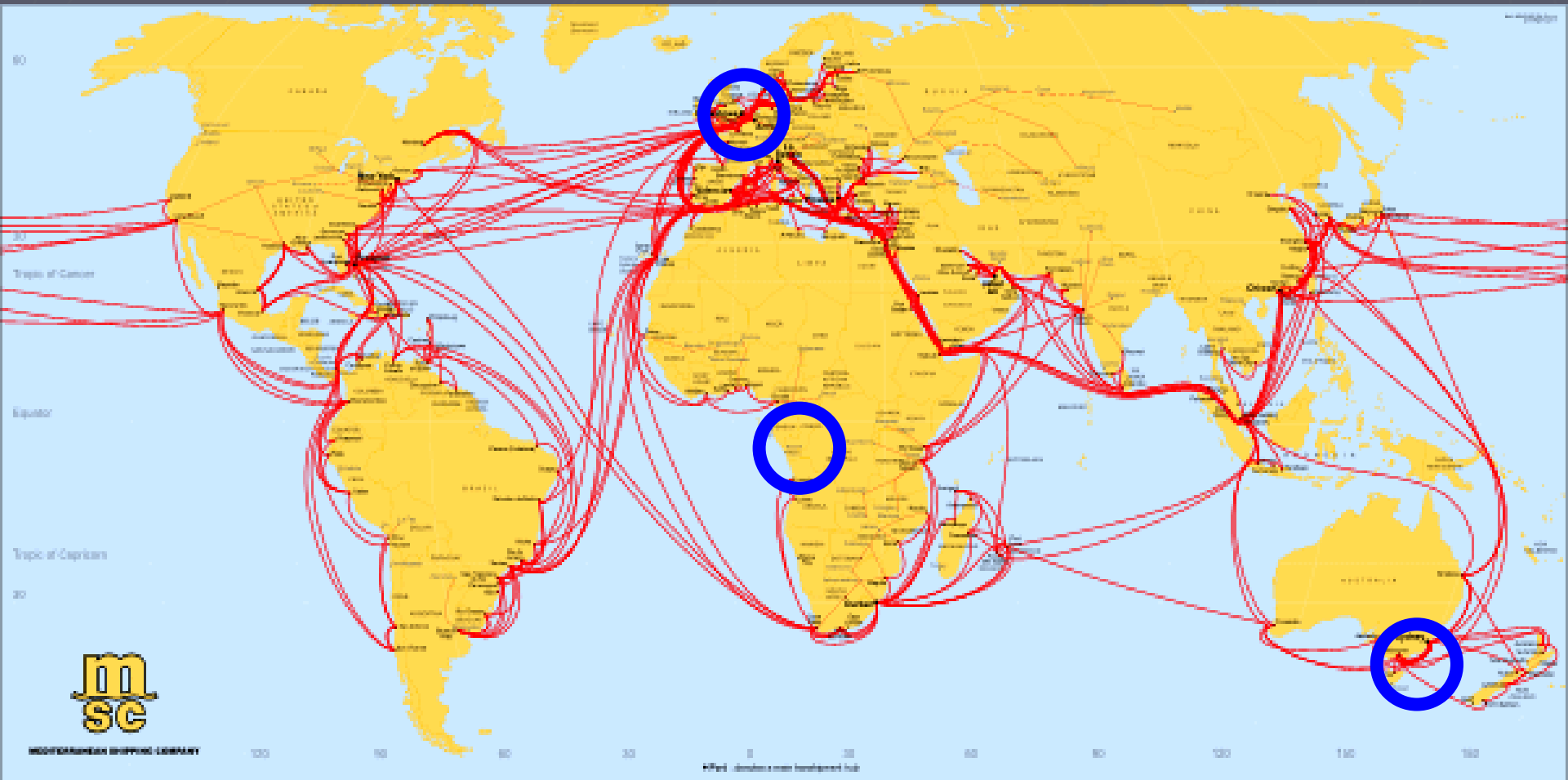

Why?
How to measure
National
Bi-lateral
What to do?

"Connectivity"

1) Per country – in a "point"
2) Per route – between pairs of countries

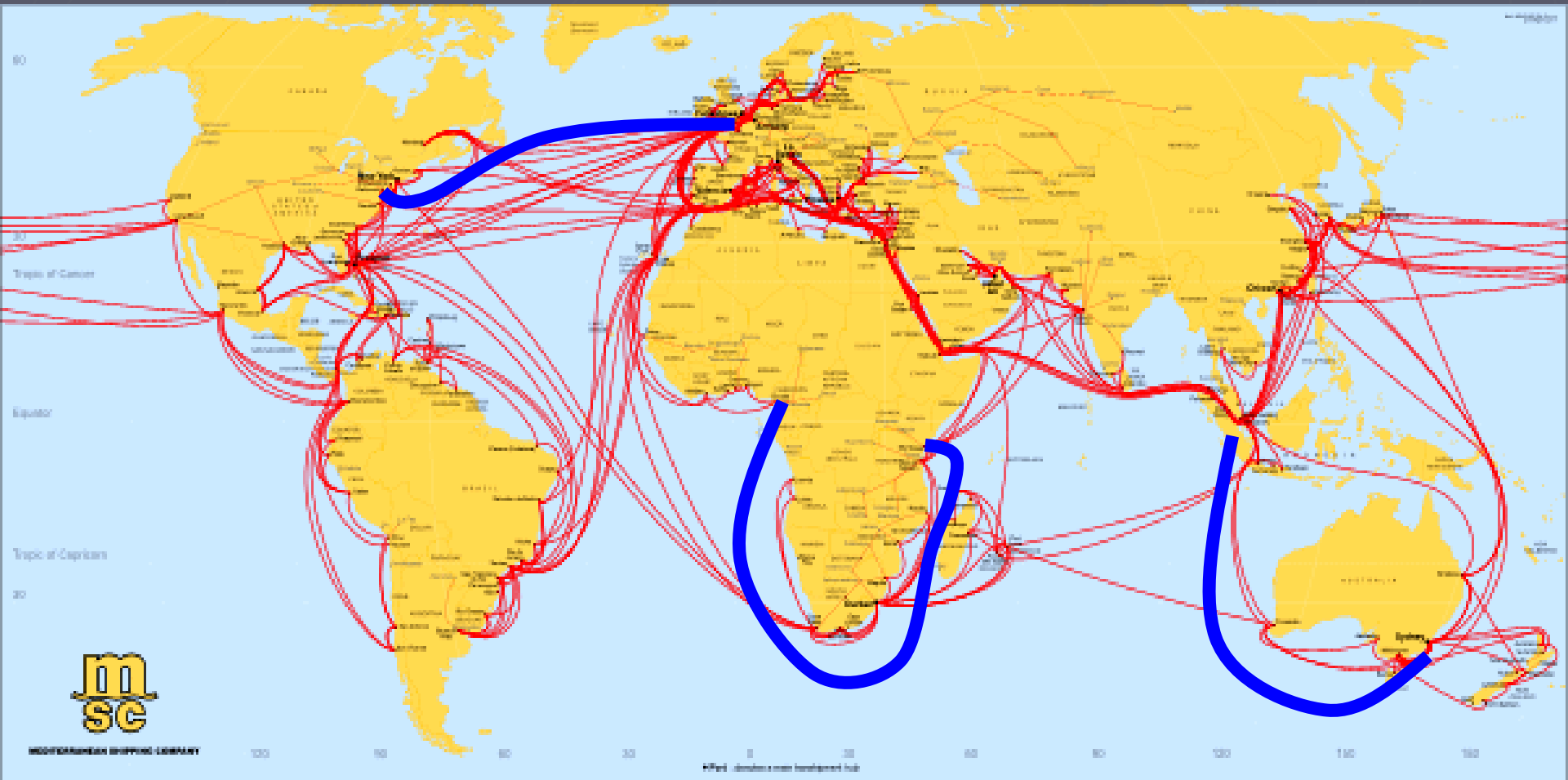
"Connectivity"

1) Per country – in a "point" (159)
2) Per route – between pairs of countries



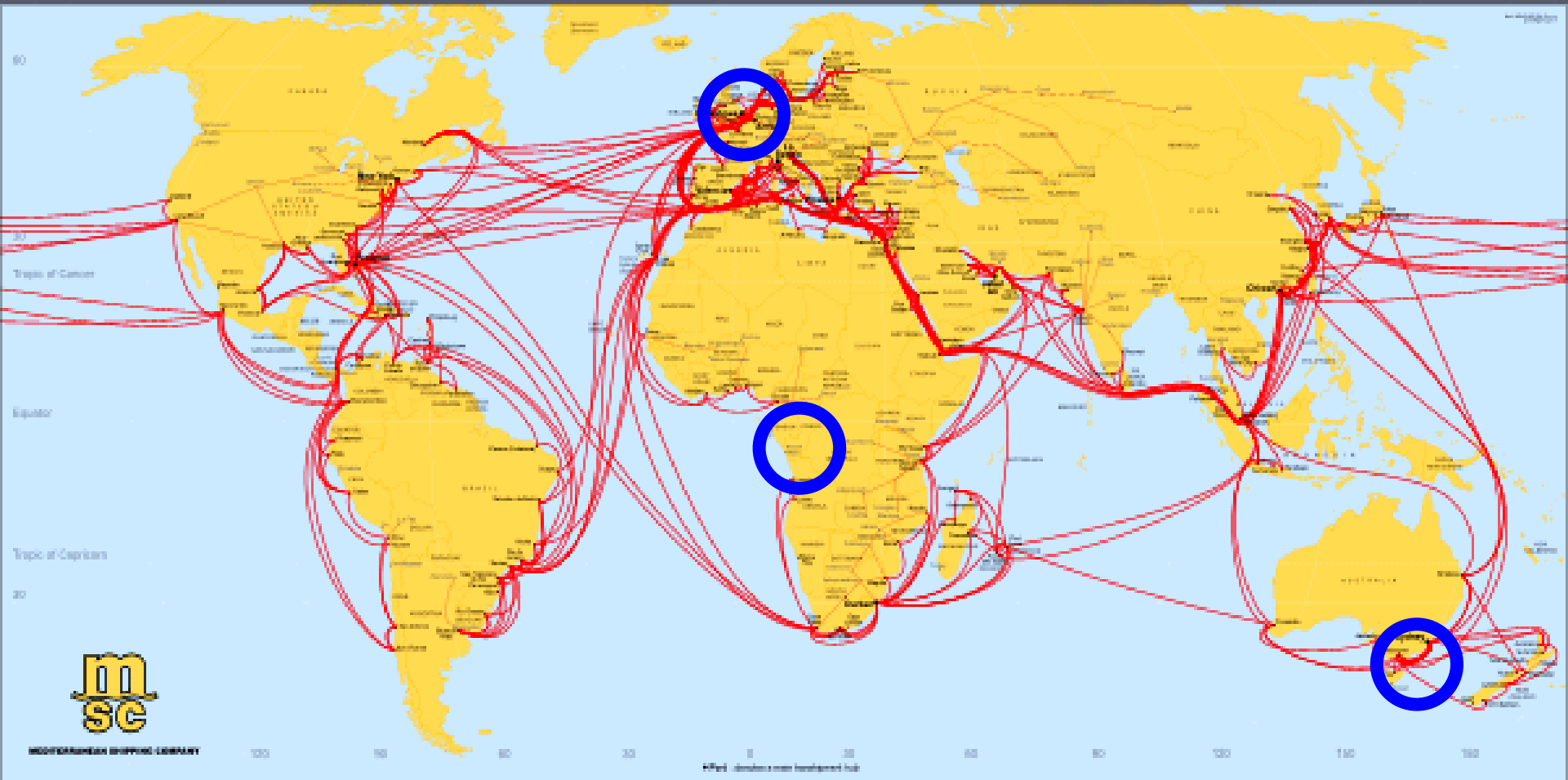
"Connectivity"

1) Per country – in a "point" (159)
2) Per route – between countries (159*158/2=12561)



"Connectivity"

1) Per country – in a "point" (159)
2) Per route – between pairs of countries

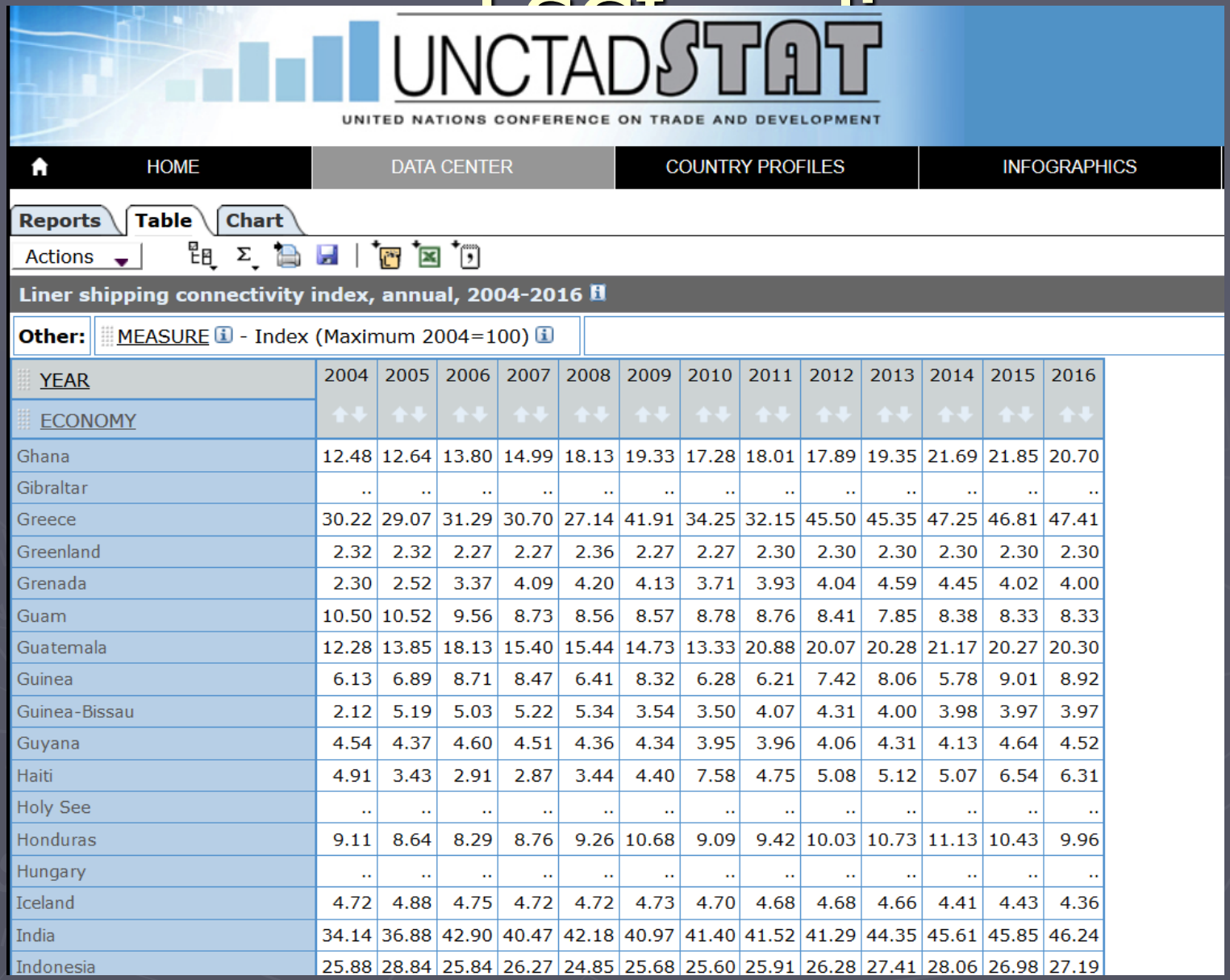


To capture a country's connectivity…

UNCTAD developed the Liner Shipping Connectivity Index – **LSCI** – using the following 5 components:

- Companies
- Services
- Largest ship
- Number of ships
- TEU

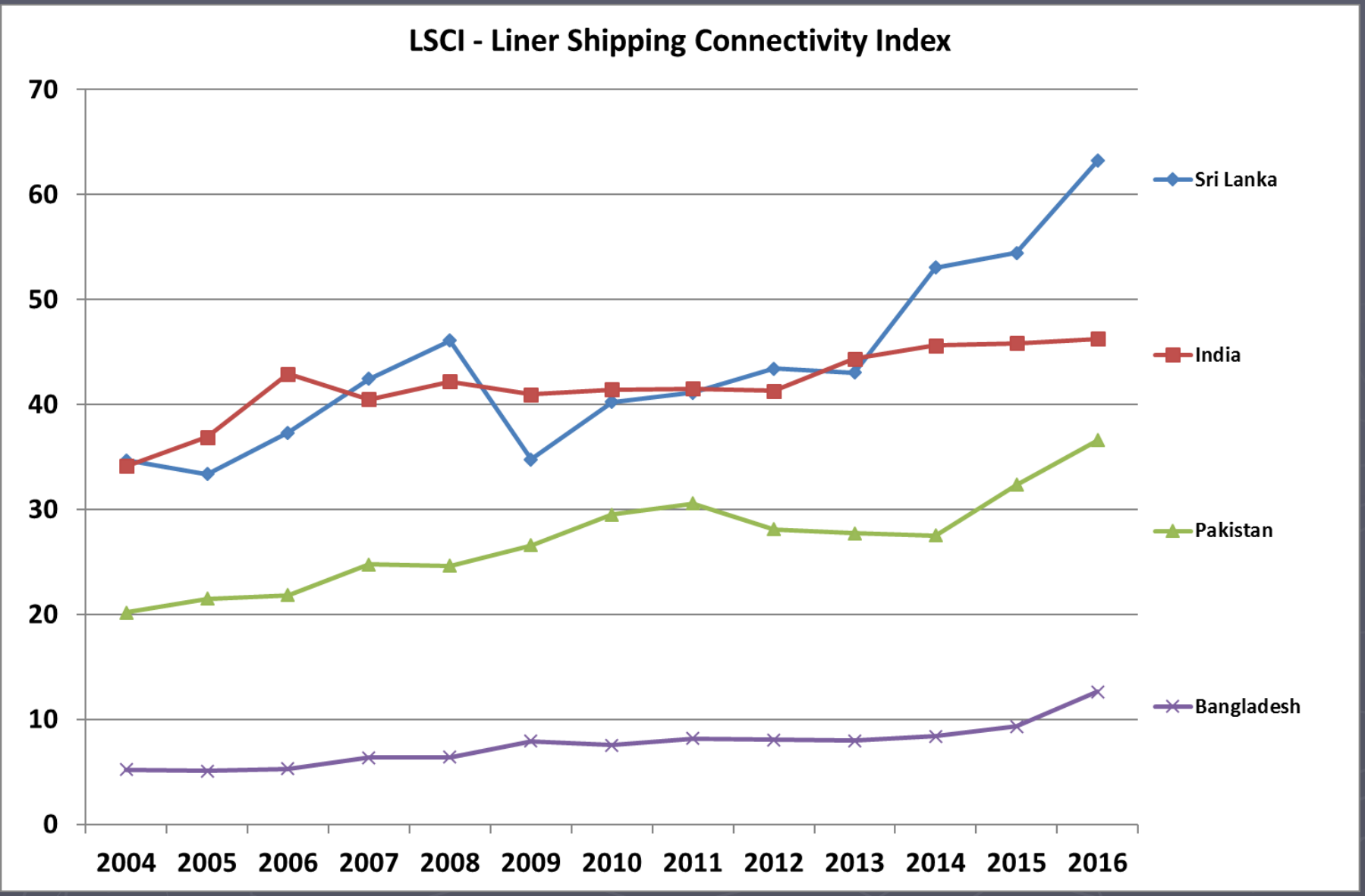
Source for components: *CI-Online* and *MDS Transmodal*



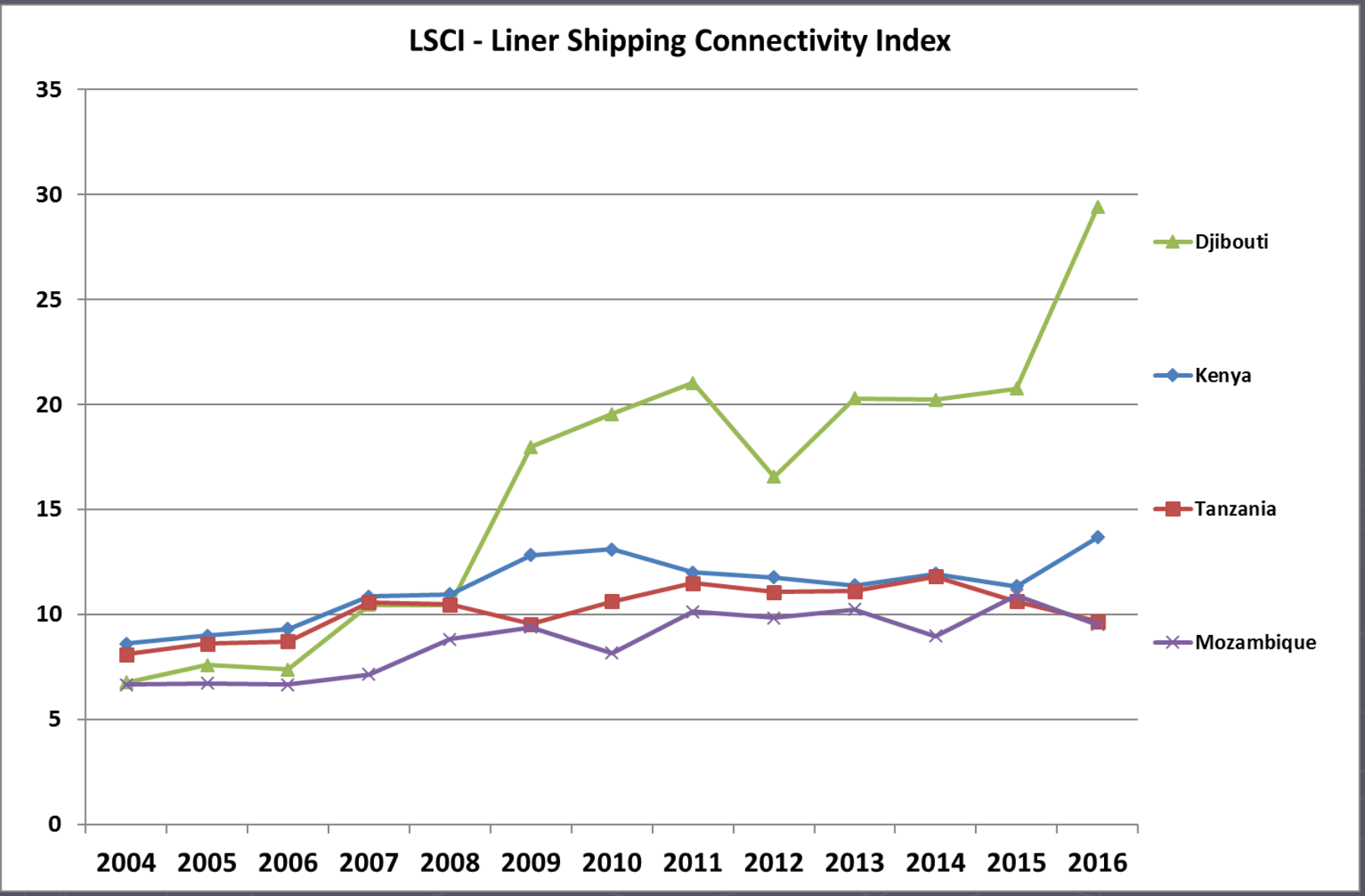
YEAR / ECONOMY	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Ghana	12.48	12.64	13.80	14.99	18.13	19.33	17.28	18.01	17.89	19.35	21.69	21.85	20.70
Gibraltar	..	..	..	..	..	..	..	..	..	..	..	..	..
Greece	30.22	29.07	31.29	30.70	27.14	41.91	34.25	32.15	45.50	45.35	47.25	46.81	47.41
Greenland	2.32	2.32	2.27	2.27	2.36	2.27	2.27	2.30	2.30	2.30	2.30	2.30	2.30
Grenada	2.30	2.52	3.37	4.09	4.20	4.13	3.71	3.93	4.04	4.59	4.45	4.02	4.00
Guam	10.50	10.52	9.56	8.73	8.56	8.57	8.78	8.76	8.41	7.85	8.38	8.33	8.33
Guatemala	12.28	13.85	18.13	15.40	15.44	14.73	13.33	20.88	20.07	20.28	21.17	20.27	20.30
Guinea	6.13	6.89	8.71	8.47	6.41	8.32	6.28	6.21	7.42	8.06	5.78	9.01	8.92
Guinea-Bissau	2.12	5.19	5.03	5.22	5.34	3.54	3.50	4.07	4.31	4.00	3.98	3.97	3.97
Guyana	4.54	4.37	4.60	4.51	4.36	4.34	3.95	3.96	4.06	4.31	4.13	4.64	4.52
Haiti	4.91	3.43	2.91	2.87	3.44	4.40	7.58	4.75	5.08	5.12	5.07	6.54	6.31
Holy See	..	..	..	..	..	..	..	..	..	..	..	..	..
Honduras	9.11	8.64	8.29	8.76	9.26	10.68	9.09	9.42	10.03	10.73	11.13	10.43	9.96
Hungary	..	..	..	..	..	..	..	..	..	..	..	..	..
Iceland	4.72	4.88	4.75	4.72	4.72	4.73	4.70	4.68	4.68	4.66	4.41	4.43	4.36
India	34.14	36.88	42.90	40.47	42.18	40.97	41.40	41.52	41.29	44.35	45.61	45.85	46.24
Indonesia	25.88	28.84	25.84	26.27	24.85	25.68	25.60	25.91	26.28	27.41	28.06	26.98	27.19

http://stats.unctad.org/LSCI

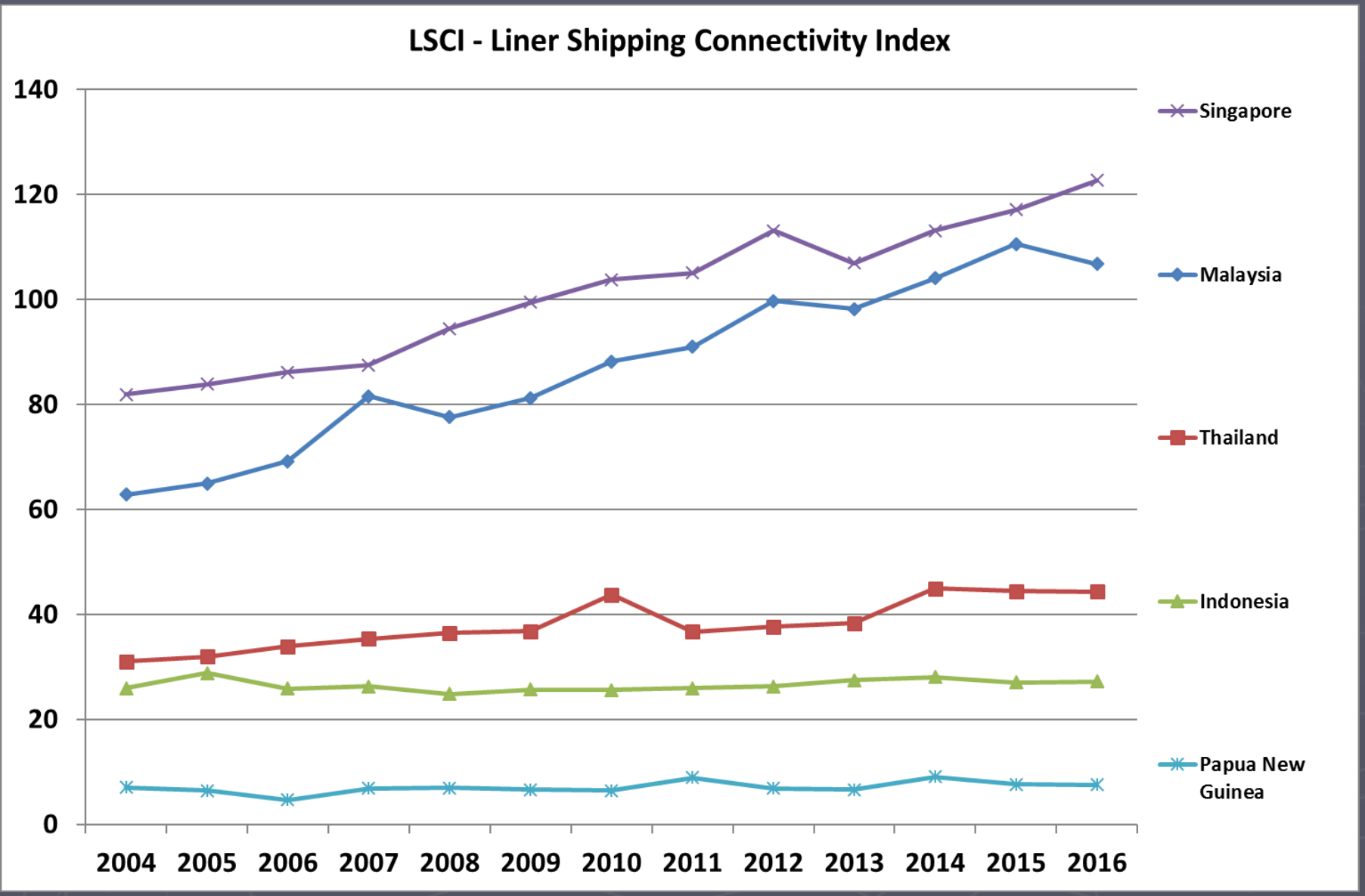
Trends in selected countries



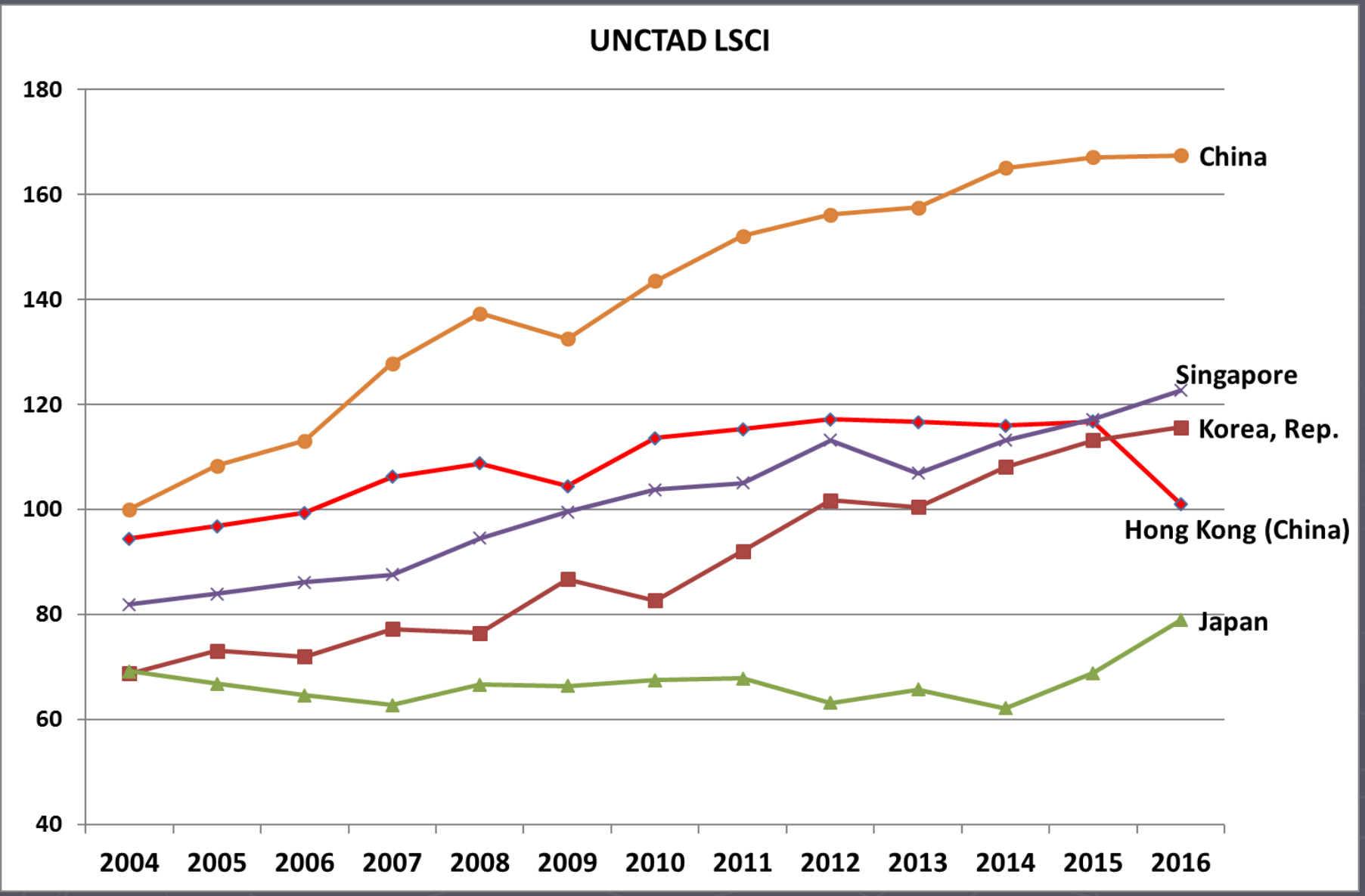
Trends in selected countries



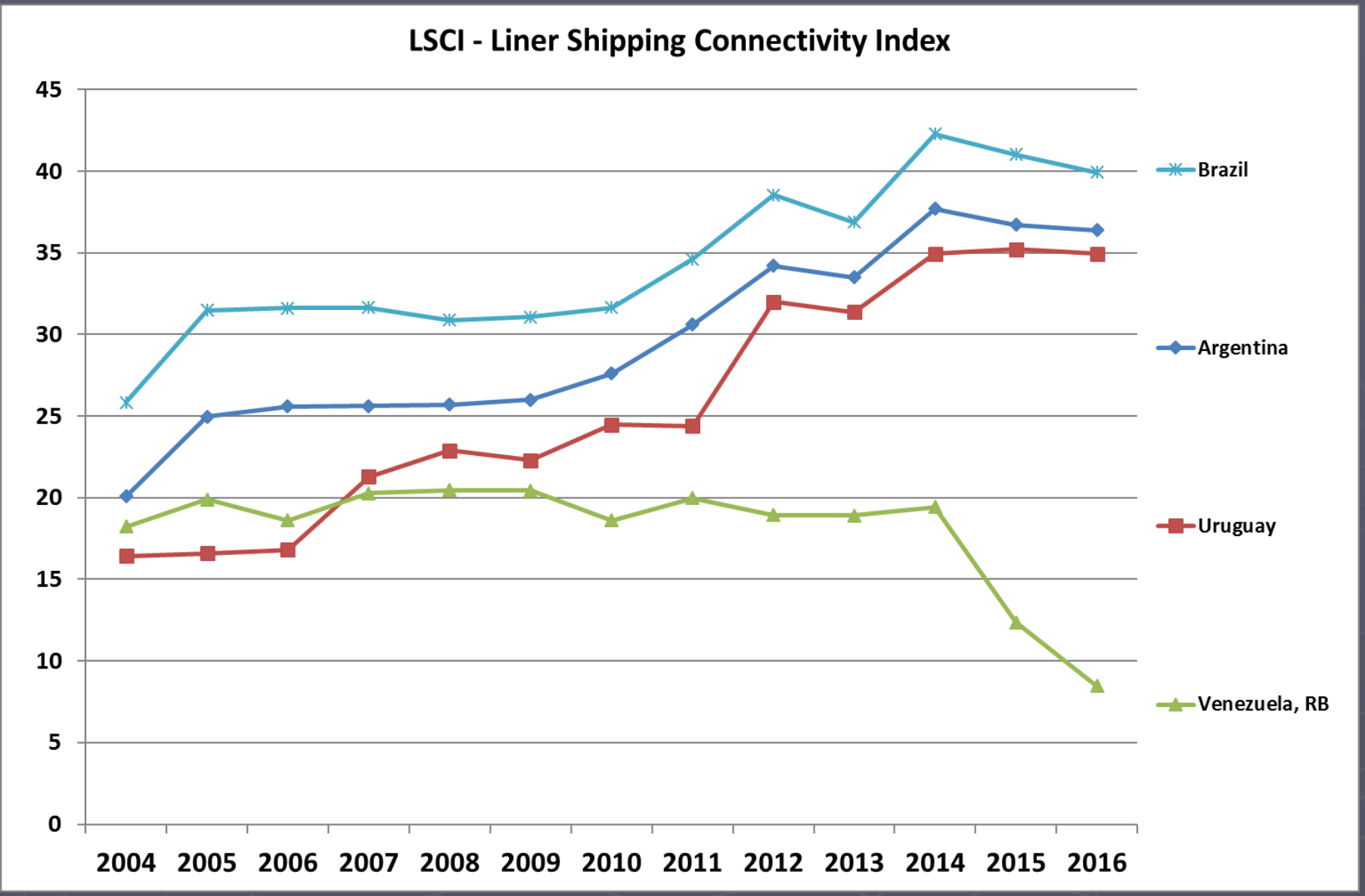
Trends in selected countries



Trends in selected countries



Trends in selected countries



The Top Five today (May 2017) – fleet deployment

	Total number of services	Total number of ships scheduled on the services	Total number of operators	Max ship capacity (TEU)	Deployed annual capacity (TEU)
China	463	1,996	907	18,506	85,347,681
Singapore	246	1,217	526	18,506	51,717,456
Republic of Korea	245	1,017	465	18,506	40,924,768
Hong Kong	201	940	426	18,506	39,589,202
Malaysia	196	906	365	18,506	36,663,697

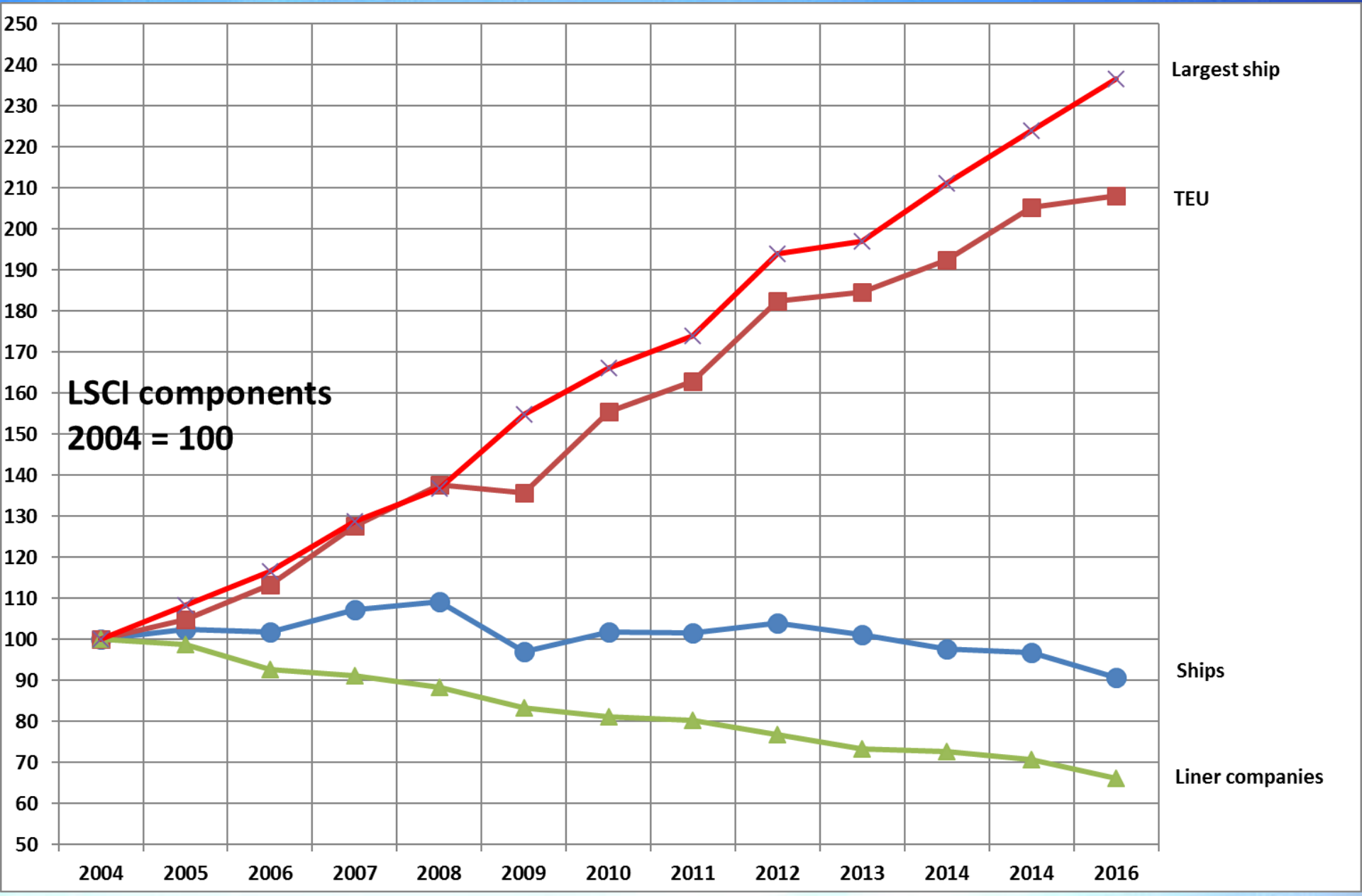
Source: *MDS Transmodal*
http://www.mdst.co.uk/

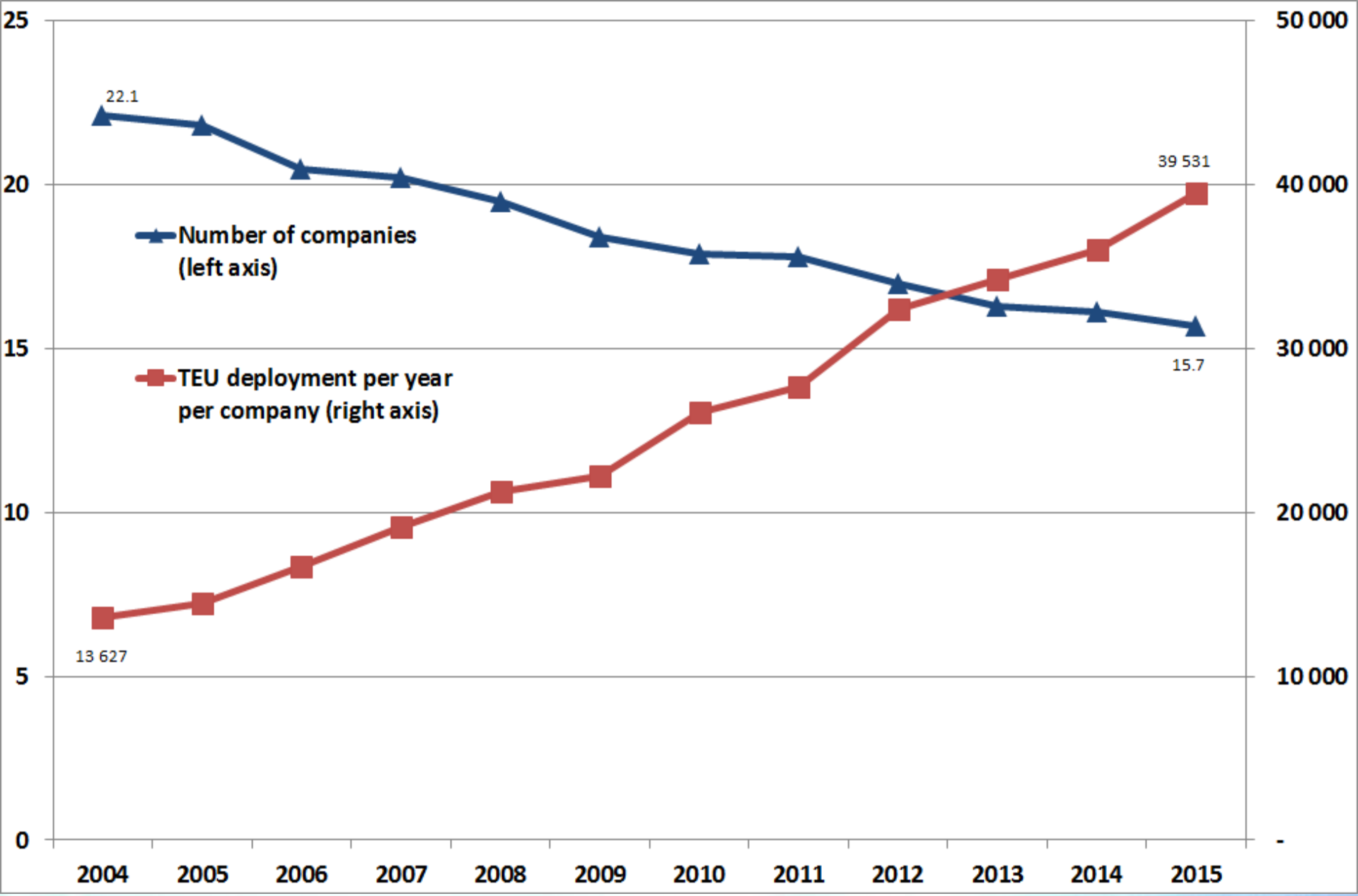
The Top Five today (May 2017) – direct liner services

Country	Number of countries connected with direct service	Average of services per direct connection	Average nunber of operators on direct connections
Belgium	103	6.5	11.9
United Kingdom	101	6.6	12.8
United States	101	8.6	19.2
China	96	18.7	44.4
Spain	96	7.4	12.0

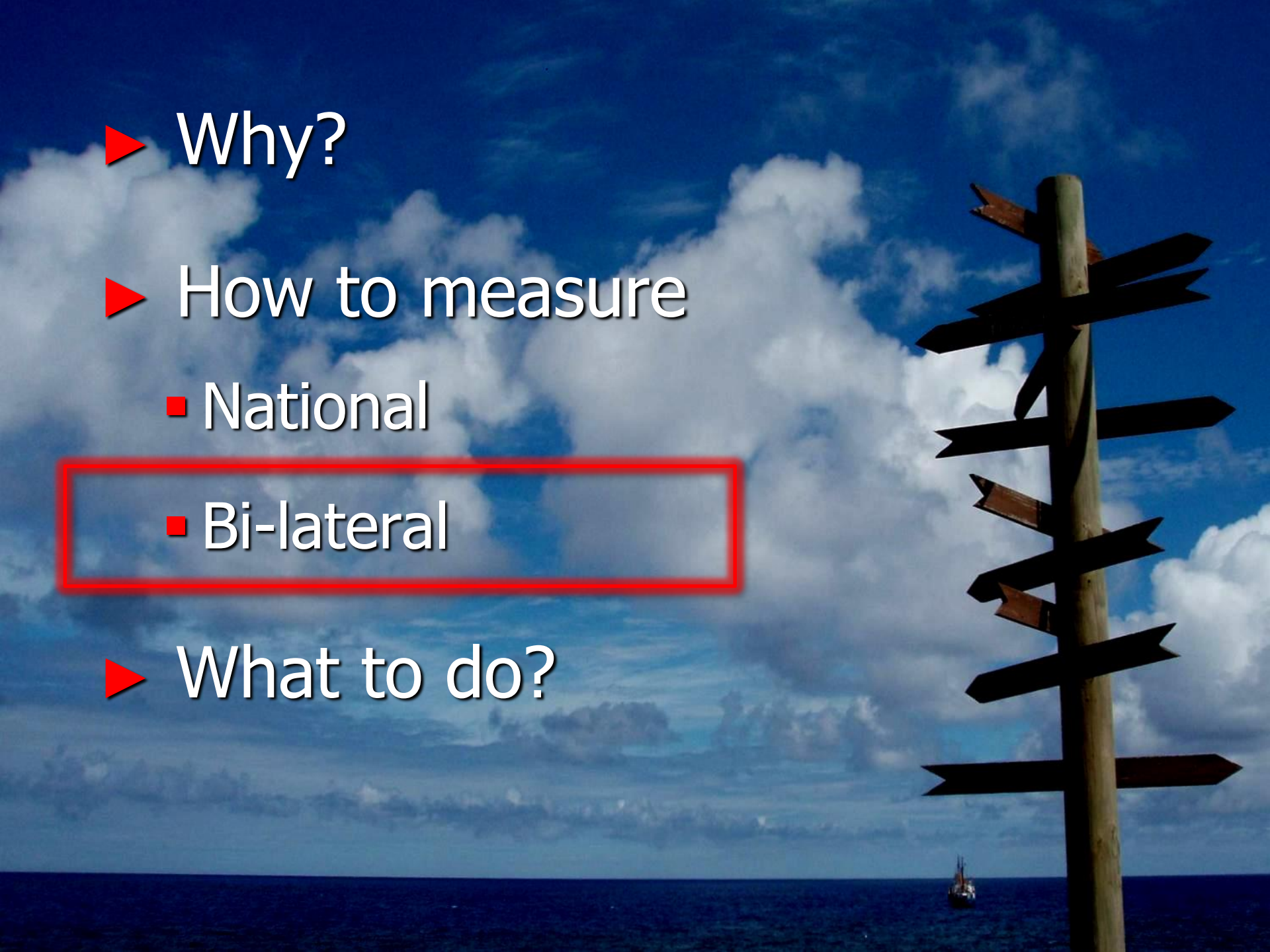
MDS Transmodal

Source: UNCAD calculations based on *MDS Transmodal* - http://www.mdst.co.uk/


LSCI components
2004 = 100
Largest ship
TEU
Ships
Liner companies
250
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2014
2016

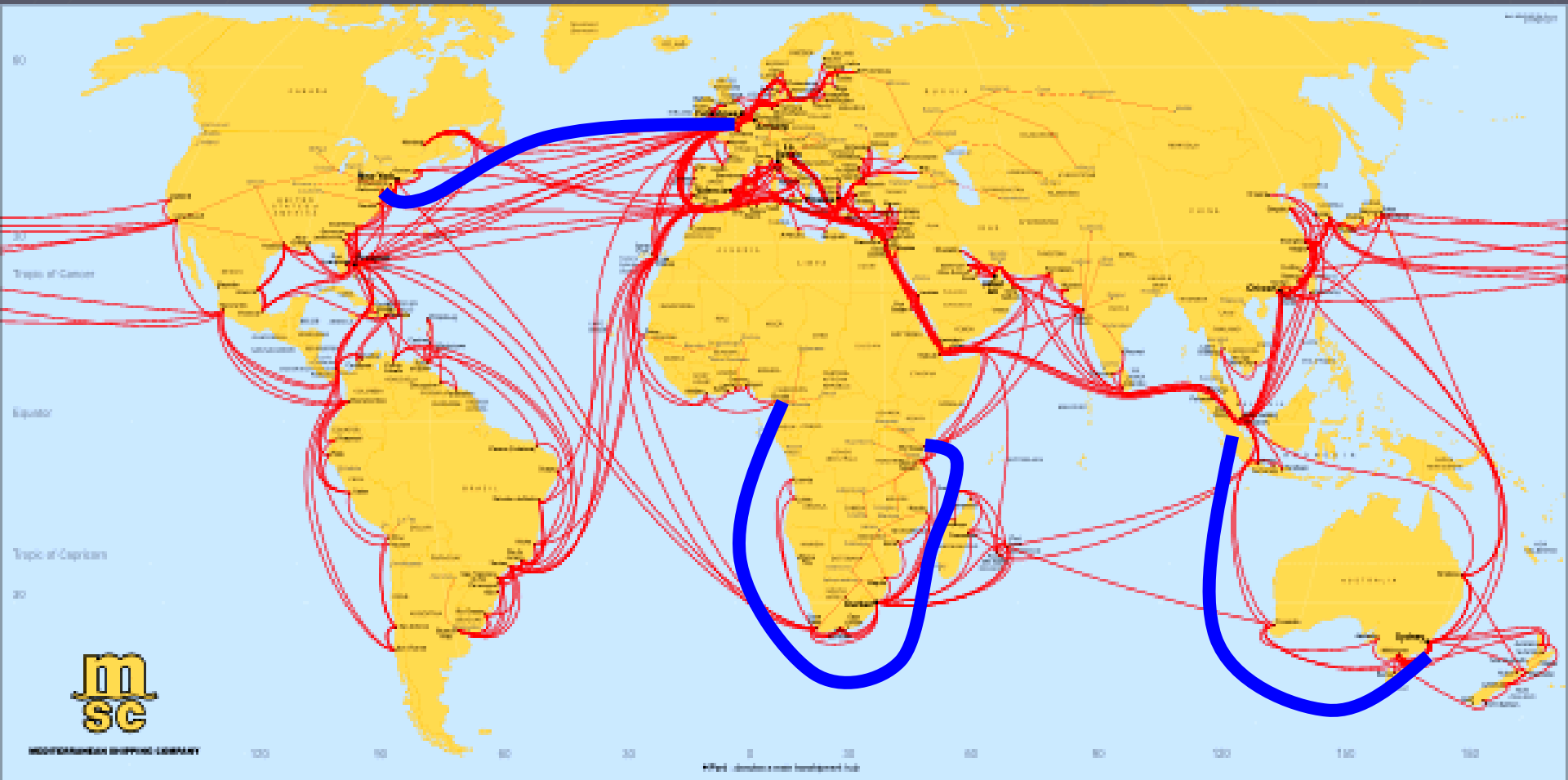


Sourse: UNCTAD Liner Shipping Connectivity Matrix, on the basis of data from Lloyds List Intelligence

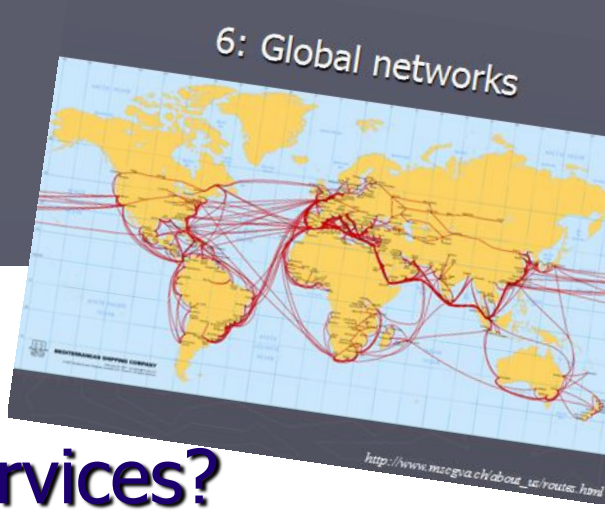

Why?
How to measure
National
Bi-lateral
What to do?

"Connectivity"

1) Per country – in a "point" ✓
2) Per route – between countries (12561)

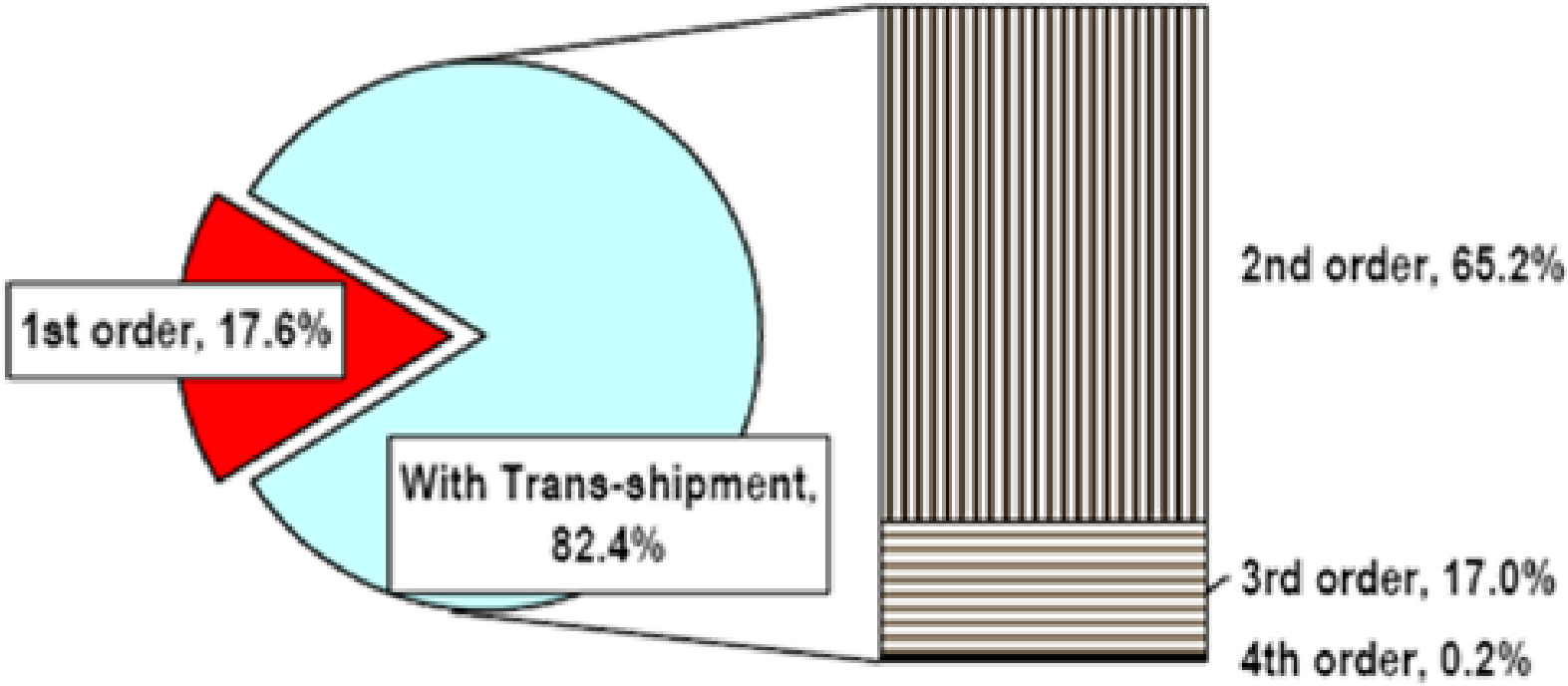


Networking



Out of 162 x 161 pairs of countries:

How many are connected by direct services?

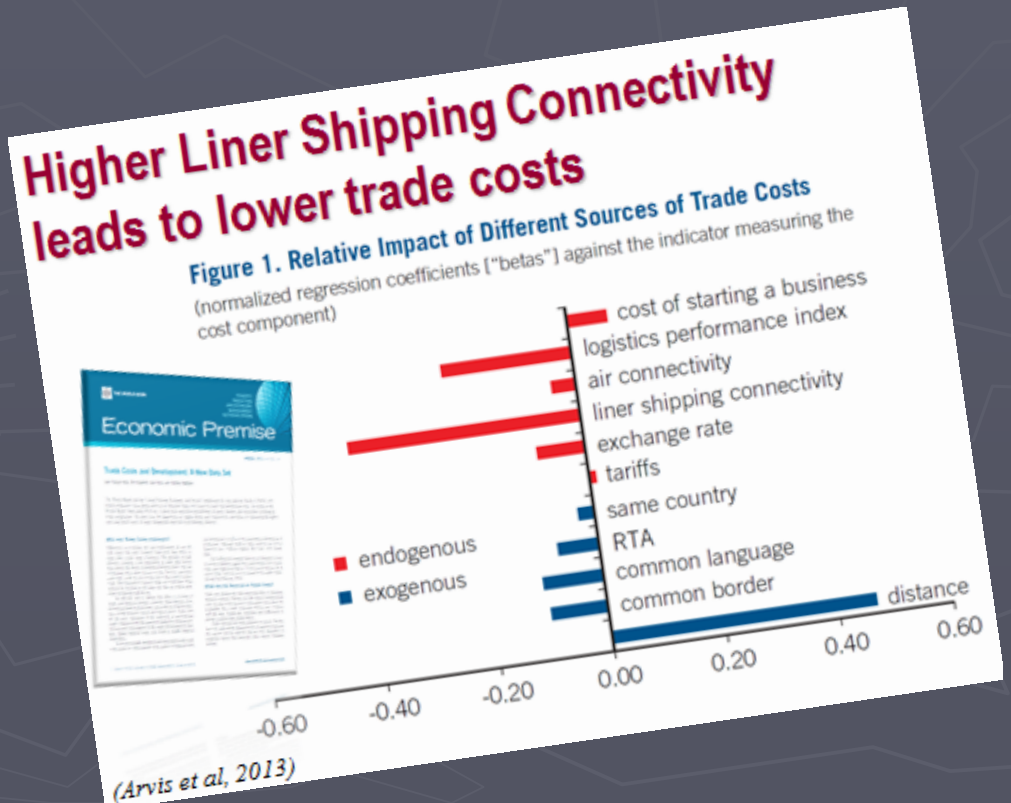


Source: UNCTAD, based on data from Containerization International

Ways to measure bi-lateral connectivity (1)

- Use national-level data:

  e.g. geometric average of country-level LSCI



Ways to measure bi-lateral connectivity (2)

- Direct connectivity:
  - Number of companies (competition)
  - Number of services (transport options)
  - Largest ship (infrastructure)

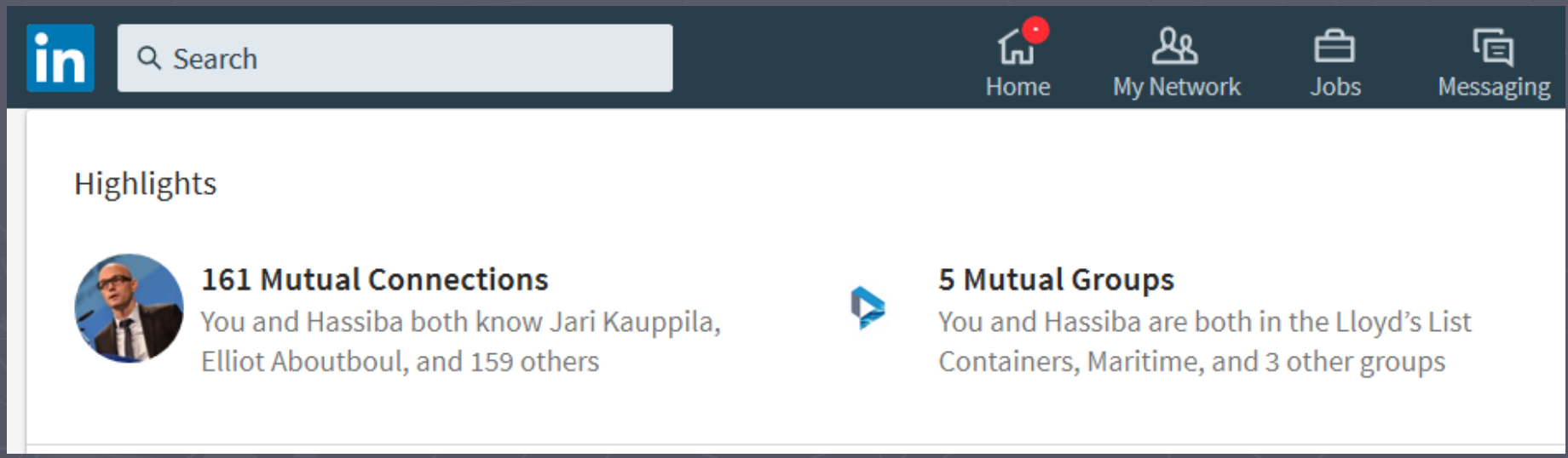
Ways to measure bi-lateral connectivity (3)

- Position in network:

  e.g. Number of options to get from A to B with one (or two) transshipment(s)
  -> number of common connections

Ways to measure bi-lateral connectivity (3)

- Position in network:



Ways to measure bi-lateral connectivity (4)

- Combine with distance:

  e.g. what's the shortest distance to get from A to B with transshipments (if there is no direct service)

Ways to measure bi-lateral connectivity (…)

- Combinations of the above…
  - e.g. Largest ship on connections with transshipoment (Max-Min)
  - Level of competition on routes with transshipment
  - (…)

UNCTAD LSBCI

UNCTADSTAT
UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UNITED NATIONS UNCTAD

HOME | DATA CENTER | COUNTRY PROFILES | INFOGRAPHICS | DOCUMENTATION | EN FR

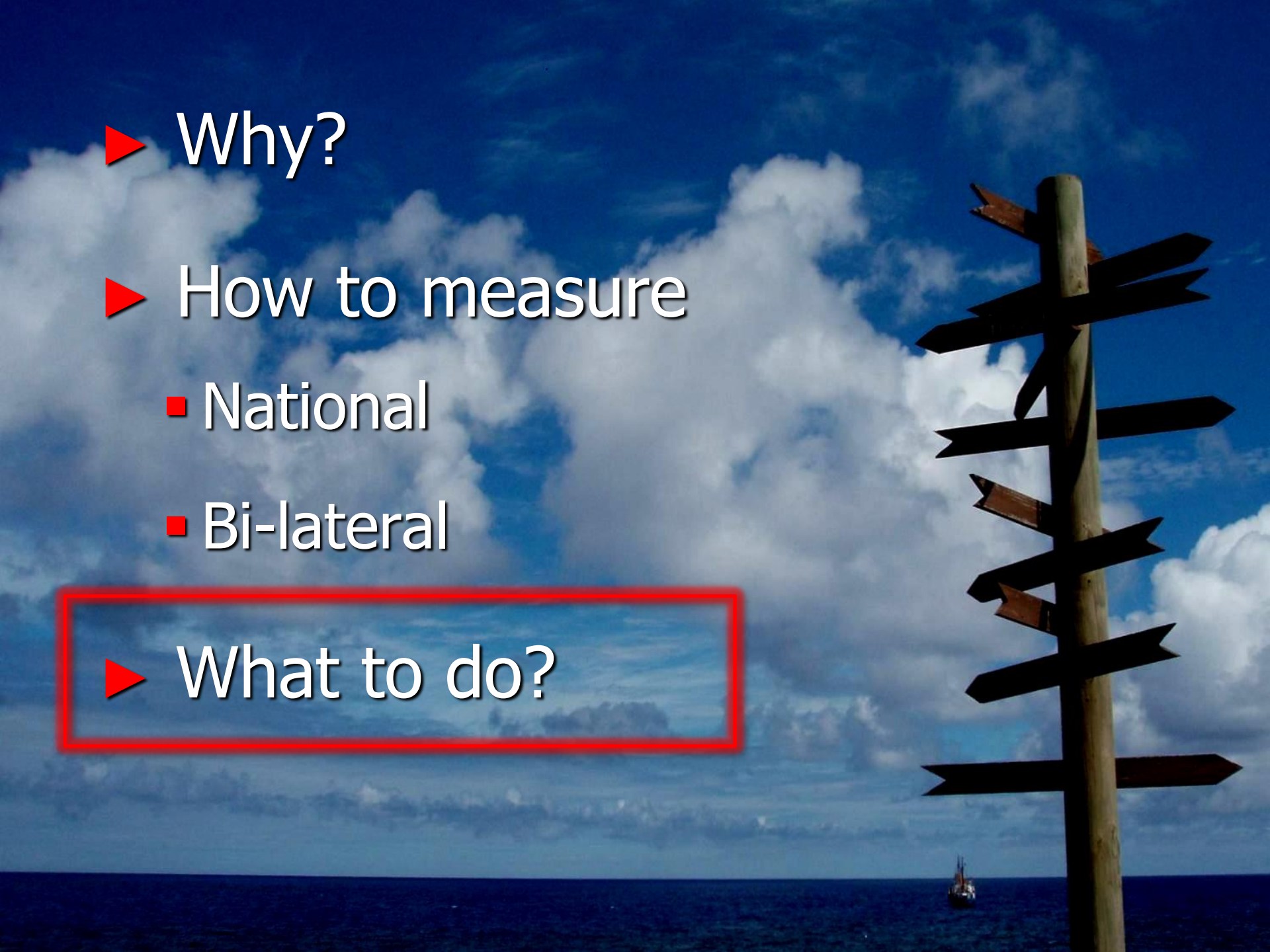
Reports | Table | Chart

Actions

Liner shipping bilateral connectivity index, annual, 2006-2016

Other: MEASURE - Index | YEAR ▼ 2016

PARTNER / ECONOMY	Albania	Algeria	American Samoa	Angola	Antigua and Barbuda	Argentina	Aruba	Australia	Bahamas	Bahrain	Bangladesh	Barbados	Belgium	Belize	Benin	Bermuda	Brazil	Brunei Darussalam	Bulgaria	Cabo Verde	Cambodia	Cameroon	Canada
Albania	_	0.175	0.102	0.113	0.105	0.179	0.106	0.185	0.180	0.102	0.100	0.107	0.206	0.103	0.183	0.081	0.183	0.095	0.160	0.099	0.099	0.183	0.187
Algeria	0.175	_	0.176	0.223	0.189	0.234	0.193	0.235	0.229	0.183	0.125	0.193	0.342	0.191	0.233	0.148	0.246	0.111	0.175	0.185	0.121	0.228	0.256
American Samoa	0.102	0.176	_	0.193	0.181	0.200	0.187	0.233	0.199	0.186	0.173	0.184	0.234	0.183	0.194	0.149	0.205	0.161	0.107	0.104	0.177	0.192	0.217
Angola	0.113	0.223	0.193	_	0.195	0.346	0.200	0.301	0.323	0.290	0.224	0.200	0.425	0.212	0.356	0.151	0.359	0.188	0.124	0.205	0.205	0.341	0.354
Antigua and Barbuda	0.105	0.189	0.181	0.195	_	0.205	0.211	0.212	0.209	0.186	0.114	0.296	0.250	0.192	0.195	0.152	0.220	0.104	0.109	0.162	0.113	0.194	0.218
Argentina	0.179	0.234	0.200	0.346	0.205	_	0.217	0.332	0.355	0.296	0.251	0.219	0.481	0.218	0.304	0.154	0.489	0.189	0.122	0.188	0.209	0.284	0.384
Aruba	0.106	0.193	0.187	0.200	0.211	0.217	_	0.229	0.223	0.195	0.123	0.217	0.321	0.205	0.199	0.153	0.234	0.107	0.113	0.175	0.121	0.197	0.288
Australia	0.185	0.235	0.233	0.301	0.212	0.332	0.229	_	0.312	0.276	0.265	0.227	0.426	0.227	0.307	0.156	0.346	0.195	0.181	0.191	0.218	0.285	0.370
Bahamas	0.180	0.229	0.199	0.323	0.209	0.355	0.223	0.312	_	0.295	0.215	0.221	0.440	0.228	0.279	0.155	0.370	0.176	0.118	0.189	0.196	0.269	0.359
Bahrain	0.102	0.183	0.186	0.290	0.186	0.296	0.195	0.276	0.295	_	0.221	0.194	0.356	0.198	0.257	0.152	0.302	0.180	0.173	0.111	0.199	0.234	0.320
Bangladesh	0.100	0.125	0.173	0.224	0.114	0.251	0.123	0.265	0.215	0.221	_	0.127	0.290	0.126	0.238	0.082	0.256	0.180	0.112	0.102	0.201	0.216	0.250
Barbados	0.107	0.193	0.184	0.200	0.296	0.219	0.217	0.227	0.221	0.194	0.127	_	0.268	0.196	0.200	0.153	0.237	0.111	0.111	0.165	0.123	0.199	0.233
Belgium	0.206	0.342	0.234	0.425	0.250	0.481	0.321	0.426	0.440	0.356	0.290	0.268	_	0.265	0.384	0.163	0.513	0.207	0.220	0.226	0.243	0.395	0.484
Belize	0.103	0.191	0.183	0.212	0.192	0.218	0.205	0.227	0.228	0.198	0.126	0.196	0.265	_	0.198	0.152	0.229	0.103	0.110	0.170	0.116	0.199	0.234
Benin	0.183	0.233	0.194	0.356	0.195	0.304	0.199	0.307	0.279	0.257	0.238	0.200	0.384	0.198	_	0.150	0.315	0.190	0.176	0.192	0.211	0.375	0.313
Bermuda	0.081	0.148	0.149	0.151	0.152	0.154	0.153	0.156	0.155	0.152	0.082	0.153	0.163	0.152	0.150	_	0.156	0.080	0.081	0.081	0.082	0.150	0.157


Why?
How to measure
National
Bi-lateral
What to do?

Recommendations

1. Facilitate transit: More cargo for your port
2. Facilitate competition
3. Connectivity beyond shipping: E-Trade4All

Maritime connectivity

UNITED NATIONS
UNCTAD

Geneva, IMSF, May 2017, Jan.Hoffmann@UNCTAD.org