

NSR Cargo Base by Analyzing Export-Import Items between East Asia and NW Europe

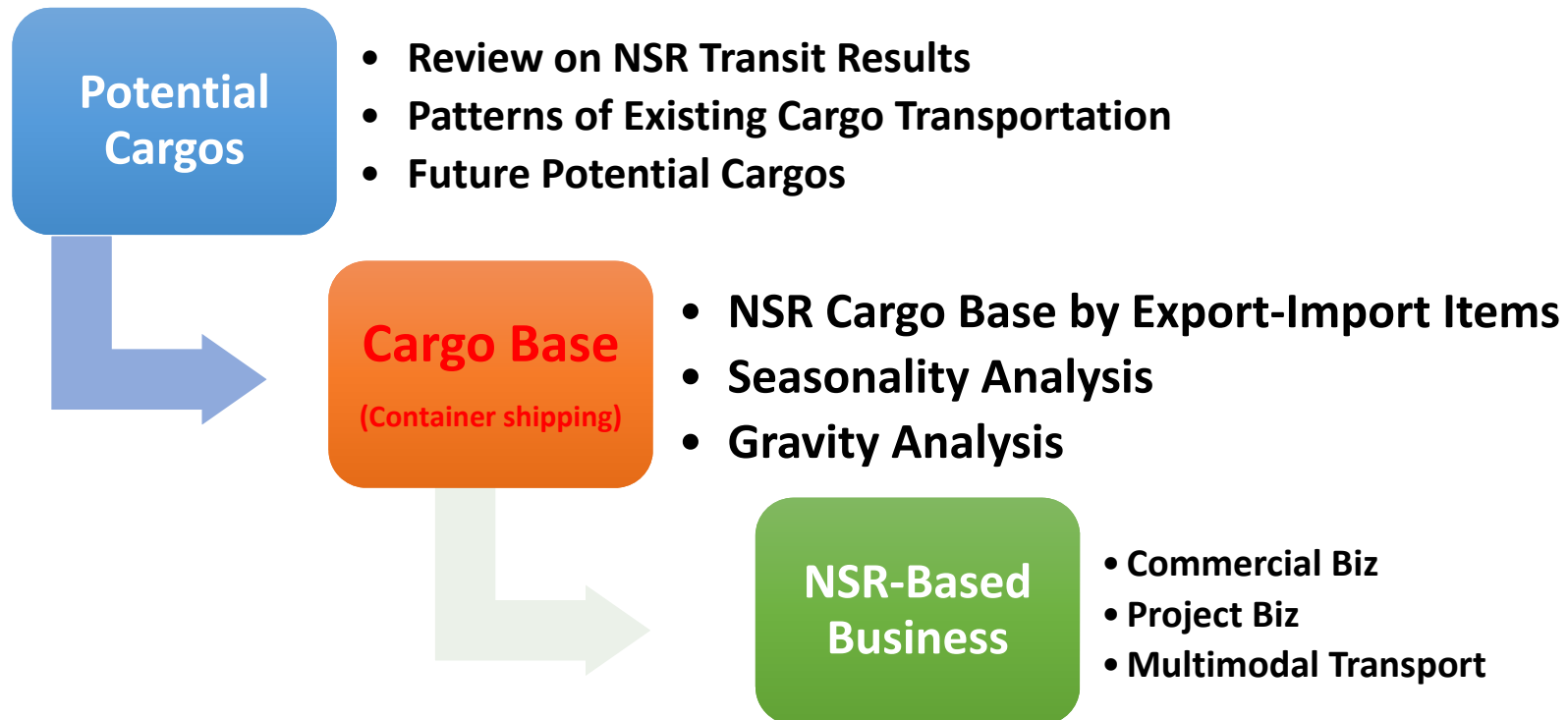
May 31, 2016 / DNV GL Busan Korea
Industry Seminar
WP4: NSR's Future Cargo Base



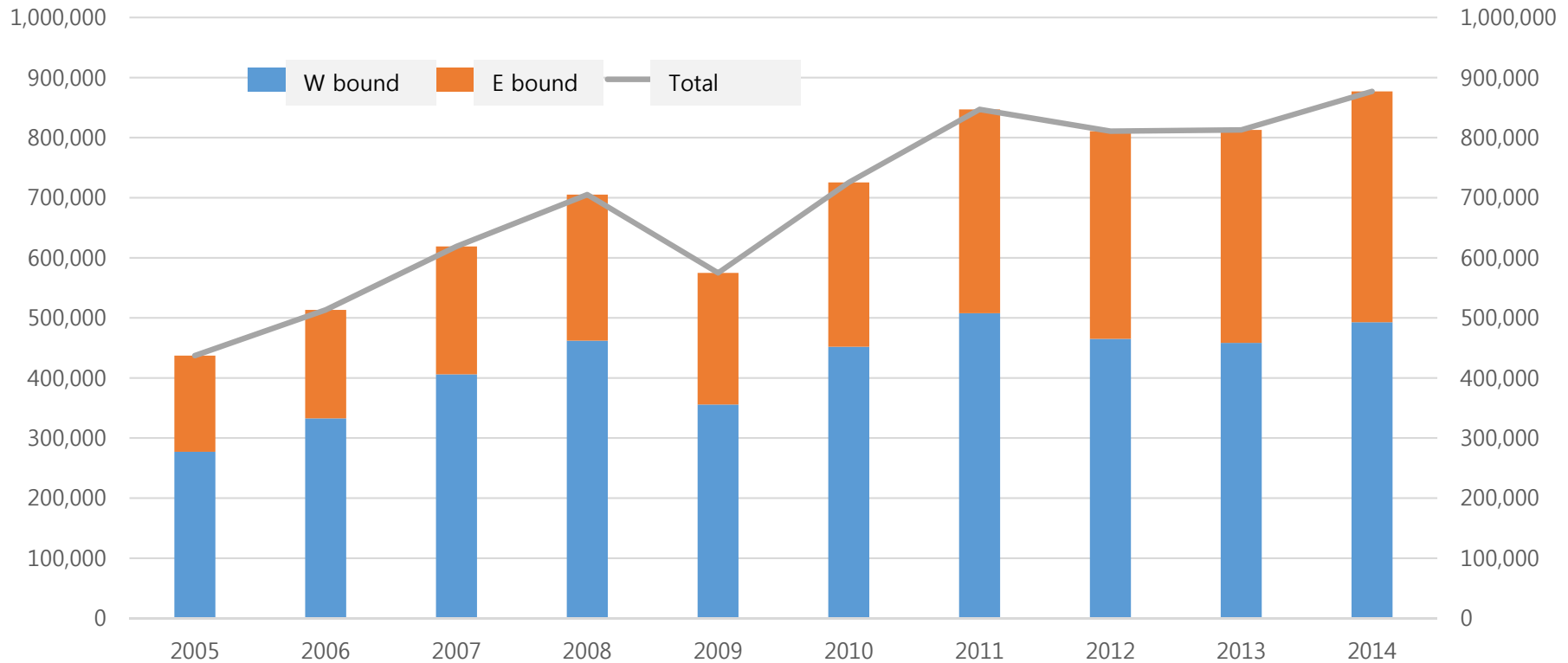
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Three Approaches for Identifying the Prospective Cargo for NSR Transport

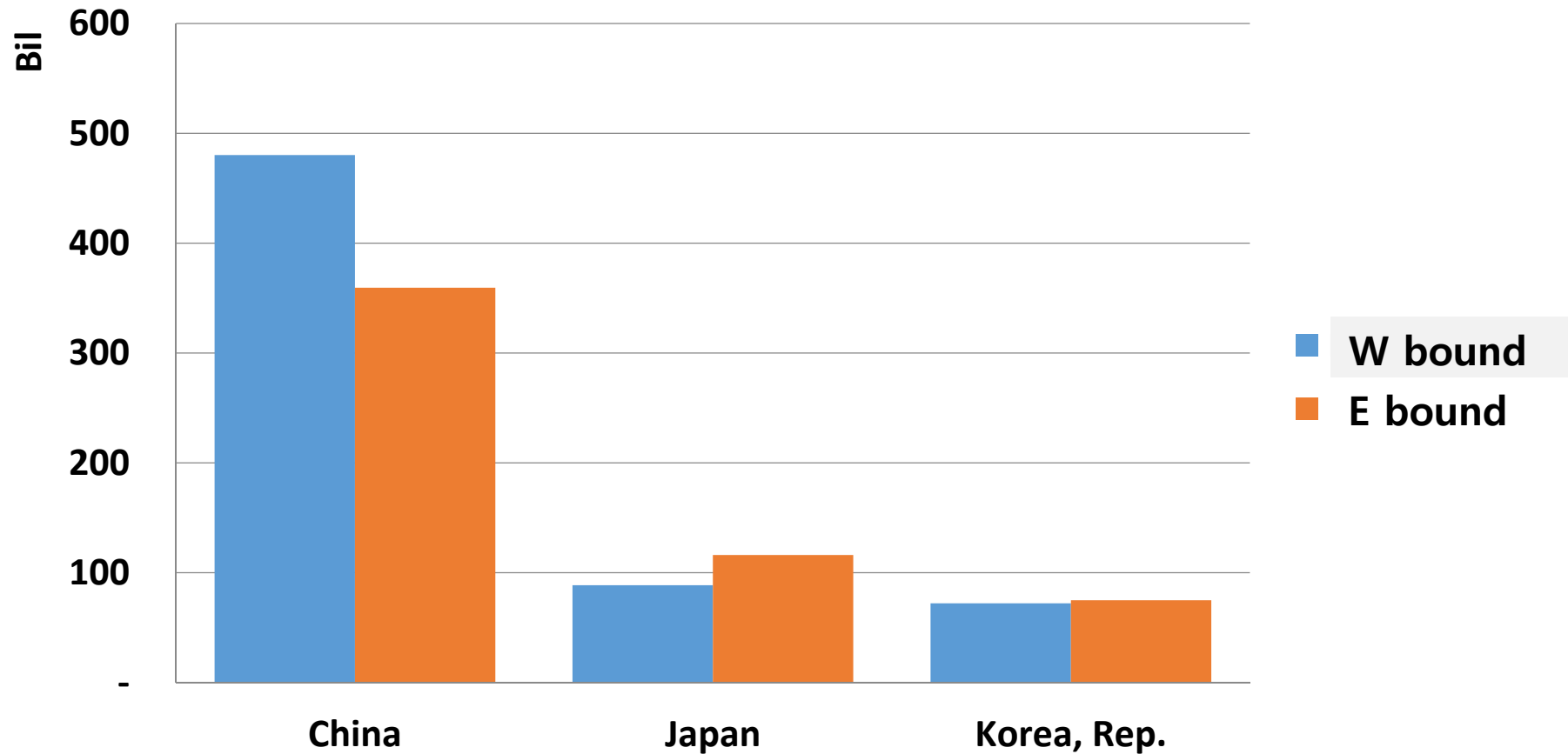


Korea-China-Japan's Trade Volume with EU (M\$, UNCTAD, 2015)



- Gradually increasing, East bound volume is more increasing than West bound

Trade Volume between EA and EU, Central Asia (B\$, World Bank, 2014)



- EU is the biggest partner of China

Export-Import Items between EA and EU (M\$, KITA, UNCTAD, 2014)

KR	W bound	Ship, Off-shore	Car	Car part	Oil product	Wireless
		6,386	5,696	3,879	3,004	2,920
E Bound	Car	Medicine	Crude Oil	Motor, pump	Machine	
	6,798	2,694	2,650	2,620	2,511	
CN	W Bound	Automatic Data Processor	Communication Equipment	Fabric, Clothes	Footwear	Furniture and its part
	41,611	30,706	15,157	11,805	11,138	
E Bound	Car	Car part	Airplane, its part	Estimating, Analysis Control processor	Medicine	
	34,463	13,380	11,755	10,148	8,857	
JP	W bound	Car	Car part	Electric and Electronic processor	Estimating, Analysis Control processor	Automatic Data processor
	9,691	3,436	3,332	2,870	2,668	
E bound	Medicine	Car	Chemicals	Medicine-ETC	Estimating, Analysis Control processor	
	8,258	8,250	2,768	2,644	2,167	

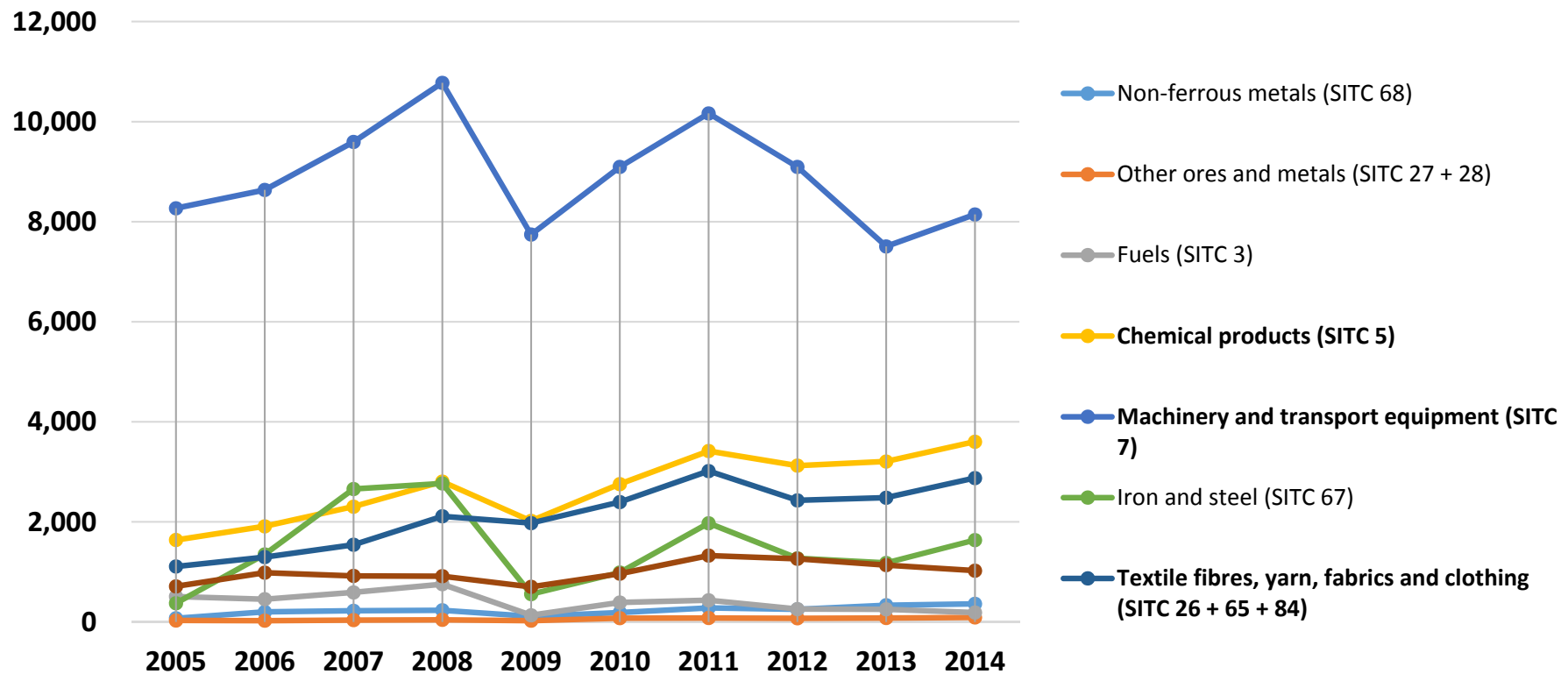
- Car-related trade is dominant based on the amount of trade money.
- China's main export items are computer, cellular phone, fabric, and footwear.

Several countries in Europe may benefit from using the NSR

- 16 countries may enjoy the benefit of using the NSR for its shorter distance(KMI).
- 'EU-NSR 16'

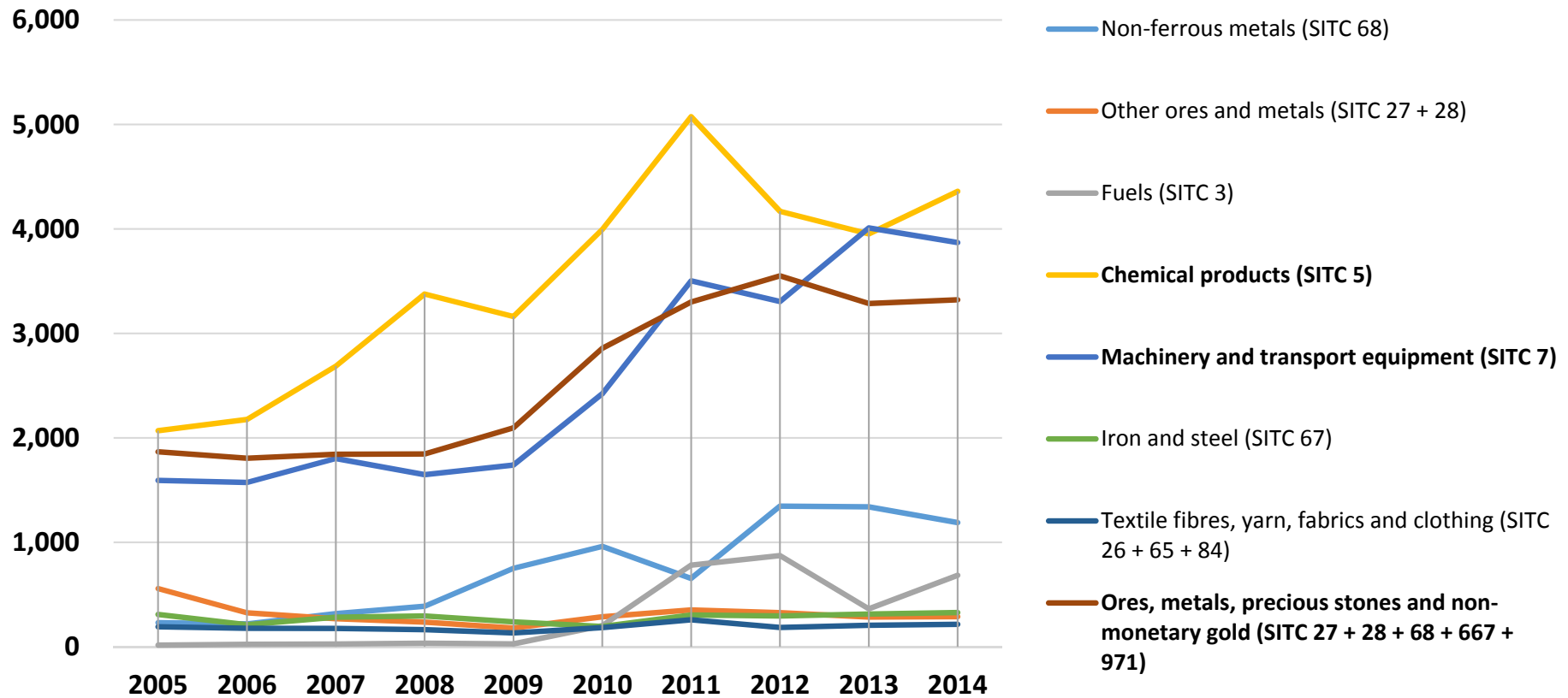


Main West-bound Item groups between EA - EU NSR16 (M\$, UNCTAD)



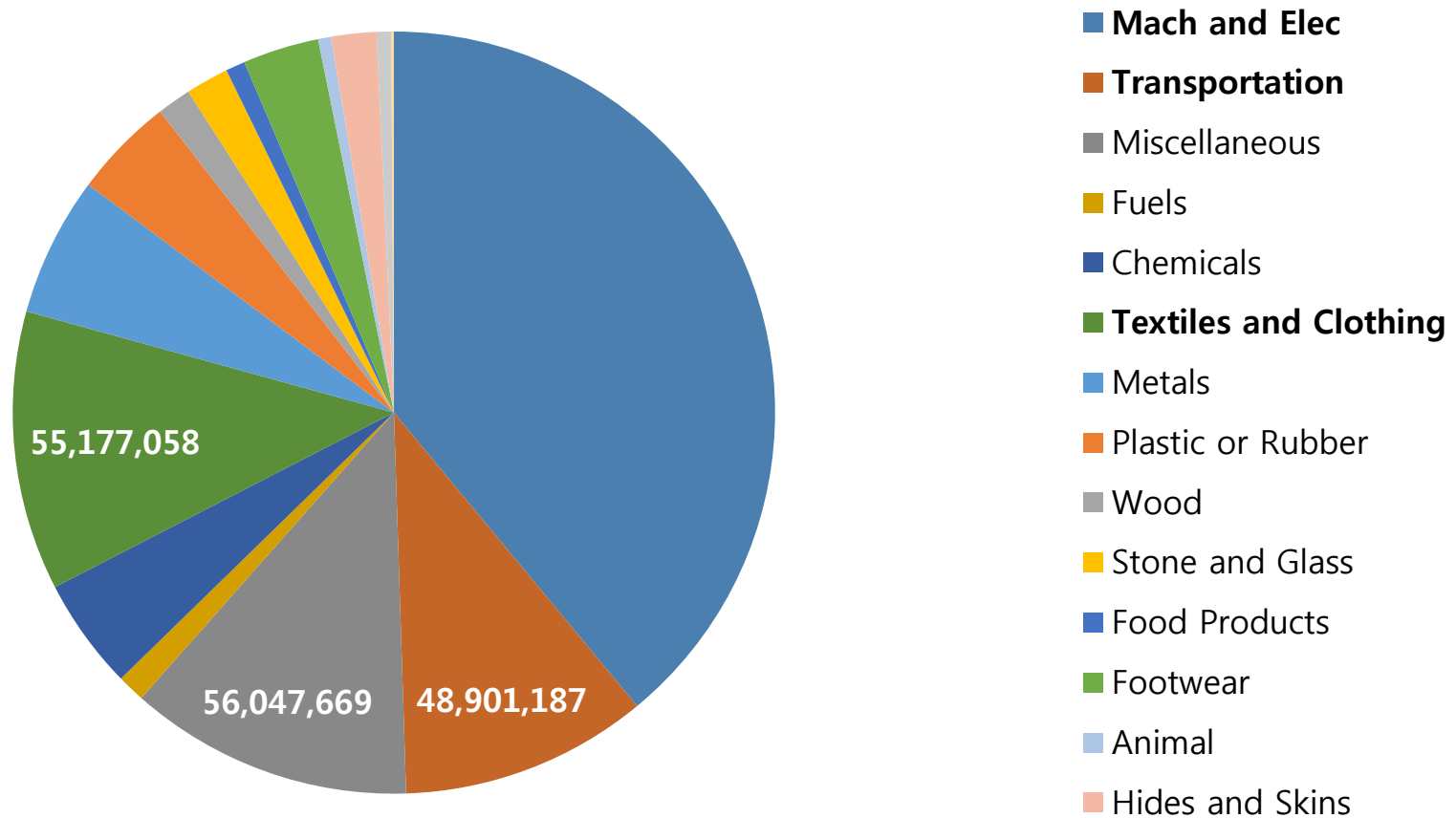
- Machinery and transport equipment, and chemical products are dominant

Main East-bound Item group between EA - EU NSR16 (M\$, UNCTAD)



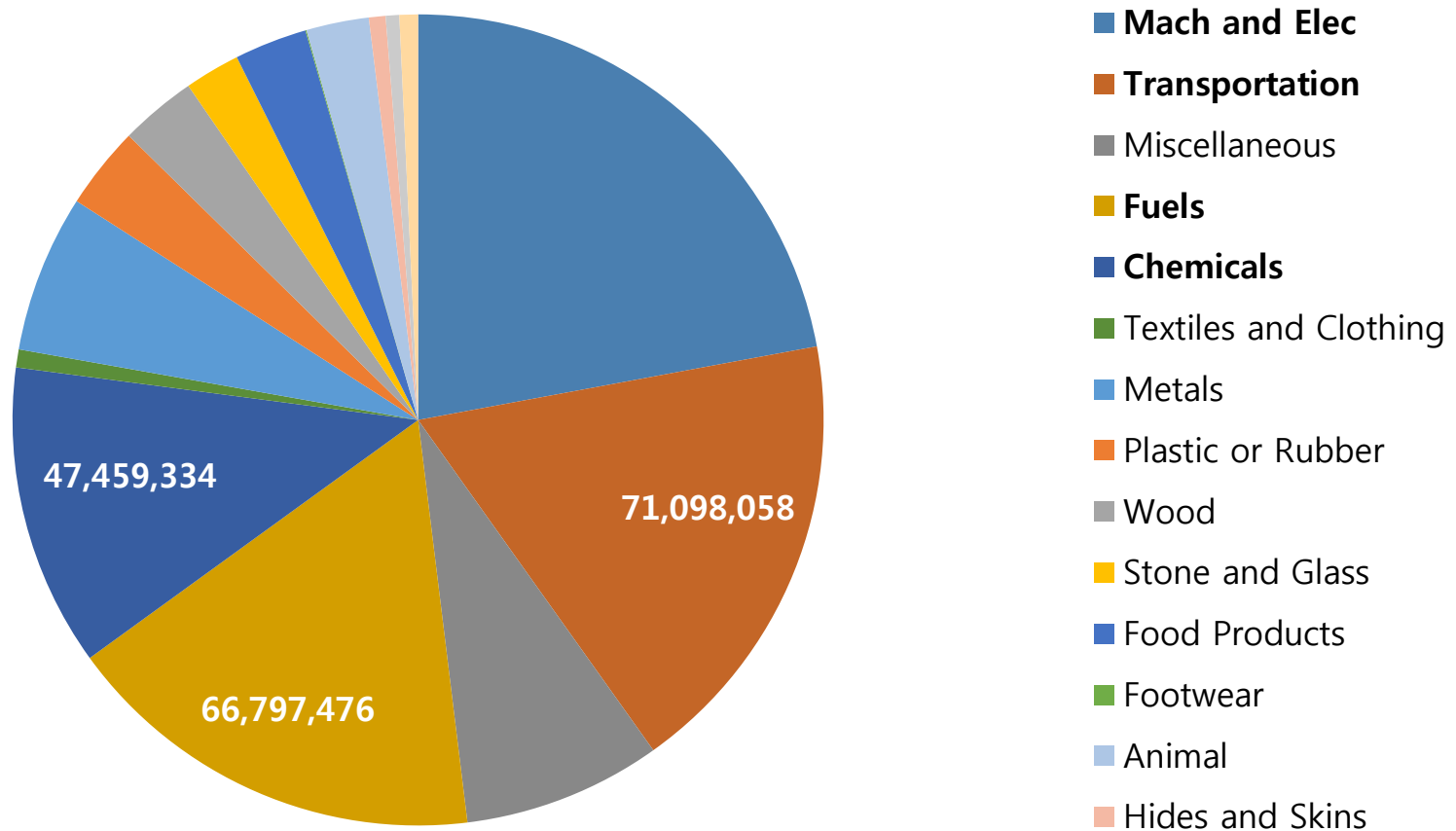
- Chemical products are dominant.

Main West-bound Item groups between EA - EU NSR16 (thousand \$, 2014, World Bank)



- Machine, Electronics, Transportation, Textile and Clothing are dominant.

Main East-bound Item groups between EA - EU NSR16 (thousand \$, 2014, World Bank)



- Machine, electronics, Transportation, Fuels and Chemical item groups are dominant .

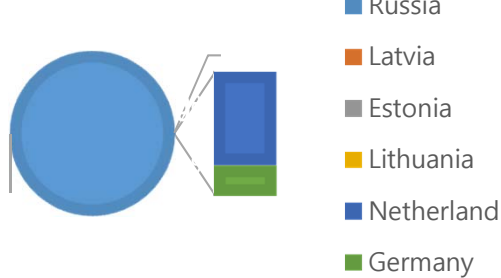
Trade Volume between Korea and EU-NSR16 (Korea customs, 2015)

Country	East Bound		West Bound	
	Volume(1,000\$)	Quantity(ton)	Volume(1,000\$)	Quantity(ton)
Netherlands	15,909,963	2,264,465	15,706,249	9,457,503
Norway	13,054,145	3,843,747	6,434,062	1,032,825
Denmark	3,301,499	804,314	3,975,003	1,395,754
Germany	70,433,795	4,760,497	24,008,792	3,062,903
Latvia	182,605	301,596	403,320	65,578
Russia Federation	47,865,877	124,840,835	29,003,680	6,307,459
Lithuania	167,211	158,330	555,124	388,919
Belgium	5,250,390	1,662,549	6,788,465	2,553,739
Sweden	5,574,869	741,307	2,721,378	404,508
Iceland	98,734	21,369	87,086	15,535
Ireland	3,080,325	131,579	1,269,635	304,200
Estonia	679,979	569,423	378,492	80,551
UK	23,742,236	13,728,876	18,246,276	3,109,224
Poland	2,529,225	237,625	12,513,375	1,414,542
France	19,962,231	2,421,509	9,220,027	1,607,872
Finland	4,021,771	752,156	1,410,376	352,393
Total	215,854,853	157,240,174	132,721,338	31,553,503

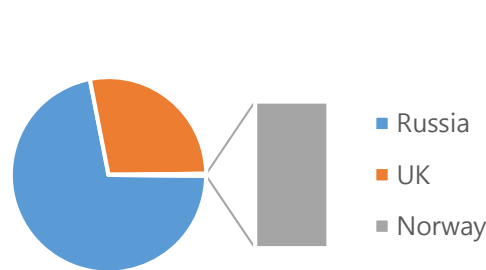
- Trade quantity from Russia is the largest but most of them are from far-east Russia.
- Import trade quantity from UK is mostly liquid..

Main East bound Items between Korean and EU-NSR 16 (Korea customs 2015)

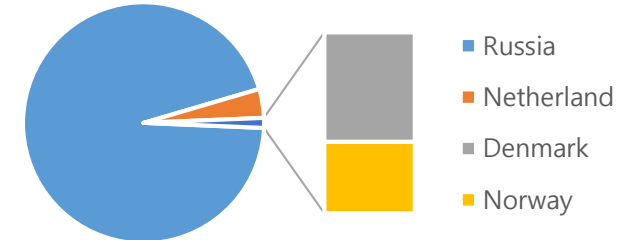
Coal(2.2M ton)



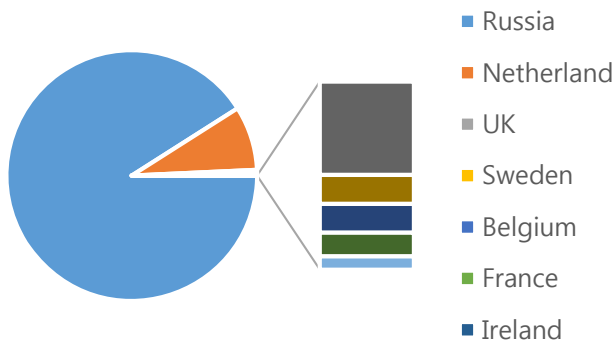
Crude Oil(1.0M ton)



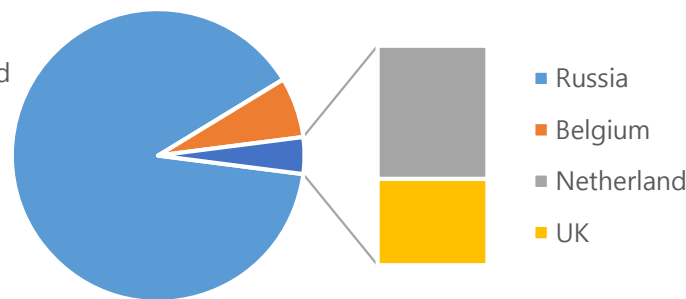
Naphtha(4.3 M ton)



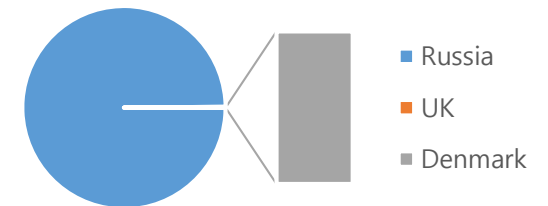
Scrap(1M ton)



LNG(2.9M ton)



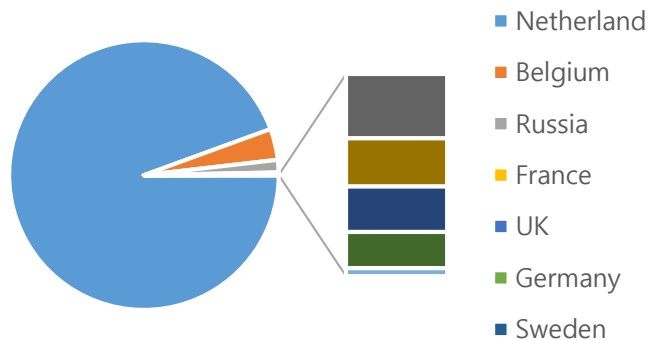
Bunker(0.6M ton)



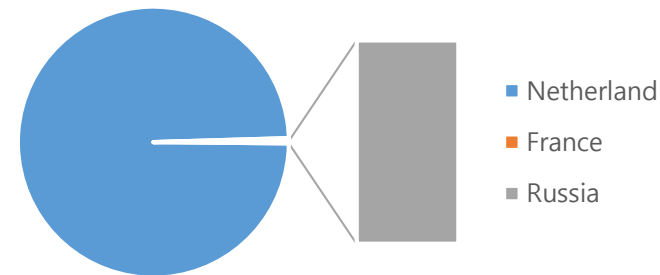
- Korea's energy and scrap import from Russia is dominant, but import from Russia included import from Fareast Russia.

Main West bound Items between Korean and EU-NSR 16 (Korea customs 2015)

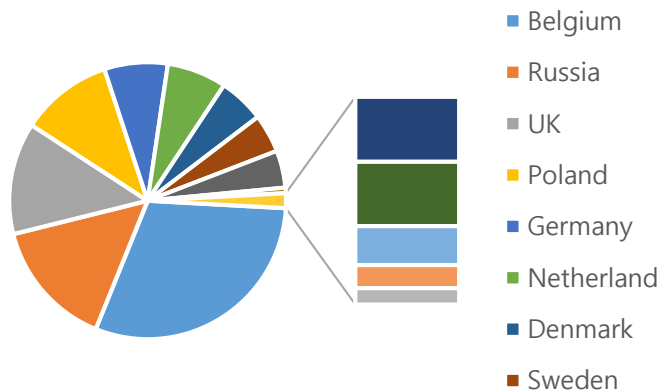
Oil Product(3.2M ton)



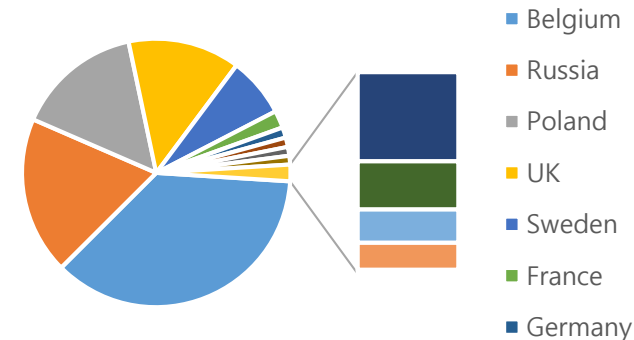
Kerosene(1.1M ton)



Steel Product(1.3M ton)



Alloyed Steel Plate(0.6M ton)



- Oil product to Netherlands is dominant, export of steel product is diversified to various countries. Alloyed steel plate is included into steel product.
- Oil product export trend is dynamic, but steel product is exported in stable markets.

China's Main Import Products(2013)

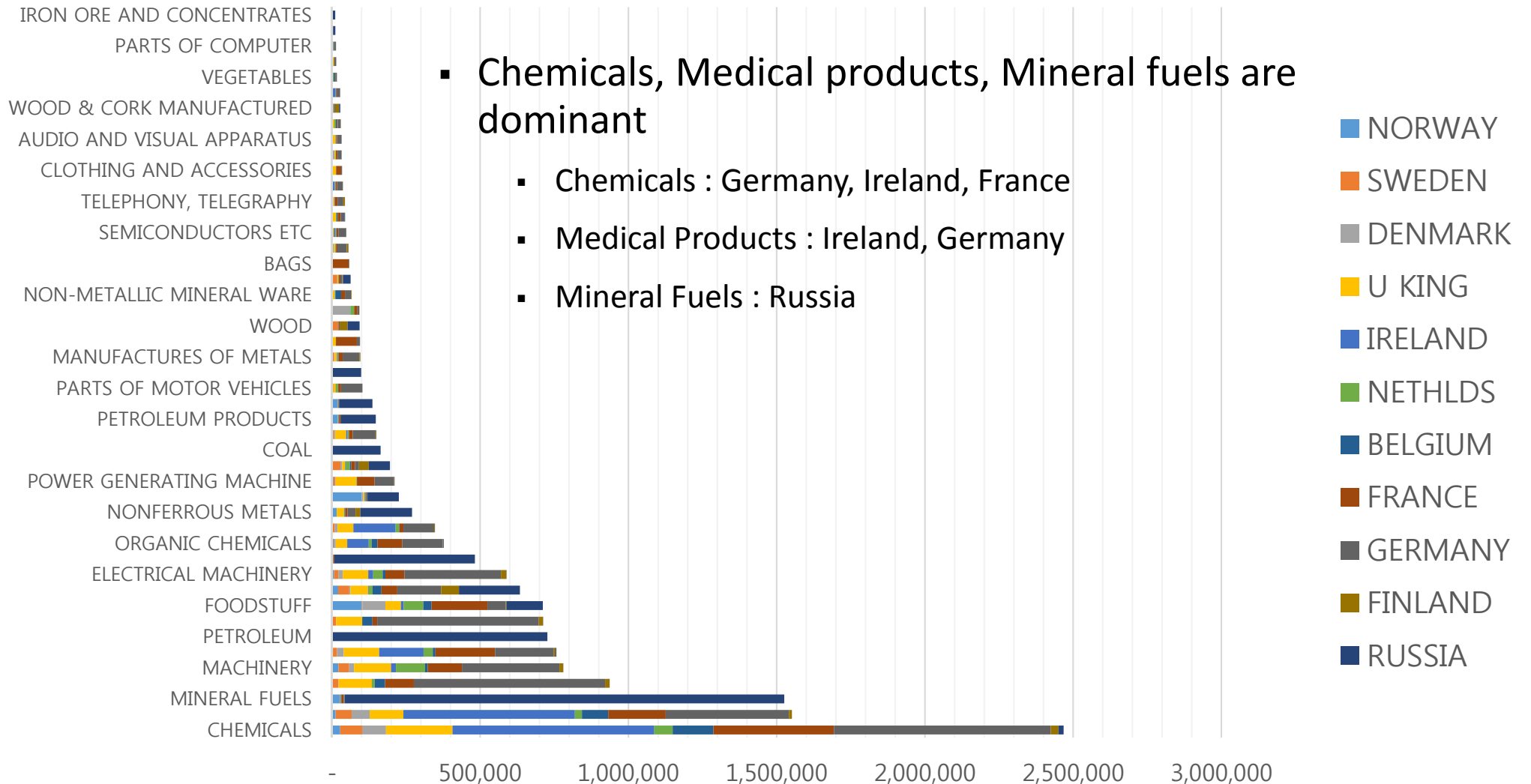
HS code	Product	Quantity		Unit
27090000	Petroleum oils and oils obtained from bituminous mineral, crude	281,742,073,502		kg
85423100	Electronic integrated circuits	86,649,098,474	24,836,478	EA/kg
98010010		-		Kg
26011120	Iron ores and concentrated-non agglomerated	555,054,877,998		Kg
85423900	Electronic integrated circuits-others	123,163,396,211	23,978,546	EA/kg
90138030	LCD panel-other devices	3,398,982,990	447,817,312	EA/kg
85423200	Electronic integrated circuits-Memories	26,908,651,277	10,394,824	EA/kg
12019010	Soya beans –Yellow	63,377,676,921		Kg
85177030	Telephone sets-Parts	46,637,641		Kg
74031111	Refined copper and copper alloys	2,917,291,273		Kg
26011190	Iron ores and concentrate-non-agglomerated	161,979,686,343		Kg
85423300	Electronic integrated circuits-Amplifiers	29,555,802,029	4,242,173	EA/kg
26030000	Copper ores and concentrates	10,068,985,199		Kg

China's Main Export Products(2013)

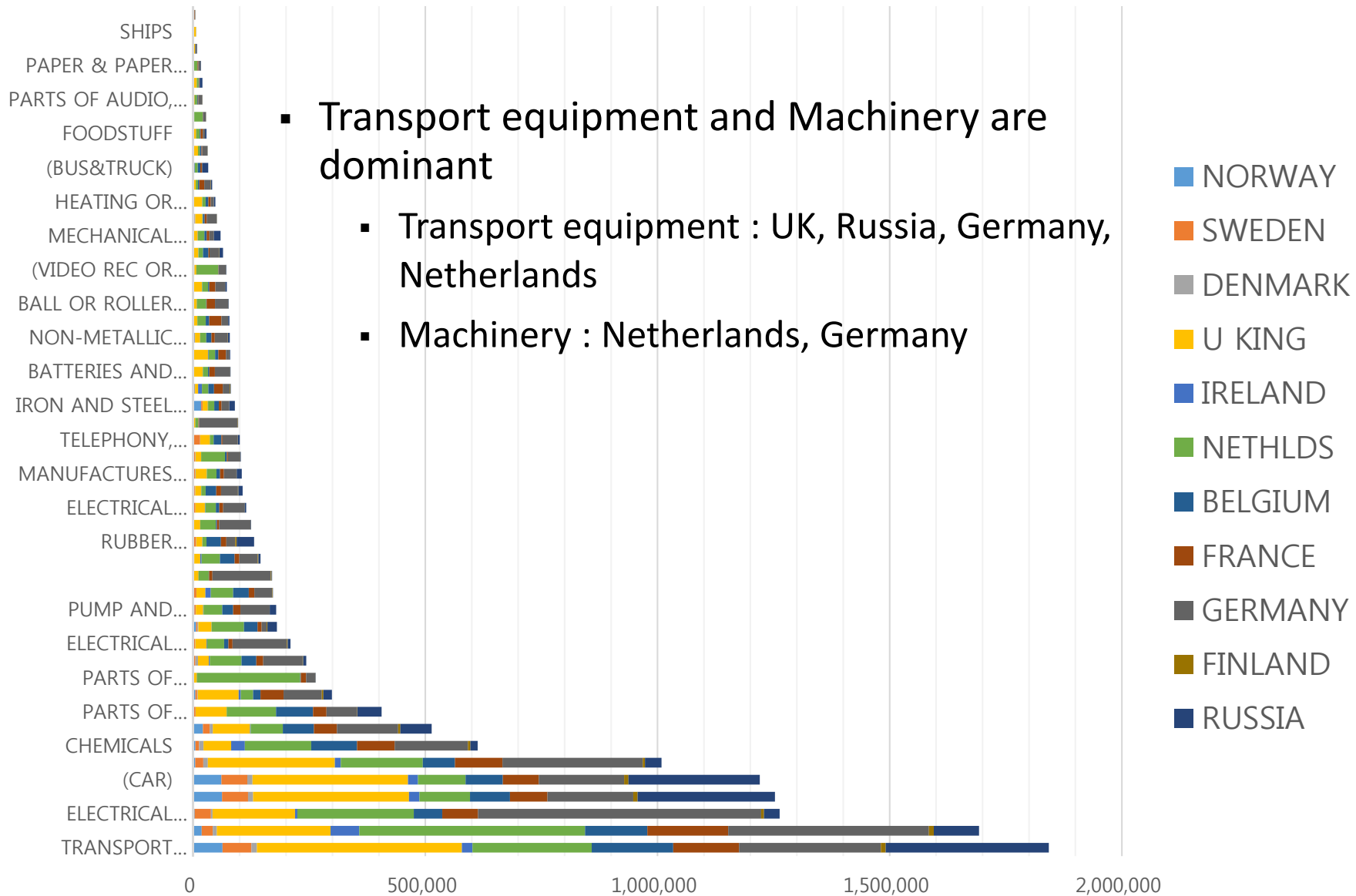
HS code	Product	Quantity		Unit
84713000	Portable automatic data processing machines	326,656,498		EA
85171210	Telephones for cellular network	1,185,797,801		EA
85423100	Processors and controllers	53,288,557,273	17,283,060	EA/kg
90138030	LCD panel-other devices	3,265,718,609	543,168,118	EA/kg
85177030	Telephone sets-Parts	68,496,482		Kg
84733090	Part and accessories for machine	655,736,987		Kg
71131919	Articles of jewellery	447,022,303		G
85423900	Electronic integrated circuits-Others	61,863,582,218	9,432,750	EA/kg
85423200	Electronic integrated circuits-Memories	14,407,054,636	3,618,140	EA/kg
64029929	Footwear – Others	1,629,508,462	3,618,140	kg/Pairs
85423300	Electronic integrated circuits-Amplifiers	13,095,483,373	1,990,253	EA/kg
84717010	Automatic data processing machine-Storage unit	275,339,617		EA
84715040	Automatic data processing machine-Processing units	32,069,517		EA
71159090	Precious metals-Others	237,971,485		G
61103000	Jerseys, pullovers, cardigans of man-made fibres	1,770,764,473	557,473,070	EA/kg
85258013	Cameras for broadcasting	956,843,935		EA
85414020	Solar cell	587,926,627	1,158,878,882	EA/kg
42021290	Plastic or textile material for trunks, suit cases	2,049,017,979	1,336,896,494	EA/kg
89019041	Ships under 150,000 ton	423		EA
27101911	Petroleum oils – Others(Jet fuel)	9,174,752,116	11,444,719,059	kg/

Main East bound Items between Japan and EU-NSR 16

(Japan customs 2015)



Main West bound Items between Japan and EU-NSR 16 (Japan customs 2015)



- Transport equipment and Machinery are dominant
 - Transport equipment : UK, Russia, Germany, Netherlands
 - Machinery : Netherlands, Germany

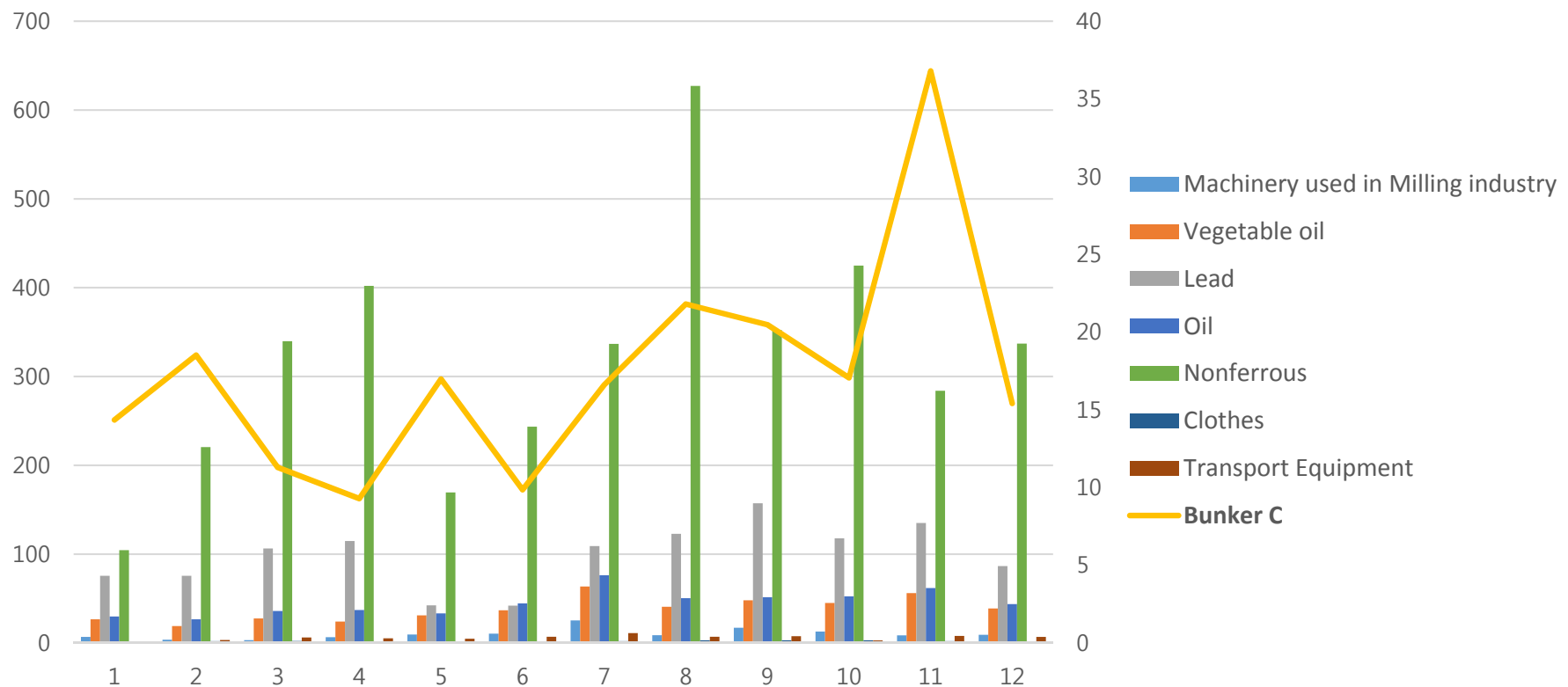
Prospective Cargoes' Conditions

- 1. Cargoes traded between EA and EU NSR16 with Big Volume**
- 2. Cargoes transported during the NSR season, considering the sea ice condition for relatively safe voyage**
 - Current NSR season : from July to November
 - Cargoes traded during the current NSR season
- 3. Cargoes whose trade is promoted by shorter trade distance**
 - Gravity Model

Seasonality Analysis for East-bound Cargoes between Korea and EU-NSR16

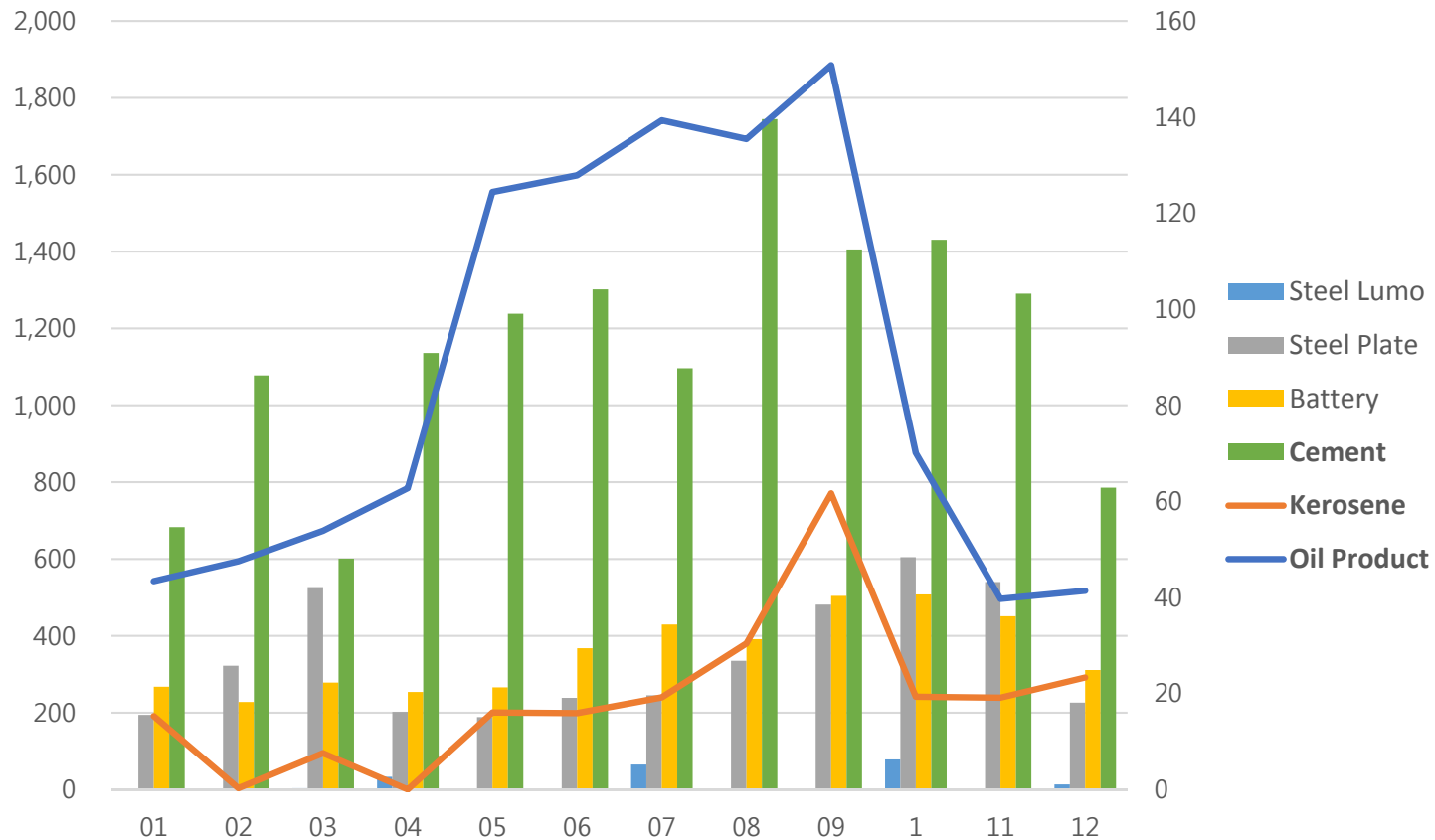
- Cargoes traded more than 50% during the NSR season
- Analysis period : recent 4 years
- Oil product (Naphtha, Bunker C) : November

$$\frac{\sum_{i=7}^{11} Cargo_i}{\sum_{i=1}^{12} Cargo_i}$$



Seasonality Analysis for West-bound Cargoes between Korea and EU-NSR16

- Oil product(Kerosene)
- Cement was transported to Russia (1.1 M ton for 4 years)



Gravity Model Analysis at Netherlands – Germany’s import case

Industry	China	Japan	Korea
Agriculture	8.9	25.6	13.6
Energy	9.8	18.5	14.6
Processed Food	15.9	30.9	20.3
Beverage	-2.1	-2.1	-2.3
Petroleum Product	19.0	29.1	22.8
Chemical/Rubber/Plastic	11.0	15.5	11.3
Steel	15.8	20.4	17.5
Car	6.8	11.0	10.2
Electric & Electronics	5.0	12.6	7.2
Machinery	12.6	16.8	7.1
ETC	12.4	18.5	15.8
Transportation	-0.1	-0.2	-0.1

- Influence to industry on NSR transportation
- Applied variables : shipping distance between countries, transaction cost, historic colony relationship, language, FTA, and so on
- Export influence to Germany : Petroleum, Processed Food
- Industry structure defines the influence.

Gravity Model Analysis by IAL

- In case of low containerization rate cargo, shorter distance has influence.
- In case of high containerization rate cargo, shorter distance has no influence.

Container shipping	A	Total Export	Total Import	Distance	F	R ²
Car parts	-8.425 (-1.756)	0.336 (3.452)***	1.347 (2.400)	0.256 (5.425)***	33.207***	0.763
Automated Data processors	6.395 (0.478)	0.857 (4.229)***	-0.926 (-0.598)	0.046 (0.396)	6.376***	0.347
Specialized vessel shipping	A	Total Export	Total Import	Distance	F	R ²
Car	-3.374 (-0.370)	0.150 (0.810)	0.986 (0.922)	-0.306 (-4.027)***	5.924***	0.406
Bulk Shipping	A	Total Export	Total Import	Distance	F	R ²
[675] Alloyed Steel Plate	-22.251 (-1.256)	-0.607 (-2.113)*	3.859 (1.879)*	-0.460 (-1.707)*	6.804***	0.362
[334] Oil products	-11.891 (-1.143)	0.931 (4.408)***	1.266 (1.032)	-0.229 (-2.453)*	9.499***	0.479

Prospective Items

- **Prospective cargoes with following information**
 - Cargo item
 - Shipper
 - Monthly or yearly cargo volume

- **Cosfim Oy : Major cargo from EU to far-east Asia**
 - Cargo item and shipper
 - Paper pulp & Wood :
 - Stora Ensom Metwa Group, UPM(Finland, Sweden)
 - Machinery
 - Marine & Offshore : Wartsila, CargotecNOV, ABB Marine, Konecrane, Rolls-Royce Marine
 - Paper making machine : Andritz, Valmet
 - Cargo volume
 - Full vessel cargo
 - Paper pulp, wood and ore & coal with monthly
 - E.g. 36k ton per lot month
 - Part cargo : Machine & Equipment, paper pulp , wood, mining products hundred-thousands tons

Current Results and Future works

- **HS code-based prospective cargo analysis provides overall information but has limitations.**
 - Exporter enjoys low tariff by selecting a HS code among available HS codes
 - Same cargoes may have different HS Code
 - The analysis shows several cargo groups are prospective cargo (steel product, oil product, car parts, etc.)
- **Gravity model based analysis shows**
 - Bulk shipping cargoes are prospective cargoes.
 - Specialized cargo(Car) without calling is prospective cargoes.
 - Container shipping cargoes may not be prospective cargoes, it is container shipping issue with calling ports.
 - Prospective cargoes by a container shipping without calling ports.

Current Results and Future works

- **Future NSR cargoes are LNG and container**
 - Not a special item cargo, but any cargo in the container
- **Liquid bulk cargo and steel product may be prospective cargoes**
 - Market condition makes transportation via NSR possible between EA and EU(Netherlands).
 - Steel products always have a chance to be transported via NSR.
- **Freezing damage issue**
 - Discussed 'Freezing Damage : Liability and Insurance' in INSORP, 1996
 - Each product's freezing damage possibility must be identified even partly.
- **Forwarder is shipper**
 - In case of NSR, shippers are not cargo owners but forwarders.

Current Results and Future works

- **Multipurpose vessel is prospective vessel for some time**
- **Economic analysis for each vessel type and size**
 - NSR compared with Suez and TSR from the viewpoint of selected cargo type
- **Future analysis for prospective cargo**
 - Forwarder as a Shipper
 - Container as a self-cargo
 - Forwarders' viewpoint
 - Cargo owner as a Shipper
 - Cargo as a cargo
 - Cargo owners' viewpoint
- **Korea, Japan and China**
 - Korea and Japan's data is available, but not China

Thank You



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