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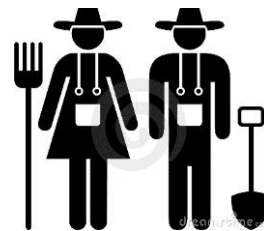
From UK land-bridge to sea route: Irish agri-food exports to the EU, transport modes and Brexit

Lucile HENRY – Ole BOYSEN





- ❖ 1. Context of Brexit and Irish agri-food exports
- ❖ 2. Transport costs and research question
- ❖ 3. Methodology
- ❖ 4. Discussion and conclusion



1. Context of Brexit and Irish agri-food exports





23/06/2016 : **Referendum - the UK wants to leave EU**

Brexit deal – ongoing negotiation



23/06/2016 : **Referendum - the UK wants to leave EU**

07/2016 – 06/2019 : Theresa May PM

Soft or Hard Brexit
Negotiation with the EU

29/03/2019 : UK withdrawal 1st deadline



07/2019 : Boris Johnson PM

Most likely a « No deal » brexit or a postponement
Irish Backstop ?

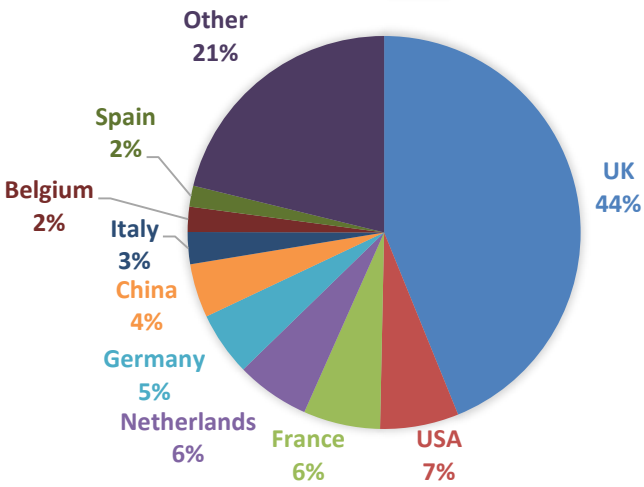
31/10/2019 : UK withdrawal 2nd deadline



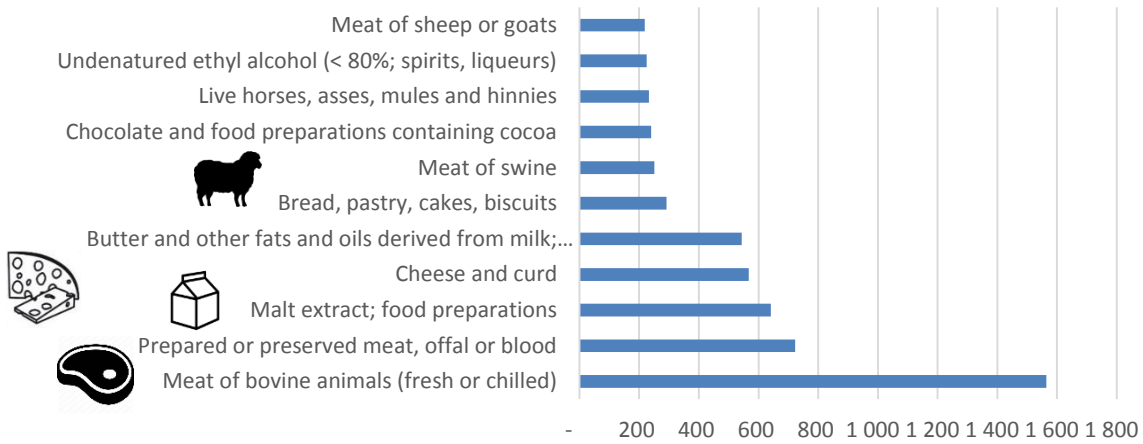
Irish agri-food exports



Main Irish agri-food exports recipients (Comext 2015, € billion)



Main Irish exports to the EU (hs4 level, Comext 2015, M€)



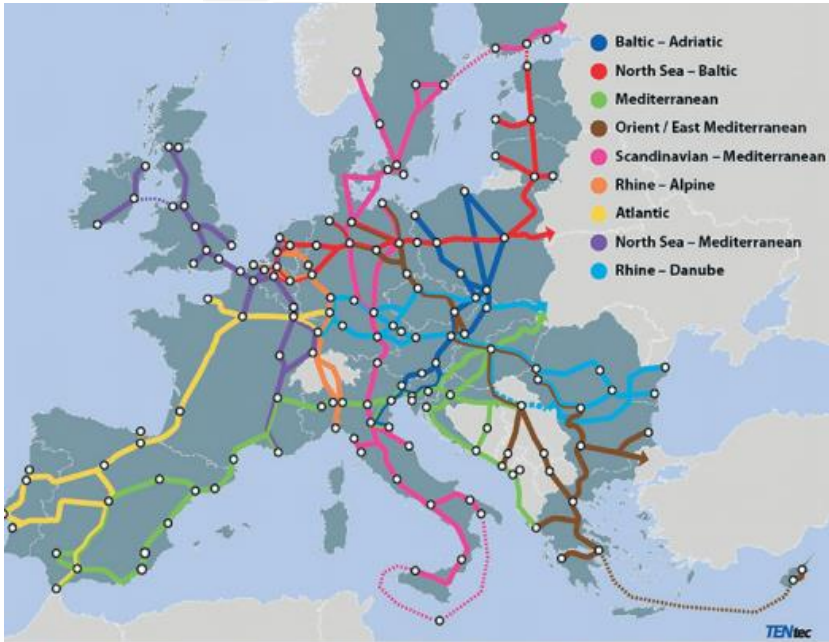


Figure 1: Ireland's current link on the European TEN-T network (European Commission 2018)

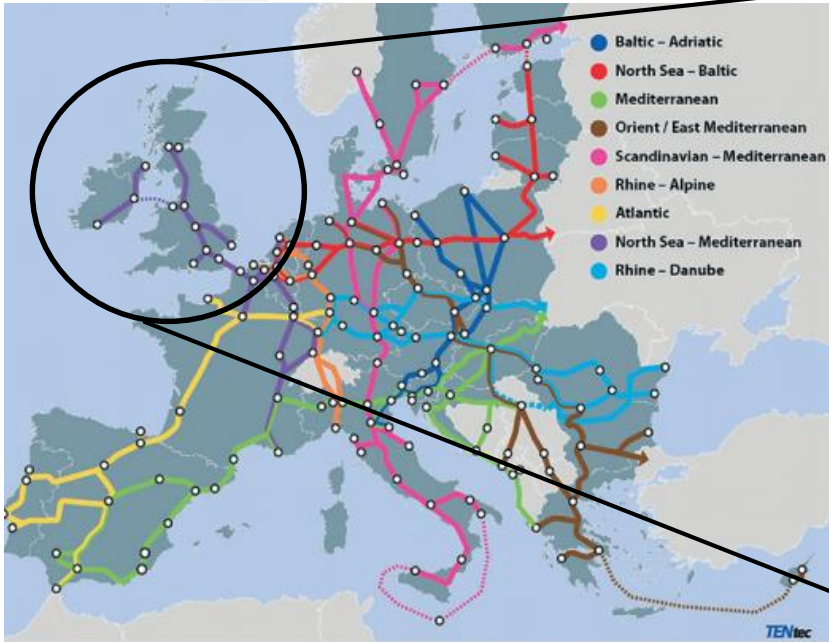
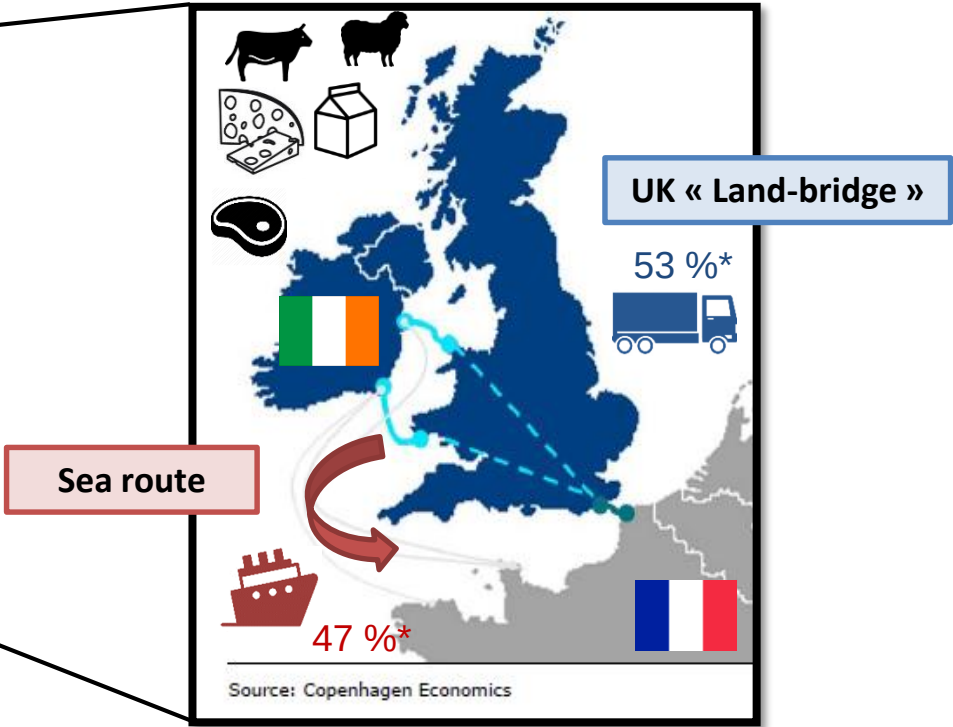


Figure 1: Ireland's current link on the European TEN-T network (European Commission 2018)



*% of Irish agri-food exports, in volume (Lawless and Morgenroth, 2017)

2. Transport costs and research question



Freight costs :

- Distance
 - Fuel price
 - Infrastructure quality (exporter and importer) (*Nordås and Piermartini, 2004; Limao and Venables, 2001*)
 - Transshipment
 - Time delay as trade barrier, waiting lines (queue) at the border (e.g. in Calais)
- (see *Hummels (2001), Hummels and Schaur (2013), Byrne and Rice (2018), Limao and Venables (2001), Limao and Maggi (2015)*)

Trade and intermodal competition/choice :

- Study of the key parameters determining the use of transport modes (*García-Menéndez et al, 2004*)
- The cost of each mode is determinant
- Calculation of transport mode utilization elasticities
- Ex : *Hummels and Schaur (2013)* : firm's choice between fast & expensive air cargo or slow & cheap ocean cargo

Data :

- Rare direct data from statistical offices (e.g. the US or New Zealand) of freight expenditures (reported in import customs declarations, used in *Hummels et al. (2014); Hummels (2001); Hummels (2007)*)
- Indirect ways, like diff. between mirrored flows (imports CIF and exports FOB), to implicitly derive transport costs

Literature review : freight costs and intermodal choice in agri-food trade

Freight costs :

- Distance
- Fuel price
- Infrastructure quality (exporter and importer) (*Nordås and Piermartini, 2004; Limao and Venables, 2001*)
- Transshipment
- Time delay as trade barrier, waiting lines (queue) at the border (e.g. in Calais)

Transport mode choice is driven by the transport costs, through several determinants

Time is an important **transport cost**, specially for agri-food (perishability), and should be included in transport costs

Data can be an issue (use of **proxy**)

- Calculation of transport mode utilization elasticities
- Ex : *Hummels and Schaur (2013)* : firm's choice between fast & expensive air cargo or slow & cheap ocean cargo

Data :

- Rare direct data from statistical offices (e.g. the US or New Zealand) of freight expenditures (reported in import customs declarations, used in *Hummels et al. (2014); Hummels (2001); Hummels (2007)*)
- Indirect ways, like diff. between mirrored flows (imports CIF and exports FOB), to implicitly derive transport costs

1. Build a database with freight costs and modal parts

We need both modal part and freight costs for IR-FR but we build a database as covering as possible

Data used :

- Trade flows X_{ijkt} and Q_{ijkt} : BACI data, 2012 – 2015, [hs6 level]
- Trade cost elements:
 - Distance, common border, common language, colonial past (CEPII data)
 - Import tariffs and NTM (UN TRAINS - WITS data)
 - EIA (Baier and Bergstrand, 2012, completed with WTO data)
 - Real exchange rates RER (IMF data)
- Freight costs : ITIC (International Transport and Insurance Costs) [hs4 level]
- Modal parts (volume) : ITGS (Comext International Trade in Goods Statistics) [EU → Non EU]

Exporter	Importer	Time	Product	Value	Quantity	Sea part	Road part	Sea f.cost	Road f.cost	Tariff	NTM
i	j	t	k	v	q	Part_sea	Part_road	AVTC_sea	AVTC_road	tar	NTM

2. Brexit impacts ?

We use this database to predict the Brexit impacts, for each [exporter importer product mode]

Initial hypothesis :

- Q_{tot} is a constant (for each ijkt)

-Time delay + additional administrative costs
~ increase in freight costs

$$Q_{tot} = Q_{sea} + Q_{road} + Q_{other}$$

$$Q_{tot} = Q_{tot} \cdot \mathbf{part}_{sea} + Q_{tot} \cdot \mathbf{part}_{road} + Q_{tot} \cdot \mathbf{part}_{other}$$

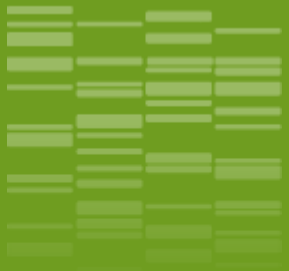
Shock : Series of increases in the road freight costs

We want to obtain :

1. Change in price (road freight)
2. Modal switch : road $\rightarrow$ sea
3. Impact on the demand/quantity/value

$$P = \text{factory price} \left(1 + \frac{\text{tariff}}{100}\right) (\prod_M \text{dist. } NTM_M^{BM}) (1 + \mathbf{AVTC})$$

↑
Freight costs



3. Methodology

Method – main steps

1. Build a database with freight costs and modal parts

a. **Freight costs** : Estimation + freight costs predictions, mode specific – based on *Hummels et al. (2014)*

$$Freight\ rate_{ijkt} = \frac{CIF - FOB}{CIF} \quad \rightarrow \quad 1 + \overset{\uparrow}{AVTC} = \left(-\frac{1}{Freight\ rate - 1} \right) = \frac{CIF}{FOB}$$

$= 1 + \text{freight costs} / \text{FOB}$

Ad Valorem Transport Costs

(All modes confounded)

Combining ITIC and ITSG databases :

- We estimate the **Ad Valorem Transport Costs (AVTC)** determinants on a subsample (of countries and modes)
- We predict **AVCT** on BACI, for each ijktm

Method – main steps

$$\ln(AVTC\ sea_{ijt}) = \alpha_s + \beta_{1s} \ln(UV_{ijt}) + \beta_{2s} \ln(fuel_t) + \beta_{3s} \ln(sea\ distance_{ij}) + \varepsilon_{sijt}$$
$$\ln(AVTC\ road_{ijt}) = \alpha_r + \beta_{1r} \ln(UV_{ijt}) + \beta_{2r} \ln(fuel_t) + \beta_{3r} \ln(distance_{ij}) + \varepsilon_{rijt}$$

	Ln (AVTC Sea)	Ln (AVTC Road)
Ln (UV)	-0.12*** (0.00)	-0.16*** (0.00)
Ln (fuel price)	0.14*** (0.00)	0.14*** (0.01)
Ln (sea distance)	0.05*** (0.00)	
Ln (distance)		0.41*** (0.00)
Constant	-3.58*** (0.02)	-6.31*** (0.07)
Explained variable	Ln(AVTC)	Ln(AVTC)
Observations	57162	27737
R2	0.269	0.343

-UV = Unit value

-Estimation on agri-food aggregated

Method – main steps

1. Build a database with freight costs and modal parts

b. Modal parts (volume) : Estimation + modal parts costs predictions, S.U.R. (Seemingly Unrelated Regression)

Combining ITIC and ITSG databases and the **AVTC** estimated :

- We estimate the modal part determinants on a subsample (of countries)
- We predict the modal parts, for each ijkt

$$Part_sea_{ijt} = \alpha s + \beta 1s (AVTC\ road_{ijt} / AVTC\ sea_{ijt}) + \beta 2s \ln(UV_{ijt}) + \varepsilon s_{ijt}$$

$$Part_road_{ijt} = \alpha r + \beta 1r (AVTC\ road_{ijt} / AVTC\ sea_{ijt}) + \beta 2r \ln(UV_{ijt}) + \varepsilon r_{ijt}$$

	Part_sea	Part_road
Ln (UV)	-0.04*** (0.00)	-0.01*** (0.00)
AVTC road/AVTC sea	0.60*** (0.00)	-0.65*** (0.00)
Constant	-0.07*** (0.00)	1.11*** (0.00)
Explained variable	part_sea	part_road
Observations	128060	128060
R2	0.311	0.372

-UV = Unit value

-Estimation on agri-
food aggregated

Method – main steps

1. Build a database with freight costs and modal parts

b. Modal parts (volume) : Estimation + modal parts costs predictions, S.U.R. (Seemingly Unrelated Regression)

Exporter	Importer	Time	Product	Value	Quantity	Sea part	Road part	Sea f.cost	Road f.cost	Tariff	NTM
i	j	t	k	v	q	Part_sea	Part_road	AVTC_sea	AVTC_road	tar	NTM

Remarks :

Predictions are close to 1/3 for sea and 2/3 for road,* small variation between products

Further work/ improvements :

Take into account the product (or chapter) specificity : Fixed Effects

*close to 47% for sea and 53% for road, like Lawless and Morgenroth (2017)

2. Brexit impacts ?

c. Counterfactual scenarios : Assume a series of increase in % between Ireland and France

-Time delay at the border

-Additional administrative costs

Examples :

AVTC road sc1 = AVTC road BLN $\times (1.1)$

i.e. +10% in AVTC road

AVTC road sc2 = AVTC road BLN $\times 2$

i.e. +100% in AVTC road

Results :

We do observe a gradual switch from sea to road

Further work/ improvements :

Find some predictions/insights to refine the scenarios

Find another way to take into account the time delay and compare

2. Brexit impacts ?

d. Predicting the potential Brexit impacts : Several tracks/possibilities

1. Use the Δ AVTC across all modes as a trade costs in a structural gravity model to predict the value change (see my previous work about gravity “*How will Brexit affect the patterns of French agricultural and food exports?*”)
2. Compute and use the Δ Price + impact on the demand

[work in progress]

4. Discussion and conclusion



Contributions

- Add/refine a trade cost usually omitted in the Brexit case
- Create a European database for freight costs (instead of using US data), mode specific
- Take into account the modal part variation through the freight costs change (road)

Limits and scope

- Agri-food sector
- Unavoidable estimations and proxy because of the lack of the data
- The fixed costs due to the logistics of the modal change are not considered

Issues

- Rare, incomplete or even non-existent data
- Association and harmonization of several databases

Further work

- Better consideration of time and perishability
- More disaggregated level for estimations and fixed effects
- A focus on the highly traded Irish products (meat and dairy)
- Refine the counterfactual scenarios
- Add an environmental component ?

Thanks for your attention

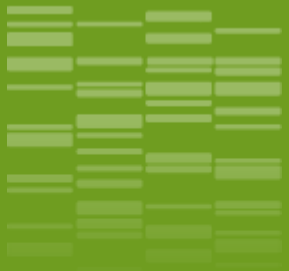
Comments, advice and proposals
are welcome



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5. Appendices

Figure 1. The MAST 2012 NTM classification

Imports	Technical measures	A SANITARY AND PHYTOSANITARY MEASURES B TECHNICAL BARRIERS TO TRADE C PRE-SHIPMENT INSPECTION AND OTHER FORMALITIES
	Non technical measures	D CONTINGENT TRADE-PROTECTIVE MEASURES E NON-AUTOMATIC LICENSING, QUOTAS, PROHIBITIONS AND QUANTITY-CONTROL MEASURES OTHER THAN FOR SPS OR TBT REASONS F PRICE-CONTROL MEASURES, INCLUDING ADDITIONAL TAXES AND CHARGES G FINANCE MEASURES H MEASURES AFFECTING COMPETITION I TRADE-RELATED INVESTMENT MEASURES J DISTRIBUTION RESTRICTIONS K RESTRICTIONS ON POST-SALES SERVICES L SUBSIDIES (EXCLUDING EXPORT SUBSIDIES UNDER P7) M GOVERNMENT PROCUREMENT RESTRICTIONS N INTELLECTUAL PROPERTY O RULES OF ORIGIN
	Exports	P EXPORT-RELATED MEASURES

Source: UNCTAD, 2012.

Trade cost : NTM

Figure 1. The MAST 2012 NTM classification

Technical measures	A SANITARY AND PHYTOSANITARY MEASURES B TECHNICAL BARRIERS TO TRADE C PRE-SHIPMENT INSPECTION AND OTHER FORMALITIES
Non technical measures	D CONTINGENT TRADE-PROTECTIVE MEASURES E NON-AUTOMATIC LICENSING, QUOTAS, PROHIBITIONS AND QUANTITY-CONTROL MEASURES OTHER THAN FOR SPS OR TBT REASONS F PRICE-CONTROL MEASURES, INCLUDING ADDITIONAL TAXES AND CHARGES

Source: UNCTAD, 2012.

List of Non-tariff Measures in MAST

A	Sanitary and Phytosanitary	B	Technical Barriers to Trade
A1	Prohibitions/restrictions of imports for SPS reasons	B1	Prohibitions/restrictions of imports for objectives set out in the TBT agreement
A11	Temporary geographic prohibitions for SPS reasons	B11	Prohibition for TBT reasons
A12	Geographical restrictions on eligibility	B14	Authorization requirement for TBT reasons
A13	Systems approach	B15	Registration requirement for importers for TBT reasons
A14	Special authorization requirement for SPS reasons	B19	Prohibitions/restrictions of imports for objectives set out in the TBT agreement, n.e.s.
A15	Registration requirements for importers	B2	Tolerance limits for residues and restricted use of substances
A19	Prohibitions/restrictions of imports for SPS reasons, not elsewhere specified (n.e.s.)	B21	Tolerance limits for residues of or contamination by certain substances
A2	Tolerance limits for residues and restricted use of substances	B22	Restricted use of certain substances
A21	Tolerance limits for residues of or contamination by certain (non-microbiological) substances	B3	Labelling, Marking and Packaging requirements
A22	Restricted use of certain substances in foods and feeds and their contact materials	B31	Labelling requirements
A3	Labelling, Marking and Packaging requirements	B32	Marking requirements
A31	Labelling requirements	B33	Packaging requirements
A32	Marking requirements	B4	Production or Post-Production requirements
A33	Packaging requirements	B41	TBT regulations on production processes
A4	Hygienic requirements	B42	TBT regulations on transport and storage
A41	Microbiological criteria of the Final product	B49	Production or post-production requirements, n.e.s.
A42	Hygienic practices during production	B6	Product identity requirement
A49	Hygienic requirements, n.e.s.	B7	Product quality or performance requirement

b. Modal parts (volume)

Estimation + modal parts costs predictions, S.U.R. (Seemingly Unrelated Regression)

	Part_mar*100	Part_road*100
In_UV	-4.29*** (0.09)	-0.92*** (0.08)
AVTC_road_mar	60.27*** (0.26)	-65.05*** (0.24)
_cons	-6.84*** (0.34)	111.21*** (0.32)
Explained variable	part_mar_100 part_road_100	
Observations	128060	
Clusters		
R2	0.311	0.372

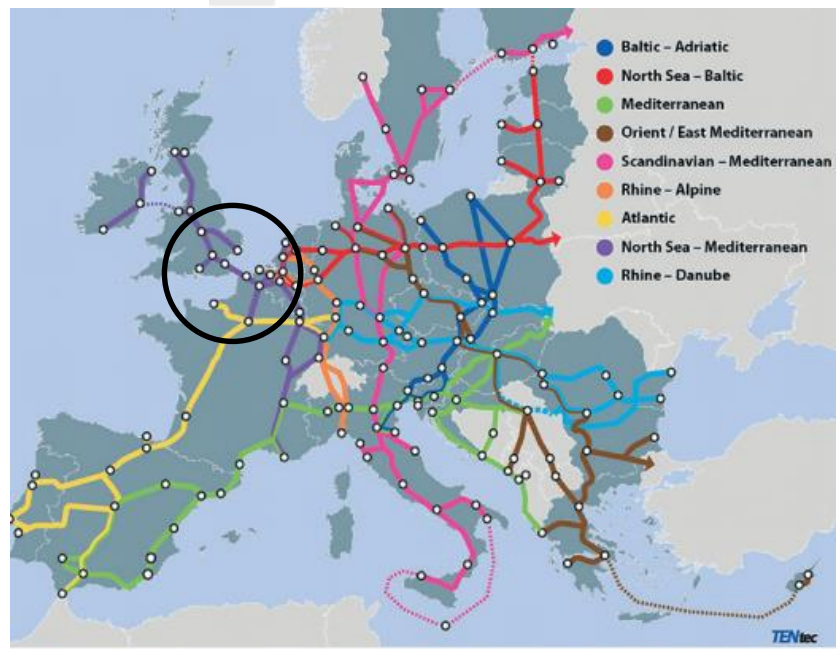


Figure 1: Ireland's current link on the European TEN-T network (European Commission 2018)

GB (Ireland + UK) --- France --- Rest of the EU

A very used path

Channel Tunnel + Port of Calais :

- 60% of flows of people and goods transiting between the UK and the EU *
- 80% of products subject to SPS controls *

High sensibility to trade barriers (NTM) and time/delay

Current life-size test in Calais :

- Every year, 4 million trucks pass through the port of Calais
- General repetition of a no-deal Brexit
- 1 month (September 2019)
- 700 additional customs officers

*<https://brexit.gouv.fr/sites/brexit/accueil/la-france-et-l-ue-se-preparent.html>

Research question : freight costs and intermodal choice in agri-food trade



a. Freight costs

Aim : Predict the freight costs by mode

Data : ITIC (International Transport and Insurance Costs) [hs4 level]

+ ITGS (Comext International Trade in Goods Statistics) [EU → Non EU]

+ BACI [all countries, hs6 level]

b. Modal parts

Aim : Predict the modal parts for each ijkt

Data : Same

c. Counterfactual scenarios

Aim : Change in modal proportions through an exogenous freight costs change

Data : Tailored database

d. Brexit impacts

Aim : Predict the impacts of the counterfactual scenarios on Irish exports
(based on the freight costs and modal part changes)

Data : Tailored database

1. Building a tailored database with modal parts and freight costs

BACI flows ijkt + freight costs and transport mode proportions

2. Impacts of Brexit through transport costs change and modal part change