



# Irish Exporter and Importer Attitudes to Freight Transport Services to and from Mainland Europe

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- **Introduction**
- **Profile of the Transport Corridor under Study**
- **Survey Experimental Design**
- **Current Progress and Next Steps**
- **Discussion**



# Ro-Ro Shipping

- Ro-Ro refers to “roll on roll off” shipping
- Large ocean shipping vessels require built in ramps that allow wheeled cargo-vehicles to drive on and off board
- Contrasts with Lo-Lo or “lift on lift off” shipping in which ships are loaded with containers using built in cranes
- Non-refrigerated manufacturing





# Project Phases

- Phase I (qualitative)
  - 8-10 interviews with a sample of Irish based road hauliers, freight forwarders and exporters
  - Cross-pattern matching and emergent and recurrent theme analysis
- Phase II (quantitative)
  - Uses information from Phase I to create a survey questionnaire for exporters/importers
  - Aim to determine the monetary value that decision makers place on ro/ro services to/from Continental Europe



# Motivation

- Approximately 90% of ro/ro freight movements with Continental Europe use the British Land Bridge network (Trant and Riordan, 2011).
- Dominance of Land Bridge service is coming under pressure:
  - Relatively high and increasing unit costs
  - Increased road congestion
  - Increased environmental concerns
  - Increased regulation



# Increased Regulation

- April 2014: UK government introduced new HGV tax on all vehicles over 12 tonnes
- Levy can be as high as £1000 a year depending on type of vehicle, number of axles and vehicle weight
- *White paper 2011: Roadmap to a Single European Transport Area*
  - Increased concern about traffic congestion, Co2 emissions and the minimal contribution made by road freight to infrastructure, suggests that further levies will arise in the future
  - Key goal 2050: to cut carbon emissions in transport by 60%
  - Key goal 2050: 50% shift of medium distance intercity passenger and freight journeys from road to rail and waterborne transport





# Research Objectives

- The aim of the research is:
  - (1) to estimate the impact of changes in the cost of ro/ro freight transport to/from continental Europe (via the UK Land Bridge) on exporter/importer demand in Ireland
  - (2) to further estimate the impact of changes in other variables, such as punctuality, reliability and frequency of service on exporter/importer demand for the service



# Research Tangibles

- Predict the impact of the UK HGV levy on ro/ro freight transport demand in Ireland
- Analysis of the potential impacts of further regulatory changes on ro/ro freight transport demand in Ireland
- Predict exporter/importer responses/tolerance for changes in other ro/ro service characteristics





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# Ro-Ro Freight Market

- 13 routes linking the island of Ireland to Great Britain
- 6 routes connecting Ireland to Continental Europe

Central Corridor
Dublin-Liverpool (P&O Irish Sea)
Dublin-Holyhead (Irish Ferries)
Dublin-Holyhead (Stena Line)
Dublin-Liverpool (Seatruck)
Dublin-Heysham (Seatruck)
Dun Laoghaire-Holyhead (Stena Line)
Southern Corridor
Rosslare-Pembroke (Irish Ferries)
Rosslare-Fishguard (Stena Line)
Northern Corridor
Belfast-Birkenhead (Stena Line)
Belfast-Heysham (Stena Line)
Belfast - Cairnryan (Stena Line)
Warrenpoint -Heysham (Seatruck)
Larne-Cairnryan (P&O Irish Sea)
Continental Corridor
Dublin-Zeebrugge-Rotterdam (Cldn-Cobelfret)
Cork-Euromed Service (Grimaldi)
Cork-Roscoff (Brittany Ferries)
Rosslare-Cherbourg (Irish Ferries)
Rosslare-Roscoff (Irish Ferries)
Rosslare Cherbourg (Celtic Link)



# Ro-Ro Freight Market



Frequency of service between Ireland and the UK -Land Bridge- is 18 times higher than for the direct service to mainland Europe





# Ro-Ro Traffic

- The direct ro/ro service to Europe lacks capacity
  - UK Landbridge => bulk of ro/ro service
  - ro/ro service between Dublin & Rotterdam & Zeebrugge an exception (absorbed lo-lo demand)
- Trant and Riordan (2011):
  - Can an up-scaled direct ro/ro services to Continental Europe can be competitive with British Land Bridge services?
  - Conclude: 'outstanding benefits', 'fraught with risk' as an investment
- Take home message:
  - a comparable substitute to ro/ro transport via UK Land Bridge does not exist and will not be simple to establish



# European Trade Patterns

- Medical & pharmaceutical products (€24.4Bn) dominate exports, accounting for 27% of the total share. (2011)
- Organic chemicals (€20Bn) is the second most valued export product, holding a share of over 22%:

<i>Sector</i>	<i>Exports Value (Euro)</i>	<i>Main Export Markets</i>
Medical and Pharmaceutical Products	24,447 (27%)	Belgium, Germany, France
Organic Chemicals	20,123 (22%)	Belgium, GB, France
Essential Oils	6,245 (7%)	GB, France, Spain, Germany
Manufactured Articles	5,444 (6%)	GB, Netherlands, Germany
Scientific Apparatus	3,615	Germany, Netherlands



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# Experimental Design

- Choice experiment:
  - Models the decision process of respondents, in this case, exporters and importers
  - Follows a survey format but differs markedly from a typical questionnaire:
    - An experimental design is constructed using choice cards of comparable alternatives; **stated preference experiment**
    - Resulting data is analysed using discrete choice econometric methods such as MNL, mixed logit etc.
    - Allows the marginal rate of substitution of different service variables/attributes to be estimated; i.e. cost vs punctuality for example, or ‘the price of punctuality’. What respondents will pay



# Service Attributes and Levels

- Transport service attributes of importance to importers and exporters were determined in phase I of the project:
  - Cost: Freight rate €/ shipment
  - Transit time: number of hours of the shipment
  - Frequency: number of sailings throughout the week
  - Punctuality: frequency and magnitude of delays
- Experimental design is based on choice cards that present alternative levels of these attributes
  - Respondent preferences: **Trade-offs**



# Choice Alternatives

## Binary

### Service via UK Land Bridge (Ro-Ro)

- High frequency “can go any day”
- Transit Times - For <2 days, it is the only option
- Highly punctual
- High cost – driver

### Direct Service (Ro-Ro/SSS)

- Weekly schedule
- Longer transit times
- More delays
- Low capacity of infrastructure - SSS
- Cheaper ( up to 50% less)

Respondent selects alternative with preferable attribute levels, does not select mode directly



# Experimental Design Options

- Typically, mainstream practitioners will rely on an orthogonal design for choice experiments
  - Assumes that all “between attribute correlations” are zero
  - Attribute levels must span all possible choice alternatives (exhaustive)
  - Analysts can choose subsets of choice-alternatives but dominant alternatives can then arise
  - Large standard errors (inefficient estimator)
- Still the most widely used design type because large sample sizes can outweigh any loss of efficiency (Bliemer and Rose, 2010)



# Experimental Design Options

- For this study, sample size is relatively small (feasibility, small population)
- To produce accurate estimates, the experimental design must be statistically efficient, i.e. have low standard errors (rules out orthogonal design)
- Must select an experimental design that allows efficiency to be achieved with a small sample size



# D-Efficient Design

- Based on the idea of minimising the expected asymptotic standard errors of the design – more efficient estimator and more reliable study results
- Achieved by use of *priors*:
  - Previous studies
  - Pilots
- Goal is to present respondents with ‘on the margin’ choice alternatives





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# Pilot Study

- Pilot study underway; currently interviewing a shortlist of exporting companies using the land-bridge to ship to Continental Europe
- Iterative process, since the pilot study's entire function is to inform the final experimental design
- Survey has thus been updated continuously throughout this process



# Next Steps

- Use the responses to the pilot survey to model exporter/importer preferences
- Update attribute levels on choice cards given the results of the above
- Use final/updated attribute levels to conduct entire survey (D-efficient design)
- Formulate the final MNL, mixed logit or other DCM using the resulting data
- Use model outputs to conduct an analysis of the sector; levy impacts etc.



# Questions

## *Thanks*

## *Questions Welcome*

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