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Price Elasticity on a Ferry Route, Tourist Flows and their Impacts on an Island Economy

Helene Willadsen and Jie Zhang

At ICTTT 2014

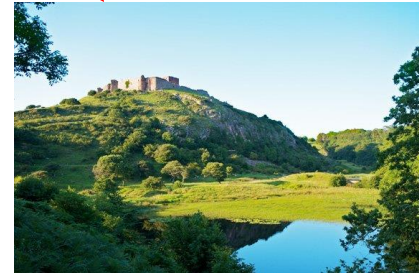
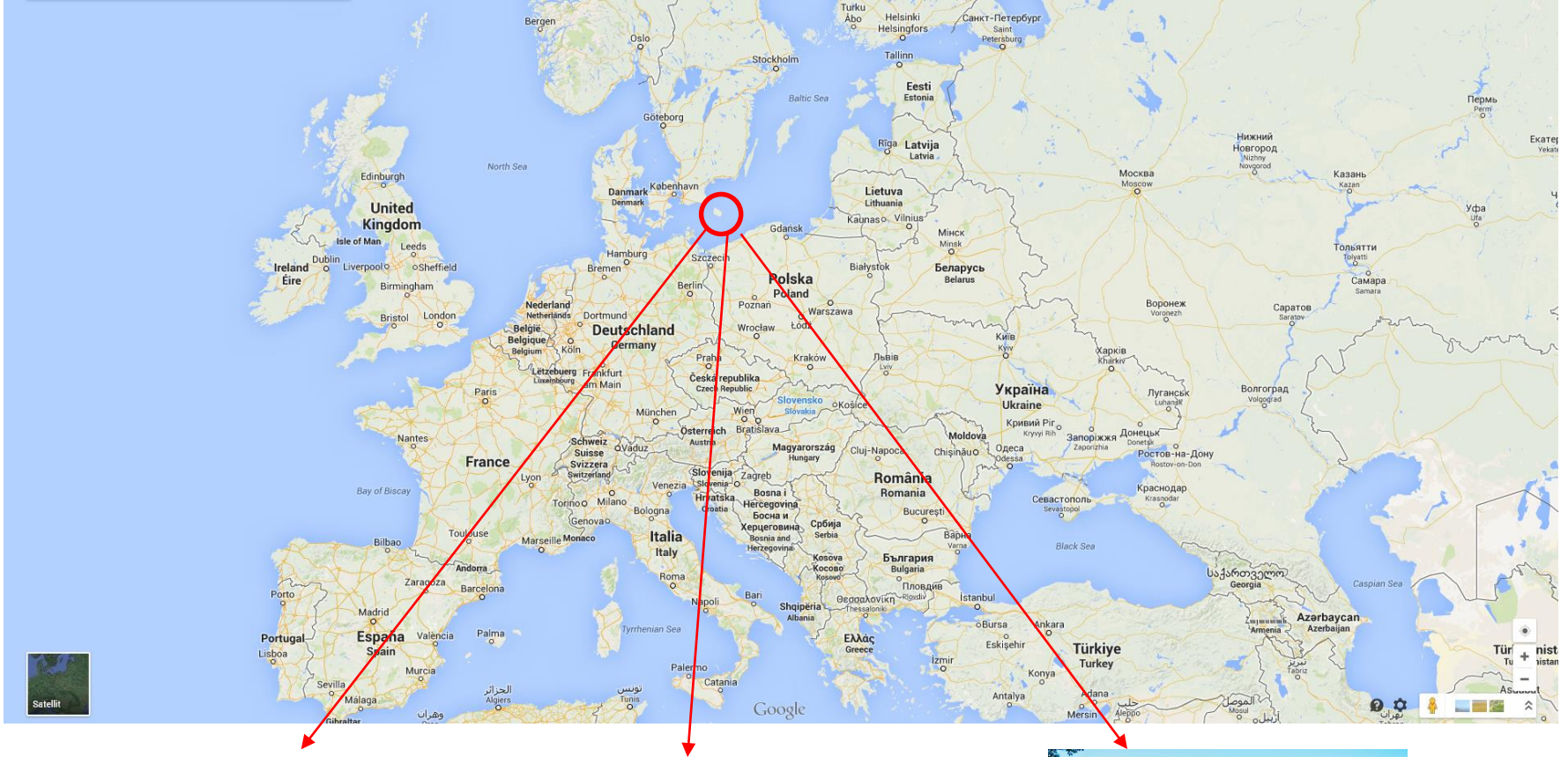
London



Disposition of this Presentation

- Geographical introduction to Bornholm and the means of transportation to and from the Island;
- The economic and demographic state of Bornholm;
- Tourism on Bornholm;
- Price elasticity of the ferry route Rønne-Ystad;
- Brief introduction of the LINE model;
- Economic consequences of price changes and changes in tourism flows;
- Conclusion.

The Island of Bornholm



Transportation

- There are several means of transportation. We focus on the ferry route Rønne-Ystad.

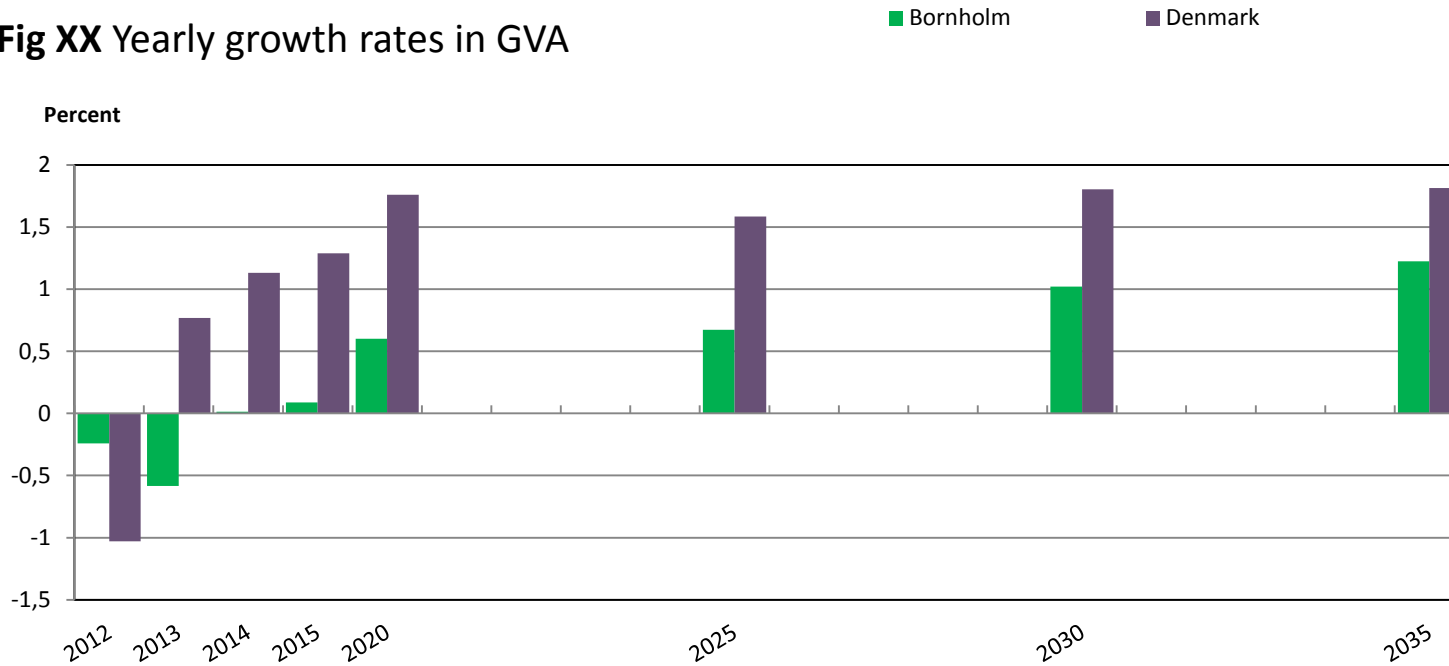


NB. There are also ferry routes to and from Świnoujście, Poland.

Economic forecasting

Bornholm is experiencing a weaker economic development than the rest of Denmark

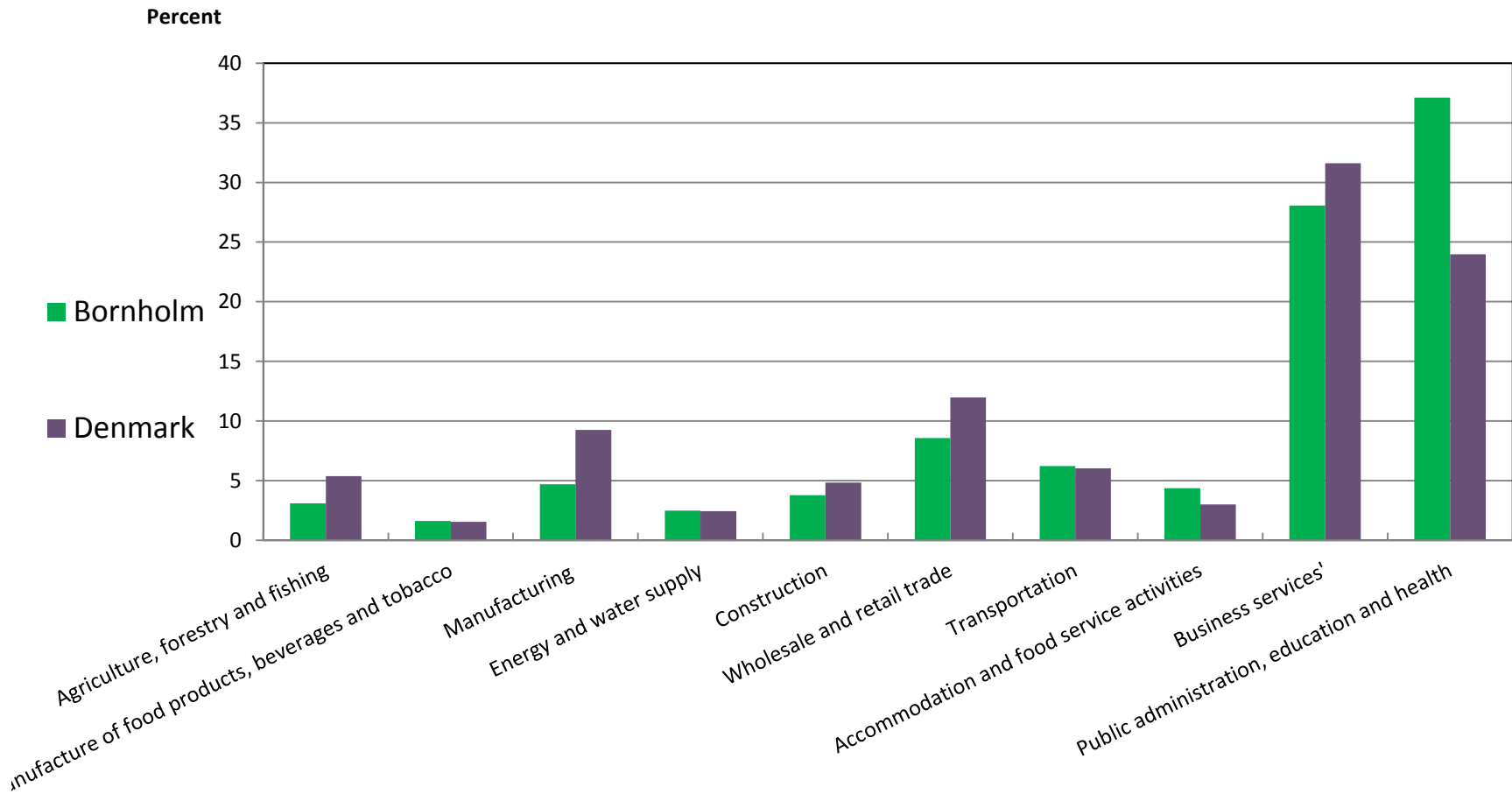
Fig XX Yearly growth rates in GVA



Source: Forecasting and data from SAM-K LINE.

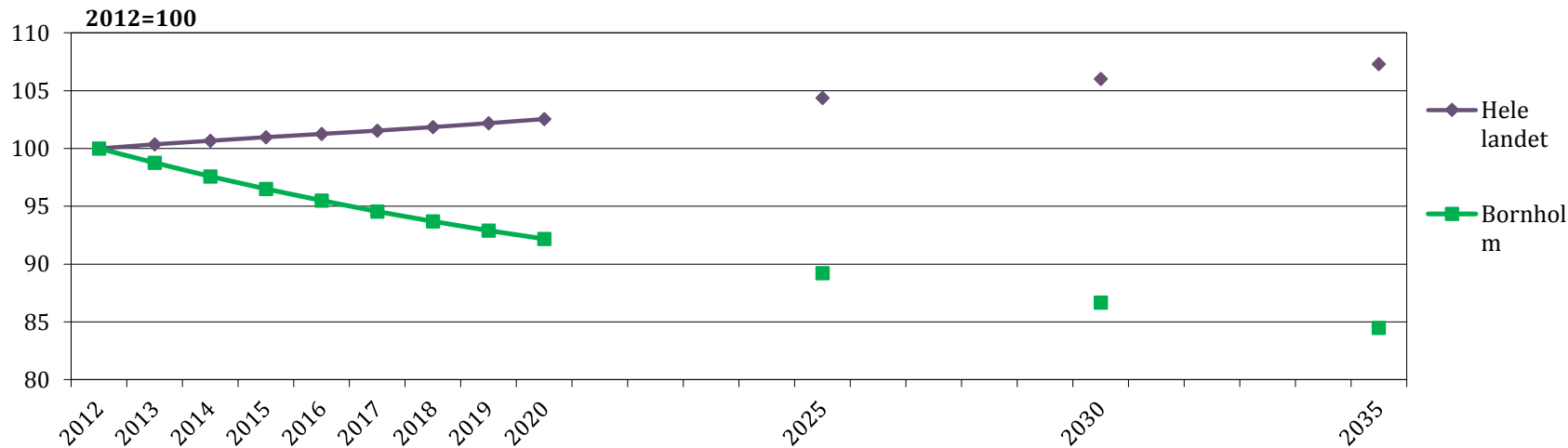
The Economy of Bornholm

Figur 1.1. Gross value-added (GVA) by sectors as percentage of all activities in 2012



Demographic Forecasting

Figure 2 Population trend, 2012 - 2035



År	Population	Workforce		Retirees *	
	number	number	Percentage of population	number	Percentage of population
2012	40.715	18.263	44,90%	15.880	39,00%
2016	38.878	16.037	41,20%	15.210	39,10%
2020	37.533	15.111	40,30%	13.751	36,60%
2025	36.327	13.719	37,80%	14.010	38,60%
2030	35.288	12.392	35,10%	14.254	40,40%
2035	34.398	11.331	32,90%	14.319	41,60%

The Ferry-route

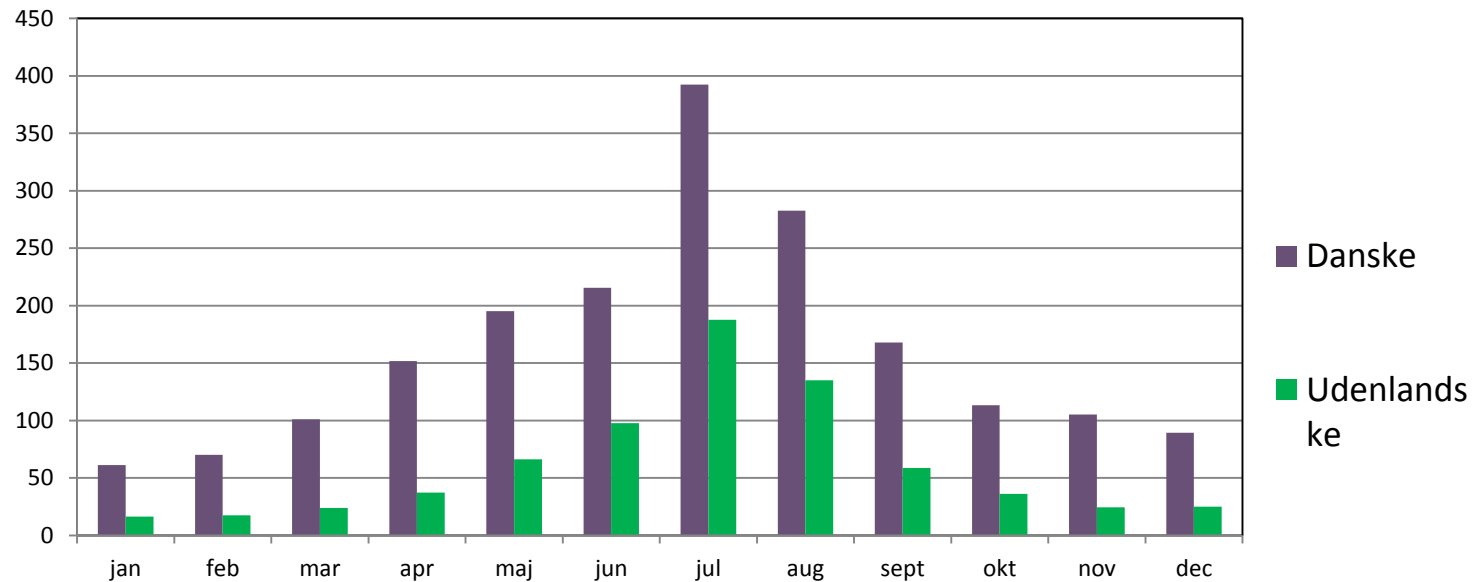
Approximately 1.5 million. passengers on the route on a yearly basis.

- Given that the workforce is declining increased commuting might offer a solution to the over-demand.
- Besides commuters the ferry is used by tourists. Both foreign and domestic.
- Most people use the Rønne-Ystad route:

	2010	2011	2012
	----- Numbers in thousands -----		
Rønne-Ystad	1192	1261	1310
Allinge-Simrishamn	24	22	26
Rønne-Køge	83	59	59
Rønne-Fährhafen Sassnitz	93	103	98
Nexø-Polen	45	28	26
Færge passagerer i alt	1437	1473	1519
% af passagerer til /fra Sverige	88.7 %	89.6 %	90.1 %
% af passagerer til /fra Tyskland	6.5 %	7.0 %	6.5 %

Figure 3 Number tourist nights for Danish and foreign guests at Bornholm

Number in thousand



So Bornholm is a holiday place for:

- Mostly Danish tourists
- Highly seasonal summer-tourism

Transportation costs

- Calculations of elasticities are made in the National Traffic Model. The cost of the **ferry Rønne-Ystad** are:
- **Baseline cost:**
 - Standard cost for a Peak season, one way ticket for a car including up to 5 passengers: **147 euros**
- **The new prices with a price change of:**
 - 20% gives a standard fare of **118 euros**
 - 40% gives a standard fare of **88 euros**

Price elasticity

- Own-price-Elasticity:

Describes the increase in demand (for traffic) when the price is lowered with one percent.

	20% price reduction	40% price reduction	60% price reduction
Purpose:	--- Elasticity ---		
Commuting and business (1)	1.118	0.646	0.467
Recreational Daytrips (2)	0.378	0.318	0.308
Recreational Overnight (3)	0.470	0.449	0.439

This means that for "recreational daytrippers" the demand will change with:
 $0.378 * 0.2 = 7.56 \%$
 When the price is reduced by 20%

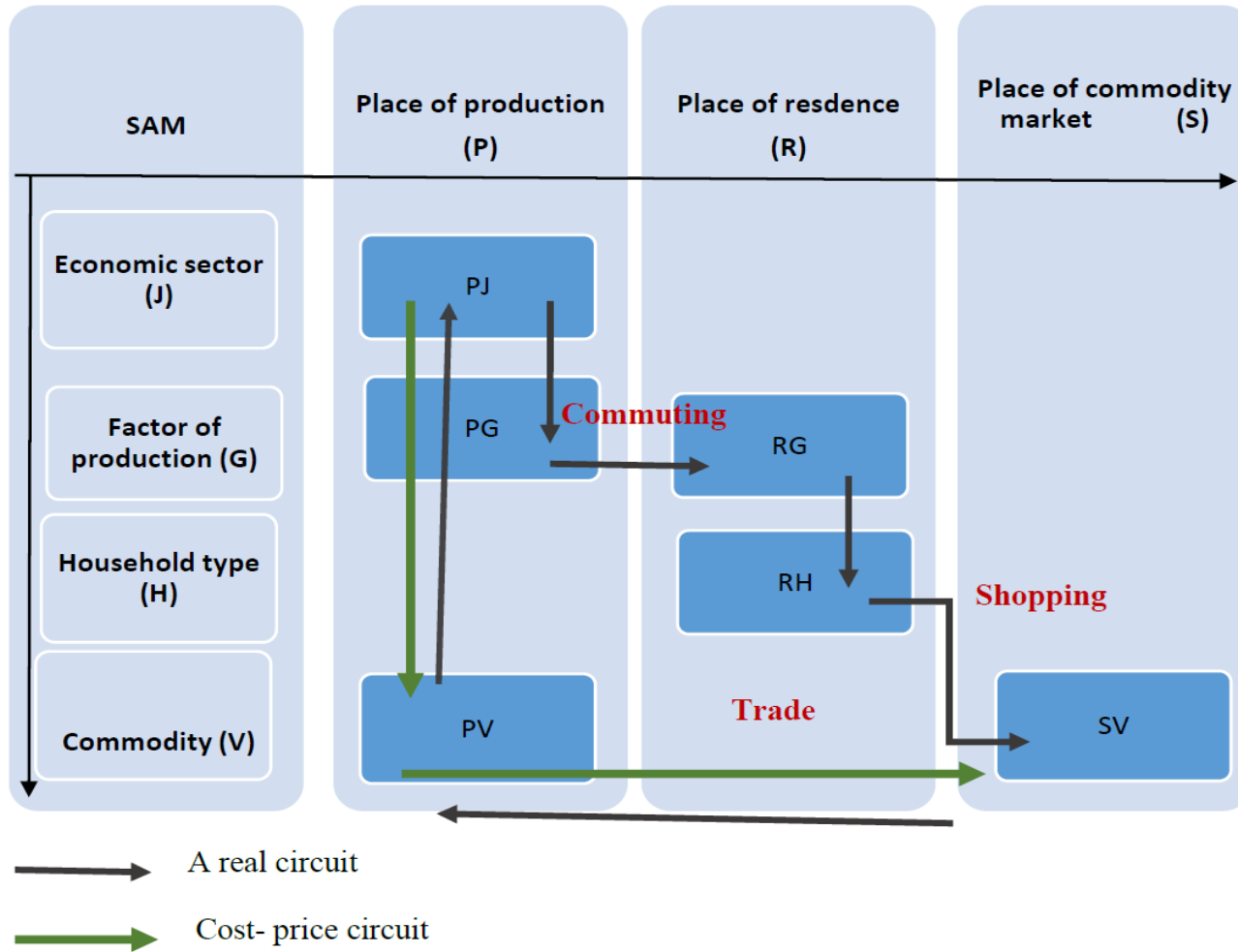
Price elasticity

- Changes in transportation demand

Type	Purpose	Ferry (20%)	Ferry (40%)
		- Increase in percent -	
Net – inbound commuting	1	22.36%	25.84%
Net – outbound commuting	1	22.36%	25.84%
DK one-day-tourists	2	7.56%	12.72%
DK overnight tourists	3	9.40%	17.96%
Foreign one-day-tourists	2	7.56%	12.72%
Foreign overnight tourists	3	9.40%	17.96%
DK Business overnight – arr.	1	22.36%	25.84%
Foreign Business overnight – arr.	1	22.36%	25.84%
DK Business one-day	1	22.36%	25.84%
Foreign Business one-day	1	22.36%	25.84%
Total trips		10.38%	18.39%

- A inter-regional model at a municipality level;
- Horizontal dimension is spatial, distinguished by three locations: place of production (P), place of residence (R) and place of commodity market (S);
- Vertical dimension is a social accounting matrix (SAM);
- Two circuits: a real circuit and a cost-price circuit;
- Three links: commuting, shopping and inter-regional trade.

Diagram for the LINE Model



Scenario settings

- The baseline for the tourist flows is 2015.
- The assumption for the effects of price deduction is set up as two scenarios: one is the ferry price reduction at 20%, and the other is the ferry price reduction at 40%.
- Example given by 40%.

	Ferry (40%)	Ferry (40%)	Ferry (40%)
Overnight forms	Danish tourists	SWE tourists	NOR tourists
Hotel - leisure	26,364	5,616	3,329
Camping	26,969	1,567	919
Vandrerhjem	7,290	404	130
Holiday center	21,911	867	1,277
Summer cottage	51,370	3,764	5,126
Overnight, total	133,904	12,218	10,782
Same-day tourists	3,093	335	-

Changes in tourism expenditure

Tourism expenditure at Bornholm for scenario of deduction of ferry price at 40%

Overnight forms	Danish tourists	Swedish tourists	Norwegian tourists	Foreign tourism
Overnight tourism	86.70	16.96	11.41	28.37
Same-day visitors	0.02	0.51	0.00	0.51
SUM:	86.71	17.47	11.41	28.88

Economic consequences

The results from the model calculation is shown as:

	Bornholm	Rest of Denmark	Denmark
	Number of jobs		
Employment (direct effects)	68	20	88
Employment (derived effects)	16	33	49
Total employment generated	84	53	137
	mil. kr.		
Gross value-added (direct)	24.4	11	35.4
Gross value-added (derived)	8.2	19	27.2
Total gross value-added generated	32.6	30	62.6
	mil. kr.		
Total personal income taxes	8.9	8.4	17.2
Value-added taxes and other taxes	28.4	5.7	34.1
Total taxes generated	37.3	14.1	51.4

Concluding remarks

- This paper demonstrates there is a connection amongst transport, tourism and local economy;
- By using the interregional macroeconomic model, the future demand for the traffic flows between the Swedish harbour (Ystad) and Bornholm is estimated;
- The National Traffic Model is applied in the analysis to calculate the price elasticity of different transport modes;
- Finally, the changes in the tourism flows become the settings for the model scenario analysis. The economic consequences are then calculated through the LINE model frameworks.

Concluding remarks (cont')

- Firstly, there are many small and medium sized businesses at Bornholm. Location at peripheral regions indicates the higher transportation costs. Transportation cost plays a role for these businesses in the competitive markets (both domestically and internationally);
- Secondly, the lower ferry prices will no doubt increase the number of commuters, both in - and out - commuters. When Bornholm is in the situation of lacking labour force, it will be easier for the people from other regions to fill in the jobs without migration;
- Thirdly, apart from an increase in commercial tourists, the effects on the non-commercial tourists are still unknown. For example, what economic contribution they might make when people from outside come to visit families and friends on the islands? What economic contribution of people from outside buy summer cottages and often come for staying on the islands?



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