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EXPORT PRICE VOLATILITY AND PRICE TRANSMISSION ASYMMETRY: THE CASE OF SALMON AND COD

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Outline

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- Literature review
- Research methods
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- The estimated results
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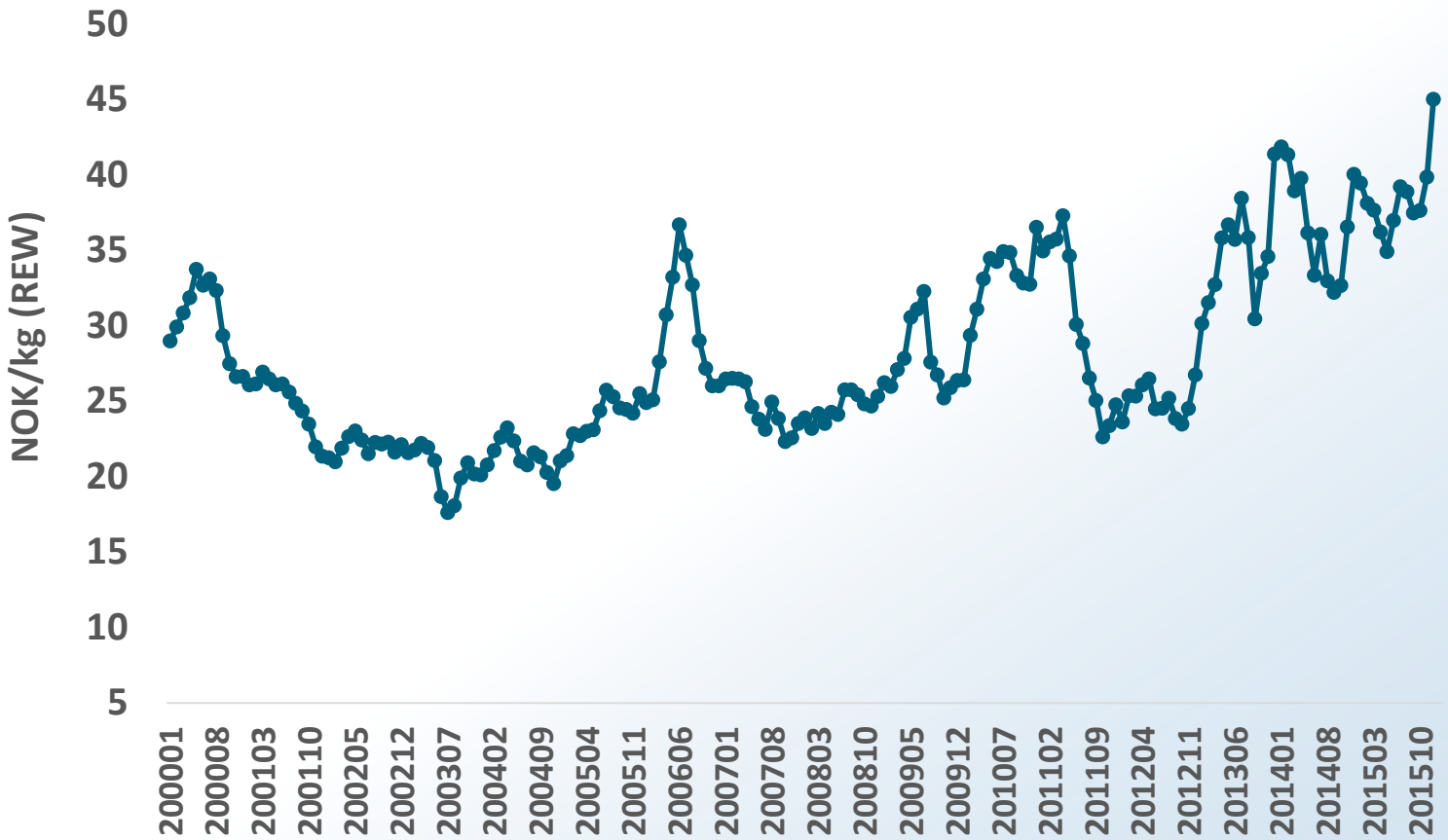
Research objectives

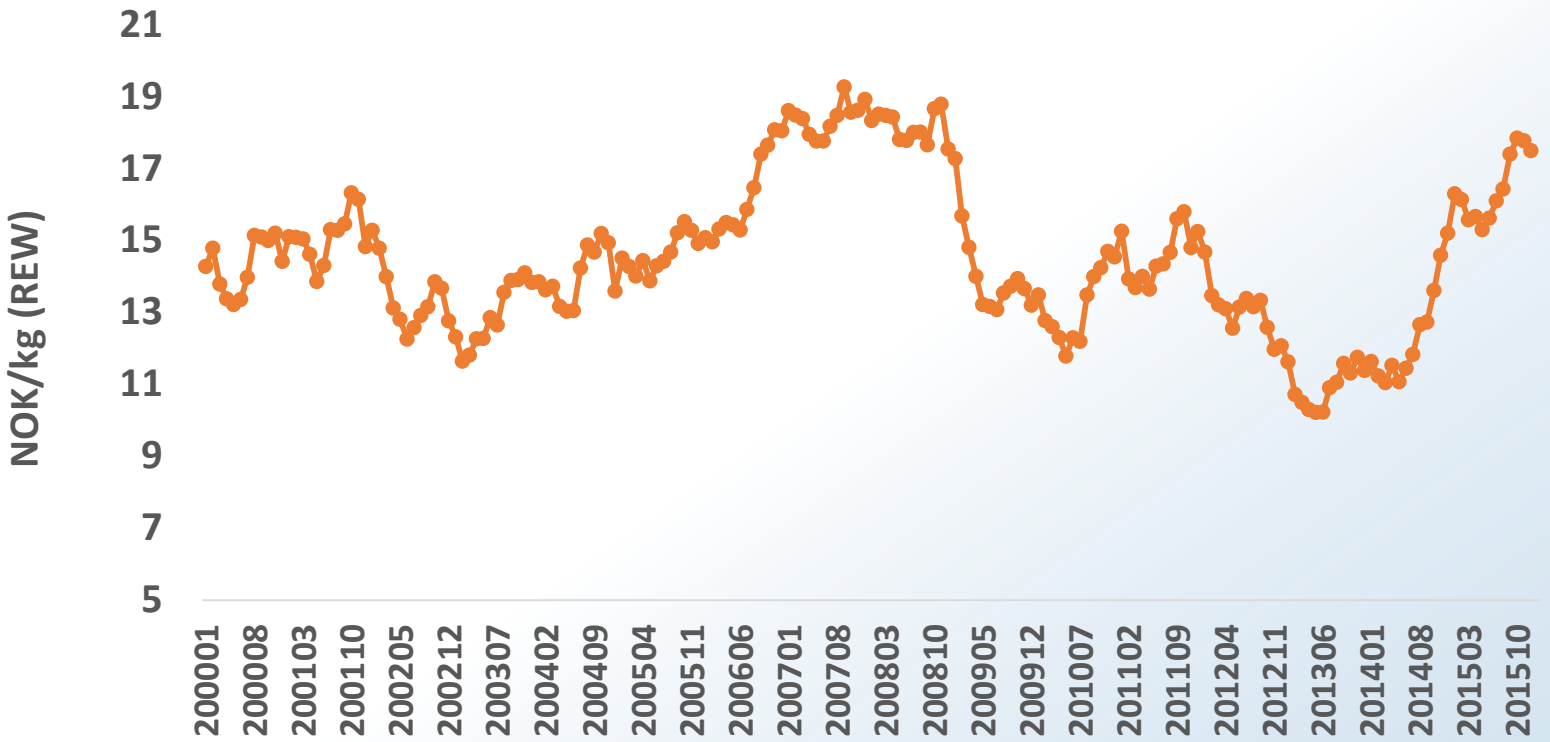
To investigate the impact of price asymmetric transmission on price volatility.

- First estimate price transmission relationships from the downstream level to export price for salmon and cod.
- After confirming asymmetric responses, we construct an asymmetry index.
- The impact of the asymmetry index on export price volatility is further investigated by controlling for demand and supply shocks.

Export prices of the Norwegian Salmon



Export prices of the Norwegian Cod



Literature review

- Peltzman, S. (2000). Prices rise faster than they fall. *Journal of Political Economy* (108), pp. 466-502.
- Dahl, R.E., & Oglend, A. (2014). Fish price volatility. *Marine Resource Economics* (29), pp. 305-322.
- Oglend, A., & Sikveland, M. (2008). The behavior of salmon price volatility. *Marine Resource Economics* (23), pp. 507-526.
- Andersen, T.B., Roll, K.H., & Tveterås, S. (2008). The price responsiveness of salmon supply in the short and long run. *Marine Resource Economics* (23), pp. 425-437.
- Oglend, A. (2013). Recent trends in salmon price volatility. *Aquaculture Economics & Management* (17), pp. 281-299.

Research methods

(1) $$\log ep_{i,t} = \alpha_{i,0} + \alpha_{i,1} \log lp_{i,t} + \alpha_{i,3} T_{i,t} + \varepsilon_{i,t} \qquad i = 1,2$$

ECM:

(2) $$\Delta \log ep_{i,t} = \beta_{i,0} + \beta_{i,1} \Delta \log lp_{i,t} + \beta_{i,2} \Delta \log ep_{i,t-1} + \beta_{i,3} \varepsilon_{i,t-1} + \nu_{i,t}$$

(3) $$\Delta \log ep_{i,t} = \gamma_{i,0} + \gamma_{i,1} \Delta \log lp_{i,t} + \gamma_{i,2} \Delta \log ep_{i,t-1} + \gamma_{i,3} \varepsilon p_{i,t-1} + \gamma_{i,4} \varepsilon n_{i,t-1} + \mu_{i,t}$$

Index of asymmetry:

(4) $$asy_{i,t} = abs(\gamma_{i,3,t} - \gamma_{i,4,t})$$

Price of volatility (GARCH):

(5a) $$\Delta \log ep_{i,t} = \lambda_{i,0} + \lambda_{i,1} \Delta \log ep_{i,t-1} + \mu_{i,t}$$

(5b) $$\nu_t = \pi_{i,0} + \pi_{i,1} \mu_{i,t-1}^2 + \pi_{i,2} \nu_{t-1}$$

Research methods (continued)

- Emprical model

(6) $$V_{i,t} = \pi_{i,o} + \pi_{i,1} asy_{i,t} + \pi_{i,2} \log ex_{i,t} + \pi_{i,3} \log seafood_{i,t} + \tau_{i,t}$$

$$i = 1,2$$

Data

- Landing prices of salmon and cod

from the Norwegian Directorate of Fisheries.
salmon: 2000.01-2013.12
cod: 2000.01-2015.12

- Export prices of salmon and cod

from Statistics Norway
2000.01-2015.12

- Exchange rate data

from Eurostat
2000.01-2015.12

Research methods

- (1) $\log ep_{i,t} = \alpha_{i,0} + \alpha_{i,1} \log lp_{i,t} + \alpha_{i,3} T_{i,t} + \varepsilon_{i,t} \qquad i = 1,2$

ECM:

(2) $\Delta \log ep_{i,t} = \beta_{i,0} + \beta_{i,1} \Delta \log lp_{i,t} + \beta_{i,2} \Delta \log ep_{i,t-1} + \beta_{i,3} \varepsilon_{i,t-1} + \nu_{i,t}$

(3) $\Delta \log ep_{i,t} = \gamma_{i,0} + \gamma_{i,1} \Delta \log lp_{i,t} + \gamma_{i,2} \Delta \log ep_{i,t-1} + \gamma_{i,3} \varepsilon p_{i,t-1} + \gamma_{i,4} \varepsilon n_{i,t-1} + \mu_{i,t}$

Index of asymmetry:

(4) $asy_{i,t} = abs(\gamma_{i,3,t} - \gamma_{i,4,t})$

Price of volatility:

(5a) $\Delta \log ep_{i,t} = \lambda_{i,0} + \lambda_{i,1} \Delta \log ep_{i,t-1} + \mu_{i,t}$

(5b) $\nu_t = \pi_{i,0} + \pi_{i,1} \mu_{i,t-1}^2 + \pi_{i,2} \nu_{t-1}$

Estimated results

Salmon price transmision model using full sample period

	Estimate	Std. Error	t value
intercept	-0.0008	0.002	-0.39
$\varepsilon p_{i,t-1}$	-0.097	0.047	-2.05
$\varepsilon n_{i,t-1}$	-0.115	0.055	-2.10
$\Delta \log lp_{i,t}$	0.527	0.016	32.49
$\Delta \log ep_{i,t-1}$	0.134	0.030	4.44

Estimated results (continued)

Cod price transmision model using full sample period

	Estimate	Std. Error	t value
intercept	-0.004	0.004	-0.957
$\varepsilon p_{i,t-1}$	-0.303	0.087	-3.470
$\varepsilon n_{i,t-1}$	-0.500	0.106	-4.730
$\Delta \log lp_{i,t}$	0.193	0.051	3.812
$\Delta \log ep_{i,t-1}$	0.161	0.069	2.334

Research methods (continued)

- Emprical model for price volatility and price asymmetry

(6) $$V_{i,t} = \pi_{i,o} + \pi_{i,1} asy_{i,t} + \pi_{i,2} \log ex_{i,t} + \pi_{i,3} \log seafood_{i,t} + \tau_{i,t}$$

$$i = 1,2$$

Estimated results (continued)

Salmon volatility and price asymmetry

	Estimate	Std. Error	t value
Intercept	-0.040	0.015	-2.568
$asy_{i,t}$	-0.004	0.002	-2.251
$\log ex_{i,t}$	-0.002	0.001	-3.049
$\log seafood_{i,t}$	0.014	0.002	8.154

Estimated results (continued)

Cod volatility and price asymmetry

	Estimate	Std. Error	t value
Intercept	0.0452	0.0028	16.02
$asy_{i,t}$	-0.0025	0.0007	-3.50
$\log ex_{i,t}$	-0.0004	0.0002	-2.63
$\log seafood_{i,t}$	-0.0008	0.0005	-1.68

Conclusion

- We confirm the result given by Peltzman, S. (2000). “Prices rise faster than they fall”. This is particularly true for the Norwegian cod industry.
- Price transmission between landing and export prices are faster in cod industry than in salmon industry.
- The results indicate that the coefficient of asymmetry index is significant with a negative sign in both salmon and cod models.
- In terms of magnitude, price volatility of salmon is more sensitive to the asymmetric adjustment and demand shifters than that of cod.
- Substitution from whitefish (cod) and pelagic fish (herring) might also explain the large price volatility in salmon prices.