

Post season pricing as a mechanism for risk sharing: Evidences from laboratory experiments on Bristol Bay sockeye salmon ex-vessel market

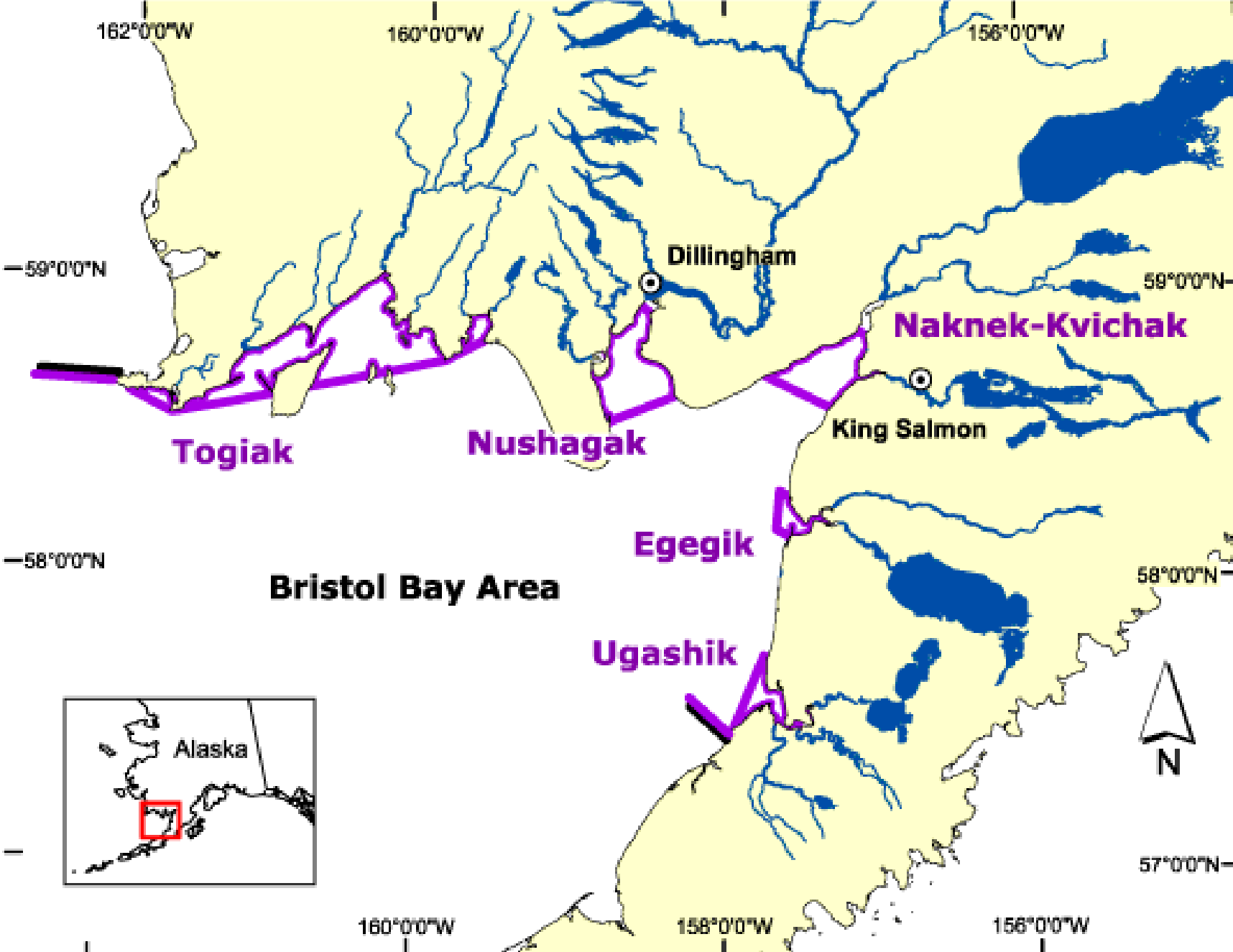
YUNLING JOCELYN WANG AND CHRIS ANDERSON

UNIVERSITY OF WASHINGTON

IIFET 2016



Background on Bristol Bay Sockeye salmon commercial fishery



- Home to the world's largest wild sockeye salmon run
- Very short fishing season
- limited entry with escapement goal management style fishery

Bristol Bay ex-vessel market structure

Most harvesters would sell all of their fish to a single processor; in return, this processor would provide harvesters with services such as boat storage, prompt off-loading of catch, etc.

- About 8 main processors, approximately 1400 vessels

Ex-vessel price is determined after the fishing season is over, sometimes it takes months after the season is over before the ex-vessel price is finalized.

At any given time, the large processors typically offered fishermen similar prices.

- If one raises its price, other processors tend to “match” it

Different than a lot of other fisheries: harvesters typically get paid at the moment of transaction (price at landing)



Potential theories on the ex-vessel price “matching” behavior

Collusion/price-fixing:

- Post season pricing adjustment allows processors to know what each other offer and thus the ability to maintain low prices

Risk sharing mechanism:

- with wholesale market and stock uncertainties, this market structure allows processors to share part of the risks with harvesters; in return, harvesters benefit from higher average ex-vessel prices than price-at landing market structure

Experiment design

2X2 design: two market structures, price at landing and post season pricing with two conditions, wholesale market certainty and uncertainty

13 participants each session (3 processors and 10 harvesters), 4 sessions for each market structure

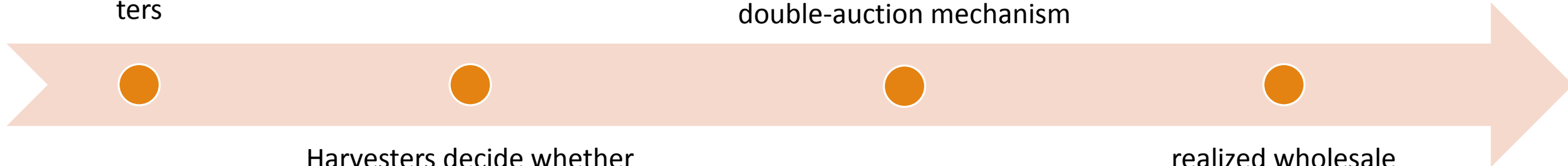
Price at landing: trading between harvesters and processors and determination of ex-vessel prices occur simultaneously before realization of the wholesale market uncertainties

forecast wholesale price observed by processors/harvesters

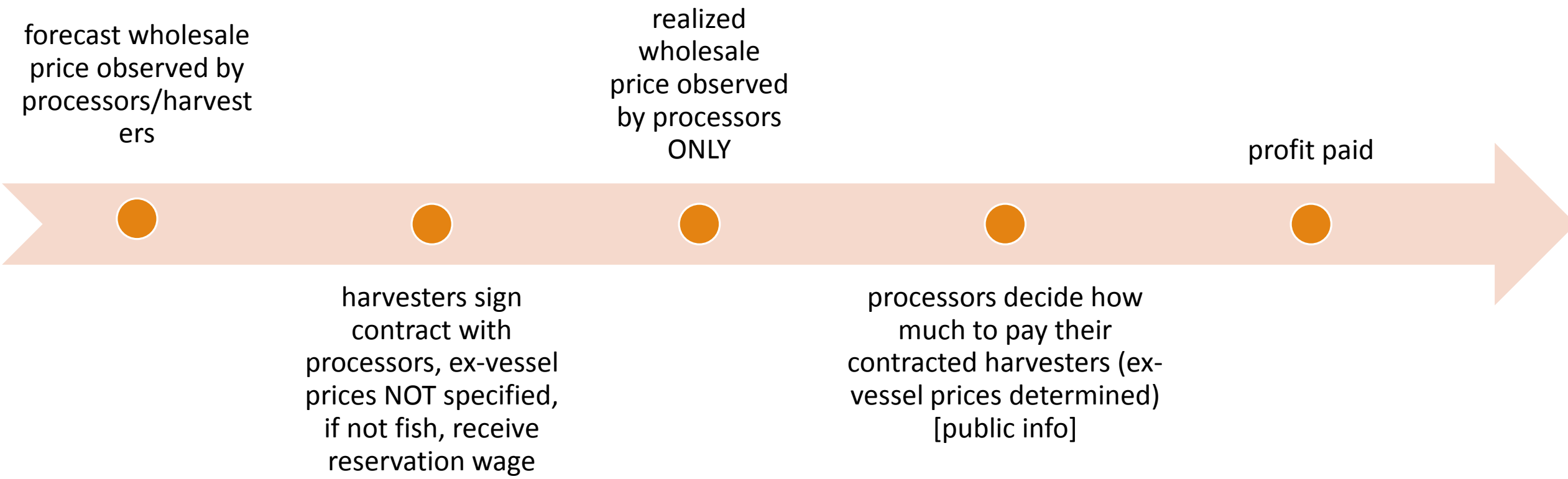
processors and harvesters trade; ex-vessel price determined via double-auction mechanism

Harvesters decide whether to fish or not, if not fish, receive reservation wage

realized wholesale price observed by processors; profits paid



Post season: processors determine ex-vessel prices after realization of the wholesale market uncertainties



Hypotheses:

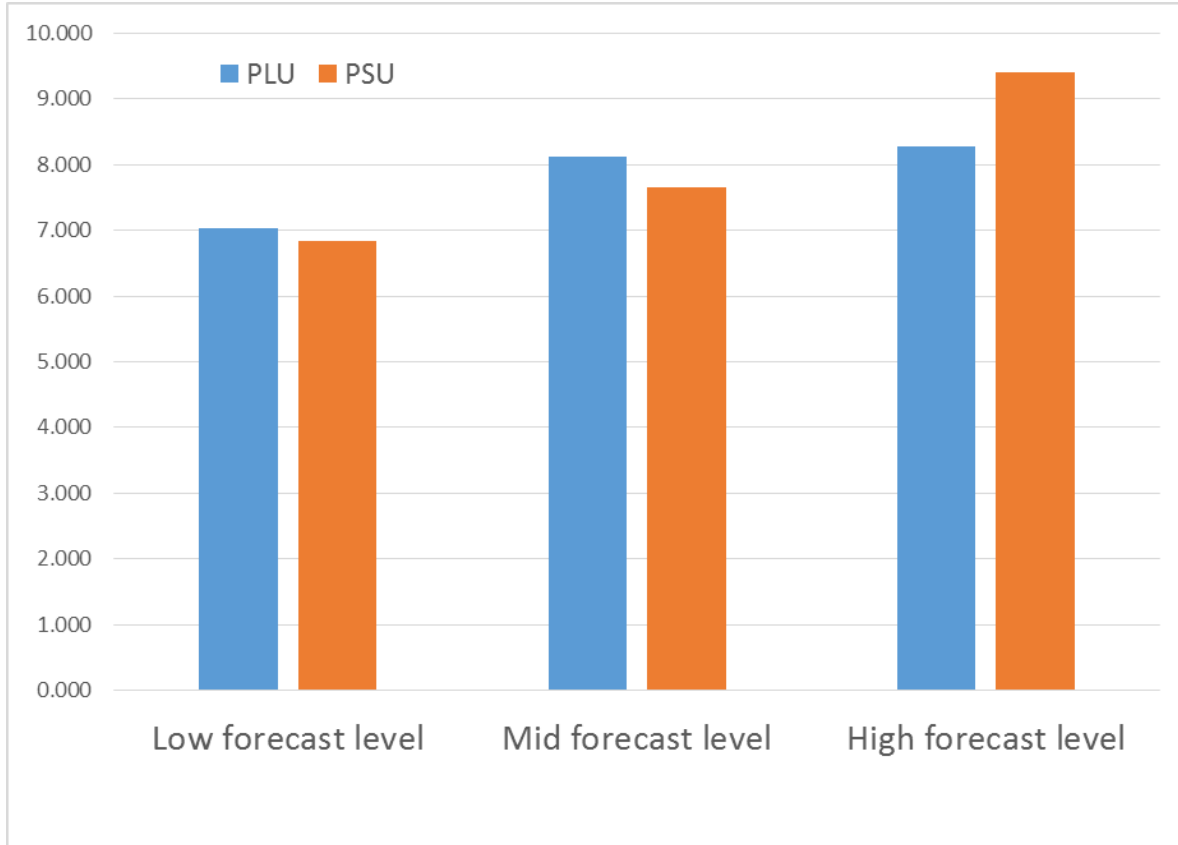
- H1: under certainty, price at landing yields higher ex-vessel prices than postseason pricing
- H2: under uncertainty, post season yields higher ex-vessel prices than price at landing
- Uncertainty is key for risk sharing

Summary Statistics: average ex-vessel prices by different levels of forecast wholesale market prices

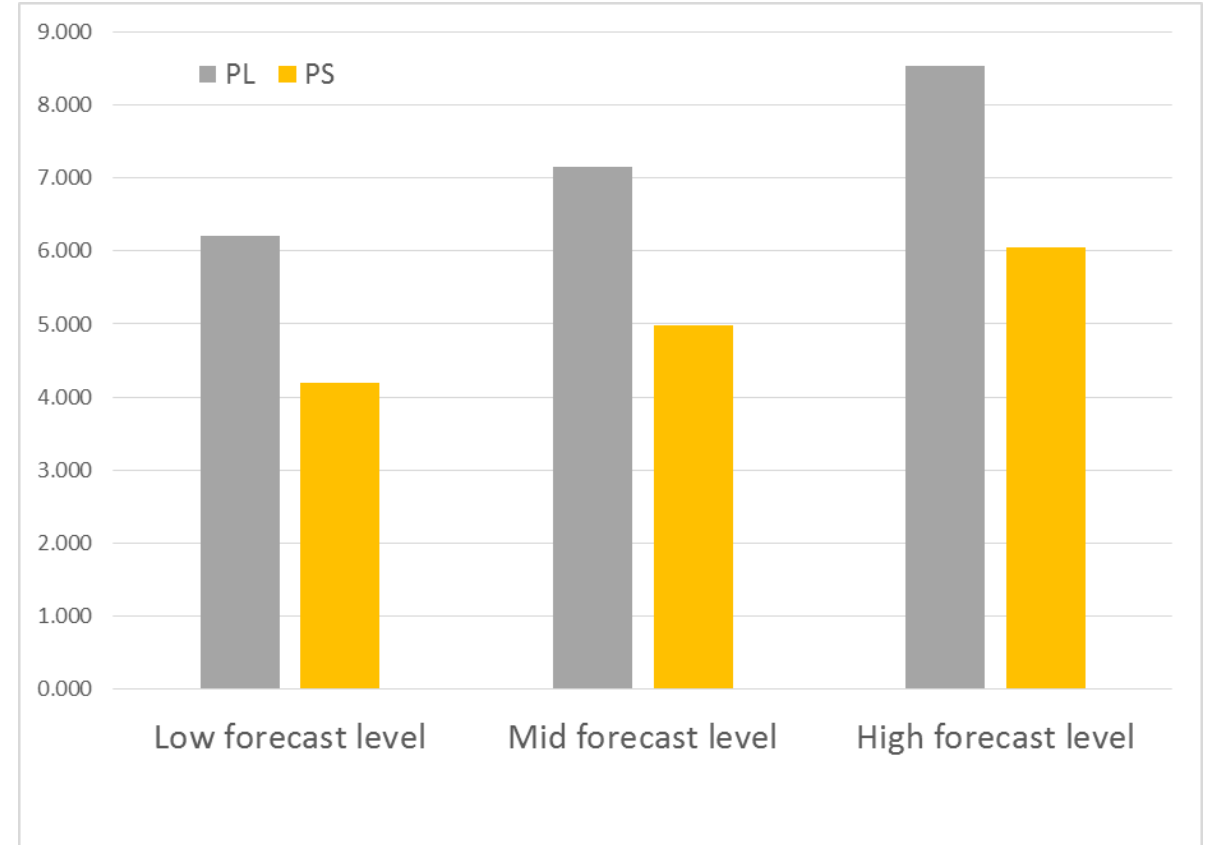
Forecast: forecast of the wholesale market price

- Under certainty: forecast = realized

Y-axis: average ex-vessel prices



Uncertainty Condition



Certainty Condition

VARIABLES	(1) Ex-vessel Price: OLS	(2) Ex-vessel Price: REM	(3) Ex-vessel Price: REM with session dummies	(4) Ex-vessel Price: REM with session dummies
Mid Forecast	0.912*** (0.177)	0.884*** (0.163)	0.874*** (0.146)	0.566*** (0.159)
High Forecast	1.712*** (0.173)	1.747*** (0.158)	1.750*** (0.173)	1.279*** (0.228)
Price at landing = 1 uncertainty	2.250*** (0.223)	2.313*** (0.363)	0.566 (0.471)	0.564 (0.442)
(Price at landing)* uncertainty	-2.406*** (0.308)	-2.322*** (0.361)	-2.374*** (0.501)	-1.910*** (0.433)
One-shot post season =1 (one-shot post season)* uncertainty	-1.567*** (0.281)	-1.060** (0.446)	-2.162*** (0.770)	-1.569** (0.696)
total_producers				0.265*** (0.0669)
Constant	4.203*** (0.191)	4.100*** (0.277)	5.349*** (0.449)	3.193*** (0.686)
Observations	1,125	1,125	1,125	1,125
R-squared	0.334			
Number of id		104	104	104

(2) REM with individual defined as a person who has participated as processor within the same session

- Isolate individual pricing pattern

(3) REM + session FE

- Isolate session effect

(4) REM + session FE + total number of producers

- proxy for supply of fish

Price premium paid to harvesters when market switches from post season to price at landing

Price premium paid when market switches from Post-season to Price at landing				
Models \ Conditions	(1) OLS	(2) REM	(3) REM with session dummies	(4) REM with session dummies
Certainty	2.250***	2.313***	0.566	0.564
(Std. Dev.)	(0.223)	(0.363)	(0.471)	(0.442)
Uncertainty	-0.156	-0.009	-1.808***	-1.346***
(Std. Dev.)	(0.213)	(0.362)	(0.434)	(0.416)



THANK YOU! QUESTIONS? COMMENTS? SUGGESTIONS?

JOCELYNW@UW.EDU

Summary Statistics

Forecast	Market	PLU	PSU	PLC	PSC	mPSC	mPSU
Low	Ex-vessel Price	7.021	6.834	6.199	4.196	2.963	4.700
	std. dev.	(1.316)	(2.124)	(0.922)	(2.138)	(2.106)	(4.334)
	number of producers	6.125	7.083	8.870	6.806	3.313	4.583
	std. dev.	(2.669)	(2.710)	(0.856)	(2.559)	(1.626)	(2.882)
Mid	Ex-vessel Price	8.111	7.653	7.160	4.977	4.259	5.694
	std. dev.	(1.346)	(3.455)	(0.983)	1.840	3.294	3.616
	number of producers	8.517	8.886	9.846	8.000	5.875	4.333
	std. dev.	(1.934)	(1.571)	(0.363)	(1.852)	1.650	2.923
High	Ex-vessel Price	8.277	9.406	8.540	6.053	3.828	5.061
	std. dev.	(1.671)	(3.120)	(1.210)	(2.185)	3.103	4.100
	number of producers	9.235	9.308	9.552	8.931	7.176	5.308
	std. dev.	(1.036)	(1.302)	(0.818)	(1.237)	1.438	2.364

Price premium paid to harvesters when market switches from repeated to one-shot game post season pricing

Price premium paid when market switches from Post-season to one-shot post-season				
Models \ Conditions	(1) OLS	(2) REM	(3) REM with session dummies	(4) REM with session dummies
Certainty	-1.567***	-1.060**	-2.162***	-1.569**
(Std. Dev.)	(0.281)	(0.446)	(0.770)	(0.696)
Uncertainty	-2.810***	-2.478***	-3.589***	-2.701***
(Std. Dev.)	(0.295)	(0.453)	(0.788)	(0.696)