Radioactively Contaminated? Seafood Preferences among Japanese after the Fukushima Nuclear Disaster

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Selected Poster prepared for presentation at the Agricultural & Applied Economics Association's 2015 AAEA Annual Meeting, San Francisco, CA, July 26-28, 2015.

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Problem Identification

- The Great East Japan Earthquake of March 11, 2011 and the level 7 meltdowns at the Fukushima Dai-ichi Nuclear Power Plants caused by tsunami altered food choices in Japan.
- Seafood consumption has significantly been affected not only in Japan but in many North Pacific Rim nations including the U.S.
- Japanese government has promoted a campaign "***Tabete Ouen Shiyou!***" which means "*Let's Eat* (products from disaster-affected regions such as the *Tohoku* region) *and Help* (their recovery efforts)*!*"
- County-of-origin labeling for most fresh food products is mandatory in Japan. Japanese consumers prefer domestic foods and have continued to select Japanese domestic vegetables even after the 3.11 Earthquake and the Fukushima nuclear disaster, firmly trusting their government food policies (Peterson and Yamaura 2014).
- Annual Japanese seafood consumption (both raw, e.g., sushi or sashimi, and cooked) is 57 kilograms per person (the 6th largest in the world and more than double the consumption in the US) in 2009 (MAFF 2015).
- Origin labeling for seafood is mandatory and indicates countries of origin for imports and fishing zones or landing harbors for domestic products. Some seafood such as mackerel is available not only at most landing harbors in Japan but also imported. Mackerel is the 9th popular seafood in Japan and is consumed 1.3 kilograms per person yearly (MAFF 2015).
- Japanese are highly concerned about country-of-origin, eco-labelling and food safety. However, few studies have examined consumer seafood preferences in Japan after the Fukushima disaster.

Objectives

- The study investigates whether Japanese consumers prefer mackerel from various landing harbors in Japan after the 3.11 Earthquake. Specifically, we examine whether they exhibit aversion toward harbors in the Tohoku region, and whether Japanese consumers consider imported products over domestic products in the aftermath of the Fukushima nuclear disaster.

References

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- Peterson, H.H. and K. Yamaura. (2014). "Ambiguity Aversion and Preferences for Food Origin Post Fukushima Nuclear Disaster." Selected paper presented at the AAEA Annual Meeting, Minneapolis, Minnesota, Jul. 27-29, 2014.

Consumer Survey & Design

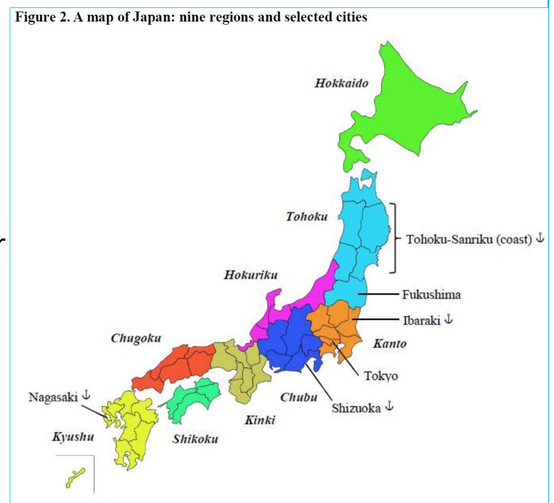
- The choice scenarios were developed using mackerel fillets that varied by price (**68**, **98**, and **128 yen per fillet**), origin (**four domestic landing harbors** and **two foreign countries**), and production processes (**farmed** or **no label**).

Figure 1. Sample mackerel choice experiment of the online survey

Option A	Option B	Option C	
			
Nagasaki Hatchery fish	*Ibaraki*	*Korea* Hatchery fish	None of Them
68 yen Per a fillet	98 yen Per a fillet	128 yen Per a fillet	

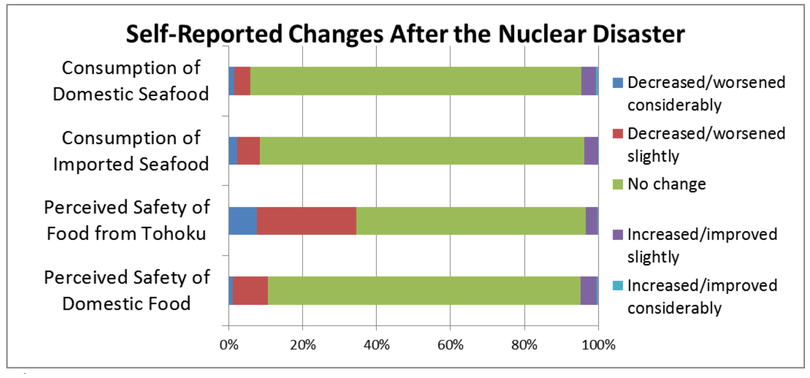
- Domestic Landing harbors included: ***Tohoku-Sanriku*** (where the Fukushima power plant is located), ***Ibaraki*** (b/w Tokyo and Fukushima), ***Shizuoka*** (the center of the main island in Japan), and ***Nagasaki*** (the island southwest of the main island). Foreign origins were ***Norway*** and ***South Korea***.

Figure 2. A map of Japan: nine regions and selected cities



Source: Created by Authors.
Note: City names with anchor are selected landing harbors in this research.

- A total of 1,208 responses were collected online in February 2014 from a stratified, random nationwide sample.



Results

- OLS results

OLS Estimates for Changes in amounts purchased of seafood (DJQSEAFOOD, DIQSEAFOOD) and for Changes in perceived levels of safety of seafood (DSFTOHOKU, DSFJAPAN) after the Great East Japan Earthquake and Fukushima Daiichi nuclear disaster

	DJQSEAFOOD		*DIQSEAFOOD*		*DSFTOHOKU*		*DSFJAPAN*	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Intercept	0.3622	0.3057	-0.5201	0.3181	0.0532	0.4951	0.0941	0.3171
GENDER	-0.0230	0.0280	0.0164	0.0292	-0.0557	0.0454	-0.0289	0.0291
AGE	0.0113 *	0.0068	0.0016	0.0070	-0.0152	0.0110	-0.0062	0.0070
AGE2	-0.0001 *	0.0001	0.0000	0.0001	0.0002	0.0001	0.0001	0.0001
BPLUS	-0.0046	0.0284	0.0326	0.0295	-0.0502	0.0459	-0.0005	0.0294
HINC	-0.0069 *	0.0037	0.0031	0.0038	-0.0093	0.0060	-0.0011	0.0038
WKIDS	0.0190	0.0321	-0.0137	0.0334	-0.0742	0.0519	-0.0101	0.0333
N65PLUS	0.0421	0.0309	-0.0341	0.0321	0.1436 ***	0.0500	0.0722 **	0.0320
NAHMEALS	0.0010	0.0068	0.0062	0.0071	-0.0158	0.0110	-0.0115	0.0070
FRQORIGIN	-0.0351 **	0.0174	0.0217	0.0181	-0.0198	0.0282	-0.0264	0.0181
TRDORIGIN	0.0562 ***	0.0182	-0.0732 ***	0.0189	0.0675 **	0.0295	0.0458 **	0.0189
TRFORIGIN	-0.0119	0.0169	0.1053 ***	0.0176	0.0065	0.0273	0.0090	0.0175
DFFUKUSHIMA	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0000	0.0001
DFFUKUSHIMA2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HOKKAIDO	-0.7701 ***	0.2489	0.3859	0.2591	-0.3517	0.4032	-0.2066	0.2583
TOHOKU	-0.6999 ***	0.2468	0.2330	0.2568	-0.0990	0.3997	-0.0571	0.2560
KANTO	-0.6851 ***	0.2435	0.3253	0.2535	-0.1755	0.3945	-0.0951	0.2527
HOKURIKU	-0.7097 ***	0.2495	0.3589	0.2597	-0.0423	0.4042	-0.0350	0.2589
CHUBU	-0.6551 ***	0.2453	0.2735	0.2553	-0.2446	0.3974	-0.1145	0.2545
KINKI	-0.7234 ***	0.2444	0.2448	0.2544	-0.2760	0.3959	-0.1381	0.2536
CHUGOKU	-0.7105 ***	0.2478	0.2743	0.2579	-0.2184	0.4014	-0.1284	0.2571
SHIKOKU	-0.7923 ***	0.2581	0.3599	0.2686	-0.1746	0.4181	-0.1053	0.2678
KYUSHU	-0.6956 ***	0.2460	0.2412	0.2560	-0.1621	0.3985	-0.0403	0.2552
ASAHI	0.0033	0.0364	0.0087	0.0379	-0.0220	0.0590	-0.0422	0.0378
MAINICHI	0.1329 *	0.0686	-0.0410	0.0714	0.1170	0.1111	0.1034	0.0712
YOMIURI	0.0835 **	0.0352	-0.0327	0.0366	0.1218 **	0.0570	0.0208	0.0365
SANKEI	0.0178	0.0803	0.0049	0.0835	0.0551	0.1300	-0.0542	0.0833
No. observations	1058		1058		1058		1058	

Note: ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

- WTP based on RPL model

	Farmed	Tohoku3	Ibaraki	Nagasaki	Korea	Norway	Notbuy
average	66.75	103.92	69.67	-53.75	-98.23	142.66	-1839.36
stdev	27.50	51.86	14.80	62.95	44.48	58.44	772.79
min	-8.73	-50.32	30.97	-235.38	-238.35	-35.86	-3493.13
max	143.13	261.33	109.59	113.06	33.74	310.84	1486.06
prob<0	0.32%	1.49%	0.00%	79.89%	98.83%	1.28%	95.11%

Conclusions

- Self-reported changes in amount consumed of seafood are minimal, but consumers' perceived level of safety has been compromised, particularly from food originating from the Tohoku region. At the same time, respondents were willing to pay the highest premium for seafood brought ashore at Tohoku. Taken together, many consumers sympathize with the people of Tohoku region and support the government campaign. But, likely, the sentiment is not translating into changes in additional amounts consumed.
- Japanese WTP for imported mackerel vary by country of origin, based on their collective perceptions of product quality from the given country. There is little evidence that Japanese consumers are substituting imported foods (with less risk of radioactive contamination) with domestic foods.