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Appendix

A.1 Trip Cost Calculations

We calculate the travel cost from each respondent's home-address zip-code to each fishing site in their choice set. Detailed driving, airfare, and ferry trip costs and travel time data were collected by the Pacific States Marine Fisheries Commission (PSMFC). Commercial airfare and air-time data were collected from the U.S. Department of Transportation's' (USDOT) Bureau of Transportation Statistics for 2016 (USDOT 2017). These data include the average one-way fare and flight time between all Alaskan airports in 2016. Non-commercial (seaplane) airfare and flight time was calculated using the average fare and flight time between locations based on estimates from Alaska Seaplanes (Alaska Seaplanes 2020). All driving costs to the airport, marine port, and fishing location are computed using the 2016 AAA average cost-per-mile of $0.56, respectively. The AAA average cost-per-mile considers average annual fuel expenditures for a medium-sized sedan with depreciation that travels an average of 15,000 miles per year. This does not include other vehicle costs such as insurance, maintenance, or registration. Maritime costs and times were calculated using the average 2016 one-way ferry fare between ports from the Alaska Marine Highway System. We assume that residents choose the trip with the lowest total travel cost. Figure A.1.1. depicts the possible travel routes for a resident to reach each fishing site.

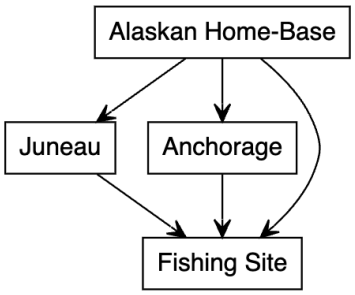

Figure A.1.1: Flowchart of travel routes for resident anglers. These anglers can either drive directly to the fishing site, take a ferry, or a commercial flight or seaplane. Other options include driving or flying to the Juneau or Anchorage airports, then flying, driving, or taking a ferry directly to the fishing site.

A.1.1. Airfare

All driving costs in the model are calculated by multiplying the total distance (in miles) by the 2016 AAA average cost-per-mile of $0.56. Residents can travel to Juneau, AK or Anchorage,

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AK, then to the fishing location nearest each fishing site or directly to their fishing site from the airport nearest their home-address. Juneau and Anchorage are the two largest airports in Alaska and act as a hub for all other Alaska regional airports. In other words, from Juneau or Anchorage, all other airports can be reached. The airfare is the average ticket price between each location during 2016 based on data from the U.S. Department of Transportation's (USDOT) Bureau of Transportation Statistics (USDOT 2017). Respondent's drive the remaining distance from the fishing sites nearest airport to the actual fishing site. If maritime travel is required then we use the driving cost from the airport to the nearest ferry location and the average ferry cost to the port nearest the fishing site plus the driving cost from the ferry port to the fishing site.

A.1.2. Driving

Residents have the option of driving directly from their home-address to each fishing site in their choice set. If a road is available, then the road distance is used to calculate total driving costs using the AAA average cost-per-mile. If no road distance is available, however, then the straight-line distance is used to calculate the driving costs.

A.1.3. Travel by Ferry

Residents have the option of taking a ferry to each fishing site in southeast Alaska. Similar to calculating total airfare, we calculate the driving cost from the resident's home-base to the nearest ferry port. Once at the ferry port nearest the home base, the average cost between each fishing port is the assumed costs of maritime travel to each fishing site if a route is available. From the port nearest the fishing site, we calculate the driving cost from the ferry port to each fishing site. The ferry method with the minimum total time is the assumed maritime route taken that is compared with all other travel methods above. Most respondents whose home base began within Alaska choose to drive directly to the Alaska site or take a ferry.

A.1.4. Travel Time

We compute the travel time for each step of the trip based on the travel method with the minimum cost for each site. Driving times from the respondents are recorded using Google Maps and CDX ZipStream (CDXZipStream 2017). Flight times are provided by the USDOT Bureau of Transportation Statistics (USDOT 2017). Flight time is the in-air flight time between destinations.

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Ferry time is the time from departing the port to arriving at the destination port. If commercial airfare is used within the travel route, then an additional 2-hours is added in accordance with the Transportation Security Administration (TSA) recommendations for security, boarding, and other potential delays (TSA 2020). Similarly, if a ferry or seaplane is used within the travel route, then an additional hour is added in accordance with travel recommendations (Alaska Seaplanes 2020; AMHS 2021).

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A.2 Historical Catch Rates

Table A.2.1 lists the 3-year average daily catch rates for Pacific halibut, king salmon, silver salmon, and "other" fish. Other fish groups lingcod, rockfish, "other" salmon, and other Alaska species into a single category. Most saltwater recreational angling trips target Pacific halibut, king salmon, or silver salmon. For this reason, we do not group these species. King salmon has the lowest average catch rate among all species. Due to the low catch rate and characteristics of the fish (size, "fight" of the fish, etc.), king salmon is a highly targeted species by recreational anglers.

Table A.2.1: Average 3-year historical catch rates for each site and species

	Pacific Halibut	King Salmon	Silver Salmon	"Other" Fish
Glacier Bay (Gustavus)	1.058	0.253	0.570	1.532
Haines (and Skagway)	0.200	0.140	0.045	0.480
Juneau	0.512	0.192	0.483	1.160
Ketchikan	0.250	0.365	0.675	1.084
Petersburg	1.249	0.114	0.297	0.695
Prince of Wales (Klawock)	0.602	0.450	1.384	1.681
Sitka	0.507	0.859	0.983	2.205
Wrangell	0.689	0.169	0.334	0.461
Yakutat	0.836	0.140	1.151	1.371

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A.3: Details on the Simulated Log-Likelihood Function for the Southeast Resident Site-Choice Model

We estimate a repeated two-level nested logit model where angler i can choose between participating in a fishing trip or a non-fishing alternative before choosing the site. The repeated nested logit model is estimated by maximizing the log-likelihood across all repeated choices ($T = 50$). The probability function for angler i choosing site j during choice occasion t is shown below:

$$\pi_{i,j,t|q,m} = \frac{\exp\left(V_{i,j,t|q}/\lambda_m\right)}{\sum_{j=1}^{J}\exp\left(V_{i,j,t|q}/\lambda_m\right)} \tag{A.3.1}$$

where λ_m is the dissimilarity coefficient and $V_{i,j,t|q}$ is the conditional indirect utility function when participating in a fishing trip conditional on being in class q. The probability of participating in a fishing trip is:

$$\pi_{i,m,t|q} = \frac{\exp\left(\lambda_m \cdot IV_{i,m,t|q}\right)}{\exp\left(V_{i,0,t}\right) + \exp\left(\lambda_m \cdot IV_{i,m,t|q}\right)} \tag{A.3.2}$$

where $V_{i,0,t}$ is the conditional indirect utility when not participating in a fishing trip and $IV_{i,m,t|q}$ is the inclusive value, calculated as the log-sum, of participating in a fishing trip.[1] The probability of angler i choosing site j during choice occasion t conditional on being in class q is calculated as the following joint probability function:

$$\pi_{i,j,t|q} = \pi_{i,j,t|q,m} \cdot \pi_{i,m,t|q} \tag{A.3.3}$$

where $\pi_{i,j,t|q,m}$ is the probability angler i visits site j during choice occasion t conditional on being in class q and $\pi_{i,m,t|q}$ is the probability of angler i choosing to participate in a fishing trip during choice occasion t conditional on being in class q. The probability function contains random terms in the model, the "noisy" wage rate and the random constant, so we must simulate each probability function, shown below:

$$\hat{\pi}_{i,j,t|q} = \frac{1}{R}\sum_{r=1}^{R}\pi_{i,j,t,r|q} \tag{A.3.4}$$

[1] The inclusive value of not participating in a fishing trip is equal to the log-sum of the conditional indirect utility of not participating in a fishing trip: $IV_{i,m,t} = \ln\sum_{j\in B_m}^{J}\exp\left(V_{i,0,t}\right)$

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where $r = [1, \dots, R]$ are 3,500 quasi-random Sobol draws taken over a standard normal distribution (Sobol 2001). We use equation A.3.4 to solve the following simulated log-likelihood function:

$$SLL = \sum_{i}^{I} \sum_{t}^{T} \sum_{j}^{J} y_{i,j,t} \ln \left(\sum_{q}^{Q} \pi_q \cdot \hat{\pi}_{i,j,t|q} \right) \tag{A.3.5}$$

where $y_{i,j}$ is a dummy variable equal to 1 if angler i visited site j in choice occasion t and $\hat{\pi}_{i,j,t|q}$ is the simulated probability of angler i choosing site j during choice occasion t conditional on being in class q. The simulated log-likelihood function in equation A.3.5 is solved numerically using BFGS optimization.

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A.4: Estimated Coefficients for a Repeated Mixed Nested Logit Model that Considers up to Three Unique Classes for the SVTT and Marginal Utility of Money

The tables below show the full model results for the repeated mixed logit model with a noisy wage fraction, the SLC and CILC models, and a repeated mixed logit model that assumes a fixed fraction of the wage rate varying between 0.25 and 1.00. When we compare the noisy wage fraction model with each latent class model, we see that the statistical significance for many site-specific attribute and non-participation coefficients are higher than the latent class models. This is most likely due to the bias from ignoring cost insignificance. The variation due to cost insignificance is being captured by other site-specific attributes causing the change in magnitude, sign, and significance for non-latent class coefficients. In the SLC and CILC models, all non-latent class coefficients are similar between models. All historical catch rates for species not targeted by anglers are negative and significant, excluding "other" fish. Additionally, the historical catch rates for targeted species are generally positive and insignificant. This could be a result of the historical catch rate years selected (3-year average) and may change if we expand or contract the historical data considered. The model suggests that the primary determinant for site-choice seems to be travel cost. In the data we find that most (>90%) trips are taken to sites nearest an individual's home base.

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Table A.4.1: Comparison of the estimated coefficients between a noisy wage fraction model and **SLC** models that assumes the noisy wage rates follow a Rayleigh distribution

Coefficient Name	Noisy Wage Fraction	Two Classes	Three Classes
Class 1:			
Travel Cost	-6.984***	-5.122***	-5.158***
	(0.226)	(0.187)	(0.203)
"Noisy" Wage Rate (κ_E)	3.801***	0.524***	0.565***
	(0.768)	(0.079)	(0.096)
Class 2:			
Travel Cost	-	-15.056***	-5.319***
	-	(0.686)	(0.345)
"Noisy" Wage Rate (κ_E)	-	48.032***	0.009
	-	(0.014)	(0.030)
Class 3:			
Travel Cost	-	-	-15.547***
	-	-	(0.786)
"Noisy" Wage Rate (κ_E)	-	-	67.904***
	-	-	(0.011)
Site-Specific Attributes			
Pacific Halibut – Targeted	0.236***	-0.071*	-0.070*
	(0.042)	(0.037)	(0.036)
Pacific Halibut – Not Targeted	0.009	-0.088*	-0.081*
	(0.061)	(0.048)	(0.047)
King Salmon – Targeted	0.092	0.128	0.123
	(0.274)	(0.171)	(0.165)
King Salmon – Not Targeted	-0.765**	-0.579***	-0.555***
	(0.344)	(0.210)	(0.209)
Silver Salmon – Targeted	0.304***	0.006	0.003
	(0.069)	(0.048)	(0.046)
Silver Salmon – Not Targeted	-0.057	-0.275***	-0.267***
	(0.057)	(0.085)	(0.086)
Other Fish – Targeted	-0.058	0.058	0.062
	(0.065)	(0.049)	(0.047)
Other Fish – Not Targeted	-0.253***	-0.071	-0.064
	(0.065)	(0.062)	(0.06)
Juneau	0.164***	-0.026	-0.03
	(0.028)	(0.032)	(0.031)
Ketchikan	0.358***	0.118***	0.114***
	(0.056)	(0.031)	(0.032)
Sitka	0.217*	0.055	0.050
	(0.123)	(0.085)	(0.082)

Continued below:

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Table A.4.1: (continued)

Coefficient Name	Noisy Wage Fraction	Two Classes	Three Classes
$IV_{Participation}$	0.146*** (0.021)	0.084*** (0.014)	0.080*** (0.015)
Non-Participation Function			
Age	-0.049 (0.065)	-0.141** (0.065)	-0.139** (0.065)
Fishing Experience	-1.667*** (0.269)	-1.435*** (0.238)	-1.436*** (0.238)
Male	-0.643*** (0.046)	-0.639*** (0.045)	-0.639*** (0.045)
Household Size	-0.064*** (0.017)	-0.08*** (0.017)	-0.080*** (0.017)
Constant	3.757*** (0.379)	3.586*** (0.360)	3.585*** (0.36)
Constant – Std. Dev.	-0.093 (0.436)	-0.012 (0.646)	0.015 (0.618)
Class Equations			
Class 1: Constant	- -	3.134*** (0.103)	3.121*** (0.107)
Class 2: Constant	- -	- -	-0.340 (0.991)
Class 3: Constant	- -	- -	- -
Probability of Being in Each Class (%)			
Class 1	- -	95.8 (94.9, 96.6)	91.5 (79.1, 95.7)
Class 2	- -	4.2 (3.4, 5.1)	4.4 (0.4, 17.4)
Class 3	- -	- -	4.1 (3.2, 4.9)
Goodness-of Fit Statistics			
N	290	290	290
Log-Likelihood	-9,229.573	-8,604.639	-8,603.746
AIC	18,499.146	17,255.278	17,259.493
BIC	18,572.543	17,339.686	17,354.91
LRI	0.379	0.421	0.421
R	3,500	3,500	3,500

Note: ***, **, and * denote statistical significance at the 10%, 5%, and 1% level, respectively. Estimated standard errors are presented in parentheses. BIC = Bayesian information criterion. AIC = Akaike information criterion. LRI = Likelihood ration index.

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Table A.4.2: Comparison of the estimated coefficients between a noisy wage fraction model and **CILC** models that assumes the noisy wage rates follow a Rayleigh distribution

Coefficient Name	Noisy Wage Fraction	Two Classes	Three Classes
Cost Insignificance Class			
Travel Cost	- -	0	0
"Noisy" Wage Rate (κ_E)	- -	0	0
Class 1:			
Travel Cost	-6.984*** (0.226)	-5.082*** (0.178)	-5.129*** (0.197)
"Noisy" Wage Rate (κ_E)	3.801*** (0.768)	0.511*** (0.075)	0.558*** (0.094)
Class 2:			
Travel Cost	- -	- -	-5.334*** (0.340)
"Noisy" Wage Rate (κ_E)	- -	- -	0.010 (0.029)
Site-Specific Attributes			
Pacific Halibut – Targeted	0.236*** (0.042)	-0.063* (0.038)	-0.061* (0.036)
Pacific Halibut – Not Targeted	0.009 (0.061)	-0.082* (0.049)	-0.074 (0.048)
King Salmon – Targeted	0.092 (0.274)	0.228 (0.164)	0.210 (0.157)
King Salmon – Not Targeted	-0.765** (0.344)	-0.480** (0.197)	-0.463** (0.193)
Silver Salmon – Targeted	0.304*** (0.069)	-0.015 (0.047)	-0.015 (0.045)
Silver Salmon – Not Targeted	-0.057 (0.057)	-0.317*** (0.084)	-0.300*** (0.086)
Other Fish – Targeted	-0.058 (0.065)	0.052 (0.05)	0.056 (0.048)
Other Fish – Not Targeted	-0.253*** (0.065)	-0.082 (0.063)	-0.073 (0.061)
Juneau	0.164*** (0.028)	-0.019 (0.033)	-0.024 (0.031)
Ketchikan	0.358*** (0.056)	0.114*** (0.031)	0.111*** (0.032)
Sitka	0.217* (0.123)	0.013 (0.081)	0.013 (0.077)

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Table A.4.2: (continued)

Coefficient Name	Noisy Wage Fraction	Two Classes	Three Classes
$IV_{Participation}$	0.146***	0.087***	0.082***
	(0.021)	(0.014)	(0.015)
Non-Participation Function			
Age	-0.049	-0.143**	-0.141**
	(0.065)	(0.065)	(0.065)
Fishing Experience	-1.667***	-1.431***	-1.434***
	(0.269)	(0.238)	(0.238)
Male	-0.643***	-0.639***	-0.639***
	(0.046)	(0.045)	(0.045)
Household Size	-0.064***	-0.080***	-0.080***
	(0.017)	(0.017)	(0.017)
Constant	3.757***	3.597***	3.596***
	(0.379)	(0.360)	(0.360)
Constant – Std. Dev.	-0.093	-0.003	0.017
	(0.436)	(0.639)	(0.628)
Class Equations			
Class 1: Constant	-	3.196***	3.176***
	-	(0.094)	(0.100)
Class 2: Constant	-	-	-0.150
	-	-	(0.895)
Probability of Being in Each Class (%)			
Cost Insignificance Class	-	3.9	3.8
	-	(3.3, 4.7)	(3.1, 4.6)
Class 1	-	96.1	91.4
	-	(95.3, 96.7)	(79.4, 95.7)
Class 2	-	-	4.7
	-	-	(0.6, 17.1)
Class 3	-	-	-
	-	-	-
Goodness-of-Fit Statistics			
N	290	290	290
Log-Likelihood	-9,229.573	-8,605.647	-8,604.514
AIC	18,499.146	17,253.294	17,257.029
BIC	18,572.543	17,330.362	17,345.106
LRI	0.379	0.421	0.421
R	3,500	3,500	3,500

Note: ***, **, and * denote statistical significance at the 10%, 5%, and 1% level, respectively. Estimated standard errors are presented in parentheses. BIC = Bayesian information criterion. AIC = Akaike information criterion. LRI = Likelihood ration index.

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Table A.4.3: Comparison of the estimated coefficients between varying fixed wage fraction models and an estimated fixed wage fraction model

Coefficient Name	25% of Wage Rate	33% of Wage Rate	50% of Wage Rate	75% of Wage Rate	100% of Wage Rate	Fixed Wage Fraction
Travel Cost	-5.163*** (0.076)	-5.331*** (0.075)	-5.628*** (0.073)	-5.969*** (0.071)	-6.237*** (0.070)	-4.620*** (0.083)
Fixed Wage Fraction	0.25	0.33	0.50	0.75	1.00	0.057*** (0.009)
Site-Specific Attributes						
Pacific Halibut – Targeted	0.635*** (0.086)	0.671*** (0.083)	0.718*** (0.079)	0.750*** (0.074)	0.766*** (0.071)	0.466*** (0.093)
Pacific Halibut – Not Targeted	0.153 (0.099)	0.206** (0.096)	0.285*** (0.090)	0.349*** (0.084)	0.387*** (0.080)	-0.066 (0.108)
King Salmon – Targeted	-0.235 (0.549)	0.152 (0.526)	0.715 (0.482)	1.179*** (0.433)	1.445*** (0.399)	-1.674*** (0.607)
King Salmon – Not Targeted	-1.361** (0.569)	-0.951* (0.545)	-0.349 (0.500)	0.154 (0.449)	0.447 (0.414)	-2.865*** (0.630)
Silver Salmon – Targeted	0.926*** (0.131)	0.89*** (0.126)	0.839*** (0.116)	0.802*** (0.106)	0.783*** (0.098)	1.056*** (0.146)
Silver Salmon – Not Targeted	0.096 (0.135)	0.069 (0.13)	0.038 (0.121)	0.026 (0.111)	0.027 (0.104)	0.219 (0.150)
Other Fish – Targeted	-0.580*** (0.112)	-0.616*** (0.108)	-0.671*** (0.102)	-0.721*** (0.095)	-0.753*** (0.090)	-0.462*** (0.120)
Other Fish – Not Targeted	-0.750*** (0.117)	-0.786*** (0.114)	-0.840*** (0.107)	-0.886*** (0.100)	-0.913*** (0.096)	-0.630*** (0.126)
Juneau	0.649*** (0.068)	0.656*** (0.066)	0.657*** (0.063)	0.647*** (0.059)	0.636*** (0.056)	0.590*** (0.069)
Ketchikan	0.951*** (0.075)	0.921*** (0.071)	0.872*** (0.066)	0.827*** (0.061)	0.798*** (0.058)	1.047*** (0.082)

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Table A.4.3: (continued)

Coefficient Name	25% of Wage Rate	33% of Wage Rate	50% of Wage Rate	75% of Wage Rate	100% of Wage Rate	Fixed Wage Fraction
Sitka	1.171*** (0.260)	0.983*** (0.247)	0.700*** (0.224)	0.458** (0.198)	0.315* (0.180)	1.834*** (0.297)
$IV_{Participation}$	0.415*** (0.032)	0.401*** (0.03)	0.377*** (0.028)	0.352*** (0.025)	0.335*** (0.023)	0.454*** (0.035)
Non-Participation Function						
Age	-0.166** (0.065)	-0.165** (0.065)	-0.160** (0.065)	-0.153** (0.065)	-0.148** (0.065)	-0.167** (0.065)
Fishing Experience	-1.391*** (0.238)	-1.391*** (0.238)	-1.395*** (0.238)	-1.400*** (0.238)	-1.405*** (0.238)	-1.406*** (0.238)
Male	-0.618*** (0.046)	-0.621*** (0.046)	-0.626*** (0.046)	-0.631*** (0.045)	-0.634*** (0.045)	-0.606*** (0.046)
Household Size	-0.075*** (0.017)	-0.076*** (0.017)	-0.077*** (0.017)	-0.078*** (0.017)	-0.079*** (0.017)	-0.074*** (0.017)
Constant	4.326*** (0.369)	4.379*** (0.368)	4.444*** (0.367)	4.485*** (0.365)	4.500*** (0.365)	4.070*** (0.371)
Constant – Std. Dev.	-0.005 (0.605)	< 0.001 (0.656)	-0.017 (0.618)	-0.001 (0.669)	-0.003 (0.624)	< 0.001 (0.471)
Value Per-Choice Occasion Estimates ($)						
Value Per-Choice Occasion	51.49 (41.37, 72.90)	62.19 (49.23, 91.71)	82.69 (66.55, 118.70)	118.54 (93.54, 178.27)	152.20 (122.82, 218.87)	28.86 (23.54, 37.10)
Goodness-of-Fit Statistics						
N	290	290	290	290	290	290
Log-Likelihood	-9,477.786	-9,519.965	-9,600.52	-9,693.905	-9,763.703	-9,396.484
AIC	18,993.573	19,077.93	19,239.041	19,425.81	19,565.405	18,832.967
BIC	19,063.300	19,147.658	19,308.769	19,495.537	19,635.133	18,906.365
LRI	0.362	0.359	0.354	0.347	0.343	0.367
R	3,500	3,500	3,500	3,500	3,500	3,500

Note: ***, **, and * denote statistical significance at the 10%, 5%, and 1% level, respectively. Estimated standard errors are presented in parentheses. BIC = Bayesian information criterion. AIC = Akaike information criterion. LRI = Likelihood ration index.

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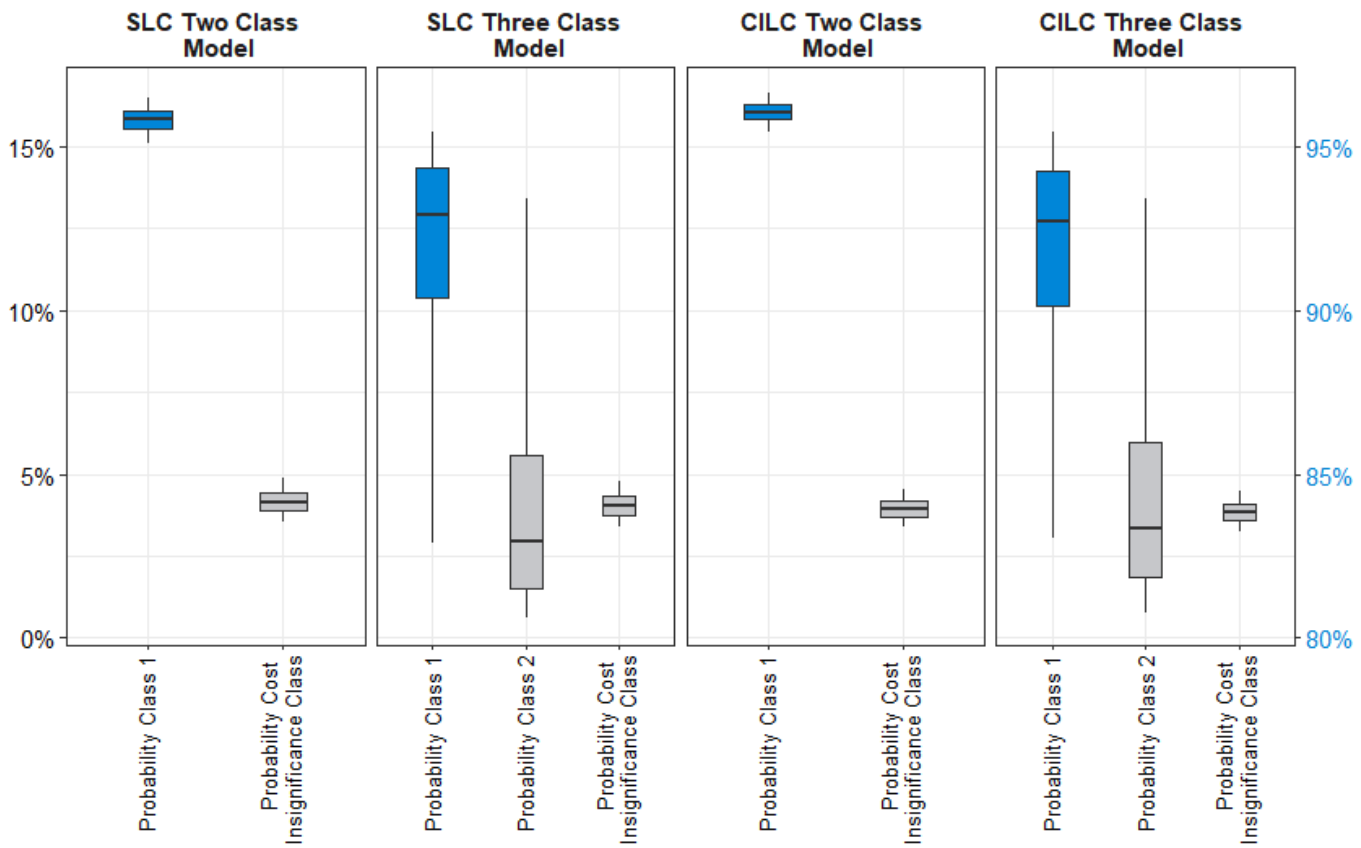

Figure A.4.1: Box and Whisker plot of class membership probabilities grouped by model type. Note: Boxes that are shaded grey correspond with the primary y-axis and boxes shaded blue correspond with the secondary y-axis (also in blue)

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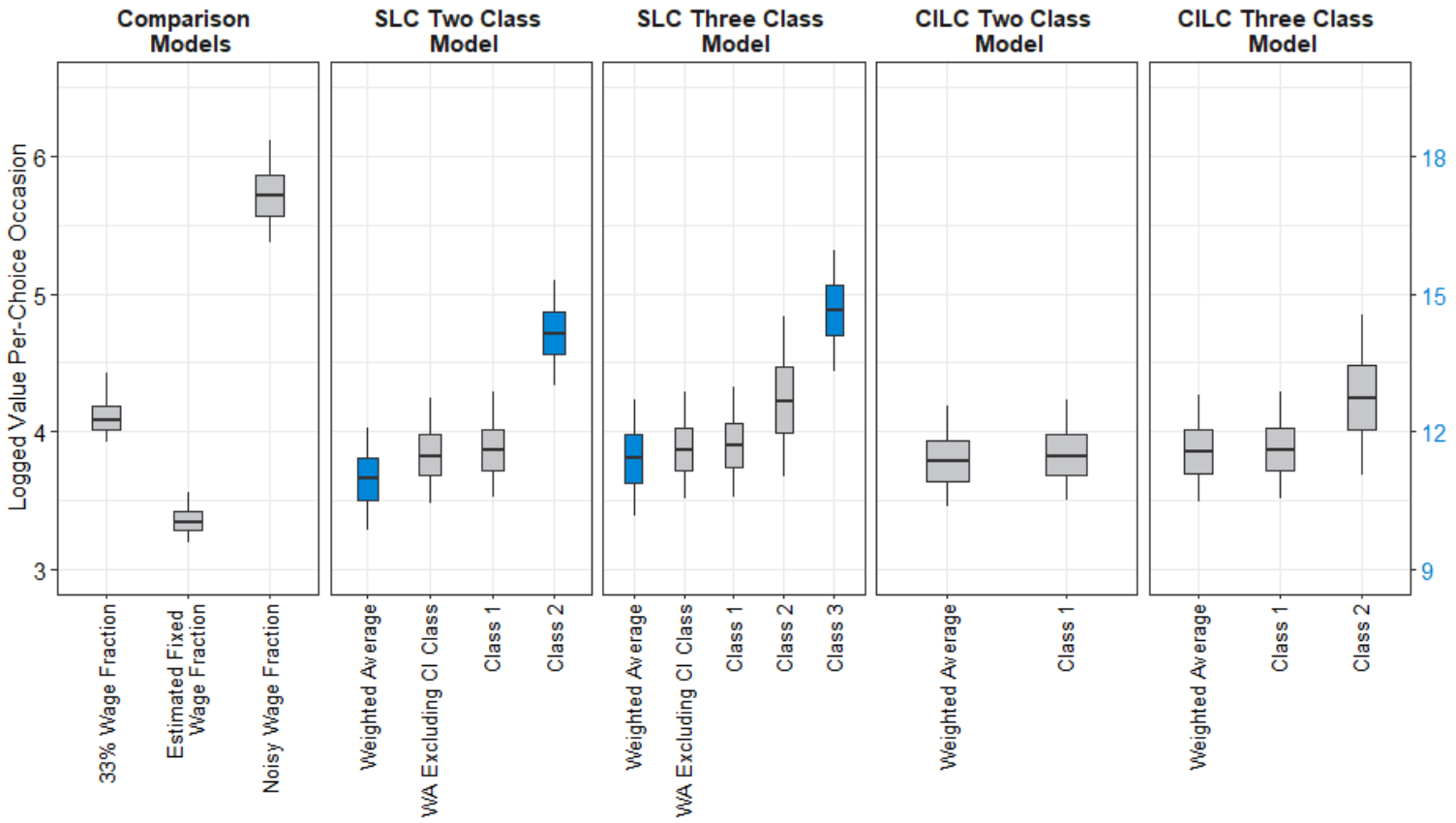

Figure A.4.2: Box and Whisker plot of the logged value per-choice occasion estimates grouped by model type. Note: Boxes that are shaded grey correspond with the primary y-axis and boxes shaded blue correspond with the secondary y-axis (also in blue)

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A.5: Comparison of the Cost-Insignificant Latent Class Models Between a Normal, Shifted Log-Normal, and Rayleigh Distribution.

We compare the model estimates from a two- and three-class cost insignificance latent class (CILC) model that assumes that the noisy wage fraction follows a normal, shifted log-normal, and Rayleigh distribution. The three-class CILC models that assumes that the noisy wage fraction follows a shifted log-normal distribution has the best log-likelihood and AIC among all models. But, the two-class CILC model that assumes that the noisy wage fraction follows a Rayleigh distribution has the best BIC. Among all models, approximately 4% of the sample exhibit cost insignificant behavior and the largest percentage of the sample have a mean noisy wage fraction within the traditional range. The three-class models that assume a normal or a shifted log-normal distribution find that approximately 10% of the sample ignores time cost but considers monetary cost. The three-class CILC model that assumes a Rayleigh distribution finds that approximately 5% of the sample exhibit this behavior. This is most likely due to the single scale parameter associated with the Rayleigh distribution. When we compare the probability of being in each class and the estimated values per choice occasion, there is no statistical difference between each model. Due to the similarity between estimated parameters and goodness-of-fit statistics and statistically equal probabilities of being in each class and estimated values per-choice occasion, we do not believe that our model is sensitive to our assumed distribution. Since the SVTT must be positive, as discussed in Section 4, the normal distribution is not theoretically consistent. Additionally, the shifted log-normal distribution caused convergence issues in the noisy wage fraction model and the SLC models due to the high estimated standard deviation. For these reasons, and the similar properties between the shifted log-normal and Rayleigh distributions, we chose the Rayleigh distribution.

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Table A.5.1: Comparison of the estimated coefficients for the CILC model under a normal, shifted log-normal, and Rayleigh distribution

	Normal Distribution		Shifted Log-Normal Distribution		Rayleigh Distribution	
Coefficient Name	Two-Classes	Three-Classes	Two-Classes	Three-Classes	Two-Classes	Three-Classes
Class 1						
Travel Cost	-5.048*** (0.163)	-5.286*** (0.23)	-5.011*** (0.152)	-5.286*** (0.23)	-5.082*** (0.178)	-5.129*** (0.197)
"Noisy" Wage Rate (κ_E)	0.582*** (0.078)	0.791*** (0.13)	-1.339*** (0.128)	-0.928*** (0.164)	0.511*** (0.075)	0.558*** (0.094)
Estimated Standard Deviation (σ_E)	0.181*** (0.030)	0.001 (0.080)	0.457 (0.305)	0.001 (0.208)	- -	- -
Class 2						
Travel Cost	- -	-5.428*** (0.278)	- -	-5.428*** (0.278)	- -	-5.334*** (0.340)
"Noisy" Wage Rate (κ_E)	- -	0.020 (0.027)	- -	-4.600*** (1.338)	- -	0.010 (0.029)
Estimated Standard Deviation (σ_E)	- -	0.001 (0.025)	- -	0.001 (0.296)	- -	- -
Cost Insignificance Class						
Travel Cost	0	0	0	0	0	0
"Noisy" Wage Rate (κ_E)	0	0	0	0	0	0
Estimated Standard Deviation (σ_E)	0	0	0	0	0	0
Site-Specific Attributes						
Pacific Halibut – Targeted	-0.064* (0.038)	-0.055* (0.032)	-0.062 (0.039)	-0.055* (0.032)	-0.063* (0.038)	-0.061* (0.036)

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Table A.5.1: (continued)

Coefficient Name	Normal Distribution		Shifted Log-Normal Distribution		Rayleigh Distribution	
	Two-Classes	Three-Classes	Two-Classes	Coefficient Name	Two-Classes	Three-Classes
Pacific Halibut – Not Targeted	-0.086* (0.049)	-0.053 (0.043)	-0.09* (0.05)	-0.053 (0.043)	-0.063* (0.038)	-0.061* (0.036)
King Salmon – Targeted	0.256 (0.169)	0.204 (0.138)	0.269 (0.175)	0.204 (0.138)	-0.082* (0.049)	-0.074 (0.048)
King Salmon – Not Targeted	-0.478** (0.199)	-0.379** (0.18)	-0.488** (0.202)	-0.379** (0.18)	0.228 (0.164)	0.210 (0.157)
Silver Salmon – Targeted	-0.01 (0.049)	-0.018 (0.039)	-0.007 (0.05)	-0.018 (0.039)	-0.480** (0.197)	-0.463** (0.193)
Silver Salmon – Not Targeted	-0.315*** (0.081)	-0.248*** (0.08)	-0.321*** (0.081)	-0.248*** (0.08)	-0.015 (0.047)	-0.015 (0.045)
Other Fish – Targeted	0.043 (0.052)	0.055 (0.042)	0.038 (0.053)	0.055 (0.042)	-0.317*** (0.084)	-0.300*** (0.086)
Other Fish – Not Targeted	-0.093 (0.065)	-0.057 (0.055)	-0.102 (0.066)	-0.057 (0.055)	0.052 (0.05)	0.056 (0.048)
Juneau	-0.018 (0.034)	-0.036 (0.028)	-0.016 (0.035)	-0.036 (0.028)	-0.019 (0.033)	-0.024 (0.031)
Ketchikan	0.114*** (0.029)	0.089*** (0.03)	0.118*** (0.028)	0.089*** (0.03)	0.114*** (0.031)	0.111*** (0.032)
Sitka	0.007 (0.083)	-0.007 (0.067)	0.009 (0.086)	-0.007 (0.067)	0.013 (0.081)	0.013 (0.077)
$IV_{Participation}$	0.091*** (0.013)	0.070*** (0.015)	0.094*** (0.013)	0.07*** (0.015)	0.087*** (0.014)	0.082*** (0.015)
Non-Participation Function						
Age	-0.144** (0.066)	-0.136** (0.065)	-0.144** (0.065)	-0.136** (0.065)	-0.143** (0.065)	-0.141** (0.065)

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Table A.5.1: (continued)

Coefficient Name	Normal Distribution		Shifted Log-Normal Distribution		Rayleigh Distribution	
	Two-Classes	Three-Classes	Two-Classes	Three-Classes	Two-Classes	Three-Classes
Fishing Experience	-1.432*** (0.239)	-1.441*** (0.238)	-1.43*** (0.238)	-1.441*** (0.238)	-1.431*** (0.238)	-1.434*** (0.238)
Male	-0.638*** (0.047)	-0.636*** (0.045)	-0.637*** (0.045)	-0.636*** (0.045)	-0.639*** (0.045)	-0.639*** (0.045)
Household Size	-0.079*** (0.017)	-0.081*** (0.017)	-0.079*** (0.017)	-0.081*** (0.017)	-0.080*** (0.017)	-0.080*** (0.017)
Constant	3.604*** (0.366)	3.608*** (0.359)	3.599*** (0.36)	3.607*** (0.359)	3.597*** (0.360)	3.596*** (0.360)
Constant – Std. Dev.	0.078 (0.688)	0.014 (0.674)	0.001 (0.693)	-0.002 (0.665)	-0.003 (0.639)	0.017 (0.628)
Class Equations						
Class 1: Constant	3.185*** (0.094)	3.094*** (0.101)	3.184*** (0.094)	3.094*** (0.101)	3.196*** (0.094)	3.176*** (0.100)
Class 2: Constant	- -	0.889*** (0.318)	- -	0.887*** (0.318)	- -	-0.150 (0.895)
Class Probabilities (%)						
Cost Insignificance Class	4.0 (3.3, 4.8)	3.9 (3.2, 4.7)	4.0 (3.3, 4.7)	3.9 (3.2, 4.7)	3.9 (3.3, 4.7)	3.8 (3.1, 4.6)
Class 1	96.0 (95.2, 96.7)	86.2 (79.9, 90.7)	96.0 (95.3, 96.7)	86.2 (79.9, 90.7)	96.1 (95.3, 96.7)	91.4 (79.4, 95.7)
Class 2	- -	9.9 (5.4, 16.4)	- -	9.9 (5.4, 16.4)	- -	4.7 (0.6, 17.1)
Per-Choice Occasion Value Estimates ($)						
Weighted Average	44.62 (29.92, 70.86)	59.02 (34.50, 98.97)	43.27 (29.24, 68.95)	58.63 (34.10, 97.48)	45.85 (30.13, 72.26)	49.11 (30.90, 79.88)

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Table A.5.1: (continued)

Coefficient Name	Normal Distribution		Shifted Log-Normal Distribution		Rayleigh Distribution	
	Two-Classes	Three-Classes	Two-Classes	Three-Classes	Two-Classes	Three-Classes
Class 1	46.49 (31.10, 73.97)	59.30 (34.30, 100.84)	45.08 (30.31, 71.89)	58.95 (33.89, 99.08)	47.75 (31.27, 75.35)	50.02 (31.54, 87.65)
Class 2	- -	79.99 (43.47, 140.24)	- -	79.06 (42.76, 138.86)	- -	75.08 (35.88, 156.06)
Goodness-of-Fit Statistics						
N	290	290	290	290	290	290
Log-Likelihood	-8,605.422	-8,597.230	-8,606.81	-8,597.229	-8,605.647	-8,604.514
AIC	17,254.845	17,246.459	17,257.621	17,246.458	17,253.294	17,257.029
BIC	17,335.582	17,341.876	17,338.358	17,341.876	17,330.362	17,345.106
LRI	0.421	0.421	0.421	0.421	0.421	0.421
R	3,500	3,500	3,500	3,500	3,500	3,500

Note: ***, **, and * denote statistical significance at the 10%, 5%, and 1% level, respectively. Estimated standard errors are presented in parentheses. BIC = Bayesian information criterion. AIC = Akaike information criterion. LRI = Likelihood ration index. [a] indicates impost value that is not estimated. Each model uses 3,500 quasi-random Sobol draws. The mean of the Rayleigh distribution is calculated as $\mu_q \cdot \sqrt{(\pi/2)}$ and the variance is calculated as $(4-\pi)/2 \cdot \mu_q^2$ where μ_q is the estimated noise parameter for class q. The mean of the shifted log-normal distribution is calculated as $\exp(\mu) + \exp(\mu + \sigma^2/2)$ and the variance is calculated as $\exp(\sigma^2 - 1) \cdot \exp(2 \cdot \mu + \sigma)$ where μ_q is the estimated mean parameter and σ is the estimated noise parameter for class q.

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Table A.5.2: Comparing the estimated mean and variance of the noisy wage fraction for the cost insignificance latent class models by class when assuming the noisy wage fraction follows a normal, shifted log-normal, and Rayleigh distribution

	Normal Distribution	Shifted Log-Normal Distribution	Rayleigh Distribution
Two Class CILC Model			
	LL: -8,605.422	LL: -8,606.81	LL: -8,605.647
	κ_1 = 0.582 σ_1 = 0.181	κ_1 = 0.553 σ_1 = 0.197	κ_1 = 0.640 σ_1 = 0.335
Three Class CILC Model			
	LL: -8,597.230	LL: -8,597.229	LL: -8,604.514
	κ_1 = 0.791 σ_1 = 0.001	κ_1 = 0.791 σ_1 = 0.001	κ_1 = 0.699 σ_1= 0.366
	κ_2 = 0.020 σ_2 = 0.001	κ_2 = 0.020 σ_2 = 0.001	κ_2 = 0.013 σ_2 = 0.007

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A.6: Welfare Effects for Changes in the Historical Harvest Rates of King Salmon for a Standard Mixed Logit Model and Latent Class Models

The latent class model can be used to calculate welfare effects for changes in site-specific attributes. Similar to the value per-choice occasion calculation, a small modification must be included to capture the probability of a respondent being in class q. Additionally, our model has continuous heterogeneity in the "noisy" wage rate and the non-participation constant. We consider both types of heterogeneity to calculate the expected CV per-choice occasion for a change in the historical catch rates of king salmon, a highly targeted Alaskan species, shown below:

$$CV_i = \frac{1}{R}\sum_{r=1}^{R}\sum_{q=1}^{Q}\pi_{i,q}\frac{\ln\left(\sum_{i=1}^{I}\exp\left(V_{i,j,r|q}^{0}/\lambda_p\right)^{\lambda_p}\right) - \ln\left(\sum_{i=1}^{I}\exp\left(V_{i,j,r|q}^{1}/\lambda_p\right)^{\lambda_p}\right)}{\exp(\gamma(q))} \quad \text{(A.6.1)}$$

where $\gamma(q)$ is the marginal utility of money parameter in class q, $\pi_{i,q}$ is the probability angler i is in class q, $V_{i,j,r|q}$ is the indirect utility for sites $j = [0, \dots, J]$ conditional on being in class q, 0 represents the conditional indirect utility before changes in the historical catch rates, 1 represents the conditional indirect utility after a marginal change in the catch rates, and $r = [1, \dots, R]$ denotes the random draw. In models that consider cost insignificance, the marginal utility of money is assumed to equal zero for anglers within class Q, implying anglers within this class would be willing to pay an undefined amount for a marginal change in site-specific attributes. For this reason, the CV estimates presented in this section ignore the willingness-to-pay from anglers with cost insignificance. We calculate the welfare effect for a 10% regionwide increase in the historical catch rates using 10,000 quasi-random Krinsky-Robb draws (Krinsky and Robb 1986).

The CV for a 10% increase in the historical catch rates of king salmon per choice occasion for anglers targeting king salmon is approximately $2 when using the standard mixed logit model. But, as discussed above, this may be biased upward due to the upward bias on the marginal utility of money term due to possible cost insignificance. In the SLC models, the mean weighted average CV is greater than the standard mixed logit model and the CILC models. This is due to anglers that exhibit near cost insignificant preferences being included in the sample during CV calculations. Although this group is a small percentage of the sample (~3%), they have a CV per choice occasion of $807 (-$622, $4,345) in the two-class model and $1,416 (-$968, $8,229) in the

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three-class model equating $40,350 (-$31,100, $217,250) and $70,800 (-$48,400, $411,450) per season, respectively, driving the weighted average upward. When we compare classes between the SLC models with CILC models, we see that the mean CV is greater for the CILC models. This because the coefficient for king salmon is slightly larger and statistically significant in the CILC model but not the SLC model. It is likely that the SLC model was heavily influenced by estimating a near-zero marginal utility of money for anglers with cost insignificance that soaked up most of the variation from other site-specific attributes. We find a similar pattern for anglers in class 2.

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Table A.6.1: Class-Specific Compensating Variation Estimates for a 15% Increase in the Historical Daily Catch Rates of King Salmon

	Standard Repeated Mixed Logit Models ($)			Standard Latent Class Models ($)		Cost Insignificance Latent Class Models ($)	
	33% Wage Fraction	Estimated Fixed Wage Fraction	Noisy Wage Fraction	Two Classes	Three Classes	Two Classes	Three Classes
Weighted (Sample) Average							
Targeted	0.48 (-2.46, 3.72) [-0.60, 1.51]	-2.22 (-3.64, -0.69) [-2.73, -1.73]	2.09 (-5.24, 13.28) [-1.26, 4.70]	807 (-622, 4,345) [22, 1,149]	1,416 (-968, 8,229) [47, 1,876]	0.49 (-0.20, 1.27) [0.24, 0.72]	0.48 (-0.22, 1.25) [0.23, 0.71]
Not Targeted	-1.19 (-2.53, 0.13) [-1.62, -0.75]	-1.61 (-2.28, -0.98) [-1.82, -1.39]	-5.04 (-8.36, -0.92) [-6.25, -4.00]	-721 (-2,001, -160) [-909, -388]	-1,136 (-3,577, -204) [-1,427, -557]	-0.54 (-0.99, -0.12) [-0.67, -0.39]	-0.55 (-1.03, -0.13) [-0.69, -0.41]
Class One							
Targeted	- - -	- - -	- - -	0.30 (-0.47, 1.12) [0.02, 0.56]	0.30 (-0.50, 1.15) [0.03, 0.55]	0.51 (-0.21, 1.33) [0.25, 0.75]	0.49 (-0.23, 1.28) [0.23, 0.73]
Not Targeted	- - -	- - -	- - -	-0.71 (-1.26, -0.24) [-0.87, -0.54]	-0.70 (-1.26, -0.22) [-0.85, -0.53]	-0.56 (-1.03, -0.12) [-0.70, -0.41]	-0.57 (-1.05, -0.14) [-0.70, -0.42]
Class Two							
Targeted	- - -	- - -	- - -	19,914 (-14,959, 109,756) [500, 27,758]	0.44 (-0.68, 1.94) [0.03, 0.77]	- - -	0.74 (-0.30, 2.28) [0.31, 1.07]
Not Targeted	- - -	- - -	- - -	-17,621 (-51,683, -3,665) [-22,259, -9,070]	-0.94 (-1.93, -0.28) [-1.17, -0.65]	- - -	-0.80 (-1.67, -0.17) [-1.02, -0.54]
Class Three							
Targeted	- - -	- - -	- - -	- - -	36,369 (-24,449, -211,646) [1,103, 47,290]	- - -	- - -
Not Targeted	- - -	- - -	- - -	- - -	-28,856 (-93,043, -4,677) [-36,210, -13,500]	- - -	- - -

Note: The weighted average refers to the latent class models where the sample average is for the comparison (non-latent) models. Values within the parentheses represents the 95% confidence interval based on 10,000 pseudo-random Krinsky-Robb draws. Values in brackets represent the interquartile range.