

Appendix 2. Alternative hypotheses, measures, and findings from survey response data (n = 86)

1. Price premium

Scholars have reported that fishers can obtain better prices for their catch as part of co-ops than working independently, particularly when they have dedicated personnel who are in charge of marketing and commercialization activities (McCay 1980, Petterson 1980).

Hypothesis: Fishers organize around co-ops in order to increase their leverage to negotiate and obtain higher market prices.

Measures and findings: Looking at the market price that fishers were paid per kilogram of the most important commercial species in the region (red snapper, *Lutjanus peru*), we found no significant difference between price received by co-op members and price received by non-members ($p > 0.1$, Table A2.1).

2. Access to fishing gear and other means of production

Authors have reported that in other fishing co-ops in the Gulf of California region, co-ops own the boats, gear, and other technologies needed for fishing and suggest this might be a strong incentive to join a co-op for fishermen (Castañeda et al. 2012, McCay et al. 2013).

Hypothesis: Fishers organize around fishing co-ops to gain access to fishing gear and other means of production that are owned in common by the co-op.

Measures and findings: The proportion of fishers owning their own fishing means of production (boats, motors, and gear) did not differ between co-operative and non-cooperative fishers ($p > 0.1$, Table A2.2).

3. Access to diverse fishing gears

Given that more than 46 species are harvested in the Corridor region, we also tested for the possibility that fishers chose cooperative vs. non-cooperative strategies based on the need to employ a diversity of fishing gears in order to be successful harvesting multiple species. Co-ops targeting multi-specific fisheries and where fishing gear is owned by the co-op such as reported by McCay et al (2013), can constitute better vehicles for fishers to gain access to a diversity of fishing gear that otherwise would be very expensive for an individual fisher to obtain.

Hypothesis: Fishers operating in a multi-specific fishery will have incentives to pool their gear instead of buying it individually.

Measures and findings: Participatory observations and informal interviews suggest that fishers treat their gear as private property and there is no tradition of sharing it, even among members of

the same co-op. These assertions were corroborated, as we found no significant differences between fisher groups regarding the number of gear types they use ($p > 0.1$, Table A2.1).

4. Access to information

Deacon et al. (2008) report that members of fishing co-ops in the Chignik Salmon fishery in Alaska shared information on stock locations significantly more than fishermen not organized in co-ops. Baticados (2008), on the other hand, did not find co-ops to be a source of information on regulations particularly because some aimed to serve only a basic economic function. In Mexico, only fishers formally organized in a co-op or owning a fishing permit are considered legal stakeholders and therefore are the most likely recipients of information about regulations and management from fisheries authorities (Cinti et al. 2010).

Hypothesis: Fishers organize around fishing co-ops to gain access to information related to governmental regulations and fishing.

Measures and findings: Survey respondents listed sources from which they receive information about regulations and fishing. Of nine sources of information surveyed, six sources of information (federal fisheries agency; NGOs; radio; fishers from the same community as the respondent; other fishers in general; and fish buyers) showed no significant difference in usage between co-op and non-co-op fishers ($p > 0.1$). Information from meetings was demonstrated to be a source used more by co-op members than non-co-op fishers ($p < 0.01$). Also, municipal and state authorities were information sources used more by co-op members than non co-op fishers. Finally, fishers from outside of respondent's community were an information source used more by non-member fishers than by co-op members ($p < 0.05$, Table A2.3).

The relationship between co-op membership and access to information was also tested using the number of species targeted, under the assumption that targeting a greater number of species is associated with increased information needs, for example in order to know where the fish are and to comply with existent regulations. We found no difference between co-op members and non-member fishers in terms of the number of species fished, ($p > 0.1$) with both groups averaging close to eight targeted species (Table A2.1).

Table A2.1 Comparing cooperative and non-cooperative fishers: Student's t-tests

Hypothesis	Fishers in co-ops	Fishers not in co-ops	p-value	conclusion
H _a : Average price/kilo Huachinango differs H ₀ : No price difference	Average price: 34.6 (Mexican Pesos)	Average price: 32.5 (Mexican Pesos)	p = 0.248	Do not reject H ₀
H _a : Average number of species fished differs H ₀ : No difference in number of species fished	Average number of species: 7.80	Average number of species: 7.74	p = 0.922	Do not reject H ₀
H _a : Average number gear types used differs H ₀ : No difference in number of gear types used	Average number of gear types: 1.36	Average number of gear types: 1.57	p = 0.194	Do not reject H ₀

Table A2.2 Comparing cooperative and non-cooperative fishers' gear ownership:
Chi-square tests

Hypothesis	Fishers in co-ops	Fishers not in co-ops	p-value	conclusion
H _a : Fishers in co-ops will own motor more often H ₀ : No difference in motor ownership between groups	Proportion owning motor: 18/35	Proportion owning motor: 22/48	0.749	Do not reject H ₀
H _a : Fishers in co-ops will own a boat more often H ₀ : No difference in boat ownership between groups	Proportion owning boat: 17/35	Proportion owning boat: 23/48	1.000	Do not reject H ₀
H _a : Fishers in co-ops will own gear more often H ₀ : No difference in boat ownership between groups	Proportion owning gear: 28/35	Proportion owning gear: 23/48	0.322	Do not reject H ₀

Note: n = 83 due to 3 missing responses.

Table A2.3 Comparing cooperative and non-cooperative fishers' information sources:
Chi-square tests

General Information Hypothesis:	Fishers in co-ops	Fishers not in co-ops	p-value	conclusion
H _a : Fishers in co-ops will receive information from the sources listed below more often than other fishers H ₀ : No difference between co-op members and other fishers in use of information sources	Proportion that use information source	Proportion that use information source	---	---
Federal fisheries authorities	5/37	9/48	0.518	Do not reject H ₀
NGO	9/37	9/48	0.255	Do not reject H ₀
Municipal and state authorities	15/37	9/48	0.027	Reject H ₀
Fish buyers	12/37	9/48	0.147	Do not reject H ₀
Other fishers	15/37	14/48	0.273	Do not reject H ₀
Fishers from the same community	19/37	27/48	0.653	Do not reject H ₀
Fishers from a different community	6/37	20/48	0.012	Reject H ₀ *
Meetings	15/37	4/48	0.0004	Reject H ₀
AM/FM Radio	23/37	27/48	0.583	Do not reject H ₀

*Although H₀ is rejected because the test was significant at the $p < 0.05$ level, co-op members used this information source less than non-member fishers, thus the test cannot be interpreted as supporting H_a. Note: n = 83 due to 3 missing responses.