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Econ 241B

# Proposals for Econ 241B research presentation

For each of these three possible projects, I have data in hand or will be able to access it. I am proficient in R in terms of data wrangling and preparation, though I have not used it for much analysis beyond simple linear regressions. These are in order of priority/interest, though the third option is probably far more straightforward.

## Ocean Health Index – British Columbia (OHIBC):

Background:

* The Ocean Health Index (OHI) is a holistic framework for understanding “ocean health” roughly defined as the ocean’s ability to provide a range of benefits to people now and in the future. The ten goals of the general OHI framework indicate the sustainable provision of these benefits, including food provision, coastal economies and livelihoods, tourism and recreation, biodiversity, and sense of place. The Index scores for each goal include current status, based on goal models incorporating publicly available data, and “likely future status,” a rough estimate of status five years in the future based upon recent trends, pressures, and resilience measures. Each goal is measured separately for each spatially distinct region within the scope of the assessment. For the global assessment, the regions are defined by the EEZs of 221 coastal nations or territories.
* While the global OHI assessments focus on the current year only, OHIBC builds upon the global assessment framework by back-casting ocean health status for British Columbia’s coastal waters across a time series spanning approximately 2001-2016. There are eight regions within the OHIBC assessment.

Analysis:

* Ideally, OHIBC scores would be sensitive enough to detect changes in the status of ocean health over this time period that can be attributed to changes in anthropogenic pressures and/or changes in marine conservation and management. However, changes in ocean health will likely have a significant time lag relative to changes in pressures and resilience measures.
* For this project I would focus on a single goal within the OHIBC framework, and compare the time series of status for that goal, across the eight OHIBC regions, to time series of pressures and resilience metrics. While the Livelihoods and Economies goal seems appropriate for an econometrics assessment, our data is probably too coarse to detect interesting signals. The Wild Capture Fisheries goal may be a more interesting goal to test, as we can use annual stock status scores for many species individually or in aggregate.
* In this case we would be looking for an effect of changes in pressures and resilience measures upon the goal status, including the potential for an unknown time lag (e.g. sea surface temps now affect stock status in one or two years). Time series issues might make this challenging and interesting.

## Global ecosystem health trends vs. marine protected areas OR cumulative human impacts

Background:

* For OHI, we calculate biodiversity status based upon the spatial distribution of thousands of marine species, each location (in this case, 0.5-degree cells) getting a score based upon the mean IUCN extinction risk for all species in that location. The resulting mean extinction risk gives a rough idea of “ecosystem health” – ecosystems with a greater proportion of at-risk species can be discerned from those with fewer at-risk species.
* Additionally, we can calculate trends in extinction risk based upon a small number of species (~1000?) with multiple IUCN assessments, regressing their change in risk over time against their text descriptors of population trends (“stable”, “increasing”, “decreasing”). This gives us a (very *very*) rough idea of how those population trends can predict changes in the extinction risk for each species. These trends can be aggregated spatially (all species within a cell) to create a map of trends in ecosystem health.

Analysis:

* With a spatial understanding of ecosystem health and health trends, we could compare these patterns to distributions of Marine Protected Areas (MPAs), considering a research question along the lines of: “is the recent uptick in MPA implementation focusing on areas with poorer ecosystem health?”
* Alternately, a not-yet-published study is examining the rate of change of cumulative human impacts (CHI) on the ocean. The original 2008 study of CHI examined the number and magnitude of human impacts, distributed spatially, including harmful fishing practices (habitat destruction, high bycatch, etc), shipping, nutrient and chemical pollution, and anthropogenic climate stressors. This new study examines how these impacts are changing over time. With these datasets, we could compare patterns and trends of ecosystem health to patterns and trends of cumulative human impacts. A general research question could be something like: “do areas of high cumulative impacts correspond to areas of poor ecosystem health?” or “are cumulative impacts increasing more in areas of poor ecosystem health?” This question could be refined by focusing more narrowly on specific impacts (e.g. fishing practices or climate change stressors).
* While we have some time-related data, we don’t really have a significant time series, so this seems more of a spatial analysis at a single point in time. I have often worked with spatial data so I’d be very interested in seeing how to set up and interpret regressions with such data.

## Analysis of data from inequity game

Background:

* + In order to try to distinguish the effects of process equity from outcome equity, and then to see if the inequitable process treatment had an impact on a subsequent game, Mark Buntaine and Sarah Anderson developed a simple two-part game for use as a survey on Amazon’s M Turk. The first part involves a dual-lottery, in which the player is assigned to either a high lottery (equal chance at $2 or $4) or a low lottery (equal chance at $0 or $2); the opponent (actually just the computer) is assigned to the other. Some players are assigned to the high lottery based on a coin flip (50/50 chance, control) while others are assigned based on die roll (1/6 chance, treatment).
  + In the pilot, the player plays through the lottery, sees her own outcome and the opponent’s outcome and is asked whether she would like to suggest a redistribution of the total winnings (not an ultimatum, and no information on whether the redistribution is accepted or rejected). After this, the player plays a simple prisoner’s dilemma game with the same (computer) opponent, choosing to cooperate or compete, to get a sense of attitude toward social cooperation.

Analysis:

* + The game design itself quite likely requires some rethinking, but we ran a pilot of 500 participants to get an idea of whether the treatment itself worked (did the die-assigned players feel they were treated unfairly compared to the coin-assigned players) and to see if any effects on social cooperation can be detected.
  + In the introduction to the game, we collected information on each player’s gender, ethnicity, political leanings, age, income, etc.
  + For this project, the goal could be to explore one of the outcome variables (proportional redistribution from lottery game and/or cooperation from the prisoner’s dilemma game) relative to the identity-based covariates and stated perception of fairness/unfairness due to the lottery assignment method.