2.5.2 No Perfect Model?

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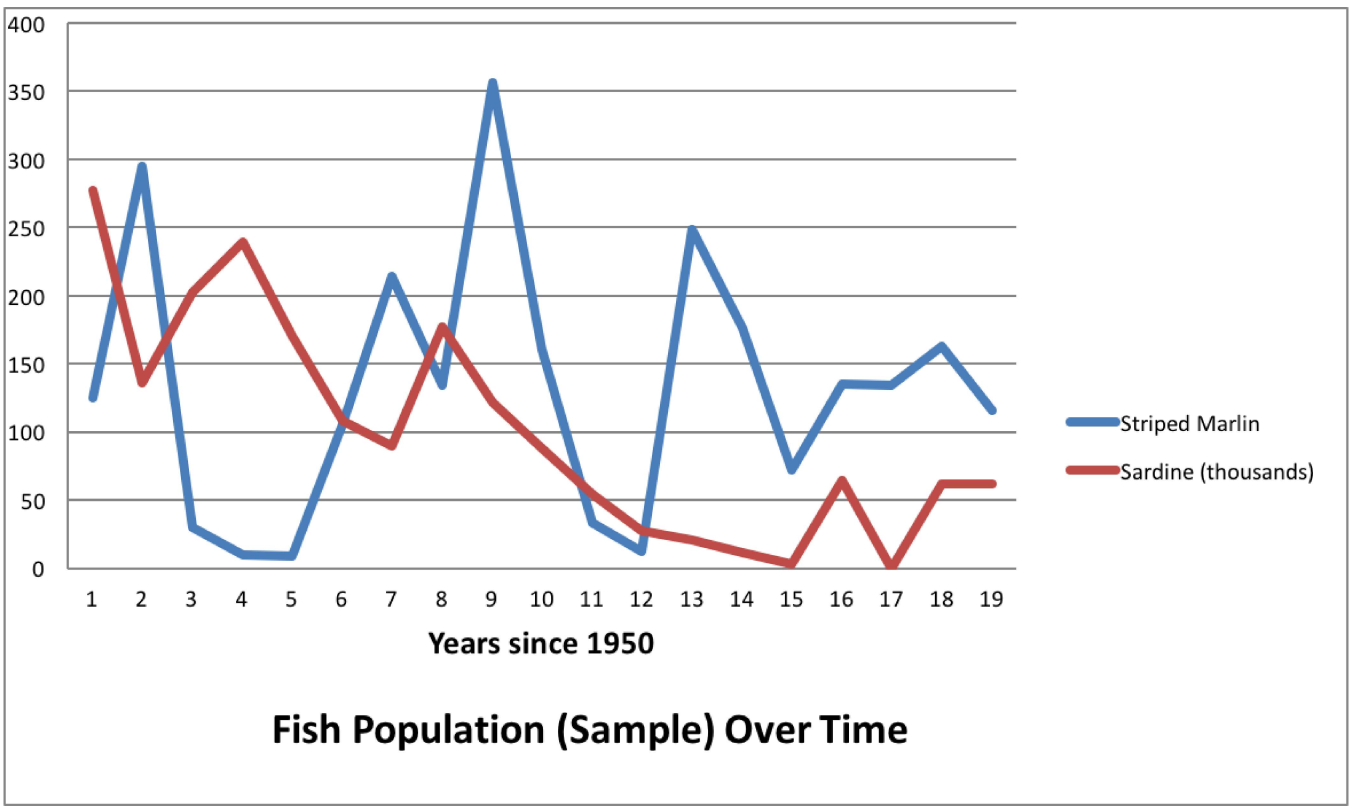
No model is perfect. While our model helped explain D'Ancona's puzzle (why doesn't fishing affect both populations equally?), it's not a perfect fit to data.

For example, if we looked at actual marlin and sardine data, it might look something like this:



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It would show fluctuations but would not exactly match the neat periodic solutions for the Lotka-Volterra model.

> **Note:** This graph is for illustrative purposes only. It is not meant to be taken as actual representation of sardine-marlin relationship, as the data is from marlin and sardine in different geographic locations.
>
> Source for Data: , Striped Marlin, Table I, Fishery for Pacific Billfish off Southern California and Mexico, 1903-69; Sardine, Canadian technical report of fisheries and aquatic sciences: Government of Canada Publications.)

Why not? One reason may be that there are other factors at play. For example, water temperature can affect the size of the habitat or breeding grounds of a fish causing fluctuations in population. (See for example Goodyear. "Modeling the time-varying density distribution of highly migratory species: Atlantic blue marlin as an example".Fisheries Research 2016.)

We saw this also in the Economics section, where what happened in Boston and New York wasn't completely explained by our elasticity computations for the linear models of price and demand.

We saw this in the Statistics section, where the continuous model of the US household income distribution was a good fit for most of the data, but bad at predicting billionaires.

The world is more complicated than any one mathematical model. However, models are still valuable tools to make sense of phenomena, to explain (at least in part) unexpected events, and to consider the effects of different interventions.

English ▼