Table 1. Hypotheses for covariates affecting landings. S_t is quarter 3 (July-September) catch in the current season, S_{t-1} is quarter 3 catch in the previous season. N_t is the post-monsoon October-March catch in the current season and N_{t-1} is the October-March catch in the prior season. Because the fishing season is July-June, N_t spans two calendar years.

Stage	Hypothesis	Resp.	Covariates
Age 2+	DD1. S_t is dominated by mature age 2+ fish, thus abundance of the 1-yr and 2-yr ages in the prior season (Oct-Jun catch) should be correlated with the abundance of mature fish this year.	S_t	N_{t-1}
Age 1-2	DD2. Abundance of 1-yr and 2-yr fish should be correlated with strength of the cohorts from the previous two seasons. The quarter 3 catch, dominated by mature fish, in the prior two years is expected to be correlated with post-monsoon catch.	N_t	S_{t-1} and S_{t-2}
Age 2+	DD3. Because age 2 fish also appear in the post-monsoon catch, we also expect the post-monsoon catch in the previous season to be correlated with the post-monsoon catch in the current season.	N_t	N_{t-1}
Spawn	S1. The onset of monsoon precipitation triggers movement of adults from offshore to spawning areas due to changes in salinity, turbulence or noise. Spent adults migrate inshore and are exposed to the fishery.	S_t	Seasonal precipitation anomaly during Jun-Jul in year t
Spawn	S2. The level of precipitation in pre-monsoon predicts spawning strength.	S_t	Seasonal precipitation anomaly during Apr-May in year t
Spawn	S3. Low SST is associated with delayed and limited spawning as a behavioral response by adults to avoid exposing larvae to low temperatures associated with poor survival.	S_t	Average SST during Jun-Sep in year t
Spawn	S4. Extremely high upwelling brings poorly oxygenated water to the surface causing sardines to move offshore.	S_t	Average upwelling index Jun-Sep, Max upwelling index Jun-Sep in year t
Spawn	S5. Salinity changes due to precipitation or river run-off trigger spawning. After spawning, spent adult move to inshore waters and are exposed to fishery.	S_t	Average Salinity during Jun-Sep in year t

Table 1. Continued.

Stage	Hypothesis	Resp.	Covariates
Larv.	L1. Larval mortality is higher in colder water due to low motility causing increased predation and slower somatic growth. Low SST is also associated with strong upwelling which advects larvae into offshore waters.	N_t	Average SST during Jun-Sep, Cum DD Jun-Sep in year t-1
Larv.	L2. Extremely strong upwelling brings poorly oxygenated water to the surface causing larval mortality and advects larvae offshore.	N_t	Ave. upwelling index Jun-Sep, max upwelling index Jun-Sep in year t-1
Juv.	J1. Upwelling is associated with higher productivity and higher density of zooplankton, which leads to better larval and juvenile growth and survival. Thus the strength of upwelling during the monsoon should be associated with higher biomass in subsequent years.	N_t	Ave. upwelling index Jun-Sep, max upwelling index Jun-Sep in year t-1 and t-2
Juv.	J2. Chlorophyll blooms are signatures of high productivity from nutrient influx either due to upwelling or coastal inputs. Bloom intensity in prior years should be associated with future sardine biomass.	N_t	Ave. Chl-a density Jun-Dec, Chl-a density Jun-Dec in year t-1 and t-2
All ages	A1. During the Mar-Apr, the sea temperatures are high and sardines migrate offshore to avoid high temp.	Catch Q2 year t	Ave. SST Q2 year t, max SST Q2 year t