Table 1: Quarter 3 Catch Model

Table 1. Model selection tests of time-dependency and linearity for the S_t model using F-tests of nested models fit to log landings data. S_t is the catch during Qtr 3 (Jul-Sep) of season t. N_{t-1} is the catch in the prior sardine season during the post-monsoon period (Oct-Jun, of the previous sardine season). N_{t-2} is the same for two seasons prior. $s()$ is a non-linear function of the response variable.

Model	Residual df	Adj. R2	MASE	F	p value	AIC
Time dependency test 1982-2015 data						
$ln(S_t) = ln(S_{t-1}) + \epsilon$	34	1	0			129.25
$ln(S_t) = \alpha + ln(N_{t-1}) + \epsilon$	33	0.877	10			117.43
$ln(S_t) = \alpha + \beta ln(N_{t-1}) + \epsilon$	32	0.822	20	4.88	0.035	114.47
$ln(S_t) = \alpha + \beta_1 ln(N_{t-1}) + \beta_2 ln(N_{t-2}) + \epsilon$	31	0.828	20	0.12	0.73	116.34
$ln(S_t) = \alpha + \beta_1 ln(N_{t-1}) + \beta_2 ln(S_{t-2}) + \epsilon$	31	0.805	20	0.31	0.58	116.13
Linearity test 1982-2015 data						
$ln(S_t) = ln(S_{t-1}) + \epsilon$	34	1	0			129.25
$ln(S_t) = \beta ln(N_{t-1}) + \epsilon$	32	0.822	20			114.47
$ln(S_t) = \alpha + s(ln(N_{t-1})) + \epsilon$	30.6	0.788	30			113.76
$ln(S_t) = \alpha + s(ln(N_{t-1})) + s(ln(N_{t-2})) + \epsilon$	28.2	0.786	30	0.54	0.618	116.14
$ln(S_t) = \alpha + s(ln(N_{t-1})) + s(ln(S_{t-2})) + \epsilon$	27.7	0.75	30	0.97	0.419	115.33