Cox model with more covariates

2020-03-18

event time: $\lambda_T(t|x) = \lambda_0(t)\exp(\beta' x) = \exp(\beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4)$

censor time: $\lambda_C(t|x) = \lambda_0(t)\exp(\gamma' x) = \exp(\gamma_1 x_1 + \gamma_2 x_2 + \gamma_3 x_3 + \gamma_4 x_4)$

where x_1, x_2, x_3, x_4 iid $\sim N(0,1)$, $\beta_1 = 0.3, \beta_2 = 0.2, \beta_3 = 0.1, \beta_4 = 0.1$, $\gamma_1 = 0.1, \gamma_2 = 0.1, \gamma_3 = 0.3, \gamma_4 = 0.4$

Table 1: estimated time dependent AUC

	Cox (x1 only)		Cox (x2 only)		Cox (x3 only)		Cox (x4 only)		Cox full		m(t,x)		hat m(t,x)	
	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
10	0.596	0.073	0.596	0.072	0.589	0.074	0.590	0.056	0.626	0.078	0.576	0.059	0.576	0.056
25	0.584	0.056	0.576	0.050	0.577	0.049	0.578	0.049	0.617	0.060	0.559	0.047	0.560	0.050
50	0.584	0.051	0.572	0.044	0.586	0.055	0.584	0.048	0.634	0.059	0.557	0.041	0.557	0.039
75	0.602	0.055	0.581	0.046	0.610	0.059	0.608	0.055	0.669	0.061	0.572	0.045	0.569	0.045
90	0.633	0.080	0.604	0.073	0.646	0.078	0.651	0.082	0.710	0.093	0.610	0.068	0.608	0.067

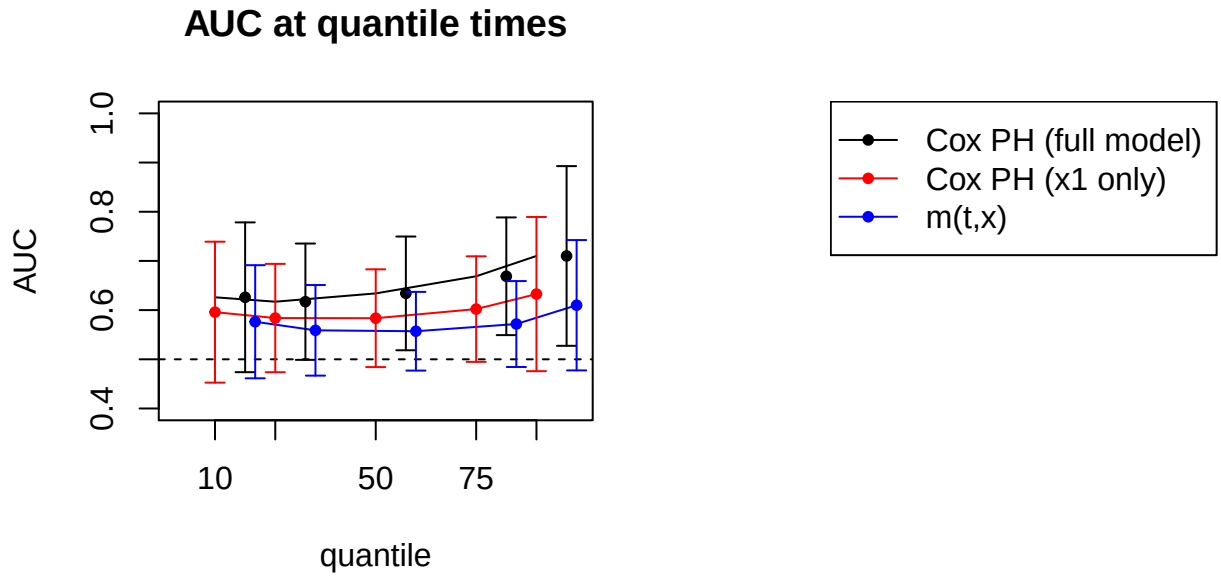
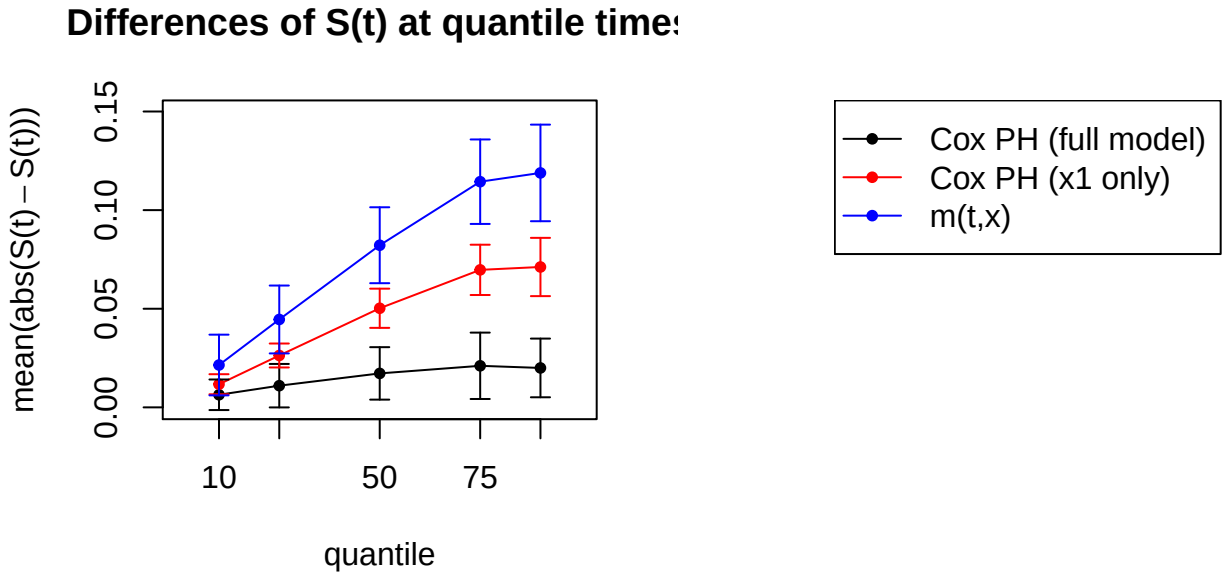


Table 2: mean absolute difference between S(t) and hat S(t)

	Cox (x1 only)		Cox (x2 only)		Cox (x3 only)		Cox (x4 only)		Cox full		m(t,x)		hat m(t,x)	
	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
10	0.012	0.003	0.015	0.002	0.015	0.002	0.016	0.002	0.006	0.004	0.021	0.008	0.022	0.008
25	0.026	0.003	0.034	0.003	0.034	0.003	0.038	0.004	0.011	0.006	0.045	0.009	0.045	0.009
50	0.050	0.005	0.066	0.005	0.066	0.006	0.074	0.006	0.017	0.007	0.082	0.010	0.083	0.011
75	0.070	0.007	0.092	0.007	0.092	0.007	0.103	0.007	0.021	0.009	0.114	0.011	0.116	0.013
90	0.071	0.008	0.093	0.007	0.093	0.007	0.105	0.007	0.020	0.008	0.119	0.012	0.120	0.015



scenario 2

$$\text{event time: } \lambda_T(t|x) = \lambda_0(t)\exp(\beta' x) = \exp(\beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4)$$

$$\text{censor time: } \lambda_C(t|x) = \lambda_0(t)\exp(\gamma' x) = \exp(\gamma_1 x_1 + \gamma_2 x_2 + \gamma_3 x_3 + \gamma_4 x_4)$$

where x_1, x_2, x_3, x_4 iid $\sim N(0,1)$, $\beta_1 = 0.3, \beta_2 = 0.2, \beta_3 = 0.1, \beta_4 = 0.1$, $\gamma_1 = 0.1, \gamma_2 = 0.1, \gamma_3 = 0.3, \gamma_4 = 0.4$

$x_1 \sim uni(-2,2), x_2 \sim exp(2), x_3 \sim n(0,1), x_4 \sim uni(0,2)$, $\beta_1 = 0.3, \beta_2 = 0.1, \beta_3 = 0.1, \beta_4 = 0.1$, $\gamma_1 = -0.3, \gamma_2 = -0.3, \gamma_3 = 0.3, \gamma_4 = 0.3$

Table 3: estimated time dependent AUC

	Cox (x1 only)		Cox (x2 only)		Cox (x3 only)		Cox (x4 only)		Cox full		m(t,x)		hat m(t,x)	
	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
10	0.578	0.059	0.580	0.064	0.591	0.074	0.593	0.070	0.581	0.063	0.592	0.065	0.594	0.065
25	0.554	0.043	0.546	0.039	0.591	0.057	0.551	0.040	0.553	0.042	0.561	0.043	0.563	0.044
50	0.550	0.037	0.534	0.027	0.590	0.055	0.549	0.035	0.548	0.036	0.558	0.042	0.558	0.042
75	0.562	0.050	0.555	0.042	0.618	0.069	0.560	0.041	0.558	0.048	0.581	0.049	0.581	0.048
90	0.582	0.063	0.591	0.058	0.648	0.081	0.576	0.063	0.572	0.064	0.601	0.074	0.600	0.073

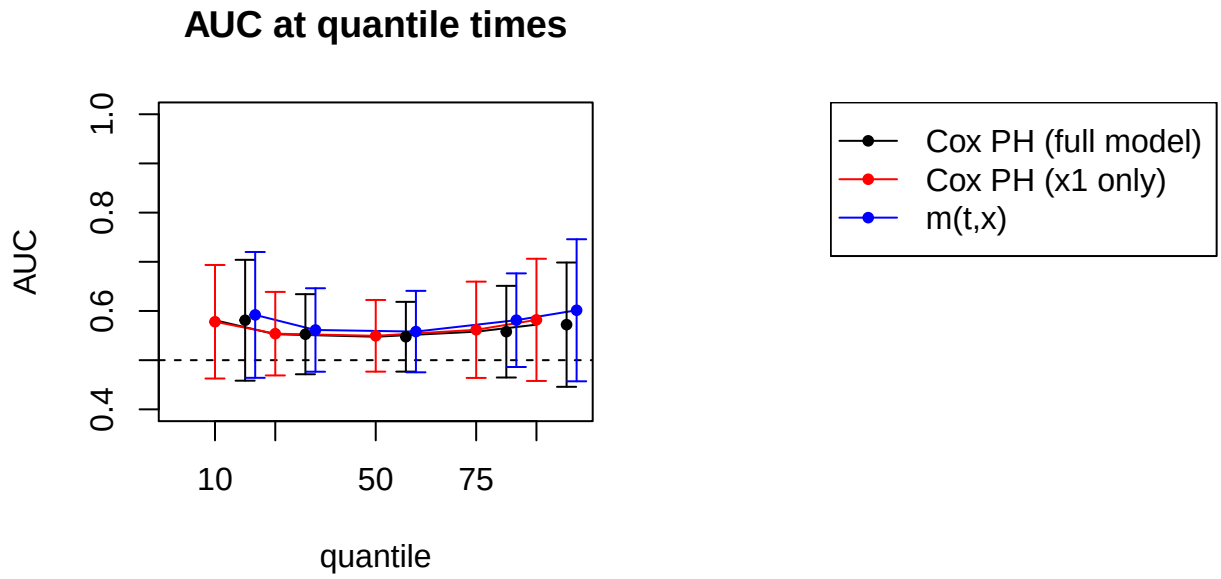


Table 4: mean absolute difference between S(t) and hat S(t)

	Cox (x1 only)		Cox (x2 only)		Cox (x3 only)		Cox (x4 only)		Cox full		m(t,x)		hat m(t,x)	
	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
10	0.007	0.003	0.014	0.002	0.014	0.002	0.014	0.002	0.006	0.004	0.013	0.007	0.013	0.007
25	0.014	0.004	0.035	0.003	0.035	0.003	0.035	0.003	0.009	0.006	0.027	0.011	0.028	0.011
50	0.027	0.006	0.070	0.005	0.070	0.005	0.070	0.005	0.015	0.008	0.047	0.011	0.049	0.013
75	0.038	0.007	0.103	0.007	0.103	0.006	0.102	0.007	0.020	0.007	0.067	0.012	0.070	0.016
90	0.041	0.008	0.114	0.007	0.114	0.007	0.113	0.007	0.019	0.007	0.075	0.015	0.079	0.020