Identifiability of the sign of covariate effects in the competing risks model

ELECTRONIC SUPPLEMENTARY MATERIAL

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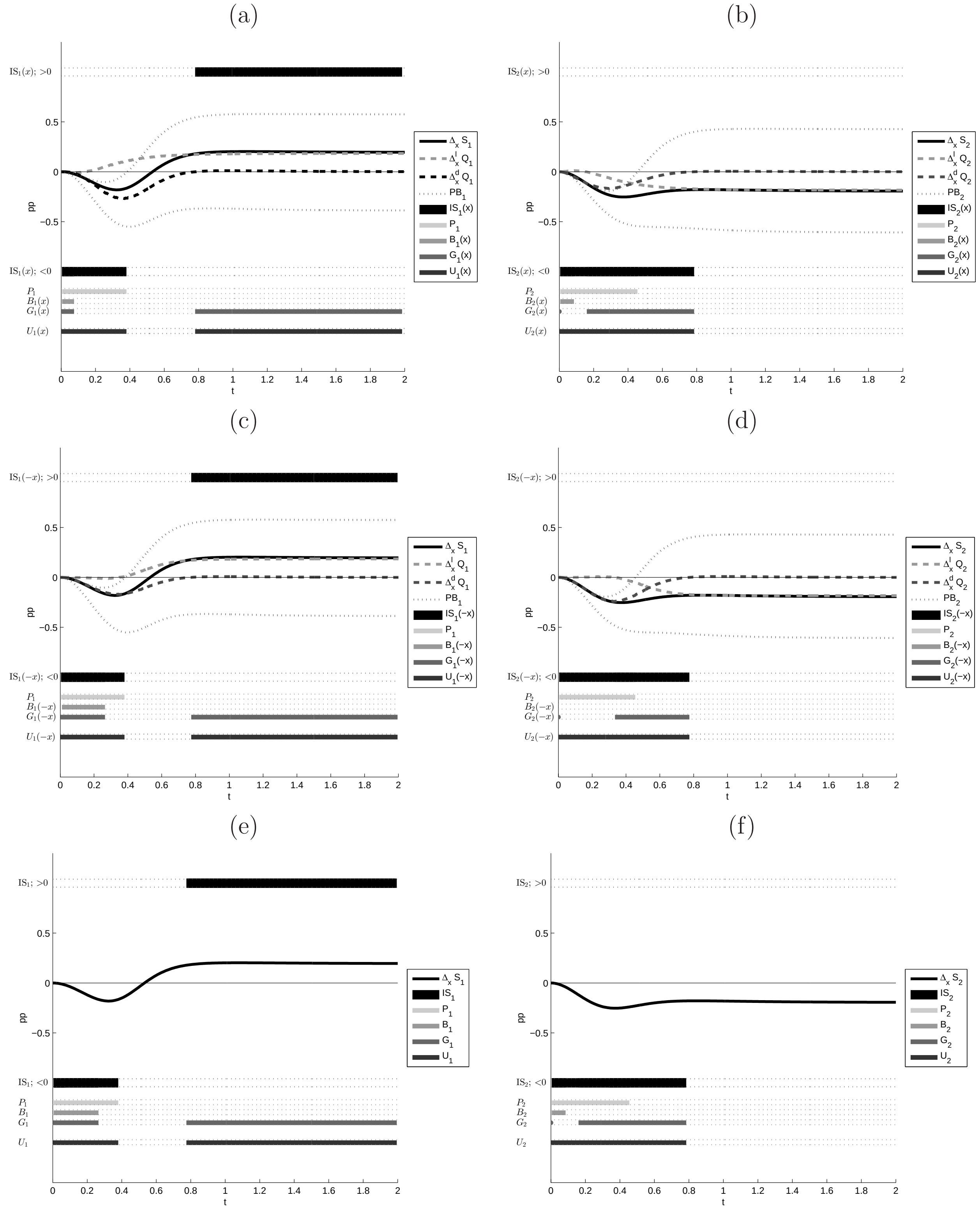
S.I: FIGURES.

Figure S1: Identified sign (IS) of the covariate effect in a known two risks model using Clayton copula and log-logistic proportional odds model with $\tau = -.8$: Risk 1 (left) and Risk 2 (right).



S.II: Tables.

Table S1: Relative size of identification sets in simulated competing risks models ($\tau = 0.8$).

	Frank Copula		Clayton Copula	
	Share of $\mathbb{T}$*	Unique of $\mathbb{T}$**	Share of $\mathbb{T}$*	Unique of $\mathbb{T}$**
Odd-rate transformation model				
$\mathbb{T}$	[0,5.45]		[0,3.02]	
Risk $j = 1$				
$\mathbb{P}_1$	0%	0%	0%	0%
$\mathbb{B}_1$	8.3%	0%	14.9%	0%
$\mathbb{G}_1$	89.6%	81.3%	81.2%	66.3%
$\mathbb{U}_1$	89.6%		81.2%	
Risk $j = 2$				
$\mathbb{P}_2$	10.8%	0.7%	19.5%	1.3%
$\mathbb{B}_2$	8.2%	0%	14.7%	0%
$\mathbb{G}_2$	10.4%	4.9%	18.7%	8.8%
$\mathbb{U}_2$	15.7%		28.3%	
Log-logistic proportional odds model				
$\mathbb{T}$	[0,13.42]		[0,2.625]	
Risk $j = 1$				
$\mathbb{P}_1$	2.8%	0.9%	14.5%	4.4%
$\mathbb{B}_1$	2%	0%	10.1%	0%
$\mathbb{G}_1$	96.2%	94.2%	80.1%	70.5%
$\mathbb{U}_1$	97.1%		85%	
Risk $j = 2$				
$\mathbb{P}_2$	4.4%	0.5%	17.3%	2.7%
$\mathbb{B}_2$	0.6%	0%	3.2%	0%
$\mathbb{G}_2$	4.7%	2.5%	24.1%	12.7%
$\mathbb{U}_2$	5.9%		30%	
Log-normal accelerated failure model				
$\mathbb{T}$	[0,28.665]		[0,17.46]	
Risk $j = 1$				
$\mathbb{P}_1$	1.6%	0%	2.7%	0%
$\mathbb{B}_1$	94.9%	0.1%	91.6%	0.2%
$\mathbb{G}_1$	93.6%	0.2%	89.5%	0.3%
$\mathbb{U}_1$	95.1%		91.9%	
Risk $j = 2$				
$\mathbb{P}_2$	0%	0%	0%	0%
$\mathbb{B}_2$	6.9%	0%	11.3%	0%
$\mathbb{G}_2$	7.1%	0.2%	11.6%	0.3%
$\mathbb{U}_2$	7.1%		11.6%	

*: size of respective identification set divided by the size of $\mathbb{T}$.
**: size of the subset of the respective identification set that is not contained in the identification sets of the other methods divided by the size of $\mathbb{T}$. Measure of *additional* contribution.

Table S2: Relative size of identification sets in simulated competing risks models ($\tau = -0.4$).

	Frank Copula		Clayton Copula	
	Share of $\mathbb{T}^*$	Unique of $\mathbb{T}^{**}$	Share of $\mathbb{T}^*$	Unique of $\mathbb{T}^{**}$
Odd-rate transformation model				
$\mathbb{T}$	[0,3.16]		[0,4.145]	
Risk $j = 1$				
$\mathbb{P}_1$	0%	0%	0%	0%
$\mathbb{B}_1$	14.2%	0%	10.8%	0%
$\mathbb{G}_1$	82%	67.8%	86.3%	75.4%
$\mathbb{U}_1$	82%		86.3%	
Risk $j = 2$				
$\mathbb{P}_2$	18.6%	1.3%	14.2%	1%
$\mathbb{B}_2$	14.1%	0%	10.7%	0%
$\mathbb{G}_2$	17.9%	8.4%	13.6%	6.4%
$\mathbb{U}_2$	27%		20.6%	
Log-logistic proportional odds model				
$\mathbb{T}$	[0,4.425]		[0,5.19]	
Risk $j = 1$				
$\mathbb{P}_1$	8.6%	2.6%	7.3%	2.2%
$\mathbb{B}_1$	6%	0%	5.1%	0%
$\mathbb{G}_1$	88.5%	82.5%	90.2%	85.1%
$\mathbb{U}_1$	91.1%		92.4%	
Risk $j = 2$				
$\mathbb{P}_2$	10.3%	1.6%	8.8%	1.4%
$\mathbb{B}_2$	1.9%	0%	1.6%	0%
$\mathbb{G}_2$	14.3%	7.6%	12.2%	6.5%
$\mathbb{U}_2$	17.8%		15.2%	
Log-normal accelerated failure model				
$\mathbb{T}$	[0,23.195]		[0,30.975]	
Risk $j = 1$				
$\mathbb{P}_1$	2%	0%	1.5%	0%
$\mathbb{B}_1$	93.6%	0.2%	95.3%	0.1%
$\mathbb{G}_1$	92.1%	0.3%	94.1%	0.2%
$\mathbb{U}_1$	93.9%		95.4%	
Risk $j = 2$				
$\mathbb{P}_2$	0%	0%	0%	0%
$\mathbb{B}_2$	8.5%	0%	6.4%	0%
$\mathbb{G}_2$	8.8%	0.3%	6.6%	0.2%
$\mathbb{U}_2$	8.8%		6.6%	

*: size of respective identification set divided by the size of $\mathbb{T}$.

**: size of the subset of the respective identification set that is not contained in the identification sets of the other methods divided by the size of $\mathbb{T}$. Measure of *additional* contribution.

Table S3: Relative size of identification sets in simulated competing risks models ($\tau = -0.8$).

	Frank Copula		Clayton Copula	
	Share of $\mathbb{T}^*$	Unique of $\mathbb{T}^{**}$	Share of $\mathbb{T}^*$	Unique of $\mathbb{T}^{**}$
Odd-rate transformation model				
$\mathbb{T}$	[0,3.125]		[0,2.575]	
Risk $j = 1$				
$\mathbb{P}_1$	0%	0%	0%	0%
$\mathbb{B}_1$	14.4%	0%	17.4%	0%
$\mathbb{G}_1$	81.8%	67.4%	77.9%	60.5%
$\mathbb{U}_1$	81.8%		77.9%	
Risk $j = 2$				
$\mathbb{P}_2$	18.9%	1.3%	22.9%	1.6%
$\mathbb{B}_2$	14.2%	0%	17.3%	0%
$\mathbb{G}_2$	18.1%	8.5%	21.9%	10.3%
$\mathbb{U}_2$	27.3%		33.1%	
Log-logistic proportional odds model				
$\mathbb{T}$	[0,4.095]		[0,2.7]	
Risk $j = 1$				
$\mathbb{P}_1$	9.3%	2.8%	14.1%	4.3%
$\mathbb{B}_1$	6.5%	0%	9.8%	0%
$\mathbb{G}_1$	87.6%	81.1%	81.2%	71.4%
$\mathbb{U}_1$	90.4%		85.4%	
Risk $j = 2$				
$\mathbb{P}_2$	11.1%	1.7%	16.8%	2.6%
$\mathbb{B}_2$	2.1%	0%	3.1%	0%
$\mathbb{G}_2$	15.5%	8.2%	23.5%	12.4%
$\mathbb{U}_2$	19.3%		29.2%	
Log-normal accelerated failure model				
$\mathbb{T}$	[0,22.26]		[0,15.28]	
Risk $j = 1$				
$\mathbb{P}_1$	2.1%	0%	3.1%	0%
$\mathbb{B}_1$	93.4%	0.2%	90.4%	0.3%
$\mathbb{G}_1$	91.8%	0.3%	88%	0.4%
$\mathbb{U}_1$	93.6%		90.7%	
Risk $j = 2$				
$\mathbb{P}_2$	0%	0%	0%	0%
$\mathbb{B}_2$	8.9%	0%	12.9%	0%
$\mathbb{G}_2$	9.1%	0.3%	13.3%	0.4%
$\mathbb{U}_2$	9.1%		13.3%	

*: size of respective identification set divided by the size of $\mathbb{T}$.

**: size of the subset of the respective identification set that is not contained in the identification sets of the other methods divided by the size of $\mathbb{T}$. Measure of *additional* contribution.