Longitudinal quantile regression with informative drop-outs
Simulation study 1

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1 Model

$$\begin{cases} y_{it} = \boldsymbol{\beta}^\top \boldsymbol{X}_{it} + \boldsymbol{\delta}^\top \boldsymbol{H}_{it} + \boldsymbol{u}_i^\top \boldsymbol{Z}_{it} + \varepsilon_{it} = \widetilde{\tau}_{it} + \varepsilon_{it} \\ h(T_i|\mathcal{T}_{iT_i}, \boldsymbol{W}_i; \boldsymbol{\gamma}, \alpha_1, \alpha_2) = h_0(T_i)\exp(\boldsymbol{\gamma}^\top \boldsymbol{W}_i + \alpha_1 \boldsymbol{\delta}^\top \boldsymbol{H}_{iT_i} + \alpha_2 \boldsymbol{u}_i^\top \boldsymbol{Z}_{iT_i}) \end{cases} \tag{1}$$

2 Simulation setting

Following the simulation setting from [1], we set

$n = 250$

$(\alpha_1, \alpha_2) = \{(1,0),(0,1),(0,0)\}, \qquad \tau = \{0.25, 0.5, 0.75\}$

$\boldsymbol{\beta}, \boldsymbol{\delta}, \boldsymbol{\gamma} = (1,1)^\top, \qquad \sigma = 1$

$\boldsymbol{u}_i \sim N\left(\begin{pmatrix}0\\0\end{pmatrix}, \begin{pmatrix}0.3^2 & 0.16*0.3^2 \\ 0.16*0.3^2 & 0.3^2\end{pmatrix}\right)$

$\boldsymbol{Z}_{it} = (1,t)^\top, \quad \boldsymbol{H}_{it} = (h_{i1}, h_{i2}*t)^\top, \quad \boldsymbol{X}_{it} = (1, x_i)^\top$, with $h_{i1}, h_{i2}, x_i, W_{i1}$ and W_{i2} generated from independent standard normals.

Fix $h_0(s) = 1$ and obtain the survival distribution as

$$S(t|\boldsymbol{u}_i, \boldsymbol{H}_{it}, \boldsymbol{W}_i) = \exp\left\{-\frac{e^{\alpha_1(\delta_1 H_{i1} + \delta_2 H_{i2t}) + \alpha_2(u_{i1}+u_{i2}t) + \boldsymbol{\gamma}^\top \boldsymbol{W}_i} - e^{\alpha_1\delta_1 H_{i1} + \alpha_2 u_{i1} + \boldsymbol{\gamma}^\top \boldsymbol{W}_i}}{\alpha_2 u_{i2} + \alpha_1 \delta_2 h_i}\right\}$$

when $\alpha_1 \neq 0$ or $\alpha_2 \neq 0$ and

$$S(t|\boldsymbol{u}_i, \boldsymbol{H}_{it}, \boldsymbol{W}_i) = \exp\{-te^{\boldsymbol{\gamma}^\top \boldsymbol{W}_i}\}$$

when $\alpha_1 = \alpha_2 = 0$. We can obtain event time T_i by inverting above survival function after generating n random variates from standard uniform distribution.

Let the censoring time $C_i/5$ be distributed according to $beta(4,1)$ to obtain a censoring proportion around 25%.

Longitudinal outcomes before drop out are independently generated from and ALD for the $\tau-$th quantile, centered on

$$\boldsymbol{\beta}^\top \boldsymbol{X}_{it} + \boldsymbol{\delta}^\top \boldsymbol{H}_{it} + \boldsymbol{u}_i^\top \boldsymbol{Z}_{it},$$

and with dispersion parameter σ.

3 Result

Item	Quantity
Widgets	42
Gadgets	13

Table 1: An example table.

References

[1] Alessio Farcomeni and Sara Viviani. Longitudinal quantile regression in presence of informative drop-out through longitudinal-survival joint modeling. *arXiv preprint arXiv:1404.1175*, 2014.