Appendix A: Models

In numerical study, two data settings/models are considered: (a) continuous data under the linear regression (LR) model, and (b) right censored survival data under the accelerated failure time (AFT) model.

LR model

Assume n iid observations. The response variable y_i is associated with the length-p vector of covariates X_i via the LR model:

$$y_i = X_i\boldsymbol{\beta} + \epsilon_i,$$

where $\boldsymbol{\beta} = (\beta_1, \beta_2, \ldots, \beta_p)^\top$ is the vector of unknown regression coefficients, and ϵ_i is the random error. Consider the ordinary least squared loss function $L(\boldsymbol{\beta}) = \frac{1}{2n}\sum_{i=1}^{n}(y_i - X_i\boldsymbol{\beta})^2$.

AFT model

Under high-dimensional settings, the AFT model can be preferred over alternatives including the Cox model with its simple form, lucid interpretation, and low computational cost. Still assume that there are n iid observations. Let T_i be the logarithm of failure time and X_i be the $1 \times p$ vector of covariates for the ith sample, $i = 1, 2, \ldots, n$. The AFT model assumes that

$$T_i = \gamma + X_i\boldsymbol{\beta} + \epsilon_i,$$

where γ is the intercept, $\boldsymbol{\beta} = (\beta_1, \beta_2, \ldots, \beta_p)^\top$ is the vector of regression coefficients, and ϵ_i is the random error. Under right censoring, (Y_i, δ_i) is observed, where $Y_i = \min(T_i, C_i)$, C_i is the logarithm of censoring time, and $\delta_i = \mathbf{1}_{\{T_i \le C_i\}}$ is the indicator function.

For estimation, a weighted least squares (WLS) approach (36) is adopted, which has computational cost lower than its alternatives and can be especially preferred under high-dimensional settings. Let $\hat{F}(y)$ be the Kaplan-Meier estimator of the distribution function of Y: $\hat{F}(y) = \sum_{i=1}^{n} q_i \mathbf{1}_{\{Y_{(i)} \le y\}}$, where the weights q_i are

$$q_1 = \frac{\delta_{(1)}}{n}, \quad q_i = \frac{\delta_{(i)}}{n-i+1}\prod_{i=1}^{i-1}\left(\frac{n-j}{n-j+1}\right)^{\delta_{(j)}} \quad (i \ge 2).$$

Here $Y_{(1)} \le Y_{(2)} \le \cdots Y_{(n)}$ are the order statistics of Y_i $(i = 1, 2, \ldots, n)$, and $\delta_{(i)}$ $(i = 1, 2, \ldots, n)$ are the associated indicator functions. The WLS objective function is

$$L(\boldsymbol{\beta}) = \frac{1}{2n}\sum_{i=1}^{n} q_i (Y_{(i)} - \gamma - X_{(i)}\boldsymbol{\beta})^2,$$

where $X_{(i)}$ is the vector of covariates associated with $Y_{(i)}$.

Define $\bar{X}_q = \frac{\sum_{i=1}^{n} q_i X_{(i)}}{\sum_{i=1}^{n} q_i}$, $\bar{Y}_q = \frac{\sum_{i=1}^{n} q_i Y_{(i)}}{\sum_{i=1}^{n} q_i}$, $\tilde{X}_i = \sqrt{q_i}(X_{(i)} - \bar{X}_q)$, and $\tilde{Y}_i = \sqrt{q_i}(Y_{(i)} - \bar{Y}_q)$. Then $L(\boldsymbol{\beta})$ can be rewritten as

$$\frac{1}{2n}\sum_{i=1}^{n}(\tilde{Y}_{(i)} - \tilde{X}_{(i)}\boldsymbol{\beta})^2.$$

Appendix B: Correlation structure of covariates

Consider a clustered correlation structure with p covariates, where covariates within the same group are generally strongly correlated and covariates within different groups are weakly correlated. We generate the correlation matrix Σ via the following network-based analysis, which flexibly accommodates the scenario with a lack of correlation for some covariates within the same group.

We first employ the degree-correlated stochastic block model (37) to generate an unweighted network with clustering. It is noted that, in the field of complex network analysis, this feature has also been commonly referred to as a community structure. A degree sequence of p nodes (i.e., covariates) is generated following the power-law distribution with exponent γ. For each pair of nodes i and j, an undirected edge is placed with probability $p_{ij} = \frac{1}{Z} cpd_i d_j q_{k_i k_j}$, where $Z = \sum_{i,j} d_i d_j q_{k_i k_j}$ is the normalization constant, d_i is the degree of node i, $c \equiv \frac{\sum_{i=1}^{p} d_i}{p}$ is the average degree of nodes, and k_i is the group that node i belongs to. $q_{k_i k_j}$ represents the connection probability between groups k_i and k_j. If $k_i = k_j$, $q_{k_i k_j}$ is sampled from an uniform distribution $\mathcal{U}[0.3, 0.5]$, otherwise $q_{k_i k_j} = 0.02$. We set $\gamma = 2.5$ and $c = 10$ in all simulations.

Next, a weight is added to each edge. The edges between nodes within the same group have weights sampled independently from $\mathcal{U}[0.5, 1]$, and the edges between nodes in different groups have weights sampled from $\mathcal{U}[0.2, 0.5]$.

Denote the adjacency matrix of the weighted network as Σ_0, with each diagonal element equal to 1 and each off-diagonal element equal to the weight of the corresponding edge. To guarantee the positive definiteness of Σ, we set $\Sigma = \Sigma_0 - (\lambda_{\min} - \frac{1}{p})\boldsymbol{I}_p$, where $\lambda_{\min}$ is the smallest eigenvalue of Σ_0, and $\boldsymbol{I}_p$ is the $p \times p$ identity matrix.

Appendix C: Additional numerical results

Table 9. Simulation under the LR models, scenario S2. In each cell, mean(SD).

	Variable		Group		ERMSE	PRMSE
	TP	FP	TP	FP		
$(\rho_f, \rho_p, \rho_n) = (0.8, 0.2, 0)$, $N_{ig} = 36$						
CD-SBoost	98.3 (9)	**11.5 (5.1)**	27.3 (2)	0.2 (0.4)	**2.7 (0.6)**	**41.6 (2.2)**
Int-SBoost	55.3 (8)	44.3 (8.1)	0.8 (0.8)	**0 (0)**	5 (0.4)	45.9 (1.4)
Sep-SBoost	55.3 (8)	44.3 (8.1)	0.8 (0.8)	**0 (0)**	5 (0.4)	45.6 (1.4)
Pool-SBoost	54.8 (12.7)	38.6 (14.1)	**36 (0)**	4 (0)	5.2 (0.6)	75.7 (5.8)
Sep-Lasso	63.3 (12.4)	105.4 (29.9)	0.8 (0.7)	0.1 (0.2)	5 (0.2)	62.9 (8.1)
Pool-Lasso	**114.3 (2.2)**	102.5 (28.8)	**36 (0)**	4 (0)	3.2 (0.1)	51.2 (3)
$(\rho_f, \rho_p, \rho_n) = (0.6, 0.2, 0.2)$, $N_{ig} = 28$						
CD-SBoost	79.9 (3.7)	**25.8 (6.4)**	19.5 (3.2)	1.5 (0.8)	**3.9 (0.4)**	**40.7 (1.2)**
Int-SBoost	57 (6.7)	44 (6)	0.5 (0.7)	**0 (0)**	4.9 (0.4)	45.4 (1.2)
Sep-SBoost	57 (6.7)	44 (6)	0.5 (0.7)	0.1 (0.3)	4.9 (0.4)	45 (1.3)
Pool-SBoost	51.8 (8.8)	37.6 (7.7)	**28 (0)**	12 (0)	5.5 (0.3)	82.2 (4.3)
Sep-Lasso	66.2 (13.8)	101.1 (42.7)	0.3 (0.2)	0.3 (0.1)	5 (0.3)	60.9 (9.1)
Pool-Lasso	**95.7 (5.1)**	96.2 (32.9)	**28 (0)**	12 (0)	4.6 (0.1)	64.4 (4.4)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0.9, 0)$, $N_{ig} = 22$						
CD-SBoost	**72.7 (9.8)**	**23.5 (8.3)**	16.1 (1.8)	3.7 (2)	**3.8 (0.6)**	**43.4 (2.7)**
Int-SBoost	58 (5.2)	44.7 (3.5)	0.3 (0.5)	**0 (0)**	5 (0.3)	45.4 (1.6)
Sep-SBoost	58 (5.2)	44.7 (3.5)	0.3 (0.5)	0.8 (1)	5 (0.3)	45.4 (1.6)
Pool-SBoost	35.7 (6.1)	45.3 (8.5)	**22 (0)**	18 (0)	6.3 (0.3)	92.6 (3.3)
Sep-Lasso	63.2 (11)	107.1 (40.3)	0.4 (0.5)	1.4 (0.7)	5.1 (0.3)	60.4 (8.7)
Pool-Lasso	62.3 (14.3)	67.6 (28.8)	**22 (0)**	18 (0)	5.8 (0.2)	82.9 (6.1)
$(\rho_f, \rho_p, \rho_n) = (0.4, 0.1, 0.5)$, $N_{ig} = 18$						
CD-SBoost	**68.9 (9.9)**	**24.5 (7.5)**	15 (1.8)	5.4 (1)	**4.1 (0.6)**	**44.6 (1.9)**
Int-SBoost	57.5 (5.4)	40.3 (3.7)	0.2 (0.4)	**0 (0)**	4.8 (0.3)	45.6 (1.5)
Sep-SBoost	57.6 (5.3)	40.2 (3.7)	0.2 (0.4)	0.8 (0.8)	4.8 (0.3)	45.3 (1.5)
Pool-SBoost	35.3 (9.4)	30.7 (9.7)	**18 (0)**	22 (0)	6 (0.3)	91.4 (6.1)
Sep-Lasso	64.2 (11)	99.6 (33.4)	0.2 (0.5)	0.7 (1.2)	4.9 (0.3)	58.9 (7.4)
Pool-Lasso	64.1 (9.2)	65.2 (34.5)	**18 (0)**	22 (0)	5.6 (0.2)	80 (6.1)
$(\rho_f, \rho_p, \rho_n) = (0.2, 0.2, 0.6)$, $N_{ig} = 12$						
CD-SBoost	58.7 (6.7)	41 (6.9)	7.9 (1.8)	6 (2.7)	5.1 (0.6)	44.6 (1.6)
Int-SBoost	54.3 (3.3)	40.3 (5.7)	0.4 (1)	**0 (0)**	**4.8 (0.3)**	44.3 (1.7)
Sep-SBoost	54.3 (3.3)	40.3 (5.7)	0.4 (1)	1 (0.8)	**4.8 (0.4)**	**43.9 (1.7)**
Pool-SBoost	24.1 (4.6)	**30.5 (6.5)**	**12 (0)**	28 (0)	6.4 (0.2)	95.3 (4.3)
Sep-Lasso	**62 (12.2)**	101.1 (39.7)	0.3 (0.4)	1.4 (0.8)	5.2 (0.4)	61.1 (9.7)
Pool-Lasso	44.9 (11.1)	55.8 (31.8)	**12 (0)**	28 (0)	6.1 (0.2)	88.9 (6.8)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0, 0.9)$, $N_{ig} = 4$						
CD-SBoost	57.7 (6.3)	42.5 (5.9)	1.4 (1)	7.1 (2.1)	5.3 (0.6)	**42.4 (1.4)**
Int-SBoost	54.5 (5)	42.3 (5.2)	0 (0)	**0 (0)**	**5 (0.4)**	45.9 (1.2)
Sep-SBoost	54.5 (5)	42.3 (5.2)	0 (0)	1.1 (0.7)	**5 (0.3)**	45.6 (1.2)
Pool-SBoost	15.2 (1.8)	**24.1 (5.4)**	**4 (0)**	36 (0)	6.7 (0.1)	103.7 (3.4)
Sep-Lasso	**65.8 (10.6)**	103.7 (36.2)	0.1 (0.2)	2.4 (1.2)	5.1 (0.5)	59.1 (8.6)
Pool-Lasso	11.5 (7.2)	49.2 (29.6)	**4 (0)**	36 (0)	6.7 (0.1)	102 (5.7)

Table 10. Simulation under the LR models, scenario S3. In each cell, mean(SD).

	Variable		Group		ERMSE	PRMSE
	TP	FP	TP	FP		
$(\rho_f, \rho_p, \rho_n) = (0.8, 0.2, 0)$, $N_{ig} = 36$						
CD-SBoost	**118.5 (3.3)**	**3.3 (2.8)**	34.5 (1.2)	0.6 (1)	**0.9 (0.5)**	**24.5 (2.3)**
Int-SBoost	74.7 (5)	49.2 (6.3)	0.1 (0.3)	**0.1 (0.2)**	4.1 (0.2)	33 (1)
Sep-SBoost	74.8 (5)	49.2 (6.3)	0.1 (0.3)	**0.1 (0.2)**	4.1 (0.2)	32.8 (1)
Pool-SBoost	63.6 (12)	57.6 (8.7)	**36 (0)**	4 (0)	4.5 (0.4)	60.8 (4.6)
Sep-Lasso	91.1 (14)	162.7 (41.8)	0.2 (0.4)	**0.1 (0.3)**	4.1 (0.3)	37.7 (7.9)
Pool-Lasso	118.1 (1.1)	71.4 (22.1)	**36 (0)**	4 (0)	2.4 (0.1)	33.5 (2)
$(\rho_f, \rho_p, \rho_n) = (0.6, 0.2, 0.2)$, $N_{ig} = 28$						
CD-SBoost	**114.6 (5.8)**	**14.1 (6.1)**	24.5 (2.2)	1.6 (2)	**1.6 (0.6)**	**25.6 (2.7)**
Int-SBoost	75.1 (10.1)	48.9 (8.9)	0.1 (0.2)	**0 (0)**	4.1 (0.4)	32.9 (1.4)
Sep-SBoost	75.1 (10.2)	48.9 (8.9)	0.1 (0.2)	**0 (0)**	4.1 (0.4)	32.7 (1.4)
Pool-SBoot	58.3 (8.9)	65.8 (6.9)	**28 (0)**	12 (0)	4.7 (0.3)	65 (3)
Sep-Lasso	92.9 (13.9)	168.9 (42.1)	0.1 (0.5)	0.1 (0.4)	4.1 (0.3)	36.5 (8.2)
Pool-Lasso	105.4 (3.6)	79.4 (24.3)	**28 (0)**	12 (0)	3.4 (0.1)	44.4 (3.1)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0.9, 0)$, $N_{ig} = 22$						
CD-SBoost	**101.5 (10.2)**	**26.7 (9.5)**	17.1 (3.4)	1.4 (1.3)	**2.7 (0.8)**	**27.4 (2.4)**
Int-SBoost	74.4 (8.4)	49.4 (8.5)	0.1 (0.3)	**0 (0)**	4.1 (0.3)	32.8 (1.3)
Sep-SBoost	74.4 (8.4)	49.5 (8.5)	0.1 (0.3)	**0 (0)**	4.1 (0.3)	32.6 (1.3)
Pool-SBoost	41 (8.7)	83.5 (9,5)	**22 (0)**	18 (0)	5.4 (0.2)	73.7 (2.8)
Sep-Lasso	91.6 (12.8)	158.7 (41.5)	0 (0)	**0 (0)**	4.1 (0.3)	37.6(8.1)
Pool-Lasso	82.8 (8.9)	69.6 (25.4)	**22 (0)**	18 (0)	4.7 (0.1)	58.4 (4.5)
$(\rho_f, \rho_p, \rho_n) = (0.4, 0.1, 0.5)$, $N_{ig} = 18$						
CD-SBoost	**93.2 (9.9)**	**25.3 (9.6)**	12.8 (1.9)	2.4 (2.7)	**2.4 (0.7)**	**29.6 (2.7)**
Int-SBoost	74.3 (5.4)	49.4 (5.8)	0 (0)	0.2 (0.4)	4.1 (0.2)	33.4 (1.1)
Sep-SBoost	74.3 (5.4)	49.4 (5.8)	0 (0)	0.2 (0.4)	4.1 (0.2)	33.3 (1.1)
Pool-SBoost	48 (7.7)	77 (8.2)	**18 (0)**	22 (0)	5.2 (0.2)	69.9 (2.5)
Sep-Lasso	92.6 (11.9)	167.7 (45.1)	0 (0)	**0 (0)**	4.1 (0.3)	36.6 (7.8)
Pool-Lasso	75.2 (6.3)	54.7 (17.9)	**18 (0)**	22 (0)	4.4 (0.1)	58.4 (3.5)
$(\rho_f, \rho_p, \rho_n) = (0.2, 0.2, 0.6)$, $N_{ig} = 12$						
CD-SBoost	89.5 (5.5)	**25 (9.2)**	8.2 (1.7)	3.3 (3.2)	**3.9 (0.6)**	**30.6 (2.1)**
Int-SBoost	72.7 (8.1)	49.8 (6.7)	0.1 (0.4)	**0.1 (0.2)**	4.2 (0.3)	32.8 (0.9)
Sep-SBoost	72.7 (8.1)	49.8 (6.8)	0.1 (0.4)	**0.1 (0.2)**	4.2 (0.3)	32.6 (0.9)
Pool-SBoost	37.6 (6.6)	82.8 (8.1)	**12 (0)**	28 (0)	5.5 (0.2)	75.1 (2.9)
Sep-Lasso	**89.7 (13.8)**	161.9 (42.3)	0.1 (0.1)	**0.1 (0.3)**	4.2 (0.3)	40.2 (7.8)
Pool-Lasso	50.9 (12.2)	39.3 (23.5)	**12 (0)**	28 (0)	5.0 (0.1)	67.4 (4.7)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0, 0.9)$, $N_{ig} = 4$						
CD-SBoost	76.2 (6.7)	38.5 (6.7)	2.5 (1.1)	4.5 (1.1)	**4.1 (0.3)**	**31.8 (1.6)**
Int-SBoost	73.8 (8.5)	48.3 (8.5)	0.1 (0.2)	0.1 (0.2)	**4.1 (0.3)**	32.8 (1.2)
Sep-SBoost	73.8 (8.5)	48.3 (8.5)	0.1 (0.2)	0.1 (0.2)	**4.1 (0.3)**	32.7 (1.2)
Pool-SBoost	30.3 (5.7)	89.8 (7.5)	**4 (0)**	36 (0)	5.8 (0.1)	78 (2.5)
Sep-Lasso	**91.1 (11.6)**	161.4 (43.3)	0 (0)	**0 (0)**	**4.1 (0.3)**	37.7 (7.2)
Pool-Lasso	18.3 (5.6)	**33.4 (18.1)**	**4 (0)**	36 (0)	5.3 (0.1)	76.5 (4.8)

Table 11. Simulation under the LR models, scenario S4. In each cell, mean(SD).

	Variable		Group		ERMSE	PRMSE
	TP	FP	TP	FP		
$(\rho_f, \rho_p, \rho_n) = (0.8, 0.2, 0)$, $N_{ig} = 36$						
CD-SBoost	100.4 (7.7)	**20.4 (3.9)**	28.4 (2.9)	0.7 (0.8)	**2.8 (0.7)**	**39.7 (1.7)**
Int-SBoost	46.1 (6.6)	43.7 (7.6)	1.2 (1.3)	**0 (0)**	5 (0.3)	45.5 (1.7)
Sep-SBoost	46.3 (6.7)	43.7 (7.6)	1.1 (1.1)	**0 (0)**	5 (0.3)	45.2 (1.7)
Pool-SBoost	40 (9.8)	47.8 (11)	**36 (0)**	4 (0)	5.3 (0.4)	75.5 (4.1)
Sep-Lasso	48.1 (12.4)	74.3 (20.1)	3.2 (1.8)	0.3 (0.1)	4.9 (0.2)	66.1 (8.5)
Pool-Lasso	**114.7 (2.6)**	102.3 (26.4)	**36 (0)**	4 (0)	2.9 (0.2)	48.9 (2.7)
$(\rho_f, \rho_p, \rho_n) = (0.6, 0.2, 0.2)$, $N_{ig} = 28$						
CD-SBoost	85.1 (5.6)	**34.8 (6.9)**	22.1 (2.7)	4.4 (1.7)	**3.8 (0.5)**	**41.2 (1.4)**
Int-SBoost	46.9 (5.7)	43.6 (5.7)	0.4 (0.7)	**0.6 (0.9)**	5 (0.2)	45.8 (1.8)
Sep-SBoost	47 (5.8)	43.5 (5.8)	0.4 (0.7)	**0.6 (0.9)**	5 (0.2)	45.5 (1.8)
Pool-SBoost	35.5 (6.3)	54.6 (9)	**28 (0)**	12 (0)	5.4 (0.3)	78.8 (4)
Sep-Lasso	50.3 (13.2)	77.4 (23.6)	2.4 (1.9)	1.1 (0.6)	4.9 (0.2)	65.4 (8.7)
Pool-Lasso	**96.2 (5.2)**	96.3 (30.5)	**28 (0)**	12 (0)	3.9 (0.2)	58.1 (3.7)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0.9, 0)$, $N_{ig} = 22$						
CD-SBoost	**78.8 (8)**	**32.4 (7.7)**	17.6 (1.5)	6.7 (2.3)	**4.8 (0.5)**	**43.3 (2.2)**
Int-SBoost	47.5 (5.6)	44.2 (5.3)	0.6 (0.7)	**0.2 (0.5)**	5 (0.2)	44.9 (1.7)
Sep-SBoost	47.5 (5.6)	44.2 (5.3)	0.6 (0.7)	**0.2 (0.5)**	5 (0.2)	44.6 (1.6)
Pool-SBoost	26.6 (5.3)	65.3 (6.7)	**22 (0)**	18 (0)	5.9 (0.2)	84.6 (3.5)
Sep-Lasso	47.7 (11.4)	74.6 (23.9)	2.1 (1.5)	1.8 (0.7)	4.9 (0.2)	65.5 (9.8)
Pool-Lasso	66.3 (14.8)	80.4 (45.7)	**22 (0)**	18 (0)	4.9 (0.2)	70.5 (6)
$(\rho_f, \rho_p, \rho_n) = (0.4, 0.1, 0.5)$, $N_{ig} = 18$						
CD-SBoost	62.5 (8)	**41.3 (6.7)**	12.4 (2.2)	5 (2.8)	5.1 (0.3)	**45.4 (1.9)**
Int-SBoost	46.9 (4.6)	44.1 (4.3)	0.5 (0.6)	**1.2 (0.9)**	5 (0.2)	45.9 (1.8)
Sep-SBoost	47 (4.6)	44.2 (4.4)	0.5 (0.6)	**1.2 (0.9)**	5 (0.2)	45.6 (1.9)
Pool-SBoost	30.3 (4.8)	63.2 (7.8)	**18 (0)**	22 (0)	5.8 (0.2)	81.9 (2.1)
Sep-Lasso	51.8 (14.1)	79.6 (26.4)	1 (0.9)	**1.2 (0.9)**	4.9 (0.2)	64.6 (8.2)
Pool-Lasso	**64.5 (7.7)**	57.3 (26.2)	**18 (0)**	22 (0)	**4.6 (0.1)**	70.7 (4.2)
$(\rho_f, \rho_p, \rho_n) = (0.2, 0.2, 0.6)$, $N_{ig} = 12$						
CD-SBoost	**56.5 (6.7)**	**43.3 (5.3)**	9.8 (1.3)	6.1 (1.9)	5.4 (0.2)	45.4 (1.8)
Int-SBoost	46.5 (6.1)	44.3 (6.4)	0.3 (0.6)	**1.3 (1.3)**	**5 (0.2)**	44.4 (1.7)
Sep-SBoost	46.5 (6.2)	44.3 (6.5)	0.3 (0.6)	1.4 (1.3)	**5 (0.3)**	**44.1 (1.7)**
Pool-SBoost	23.2 (5.5)	63.4 (7.8)	**12 (0)**	28 (0)	6 (0.3)	85.6 (3.9)
Sep-Lasso	49.8 (15.4)	72.8 (24.9)	1.2 (0.7)	3.2 (0.5)	**5 (0.2)**	67.9 (7.7)
Pool-Lasso	36.3 (5.9)	70.2 (38.3)	**12 (0)**	28 (0)	5.1 (0.2)	78.9 (5.3)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0, 0.9)$, $N_{ig} = 4$						
CD-SBoost	**54.4 (5.2)**	45.5 (5.7)	3 (0.8)	10.5 (2.2)	5.8 (0.2)	**44.6 (2.3)**
Int-SBoost	46.4 (5.8)	42.4 (5.1)	0.1 (0.3)	**1.7 (1.1)**	5 (0.2)	45.4 (2)
Sep-SBoost	46.5 (5.8)	42.5 (5.3)	0.1 (0.3)	**1.7 (1.1)**	5 (0.2)	45 (2)
Pool-SBoost	19.2 (5)	69.9 (9.1)	**4 (0)**	36 (0)	6.1 (0.2)	86.4 (2.9)
Sep-Lasso	47.8 (11.5)	74.7 (32)	0.3 (0.2)	2.5 (1.6)	**4.9 (0.2)**	66.7 (7.6)
Pool-Lasso	10.3 (3.5)	**28.5 (14.8)**	**4 (0)**	36 (0)	5.4 (0.1)	85.8 (4.3)

Table 12. Simulation under the AFT models, scenario S1. In each cell, mean(SD).

	Variable		Group		ERMSE	PRMSE
	TP	FP	TP	FP		
$(\rho_f, \rho_p, \rho_n) = (0.8, 0.2, 0)$, $N_{ig} = 36$						
CD-SBoost	**110.1 (10.8)**	**21.3 (6.4)**	31.3 (3.7)	**0.1 (0.2)**	**2.3 (0.9)**	**1.4 (0.4)**
Int-SBoost	52.2 (5.1)	74.5 (5.3)	0.7 (0.9)	**0.1 (0.2)**	5.4 (0.2)	2.4 (0.1)
Sep-SBoost	52.2 (5.1)	74.5 (5.3)	0.7 (0.9)	**0.1 (0.2)**	5.4 (0.2)	2.4 (0.1)
Pool-SBoost	41.2 (9.6)	35.2 (9.3)	**36 (0)**	4 (0)	5.7 (0.4)	5.1 (0.3)
Sep-Lasso	48.8 (9.4)	92.2 (11.5)	2.5 (0.7)	0.3 (0.1)	5.2 (0.3)	3.7 (0.8)
Pool-Lasso	110 (2.6)	81.1 (7.8)	**36 (0)**	4 (0)	3.4 (0.2)	2.9 (0.2)
$(\rho_f, \rho_p, \rho_n) = (0.6, 0.2, 0.2)$, $N_{ig} = 28$						
CD-SBoost	87.9 (10.7)	**33.3 (12.7)**	23.5 (3.3)	2.5 (0.9)	**3.5 (0.8)**	**1.9 (0.2)**
Int-SBoost	55 (7.5)	68.7 (7.4)	0.2 (0.5)	**0.2 (0.4)**	5.2 (0.4)	2.3 (0.1)
Sep-SBoost	55 (7.5)	68.7 (7.4)	0.2 (0.5)	**0.2 (0.4)**	5.2 (0.4)	2.3 (0.1)
Pool-SBoost	40.6 (9.8)	34.6 (7.8)	**28 (0)**	12 (0)	5.6 (0.3)	5.3 (0.3)
Sep-Lasso	50.8 (12.8)	91.2 (14)	1.3 (0.9)	0.5 (0.2)	5.3 (0.3)	3.9 (0.8)
Pool-Lasso	**88.4 (6.7)**	71.2 (7.6)	**28 (0)**	12 (0)	4.6 (0.2)	4.1 (0.3)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0.9, 0)$, $N_{ig} = 22$						
CD-SBoost	63.5 (8.5)	**37 (6.5)**	18 (1.5)	5.5 (1.8)	**4.9 (0.5)**	2.4 (0.2)
Int-SBoost	55.7 (5.9)	70.6 (5.1)	0.2 (0.4)	**0.3 (0.6)**	5.3 (0.3)	**2.3 (0.1)**
Sep-SBoost	55.7 (5.9)	70.6 (5.1)	0.2 (0.4)	**0.3 (0.6)**	5.3 (0.3)	**2.3 (0.1)**
Pool-SBoost	34.5 (7.5)	59.4 (7.4)	**22 (0)**	18 (0)	6.2 (0.2)	6 (0.3)
Sep-Lasso	50 (14.6)	95.1 (13)	1.4 (0.8)	1.4 (0.8)	5.4 (0.4)	3.8 (0.9)
Pool-Lasso	**65.6 (8.3)**	63.8 (9.2)	**22 (0)**	18 (0)	5.7 (0.1)	5.2 (0.3)
$(\rho_f, \rho_p, \rho_n) = (0.4, 0.1, 0.5)$, $N_{ig} = 18$						
CD-SBoost	**71.4 (7.6)**	40.1 (13)	16.1 (2.1)	6.3 (2.3)	**5 (0.4)**	**2 (0.1)**
Int-SBoost	54.2 (4.9)	69.8 (8.1)	0.1 (0.2)	**0.4 (0.5)**	5.3 (0.2)	2.2 (0.1)
Sep-SBoost	54.1 (4.8)	69.9 (8.1)	0.1 (0.2)	**0.4 (0.5)**	5.3 (0.2)	2.2 (0.1)
Pool-SBoost	34.1 (5.1)	**19.3 (5.9)**	**18 (0)**	22 (0)	6 (0.2)	5.8 (0.3)
Sep-Lasso	50 (15.8)	92.7 (14.6)	1.1 (0.9)	1.6 (0.3)	5.4 (0.4)	3.8 (0.9)
Pool-Lasso	54.9 (9.2)	41.3 (7.4)	**18 (0)**	22 (0)	5.8 (0.2)	5.4 (0.3)
$(\rho_f, \rho_p, \rho_n) = (0.2, 0.2, 0.6)$, $N_{ig} = 12$						
CD-SBoost	**63.9 (6.1)**	57.6 (9.7)	4.7 (1.9)	4.8 (2)	**5.4 (0.5)**	**1.9 (0.1)**
Int-SBoost	53.2(8.4)	71.4 (8.3)	0.1(0.2)	**0.4 (0.6)**	5.5 (0.4)	2.3 (0.1)
Sep-SBoost	53.2(8.4)	71.4 (8.2)	0.1(0.2)	**0.4 (0.6)**	5.5 (0.4)	2.3 (0.1)
Pool-SBoost	27 (6.1)	**23.9 (6)**	**12 (0)**	28 (0)	6.3 (0.2)	6.3 (0.3)
Sep-Lasso	48.1 (8)	91.5 (13.6)	0.7 (0.5)	2.1 (0.2)	5.5 (0.3)	4.0 (0.9)
Pool-Lasso	41.9 (0.5)	38.3 (5.2)	**12 (0)**	28 (0)	6.1 (0.1)	5.8 (0.4)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0, 0.9)$, $N_{ig} = 4$						
CD-SBoost	44.8 (5.7)	62.9 (7.8)	1.5 (1.1)	5.9 (1.7)	5.9 (0.4)	**2.2 (0.1)**
Int-SBoost	49.2 (6)	69 (5.6)	0 (0)	**0.9 (0.9)**	**5.7 (0.3)**	2.3 (0.1)
Sep-SBoost	49.2 (6)	69 (5.7)	0 (0)	**0.9 (0.9)**	**5.7 (0.4)**	2.3 (0.1)
Pool-SBoost	14.1 (2.6)	**17.8 (4.3)**	**4 (0)**	36 (0)	6.7 (0.1)	6.5 (0.3)
Sep-Lasso	**49.4 (15.1)**	88.1 (14.7)	0.3 (0.2)	5 (2.4)	5.9 (0.4)	4.1 (1.1)
Pool-Lasso	12.4 (4.6)	39.6 (4.8)	**4 (0)**	36 (0)	6.7 (0.1)	6.6 (0.4)

Table 13. Simulation under the AFT models, scenario S2. In each cell, mean(SD).

	Variable		Group		ERMSE	PRMSE
	TP	FP	TP	FP		
$(\rho_f, \rho_p, \rho_n) = (0.8, 0.2, 0)$, $N_{ig} = 36$						
CD-SBoost	81.3 (8.8)	**31.2 (7.7)**	28.6 (2.6)	0.5 (0.7)	**4.1 (0.5)**	**1.6 (0.1)**
Int-SBoost	36.7 (6.1)	58.8 (6.3)	1 (0.8)	**0.2 (0.4)**	5.9 (0.2)	1.8 (0.1)
Sep-SBoost	36.7 (6.1)	59 (6.2)	1 (0.8)	**0.2 (0.4)**	5.9 (0.2)	1.8 (0.1)
Pool-SBoost	36.2 (9.5)	55.2 (9.8)	**36 (0)**	4 (0)	5.9 (0.4)	3.1 (0.2)
Sep-Lasso	25.7(12.5)	52.1 (11.5)	10.3 (2.1)	1.1 (0.3)	5.6 (0.2)	2.7 (0.4)
Pool-Lasso	**90 (11.2)**	120.5 (16.2)	**36 (0)**	4 (0)	4.4 (0.4)	2.2 (0.2)
$(\rho_f, \rho_p, \rho_n) = (0.6, 0.2, 0.2)$, $N_{ig} = 28$						
CD-SBoost	**75.8 (6.7)**	**43.3 (6.9)**	19 (2.5)	3.7 (1.3)	**4.8 (0.4)**	**1.6 (0.1)**
Int-SBoost	38.4 (6.1)	58 (7.4)	0.7 (0.6)	**0.8 (0.8)**	5.8 (0.3)	1.8 (0.1)
Sep-SBoost	38.4 (6.1)	58 (7.4)	0.7 (0.6)	**0.8 (0.8)**	5.8 (0.3)	1.8 (0.1)
Pool-SBoost	33.3 (11)	48.4 (8.5)	**28 (0)**	12 (0)	6.1 (0.4)	3.3 (0.3)
Sep-Lasso	27.7 (11.3)	56.3 (13.7)	6.3 (1.3)	2.9 (0.8)	5.7 (0.2)	2.8 (0.4)
Pool-Lasso	68.9 (11.7)	99.3 (17.4)	**28 (0)**	12 (0)	5.2 (0.2)	2.7 (0.2)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0.9, 0)$, $N_{ig} = 22$						
CD-SBoost	**54.2 (6.5)**	56.8 (5.8)	9.6 (1.5)	2 (1.6)	**5.8 (0.3)**	**1.7 (0.1)**
Int-SBoost	37.9 (4.8)	59.9 (6)	0.4 (0.5)	**0.7 (0.9)**	6.1 (0.2)	1.8 (0.1)
Sep-SBoost	37.9 (4.8)	60 (6)	0.4 (0.5)	**0.7 (0.9)**	6.1 (0.2)	1.8 (0.1)
Pool-SBoost	21.9 (4.9)	**49.9 (7.4)**	**22 (0)**	18 (0)	6.7 (0.2)	3.7 (0.2)
Sep-Lasso	27.3 (12.6)	57.8 (12.5)	5.8 (1.6)	4.9 (1.5)	5.9 (0.3)	2.8 (0.5)
Pool-Lasso	46.8 (12.4)	84.9 (17.6)	**22 (0)**	18 (0)	5.9 (0.2)	3.2 (0.2)
$(\rho_f, \rho_p, \rho_n) = (0.4, 0.1, 0.5)$, $N_{ig} = 18$						
CD-SBoost	**50.8 (8.5)**	63.1 (9.7)	13.1 (2.4)	9.6 (2.7)	**5.9 (0.5)**	**1.8 (0.1)**
Int-SBoost	37.8 (6.4)	57.2 (4.7)	0.5 (0.6)	**1.2 (1.1)**	6 (0.3)	**1.8 (0.1)**
Sep-SBoost	37.9 (6.4)	57.3 (4.8)	0.5 (0.6)	**1.2 (1.1)**	6 (0.3)	**1.8 (0.1)**
Pool-SBoost	25.5 (6.9)	**40.9 (8.6)**	**18 (0)**	22 (0)	6.4 (0.3)	3.5 (0.2)
Sep-Lasso	28.5 (11.2)	58.7 (13.4)	4.3 (1.5)	5.4 (1.8)	**5.9 (0.3)**	2.8 (0.5)
Pool-Lasso	36.9 (11.7)	68.6 (15.7)	**18 (0)**	22 (0)	6 (0.2)	3.3 (0.2)
$(\rho_f, \rho_p, \rho_n) = (0.2, 0.2, 0.6)$, $N_{ig} = 12$						
CD-SBoost	**49.2 (6.1)**	69.5 (8.7)	3.7 (1)	3 (1.7)	**6 (0.3)**	**1.7 (0.1)**
Int-SBoost	38.1 (5.1)	60 (3.9)	0.4 (0.7)	**1.1 (0.9)**	6.1 (0.2)	1.8 (0.1)
Sep-SBoost	38.1 (5.1)	59.9 (4)	0.4 (0.7)	**1.1 (0.9)**	6.2 (0.2)	1.8 (0.1)
Pool-SBoost	16.9 (5.4)	**42 (7.4)**	**12 (0)**	28 (0)	6.7 (0.2)	3.7 (0.2)
Sep-Lasso	26.7 (11.8)	56.2 (14.1)	3 (0.8)	9 (4.1)	6.1 (0.3)	2.9 (0.5)
Pool-Lasso	25.1 (12.1)	57.7 (14.6)	**12 (0)**	28 (0)	6.3 (0.1)	3.6 (0.2)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0, 0.9)$, $N_{ig} = 4$						
CS-SBoost	**38.9 (5.1)**	63.9 (6.9)	0.5 (0.6)	5 (1.5)	6.6 (0.3)	**1.7 (0.1)**
Int-SBoost	34.9 (5.7)	60.3 (5.1)	0.2 (0.4)	**1.6 (1.1)**	**6.3 (0.3)**	1.8 (0.1)
Sep-SBoost	34.9 (5.7)	60.3 (5.1)	0.2 (0.4)	**1.6 (1.1)**	**6.3 (0.3)**	1.8 (0.1)
Pool-SBoost	11.6 (3.1)	33.9 (8)	**4 (0)**	36 (0)	6.9 (0.2)	4 (0.2)
Sep-Lasso	25.6 (11.6)	57.6 (14.4)	1.1 (0.2)	13.1 (4.1)	**6.3 (0.3)**	3 (0.6)
Pool-Lasso	6.6 (1.3)	**22 (7.5)**	**4 (0)**	36 (0)	6.7 (0.1)	3.9 (0.2)

Table 14. Simulation under the AFT models, scenario S3. In each cell, mean(SD).

	Variable		Group		ERMSE	PRMSE
	TP	FP	TP	FP		
$(\rho_f, \rho_p, \rho_n) = (0.8, 0.2, 0)$, $N_{ig} = 36$						
CD-SBoost	**119.6 (13)**	**12.9 (5.7)**	33.8 (2.8)	1.1 (0.9)	**2.4 (0.9)**	**1.4 (0.4)**
Int-SBoost	50.3 (5.6)	66.6 (5.8)	0.4 (0.7)	**0.1 (0.4)**	5 (0.2)	2.2 (0.1)
Sep-SBoost	50.3 (5.6)	66.6 (5.8)	0.4 (0.7)	**0.1 (0.4)**	5 (0.2)	2.3 (0.1)
Pool-SBoost	37.3 (9.5)	44.9 (6.2)	**36 (0)**	4 (0)	5.2 (0.3)	4.6 (0.3)
Sep-Lasso	37.6 (6.5)	70.6 (8.5)	6 (0.8)	0.6 (0.1)	5.1 (0.2)	4.1 (0.6)
Pool-Lasso	110.9 (13.4)	83.9 (9.8)	**36 (0)**	4 (0)	3.3 (0.3)	2.6 (0.2)
$(\rho_f, \rho_p, \rho_n) = (0.6, 0.2, 0.2)$, $N_{ig} = 28$						
CD-SBoost	80.8 (8.5)	**35.1 (9.7)**	22.1 (2.8)	0.8 (0.4)	**3.6 (0.8)**	**2.1 (0.3)**
Int-SBoost	46.7 (5.5)	70.2 (4.7)	0.4 (0.8)	**0.4 (0.6)**	5.1 (0.2)	2.3 (0.1)
Sep-SBoost	46.7 (5.5)	70.2 (4.7)	0.4 (0.8)	**0.4 (0.6)**	5.1 (0.2)	2.3 (0.1)
Pool-SBoost	30.4 (7.6)	48.2 (8.1)	**28 (0)**	12 (0)	5.5 (0.3)	4.9 (0.2)
Sep-Lasso	38.8 (9)	85.2 (9.6)	3.9 (0.6)	1.5 (0.3)	5.1 (0.2)	4 (0.8)
Pool-Lasso	**84 (10.2)**	65.3 (12.5)	**28 (0)**	12 (0)	4.3 (0.3)	3.5 (0.4)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0.9, 0)$, $N_{ig} = 22$						
CD-SBoost	**62.3 (8.9)**	47.7 (9.1)	18 (1.8)	6.2 (1.1)	**4.8 (0.4)**	2.4 (0.1)
Int-SBoost	48.7 (7.1)	67.1 (4.9)	0.1 (0.3)	**0.2 (0.4)**	5 (0.2)	**2.3 (0.1)**
Sep-SBoost	48.7 (7.1)	67.1 (4.9)	0.1 (0.3)	**0.2 (0.4)**	5 (0.2)	**2.3 (0.1)**
Pool-SBoost	29.1 (7.3)	86.3 (9.8)	**22 (0)**	18 (0)	5.7 (0.2)	5.1 (0.2)
Sep-Lasso	39.0 (8)	77.8 (8.4)	4.2 (0.5)	3.3 (0.9)	5.1 (0.2)	4.0 (0.7)
Pool-Lasso	50.7 (6.6)	**44.8 (5.6)**	**22 (0)**	18 (0)	5 (0.2)	4.5 (0.4)
$(\rho_f, \rho_p, \rho_n) = (0.4, 0.1, 0.5)$, $N_{ig} = 18$						
CD-SBoost	**50.8 (8.5)**	63.1 (9.7)	11.1 (2.4)	9.6 (2.7)	5.2 (0.5)	**1.8 (0.1)**
Int-SBoost	49.4 (6.6)	67.5 (6.2)	0.2 (0.4)	**0.3 (0.4)**	**5 (0.2)**	2.3 (0.1)
Sep-SBoost	49.4 (6.6)	67.5 (6.2)	0.2 (0.4)	**0.3 (0.4)**	**5 (0.2)**	2.3 (0.1)
Pool-SBoost	24.4 (8.2)	50.6 (6.9)	**18 (0)**	22 (0)	5.7 (0.3)	5.1 (0.3)
Sep-Lasso	37.9 (8.4)	74.5 (13.3)	2.5 (0.4)	2.9 (0.4)	5.1 (0.2)	4.1 (0.6)
Pool-Lasso	46 (6.1)	**42.4 (5.7)**	**18 (0)**	22 (0)	5.1 (0.2)	4.5 (0.5)
$(\rho_f, \rho_p, \rho_n) = (0.2, 0.2, 0.6)$, $N_{ig} = 12$						
CD-SBoost	**57.6 (5.6)**	56.7 (8.7)	9.7 (1.5)	15.9 (1.9)	5.4 (0.2)	2.5 (0.1)
Int-SBoost	49.2 (3.1)	66.3 (6.7)	0.2 (0.5)	**0.3 (0.6)**	**5 (0.1)**	**2.3 (0.1)**
Sep-SBoost	49.2 (3.1)	66.3 (6.7)	0.2 (0.5)	**0.3 (0.6)**	**5 (0.1)**	**2.3 (0.1)**
Pool-SBoost	20 (2.8)	57.3 (6.7)	**12 (0)**	28 (0)	5.9 (0.2)	5.3 (0.2)
Sep-Lasso	38.4 (3.5)	68.4 (8.2)	2.7 (0.4)	6.5 (3.9)	5.2 (0.2)	4.3 (0.5)
Pool-Lasso	20.6 (5.3)	**48.5 (4.5)**	**12 (0)**	28 (0)	5.3 (0.1)	5.1 (0.4)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0, 0.9)$, $N_{ig} = 4$						
CD-SBoost	42.7 (6.7)	61.8 (6.8)	1.1 (0.9)	4.7 (1.7)	5.4 (0.2)	**2.3 (0.1)**
Int-SBoost	**47.8 (5.4)**	67.9 (5.4)	0.1 (0.2)	**0.5 (0.8)**	**5.1 (0.2)**	**2.3 (0.1)**
Sep-SBoost	**47.8 (5.4)**	67.8 (5.4)	0.1 (0.2)	**0.5 (0.8)**	**5.1 (0.2)**	**2.3 (0.1)**
Pool-SBoost	15 (4.1)	59.2 (7.6)	**4 (0)**	36 (0)	6 (0.2)	5.5 (0.2)
Sep-Lasso	38.5 (4.1)	76.2 (10.7)	0.6 (1.1)	6.5 (0.9)	5.4 (0.2)	4 (0.7)
Pool-Lasso	9.8 (2.7)	**34.8 (6.4)**	**4 (0)**	36 (0)	5.4 (0.1)	5.4 (0.3)

Table 15. Simulation under the AFT models, scenario S4. In each cell, mean(SD).

	Variable		Group		ERMSE	PRMSE
	TP	FP	TP	FP		
$(\rho_f, \rho_p, \rho_n) = (0.8, 0.2, 0)$, $N_{ig} = 36$						
CD-SBoost	**85.5 (8.4)**	53.5 (8.9)	26.4 (2.3)	1.4 (1)	**4.0 (0.3)**	**1.5 (0.1)**
Int-SBoost	33.3 (7.3)	56.4 (7.5)	1 (1)	**0.2 (0.5)**	5.5 (0.3)	1.8 (0.1)
Sep-SBoost	33.3 (7.3)	56.4 (7.5)	1 (1)	**0.2 (0.5)**	5.5 (0.3)	1.8 (0.1)
Pool-SBoost	29.7 (9)	55 (9.5)	**36 (0)**	4 (0)	5.6 (0.3)	2.8 (0.2)
Sep-Lasso	17.5 (2.7)	**36.2 (6.7)**	5.3 (7)	0.5 (0.8)	5.3 (0.1)	2.8 (0.3)
Pool-Lasso	81.5 (9.1)	119.1 (16.7)	**36 (0)**	4 (0)	4.3 (0.4)	2.2 (0.3)
$(\rho_f, \rho_p, \rho_n) = (0.6, 0.2, 0.2)$, $N_{ig} = 28$						
CD-SBoost	**80 (9.6)**	52.4 (8.8)	21 (2.3)	2.3 (0.7)	**4.2 (0.3)**	**1.6 (0.1)**
Int-SBoost	32.3 (4.7)	54.6 (6.6)	1 (0.8)	**0.6 (0.9)**	5.6 (0.2)	1.8 (0.1)
Sep-SBoost	32.3 (4.7)	54.6 (6.6)	1 (0.8)	**0.6 (0.9)**	5.6 (0.2)	1.8 (0.1)
Pool-SBoost	32.4 (4.1)	90.6 (7.9)	**28 (0)**	12 (0)	5.6 (0.1)	2.9 (0.1)
Sep-Lasso	15.1 (3.9)	**37.5 (5.4)**	2 (2.8)	0.8 (1.3)	5.3 (0.1)	2.9 (0.3)
Pool-Lasso	60.8 (9.4)	113.5 (12.8)	**28 (0)**	12 (0)	4.8 (0.3)	2.5 (0.2)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0.9, 0)$, $N_{ig} = 22$						
CD-SBoost	**47.3 (6.7)**	66.5 (8.6)	16.6 (1.9)	7.2 (1.7)	5.5 (0.2)	**1.8 (0.1)**
Int-SBoost	33.1 (6.6)	56 (7.1)	0.9 (0.7)	**1 (0.7)**	5.6 (0.3)	**1.8 (0.1)**
Sep-SBoost	33 (6.5)	56 (7)	0.9 (0.7)	**1 (0.7)**	5.6 (0.3)	**1.8 (0.1)**
Pool-SBoost	19.2 (5.6)	76.8 (8.3)	**22 (0)**	18 (0)	6.1 (0.2)	3.2 (0.1)
Sep-Lasso	14.7 (3.5)	**35.4 (4.4)**	2.2 (4.3)	1.9 (3.3)	5.4 (0.1)	2.8 (0.3)
Pool-Lasso	28.7 (6.2)	77.6 (9.1)	**22 (0)**	18 (0)	**5.3 (0.2)**	2.8 (0.2)
$(\rho_f, \rho_p, \rho_n) = (0.4, 0.1, 0.5)$, $N_{ig} = 18$						
CD-SBoost	**47.4 (8)**	66.2 (7.7)	13.2 (1.5)	9.6 (2.1)	5.7 (0.3)	**1.8 (0.1)**
Int-SBoost	32 (3.9)	55 (4.9)	0.5 (0.7)	1.2 (0.9)	5.6 (0.2)	**1.8 (0.1)**
Sep-SBoost	32 (3.9)	55 (4.9)	0.5 (0.7)	1.2 (0.9)	5.6 (0.2)	**1.8 (0.1)**
Pool-SBoost	19 (7.2)	65.9 (10.1)	**18 (0)**	22 (0)	6 (0.3)	3.1 (0.1)
Sep-Lasso	15.2 (3.9)	**37.5 (4.6)**	1 (2)	**0.9 (2)**	**5.3 (0.1)**	2.8 (0.3)
Pool-Lasso	27.2 (5.2)	51.4 (7.7)	**18 (0)**	22 (0)	**5.3 (0.2)**	2.8 (0.2)
$(\rho_f, \rho_p, \rho_n) = (0.2, 0.2, 0.6)$, $N_{ig} = 12$						
CD-SBoost	**45.5 (6.5)**	67.9 (7.7)	8.2 (1.6)	15.7 (2.3)	5.8 (0.2)	**1.8 (0.1)**
Int-SBoost	31.9 (4.7)	56.9 (4.1)	0.1 (0.2)	**1.2 (1.1)**	5.6 (0.2)	**1.8 (0.1)**
Sep-SBoost	31.9 (4.7)	56.7 (4.4)	0.1 (0.2)	**1.2 (1.1)**	5.7 (0.2)	**1.8 (0.1)**
Pool-SBoost	20 (4.3)	68.6 (8.6)	**12 (0)**	28 (0)	6 (0.2)	3.2 (0.1)
Sep-Lasso	17.3 (4.1)	35.2 (5.8)	2.1 (3.9)	4.1 (7.5)	**5.3 (0.1)**	2.8 (0.3)
Pool-Lasso	16.9 (3.3)	**23.4 (5.2)**	**12 (0)**	28 (0)	5.4 (0.1)	3 (0.3)
$(\rho_f, \rho_p, \rho_n) = (0.1, 0, 0.9)$, $N_{ig} = 4$						
CD-SBoost	**35.9 (4.1)**	62.8 (7.5)	0.9 (0.7)	6.4 (1.8)	**5.3 (0.1)**	**1.6 (0.1)**
Int-SBoost	33.3 (3.8)	55.5 (4.9)	0.7 (0.8)	**1.3 (0.9)**	5.6 (0.2)	1.8 (0.1)
Sep-SBoost	33.3 (3.8)	55.5 (4.9)	0.7 (0.8)	**1.3 (0.9)**	5.6 (0.2)	1.8 (0.1)
Pool-SBoost	14.4 (3.5)	70.4 (6)	**4 (0)**	36 (0)	6.2 (0.1)	3.2 (0.1)
Sep-Lasso	14.9 (4.5)	**34.4 (6.8)**	0.3 (0.6)	5.4 (3.6)	5.4 (0.1)	2.9 (0.2)
Pool-Lasso	4.1 (0.1)	16.4 (3.8)	**4 (0)**	36 (0)	5.5 (0.1)	3.1 (0.1)

Table 16. Analysis of leukemia data using Int-SBoost (Sep-SBoost): identified genes and estimates.

Gene	Data 1	Data 2	Gene	Data 1	Data 2
CEP89		0.091	CALM3		-0.158
DPYSL3		0.187	SMCO2		0.168
CELSR1	-0.291		CCR7	-0.225	
C1ORF115		-0.099	DKFZP434A1114	-0.331	
CD27		-0.106	LOC150819		-0.104
CDC25B		-0.111	LOC389429		0.123
C3ORF49		0.172	CLEC2D		-0.158
C14orf123	-0.243		MILR1	-0.189	
ALDH9A1	-0.168				

Table 17. Analysis of leukemia data using Pool-SBoost: identified genes and estimates.

Gene	Data
CEP89	0.296
CD27	-0.371
CLTCL1	-0.272
ADA	0.215

Table 18. Analysis of kidney cancer data using Int-SBoost (Sep-SBoost): identified genes and estimates.

Gene	Data 1	Data 2	Data 3	Gene	Data 1	Data 2	Data 3
ASIP	-0.124			MED9		0.124	
ASRGL1	0.074			NMB		-0.170	
ATRIP		0.187		LOC100420029		0.053	
BAZ1B		-0.200		PGPEP1	0.198		
HEATR9	-0.134			POM121L10P		-0.134	
C2ORF42		-0.098		PRR5ARHGAP8			0.254
CEP170	0.286			LOC101929379		-0.385	
FLJ21736		0.046		SLC25A26			0.213
CLRN3		-0.208		LOC116141		-0.154	
HSPC139			-0.137	LOC651293			0.087
CSNK1D	0.110			SPNS2	0.217		
CSNK2A1			-0.215	TARS2			-0.077
LOC101928965	0.186			TELO2			-0.278
FAIM2			0.408	TFF3			-0.072
FLJ44635			0.119	MKS3	-0.080		
FUT6	0.143			TMPRSS9			-0.182
GLOD4			-0.143	TRIM41			0.320
GTF2IRD2P1			0.083	TTTY6	-0.409	0.172	
HIST1H2BM		-0.114		UBE2MP1			-0.098
HLTF		-0.095		VPS33B	0.177		
HTR7P1	-0.171			XRN2			-0.144
HYAL2			0.125	YAF2			-0.215
IDH2		0.106		ZNF121			-0.108
KCNF1			-0.152	LNX	-0.110		
MGC33953	-0.174						

Table 19. Analysis of kidney cancer data using Pool-SBoost: identified genes and estimates.

Gene	Data	Gene	Data
ADAM10	0.068	NMB	-0.110
ASRGL1	0.232	PRR5ARHGAP8	0.216
PRO2472	0.129	LOC101929379	-0.325
PRO2325	-0.143	MSS	0.119
CTPP3	-0.093	SLC25A26	0.238
HSPC139	-0.059	SPNS2	0.100
DCTN6	-0.106	LOC116036	-0.071
HIST1H2BM	-0.156	TMPRSS9	-0.094
HYAL2	0.126	TPSG1	0.171
KCNF1	-0.210	UBE2MP1	-0.060
MGC33953	-0.178	XRN2	-0.110
LOC154339	-0.110		

Gene	Data1	Data2	Data3
UBE2Q2P31		-0.053	
ACER3	-0.033		
ACOT8	0.096		
ACSF3	-0.047		
ACSL6	-0.243		
APH1A			-0.034
ARID4B			-0.059
ASIP	-0.178		
ATRIP		0.042	
B2M		-0.049	
BAG1		0.078	
BAZ1B		-0.267	
BTBD3	-0.313		
BTN3A3	-0.029	-0.001	
C10ORF11	0.110		
C12ORF4	0.133		
C2ORF42		-0.006	
C6orf147	-0.017	0.029	
C6ORF62	0.021		
CACNA1D	0.034		
CCHCR1	-0.011	0.004	
CD320			-0.070
CD63	0.028		
LINC00244	0.003		
LINC00597	0.121		
LOC115076	0.000		
LOC115789	-0.048		
LOC133400	0.042		
LOC148767	-0.033		
NSRP1	0.000		
PPP1R36	0.003		
PRO2472	0.043		
RP4622L5	-0.016		
RUNX1IT1			-0.356
SNHG20	-0.002		
SYNE4	-0.048	0.003	
TBC1D32	-0.038		
CDC40			-0.014
ACHM1		-0.031	
CDK19	-0.048		
CDK5RAP3		0.019	
CECR5			-0.067
CEP170	0.215		
CEP76			-0.002
CKAP2L		-0.023	
CLRN3		-0.127	
CNNM2		-0.017	
CNTROB		0.042	
COMMD1		-0.014	
CSNK1D	0.139		
CSNK2A1		-0.054	
HSPC139			-0.265
LOC202871		-0.060	

PBDC1	0.002		
CYTH2	-0.048	0.040	
CRACR2B		0.082	
DCTN6			-0.044
DDX28	-0.018		
DDX42	-0.058		
DYSF	-0.004		
EDF1		-0.036	
EFCAB3	0.068	0.066	
ENGASE	0.041		-0.036
ENOPH1		0.053	
EOMES	-0.004		
ERICH6		-0.071	
ERK			-0.015
FAIM2			0.049
FAM171B	-0.057		
FAM22D	0.058		
FKBP1A			-0.031
FLJ16103		0.005	
FLJ44635			0.131
FOXO4		0.028	
FUT3		-0.239	
FUT6	0.105		
GABPB1			-0.071
GALC	-0.102		-0.076
GALE	-0.060		
GCAT	-0.034	0.069	
GCC1			0.045
GCTG	-0.114		
GGA1		0.011	
GLOD4			-0.082
GPHN	0.053		
GRM8		0.069	
GTF2IRD2P1			0.185
HES4	0.027	-0.065	
HIST1H2BF		-0.055	
HIST1H2BM	0.009		
NXPE1	0.033		
HLTF	0.025	-0.010	
HNRNPH2		0.106	
HOXA9			-0.109
HOXB3	-0.038	0.064	
HOXC10		0.012	
HYAL2			0.189
ID2B		0.024	
IDH2		0.089	
IL20RA	0.035		
LOC158826			-0.020
IP6K2	-0.005		
IPO9		0.116	
JMJD4	-0.015		
KCNE1			-0.033
KCNF1		-0.100	-0.069
KDM5A	0.014	-0.098	

FLJ11857	0.114		
LEFTY1	-0.077		-0.023
.IMS3LOC44089!	-0.015		
LINC00265	-0.025		
LINC01124	-0.013		
LINGO1	0.005	-0.036	
LNX	-0.085		
LOC100134539	-0.056		
LOC100421556		0.005	
LOC148413	0.012		
LOC154339	-0.009		
LOC341056			0.041
LOC88158	0.006		
LRRC45		0.020	
LRRIQ4	0.140	0.111	
LY6G6F	-0.100		
MARCH7		-0.014	
MED19			-0.058
MGC20496		-0.407	
MGC33953			-0.035
MOCS3	0.043		
MOSPD2		0.005	
MPST		-0.136	
MRPS25		0.192	
MSN	-0.008		
NTMT1	0.046		
PAXIP1AS1	-0.027		
PIN4P1	0.064		
NAALAD2		-0.056	
NCOA5			
LINC00115	0.018		
NMB		-0.015	
NOTCH2			0.003
LOC100420029		0.050	
NUBP2	-0.079		
NUDC	0.084		
OR10A1	-0.047		
OSGEP	0.041		
LOC101929379	-0.058	-0.070	
LOC115483	-0.070		
LOC130739	-0.044		
LOC144785	-0.106		
LOC144997	-0.093		
LOC651973	-0.165		
P2RX7	-0.058		
PADI2	0.029		
PCDHB6			-0.034
PDZD2	-0.106		
PEX10	0.037		
PIGZ	-0.001		
PIP5K1A			-0.001
PLEKHJ1		-0.011	
PLXNC1			0.048
POLE4	-0.016		

POLG2			0.059
POM121L10P		-0.113	
POPDC3	-0.016		
POU5F1B	-0.071		
PPP2CB	-0.020		
PRR5ARHGAP8			0.313
PTPN3	0.086		
PURA		0.001	
R3HDM1		-0.110	
RAB17		-0.020	
RBBP9	-0.017		
RNF220	0.009		
RNU11	-0.054		
LOC647572		0.076	
RPL31P11			0.012
RPS27A		-0.081	
RPSAP58		-0.118	
RRP8		0.020	
SF3B4	-0.140		
SIRT6	0.000	-0.126	
KIAA1532	-0.095		
LOC116141		-0.079	
LOC651293			0.083
LOC95616	-0.039		
MIEF1		0.091	
SLC25A26			0.019
SNTB1		-0.021	
SOX9	0.168		
SPSB1	0.004		
SUCLG2			0.126
SURF6			-0.079
SYBU	0.121		
SYNJ1			0.034
TAC2		0.085	
TANK	-0.037		
DKFZP434G1017	0.001		
TBC1D20	0.019		-0.100
TBL3		0.018	
TELO2			-0.208
TFCP2L1	0.075		
TFF3			-0.054
TGIF1		0.013	
TLR7like	-0.088		
TM4SF18	-0.024		
TMOD3			-0.110
TMPRSS9			-0.174
TMSB4Y	-0.094		
TNFSF12TNFSF13	-0.017		
TNNC2			-0.012
DFNB79	-0.009		
LOC154278	-0.026		
TP53RK	0.047		
TPSG1	0.044		
TREML4	-0.047	-0.105	

TRIM41			0.447
TSPO	-0.022		
TTC29	-0.188		
TTTY6	-0.120	0.026	
TXLNG			-0.119
UBE2MP1			-0.048
NELFA			-0.179
USP9X	-0.003		
VARS2		0.089	
VPAC1	0.037		
VPS33B	0.042		
WRN			-0.113
XPNPEP3	-0.049		
XRN2			-0.049
YAF2			-0.083
ZBTB24	-0.030		
ZFAND2B		-0.143	
ZFP37	-0.039		
ZNF121			-0.044
ZNF49		0.041	
ZNF518B		-0.008	
ZNF625	0.003		
ZNF749	0.078		

Gene	Data
HEATR9	-0.147
C20orf94	0.143
APH1A	-0.126
OPH	0.123
C9ORF153	0.118
CCDC170	-0.107
ASRGL1	0.096
PRO2325	-0.088
C9ORF50	-0.076
CCNK	-0.051
ATRIP	-0.029
CEP170	0.196
CDK19	-0.112
CEACAM6	0.082
CHDH	-0.061
CIB1	0.056
CSNK1D	0.043
CNNM2	0.040
HSPC139	-0.039
ACHM1	-0.009
D2HGDH	0.091
EBF1	0.192
DCTN6	-0.179
EFCAB3	0.117
DCAF11	-0.099
CRACR2B	0.091
EHBP1	-0.053
GTF2IRD2P1	0.175
GIN1	-0.124
HINT3	0.097
ENOPH1	0.094
HIGD1B	0.093
HIST1H4B	-0.092
ENGASE	-0.072
GCAT	-0.072
GALC	-0.066
GLYATL1	-0.051
FAIM2	-0.042
HOXB5	-0.057
HYAL2	0.193
ICA1	-0.124
ID2B	0.084
KCNF1	-0.140
KIAA1429	-0.070
LRRIQ4	0.241
LARP6	-0.137
MGC33953	-0.106
MED19	-0.096
MFSD2B	-0.091
LLGL2	-0.074
LEFTY1	-0.061
NAALAD2	-0.064
NID1	-0.197

NMB	-0.082
LOC100420029	0.205
NTHL1	-0.106
NTAN1	-0.051
OR10A1	-0.055
LOC101929379	-0.244
PTPN3	0.152
PUM1	0.126
RBM44	-0.124
POLL	0.103
PEX10	0.087
PDZD2	-0.083
QTRT1	-0.069
RORC	-0.053
POM121L10P	-0.009
NSPCL	-0.101
RPS19BP1	0.081
RPSAP58	-0.058
SYBU	0.149
SLC25A26	0.138
KIAA1532	-0.095
SLC25A10	-0.058
SUGT1P1	-0.054
ST6GALNAC1	-0.049
TARS2	-0.037
TAC2	0.029
TMEM160	0.151
KIAA0948	-0.118
TMEM44	-0.096
TFF3	-0.069
TMEM141	-0.065
TMPRSS9	-0.003
TRIM41	0.079
TREML4	-0.069
TPSG1	0.048
UBE2MP1	-0.085
WDR6	-0.100
WRN	-0.066
ZNF519	-0.079
ZNF311	-0.070
ZNF518B	-0.059
ZFP37	-0.049

Gene	Data1	Data2
AADACL2		0.030
ABCC2	0.010	0.004
APLF		0.066
APOLD1	0.026	
ARNTL2		0.103
BTBD3		0.014
C2ORF80		-0.019
CACNB2		0.069
CALCRL	0.001	0.063
CALM3		-0.004
CARD10		0.032
CAT	0.016	
CCDC6		0.047
CEP70	0.088	-0.107
CEP89	0.070	0.005
CYP2C8		0.023
DPYSL3		0.003
EQTN	0.001	
FAM229B		0.123
LINC00271		0.072
LOC100506362		0.006
LOC105376417		0.072
LOC116393		0.011
LOC221070		0.034
PBM1	0.020	
SMCO2		0.063
TEX30	0.019	
TMEM241	0.048	
WSS	0.016	
ARFGAP3		0.038
ATP6V1C2	-0.084	
C10ORF67		-0.083
C1ORF115		-0.111
CELSR1	-0.122	
CMA1	-0.141	-0.025
CNGB1		-0.019
COL23A1	-0.008	
CSF3R		-0.066
CYP24A1		-0.073
DLGAP1		-0.002
HSPC220	-0.030	
LOC101060345		-0.026
LOC116088		-0.138
OK		-0.008
WWC2AS2		-0.014
ABCB4	-0.104	
BMP5		-0.079
CCL18	-0.108	0.126
CD300LG	0.028	
CPXM2	0.055	
LOC102723905		0.001
ADTRP		-0.071
APBB1		0.022

AXIN2		0.006
CCR7	-0.058	
CD2		-0.056
CDHR3		-0.008
COL13A1		0.009
COL4A3		-0.033
DRAXIN	-0.047	
FLJ38020		-0.036
LINC01588		-0.012
LOC115271	-0.112	-0.089
NMRK1	-0.130	
CDK2AP1	0.000	
COPB2		0.052
CORT		-0.170
CYTH2	0.011	
KIAA0548		-0.064
NUTM1		-0.001
PRO1873		-0.037
ADAMTSL5		-0.063
AHSG		-0.047
ALS2CR12		-0.009
C6ORF89	-0.088	
DKFZP434A1114	-0.062	
AMIGO2	-0.006	
CXCR4		0.018
DKK3	-0.026	
ANG		-0.008
BCAS1		-0.036
CXCR6		-0.001
ARHGEF39		-0.004
CCNB2		-0.001
CDC20		-0.026
CENPE		-0.036
LOC116072		-0.072
C3	-0.024	
ANKRD28		0.118
BCO2		0.057
CDCA4	0.005	
MGC10767		-0.036
ACOX2	-0.015	
APH1B	-0.121	
APPBP2		-0.154
BPNT1		-0.006
CCDC43		0.158
CCNI		0.008
CLDN20		-0.042
DIP2B		-0.195
FAM216A		-0.001
HSA6077	0.013	
LOC100129681		-0.021
LOC85885		-0.060
SBSPON		0.049
BST1		-0.023
LOC116424	-0.032	-0.032

MXRA4withdrawn		0.154
AFAP1	0.001	
C6orf94		-0.006
CD36		-0.064
JEAP		
LOC649438		-0.050
ADA		0.115
BCL7A	0.004	
C1QTNF9B	0.027	0.039
CLHC1	0.028	
DCUN1D4		0.037
DUSP10	0.061	
LOC728848		0.031
STPG2		0.027
CNIH4	-0.010	0.035
CYB5R1		-0.133
LOC389429		0.059
CCDC116	-0.064	
CNBD2		0.023
ABCF1		-0.135
ANAPC15		-0.083
C15ORF56	0.013	
CPNE9	-0.005	-0.020
DOCK7	0.096	
HSPC167		-0.007
BZW2		-0.004
CSNK2A1		-0.023
DNAJC12	0.037	
DOCK10		-0.070
FLJ10971		-0.111
LOC51743		-0.004
TLDC2		0.068
ANKMY1		-0.001
ANKS1B	-0.082	
C10ORF95		0.148
C17ORF97		0.021
C1GALT1C1	-0.046	
C7ORF57		-0.151
C9ORF139	0.135	-0.055
CCDC103		-0.025
CELF6		0.006
CIRBP		0.022
DNMT3A		0.013
FLJ23754		0.056
KIAA1254		0.011
LKAAEAR1		0.042
LOC116063	0.010	
LOC149670		0.002
PCOLC		-0.005
ADAMTSL3	0.095	
CDHR1		-0.012
CLEC2D		-0.020
GC36		-0.005
LOC129136		-0.069

ALDH9A1	-0.016	
BECN1		0.023
C14orf123	-0.071	
DNJ3	-0.131	
RUSC1AS1		0.022
CIDEB		-0.087
DUS2		-0.017
LOC196214		-0.005

Gene	Data
CEP89	0.212
CEP70	0.176
C9ORF139	-0.125