**Simulation results, until 01/15/2014, Ming Yang**

* New results are highlighted, with increased number of simulation, results are better.
* Those in red have large bias.
* SD for alpha2 is always higher
* Except alpha2, all other parameters have small bias and SD
* Trying to increase # of dataset to 100 for those settings have larger bias

(beta1, beta2, delat1, delta2, gamma1, gamma2) = (1,1,1,1,1,1) for all settings

**1. When fix alpha2 as constant in simulation**

**(alpha1, alpha2) = (1,1), # datasets = 100, sample size = 250, quantile = 0.25**

$mean

alpha1 beta[1] beta[2] c delta[1] delta[2] deviance gamma[1]

1.046 0.990 0.997 0.968 0.983 1.001 13100.472 1.019

gamma[2] sigma w11 w21 w22

1.028 1.006 0.369 -0.100 0.316

$sd

alpha1 beta[1] beta[2] c delta[1] delta[2] deviance gamma[1]

0.111 0.101 0.094 0.088 0.086 0.096 45.289 0.087

gamma[2] sigma w11 w21 w22

0.088 0.036 0.132 0.214 0.116

**(alpha1, alpha2) = (0,1), # datasets = 100, sample size = 250, quantile = 0.25**

$mean

alpha1 beta[1] beta[2] c delta[1] delta[2] deviance gamma[1]

0.005 1.010 1.005 0.988 0.988 0.998 13238.439 1.005

gamma[2] sigma w11 w21 w22

1.001 1.008 0.372 -0.117 0.318

$sd

alpha1 beta[1] beta[2] c delta[1] delta[2] deviance gamma[1]

0.057 0.097 0.094 0.083 0.094 0.124 45.673 0.085

gamma[2] sigma w11 w21 w22

0.085 0.036 0.132 0.211 0.115

**2. When alpha2 is treated as a parameter in the model (increased sample sizes)**

**(alpha1, alpha2) = (0,1), # datasets = 30, sample size = 500, quantile = 0.25**

$mean

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

-0.010 0.928 1.017 0.997 1.000 0.989 0.984 26430.445

gamma[1] gamma[2] sigma w11 w21 w22

1.006 0.997 1.001 0.306 -0.026 0.367

$sd

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

0.040 0.368 0.068 0.066 0.058 0.066 0.091 64.222

gamma[1] gamma[2] sigma w11 w21 w22

0.059 0.058 0.026 0.111 0.212 0.124

**(alpha1, alpha2) = (0,1), # datasets = 30, sample size = 500, quantile = 0.5**

$mean

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

-0.010 1.036 0.990 0.997 0.985 0.983 0.997 26017.437

gamma[1] gamma[2] sigma w11 w21 w22

1.020 1.002 1.004 0.319 -0.024 0.293

$sd

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

0.037 0.396 0.058 0.058 0.057 0.056 0.072 57.445

gamma[1] gamma[2] sigma w11 w21 w22

0.059 0.059 0.026 0.103 0.168 0.102

**(alpha1, alpha2) = (0,1), # datasets = 30, sample size = 500, quantile = 0.75**

$mean

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

-0.010 0.834 0.997 1.002 0.998 1.004 0.998 26444.913

gamma[1] gamma[2] sigma w11 w21 w22

1.005 0.997 1.000 0.312 -0.052 0.361

$sd

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

0.039 0.343 0.067 0.066 0.058 0.067 0.091 64.765

gamma[1] gamma[2] sigma w11 w21 w22

0.059 0.059 0.026 0.116 0.227 0.133

**(alpha1, alpha2) = (0,1), # datasets = 100, sample size = 500, quantile = 0.75**

$mean

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

-0.009 0.919 0.995 0.992 0.990 0.992 0.994 26448.527

gamma[1] gamma[2] sigma w11 w21 w22

1.010 1.007 1.001 0.330 -0.063 0.343

$sd

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

0.039 0.414 0.067 0.066 0.058 0.067 0.088 65.285

gamma[1] gamma[2] sigma w11 w21 w22

0.060 0.059 0.026 0.117 0.202 0.125

**(alpha1, alpha2) = (1,1), # datasets = 50, sample size = 500, quantile = 0.25**

$mean

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

1.025 0.925 0.994 1.001 0.989 0.996 0.986 26209.664

gamma[1] gamma[2] sigma w11 w21 w22

0.999 1.000 1.000 0.322 -0.061 0.312

$sd

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

0.077 0.430 0.071 0.066 0.062 0.060 0.068 64.110

gamma[1] gamma[2] sigma w11 w21 w22

0.060 0.060 0.026 0.115 0.187 0.112

**(alpha1, alpha2) = (1,1), # datasets = 50, sample size = 500, quantile = 0.5**

$mean

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

1.011 0.908 1.014 1.001 0.986 1.002 0.998 25742.474

gamma[1] gamma[2] sigma w11 w21 w22

1.000 1.016 1.001 0.326 -0.023 0.303

$sd

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

0.071 0.411 0.061 0.058 0.061 0.054 0.062 55.838

gamma[1] gamma[2] sigma w11 w21 w22

0.061 0.060 0.026 0.105 0.170 0.110

**(alpha1, alpha2) = (1,1), # datasets = 100, sample size = 500, quantile = 0.5**

$mean

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

1.018 0.950 0.997 0.993 0.999 0.999 1.006 25667.000

gamma[1] gamma[2] sigma w11 w21 w22

1.028 1.000 1.004 0.319 -0.043 0.315

$sd

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

0.071 0.387 0.061 0.058 0.062 0.054 0.062 55.640

gamma[1] gamma[2] sigma w11 w21 w22

0.061 0.060 0.026 0.103 0.175 0.109

**(alpha1, alpha2) = (1,1), # datasets = 50, sample size = 500, quantile = 0.75**

$mean

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

1.012 0.823 0.983 1.008 0.980 0.994 1.005 26231.989

gamma[1] gamma[2] sigma w11 w21 w22

1.014 1.014 1.000 0.327 -0.029 0.302

$sd

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

0.076 0.464 0.070 0.066 0.061 0.060 0.068 64.852

gamma[1] gamma[2] sigma w11 w21 w22

0.061 0.060 0.026 0.114 0.194 0.118

**(alpha1, alpha2) = (1,1), # datasets = 100, sample size = 500, quantile = 0.75**

$mean

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

1.012 0.908 0.993 0.996 0.990 1.002 1.000 26183.417

gamma[1] gamma[2] sigma w11 w21 w22

1.004 1.008 1.000 0.342 -0.060 0.316

$sd

alpha1 alpha2 beta[1] beta[2] c delta[1] delta[2] deviance

0.076 0.466 0.070 0.066 0.062 0.061 0.069 64.921

gamma[1] gamma[2] sigma w11 w21 w22

0.061 0.061 0.026 0.116 0.190 0.119