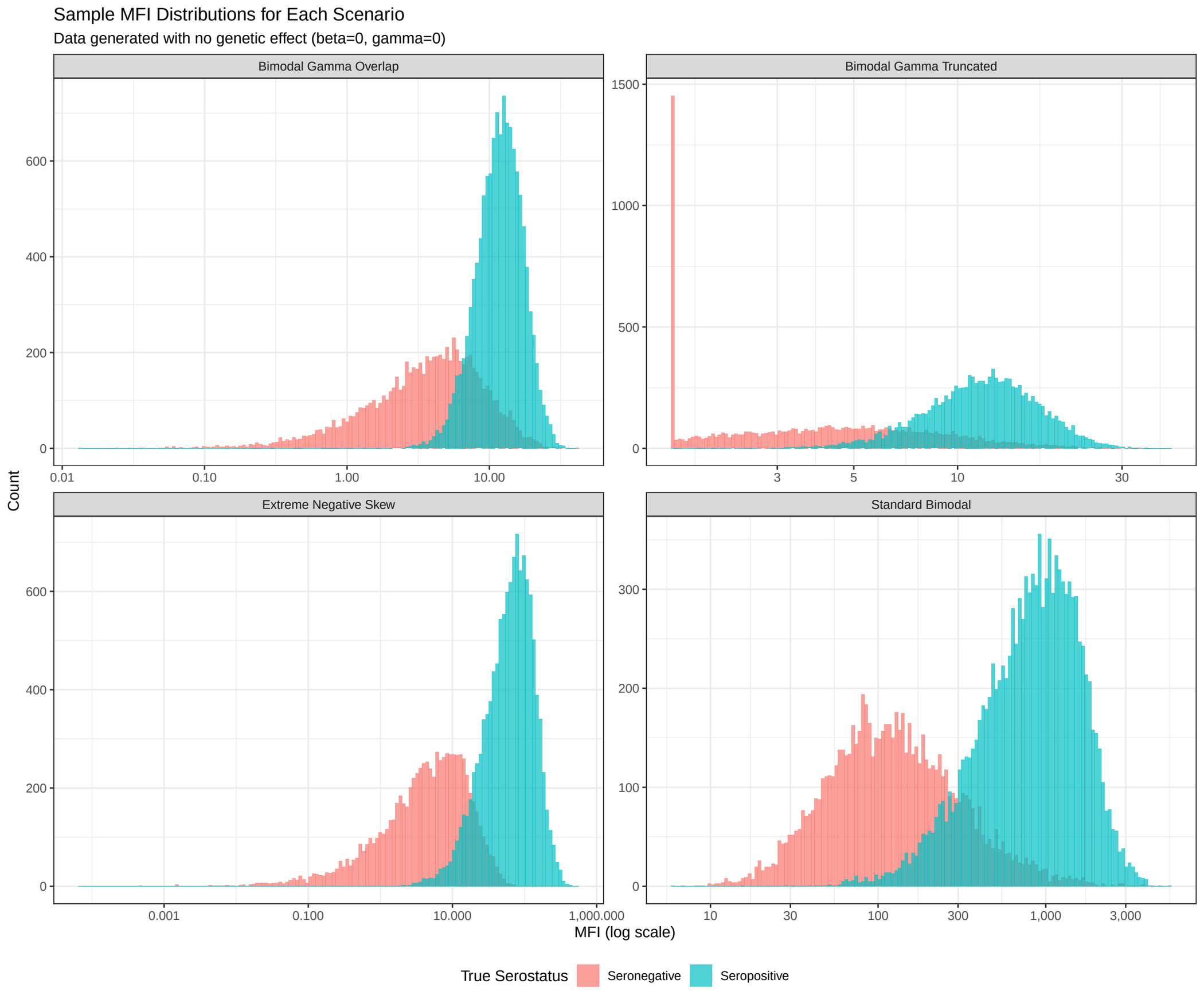
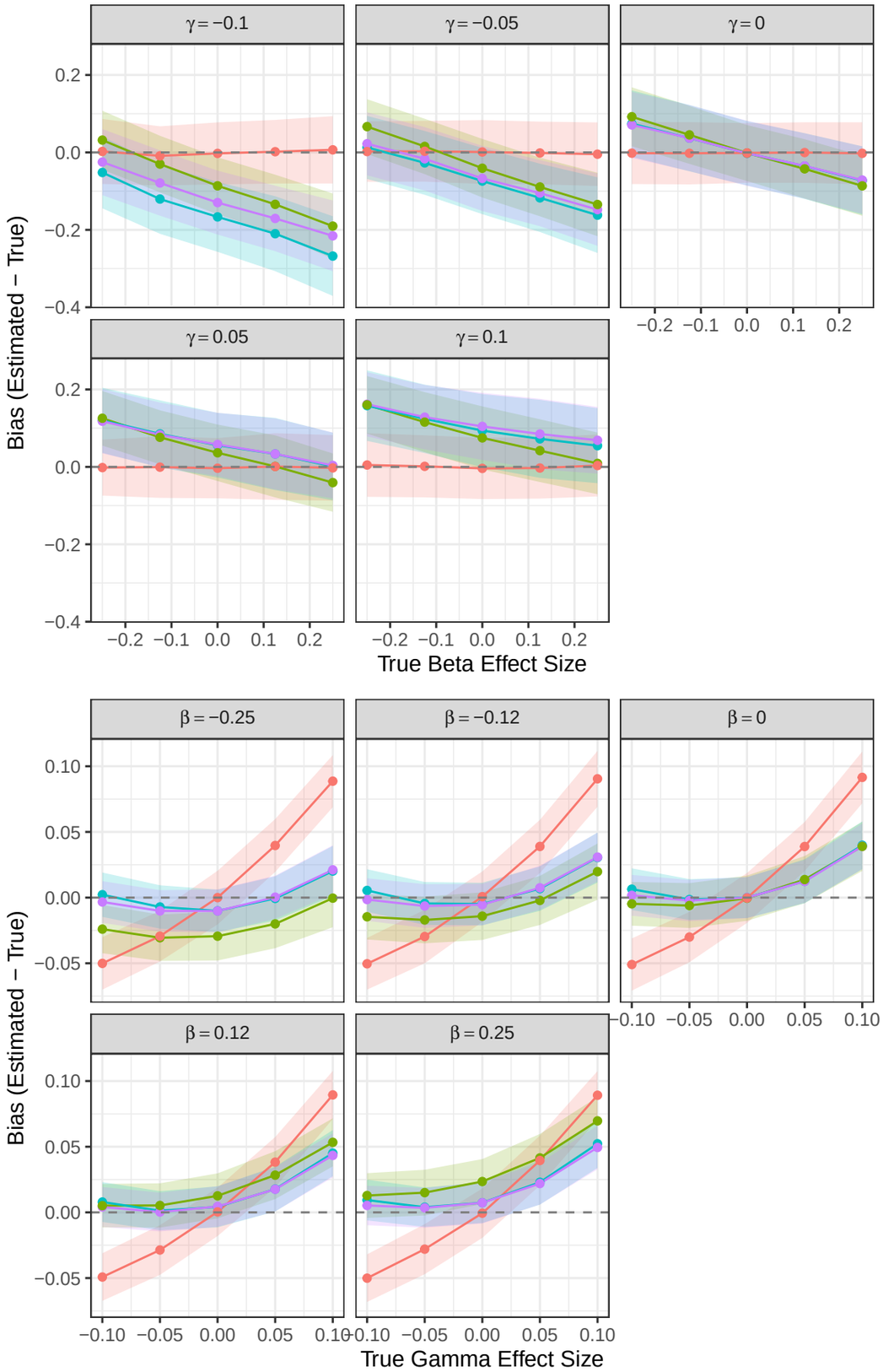

Sample MFI Distributions for Each Scenario
Data generated with no genetic effect (beta=0, gamma=0)
Bimodal Gamma Overlap
Bimodal Gamma Truncated
Extreme Negative Skew
Standard Bimodal
Count
MFI (log scale)
0.01
0.10
1.00
10.00
3
5
10
30
0.001
0.100
10.000
1,000.000
10
30
100
300
1,000
3,000
True Serostatus
Seronegative
Seropositive

Type I Error Rate (at Alpha = 0.05)

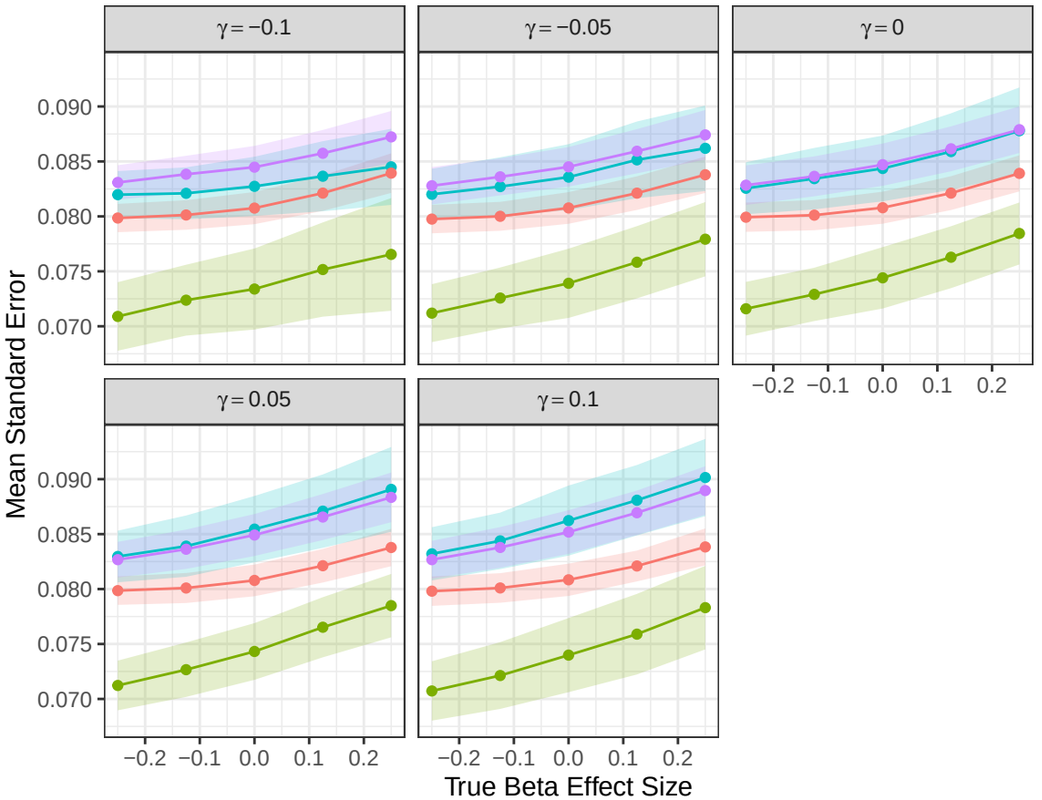
Scenario	Effect	NA	Gold Standard	Mixture Model	GMM Cutoff	Noisy External
Bimodal Gamma Overlap	Gamma	0.0%	5.4%	3.0%	4.8%	3.6%
Bimodal Gamma Overlap	Beta	NA	4.2%	3.6%	4.8%	4.2%
Bimodal Gamma Truncated	Gamma	0.0%	3.8%	6.2%	4.7%	3.4%
Bimodal Gamma Truncated	Beta	NA	3.0%	3.2%	5.4%	5.2%
Extreme Negative Skew	Gamma	0.0%	4.2%	2.2%	5.2%	4.8%
Extreme Negative Skew	Beta	NA	2.8%	5.2%	3.8%	4.6%
Standard Bimodal	Gamma	0.0%	5.2%	8.4%	4.2%	5.0%
Standard Bimodal	Beta	NA	4.6%	5.0%	5.8%	5.4%

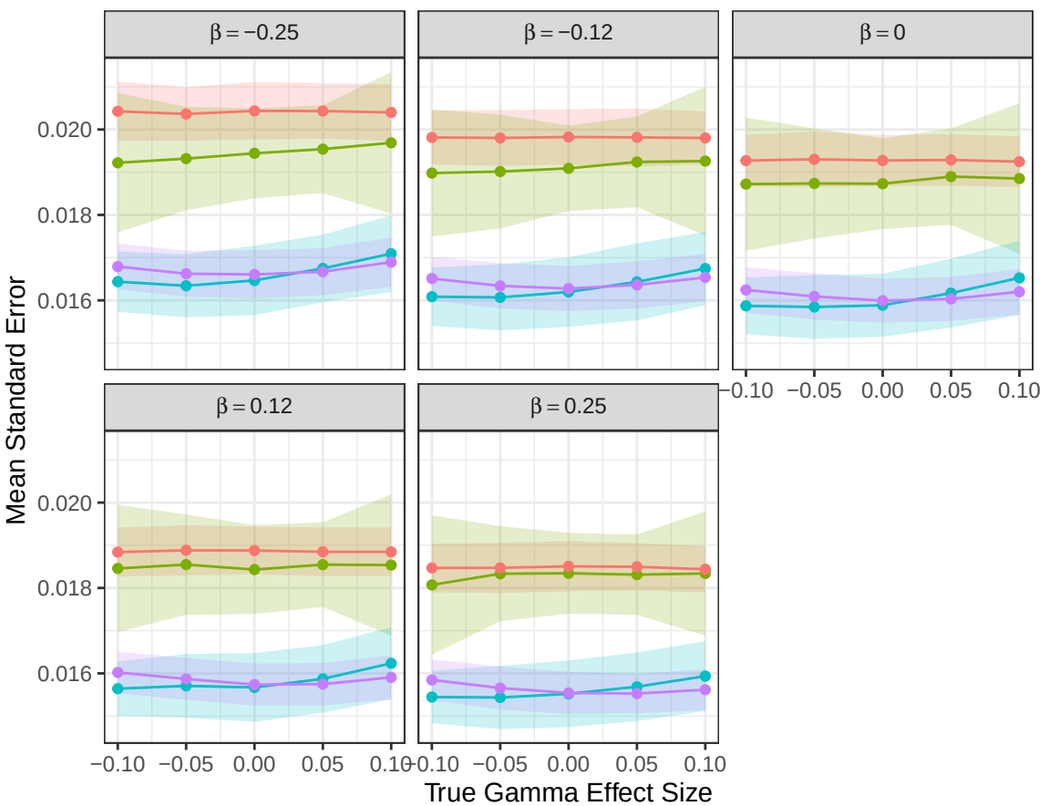
BIMODAL GAMMA OVERLAP : Bias (Estimated − True)

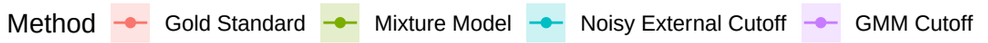


Error ribbons show Mean +/− 1 SD.

BIMODAL GAMMA OVERLAP : Mean Standard Error

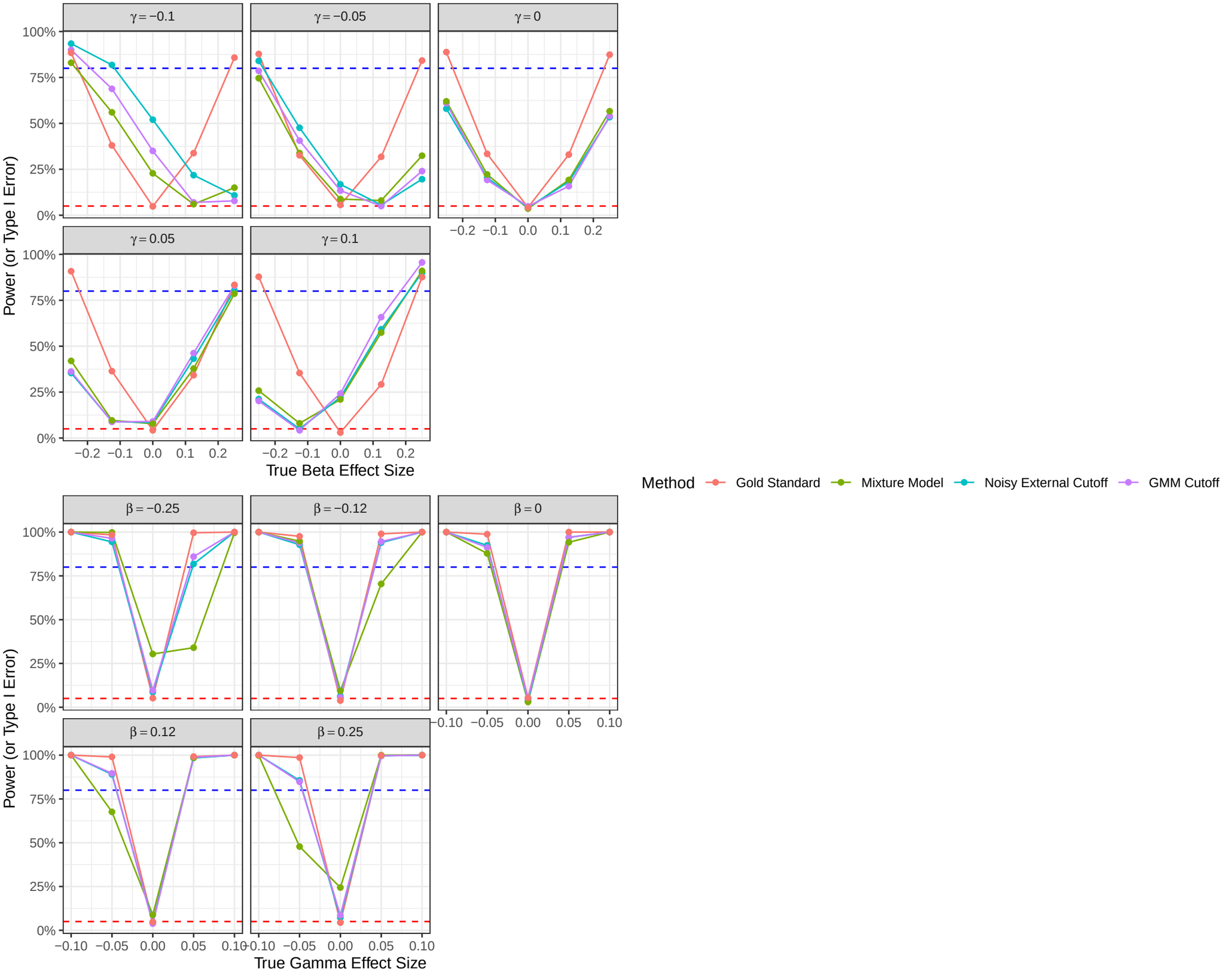






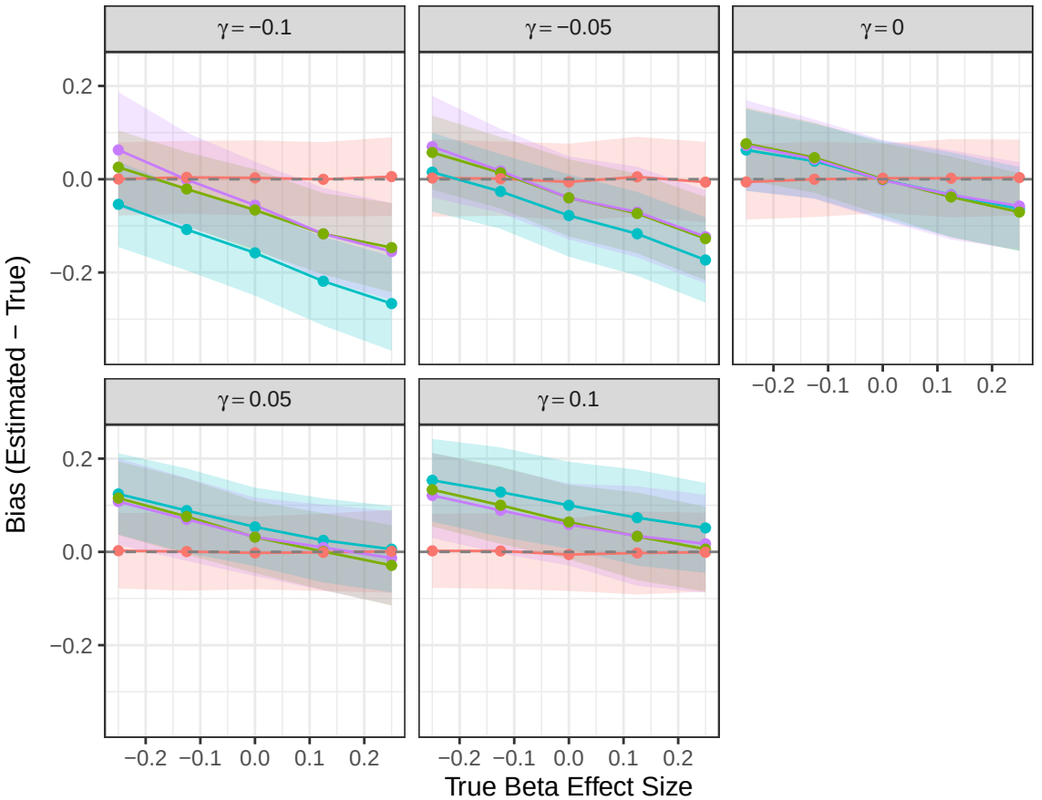
Error ribbons show Mean +/− 1 SD.

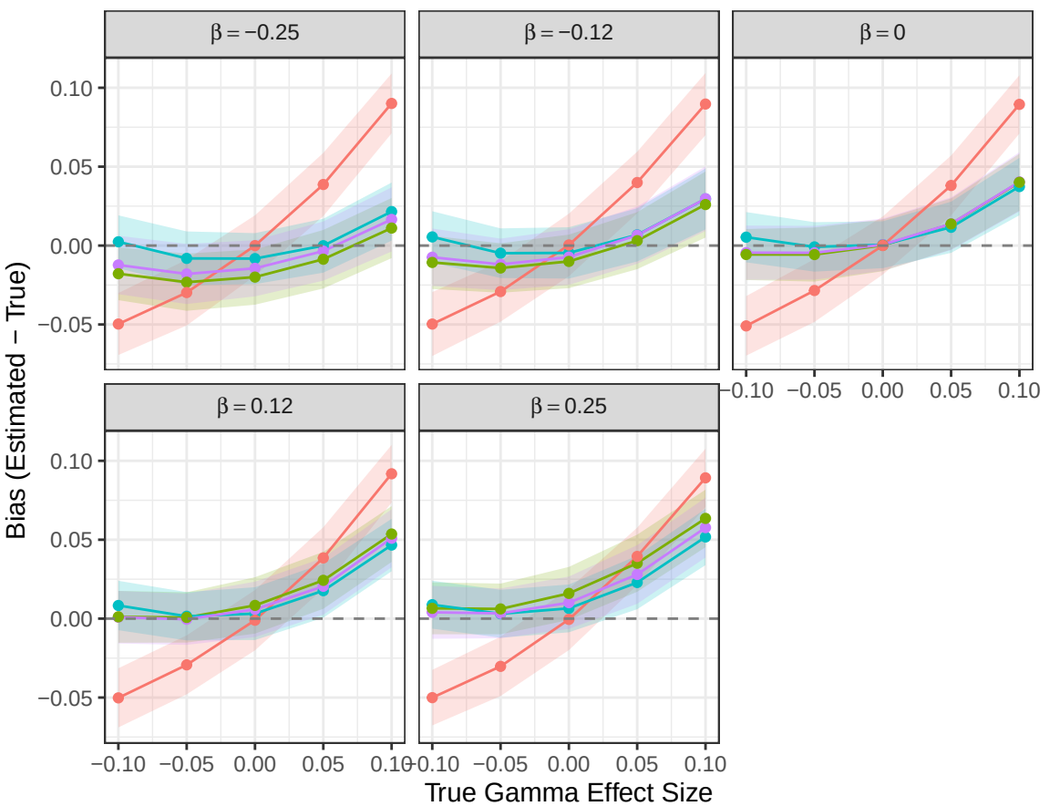
BIMODAL GAMMA OVERLAP : Statistical Power



Red line = 5% Type I Error rate. Blue line = 80% Power.

BIMODAL GAMMA TRUNCATED : Bias (Estimated − True)

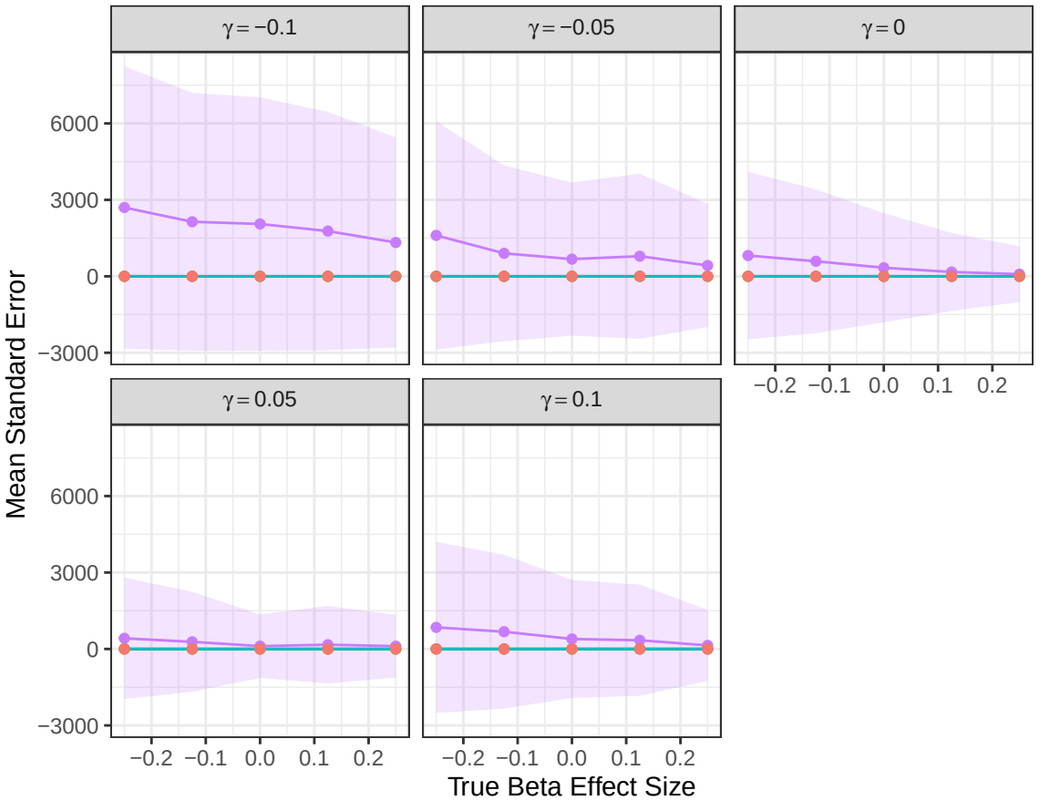


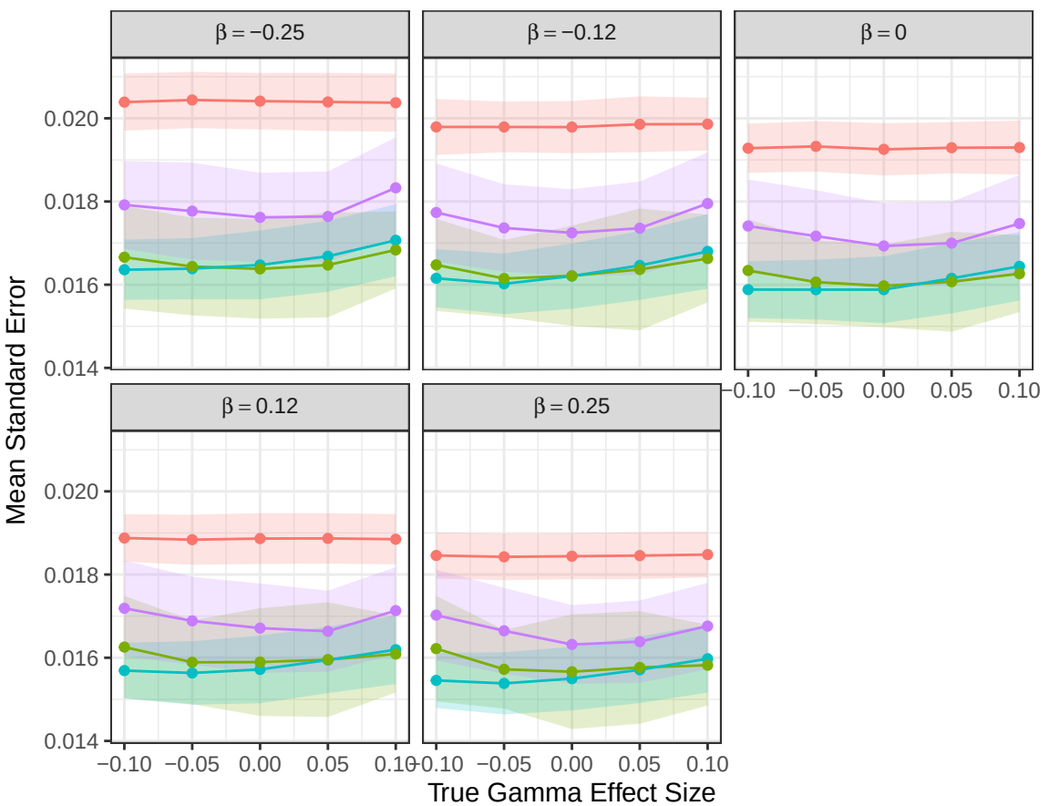


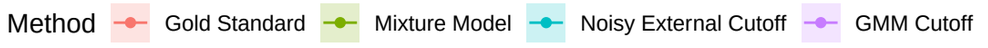
Method: Gold Standard, Mixture Model, Noisy External Cutoff, GMM Cutoff

Error ribbons show Mean +/− 1 SD.

BIMODAL GAMMA TRUNCATED : Mean Standard Error

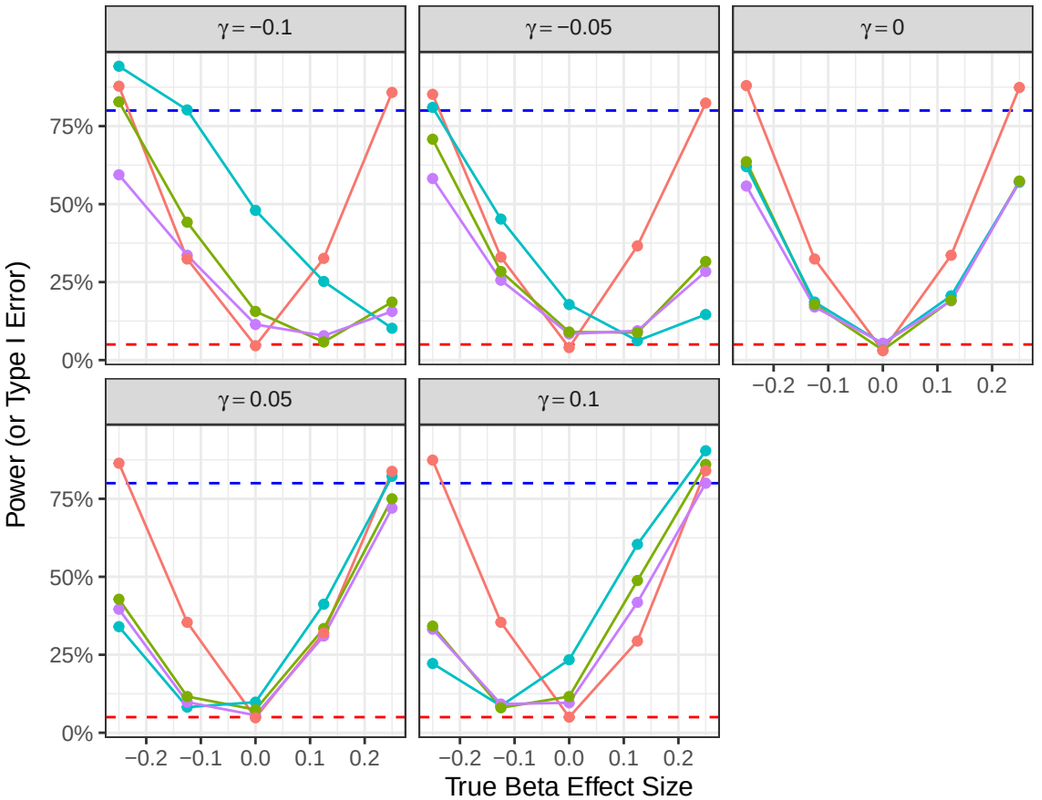


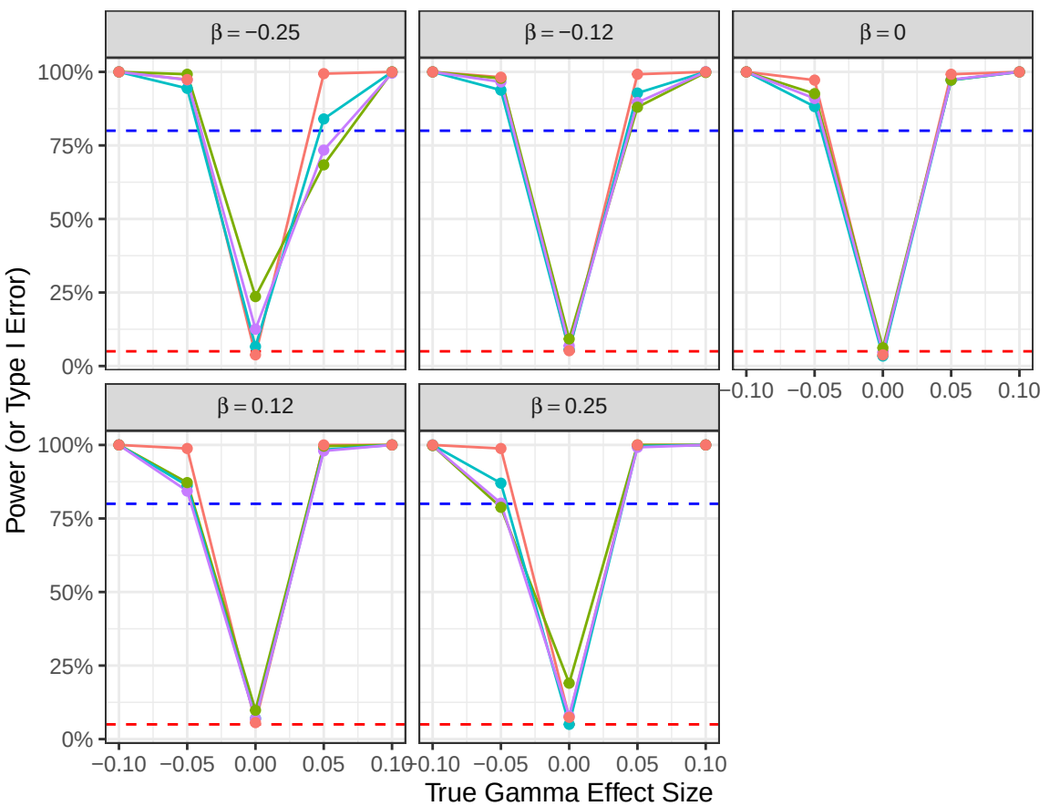


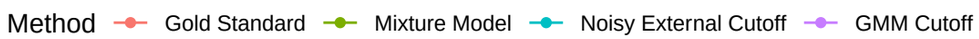


Error ribbons show Mean +/− 1 SD.

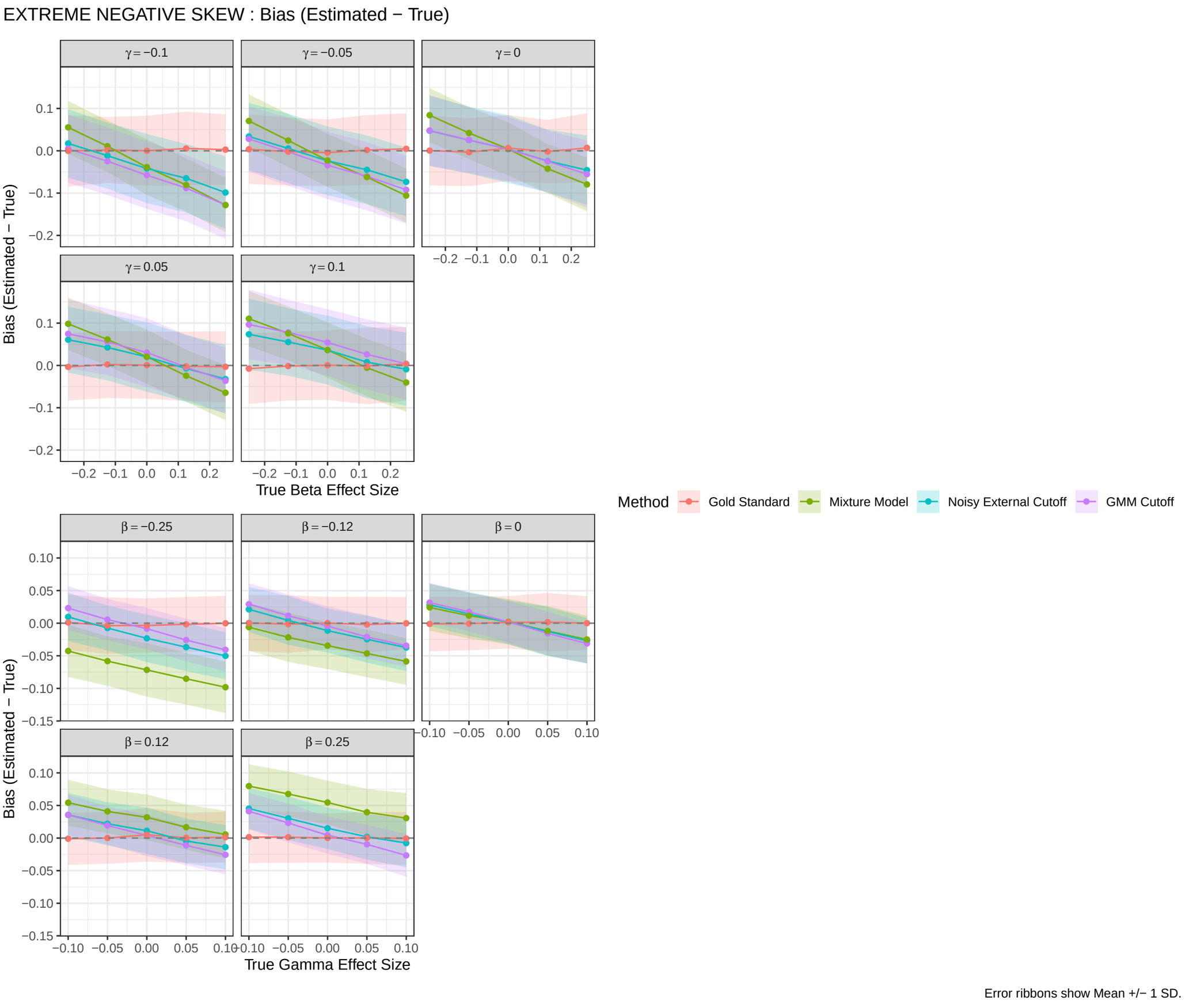
BIMODAL GAMMA TRUNCATED : Statistical Power



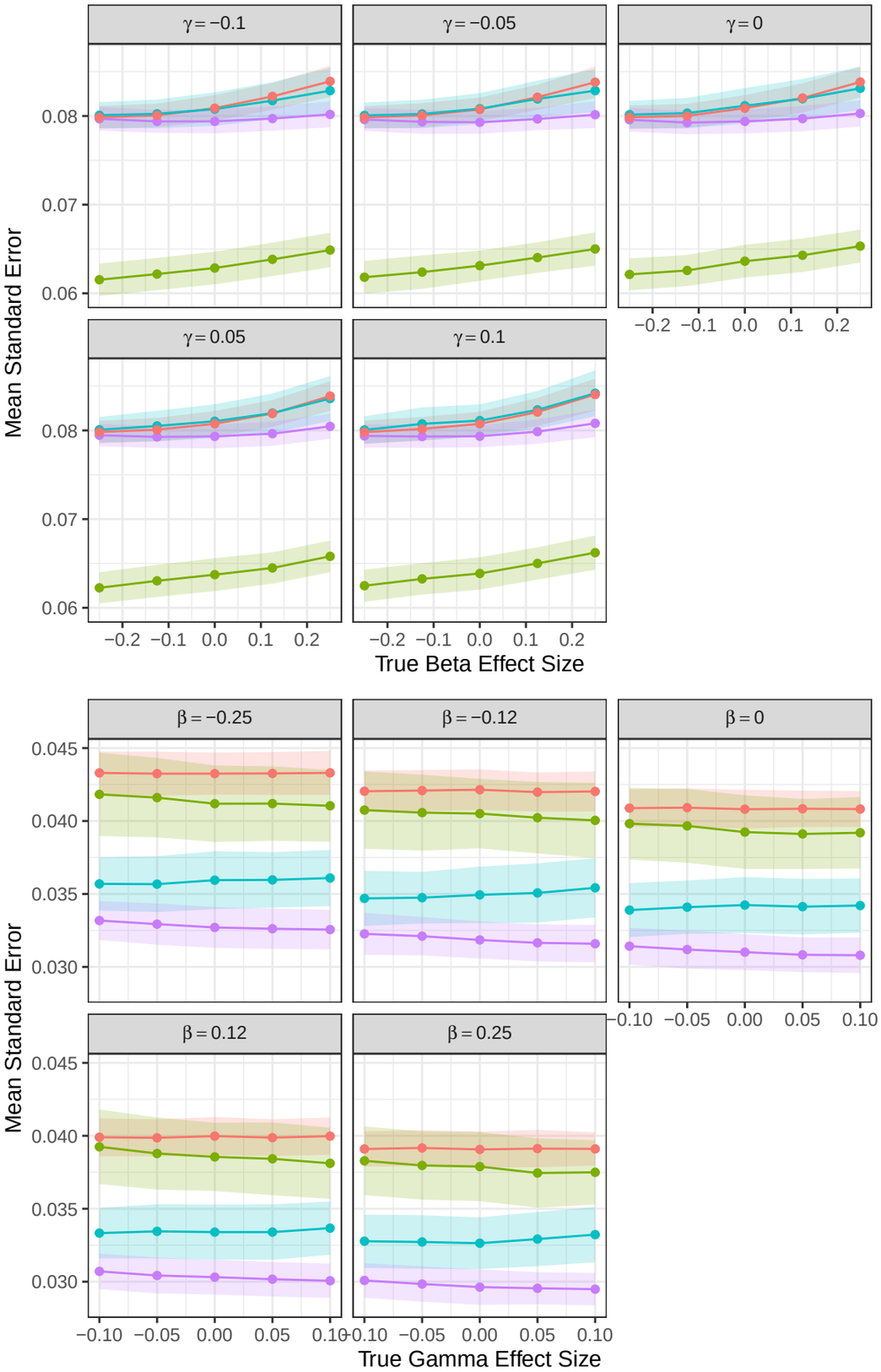




Red line = 5% Type I Error rate. Blue line = 80% Power.


EXTREME NEGATIVE SKEW : Bias (Estimated − True)
γ = −0.1
γ = −0.05
γ = 0
γ = 0.05
γ = 0.1
β = −0.25
β = −0.12
β = 0
β = 0.12
β = 0.25
Bias (Estimated − True)
True Beta Effect Size
True Gamma Effect Size
Method
Gold Standard
Mixture Model
Noisy External Cutoff
GMM Cutoff
Error ribbons show Mean +/− 1 SD.

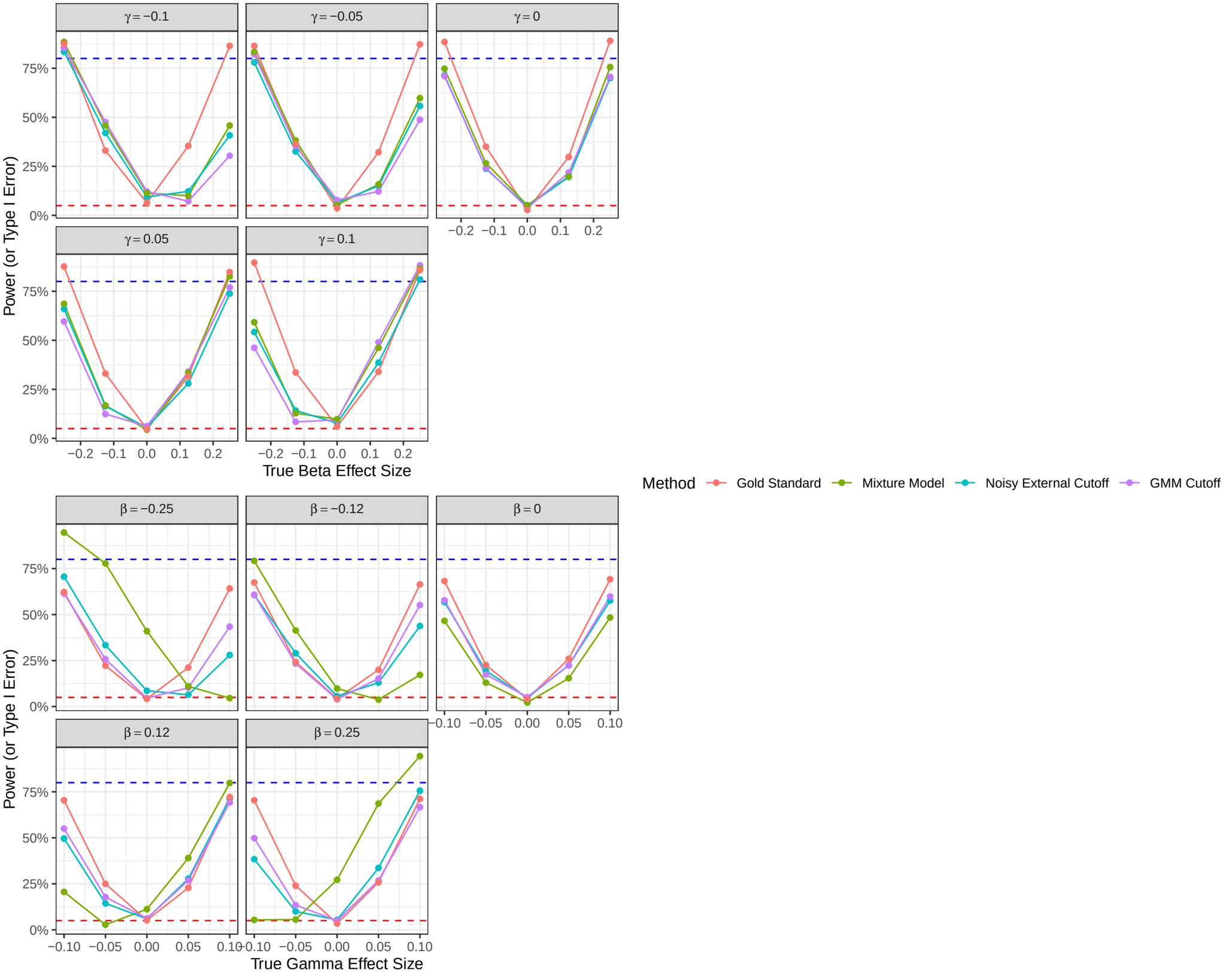
EXTREME NEGATIVE SKEW : Mean Standard Error



Method — Gold Standard — Mixture Model — Noisy External Cutoff — GMM Cutoff

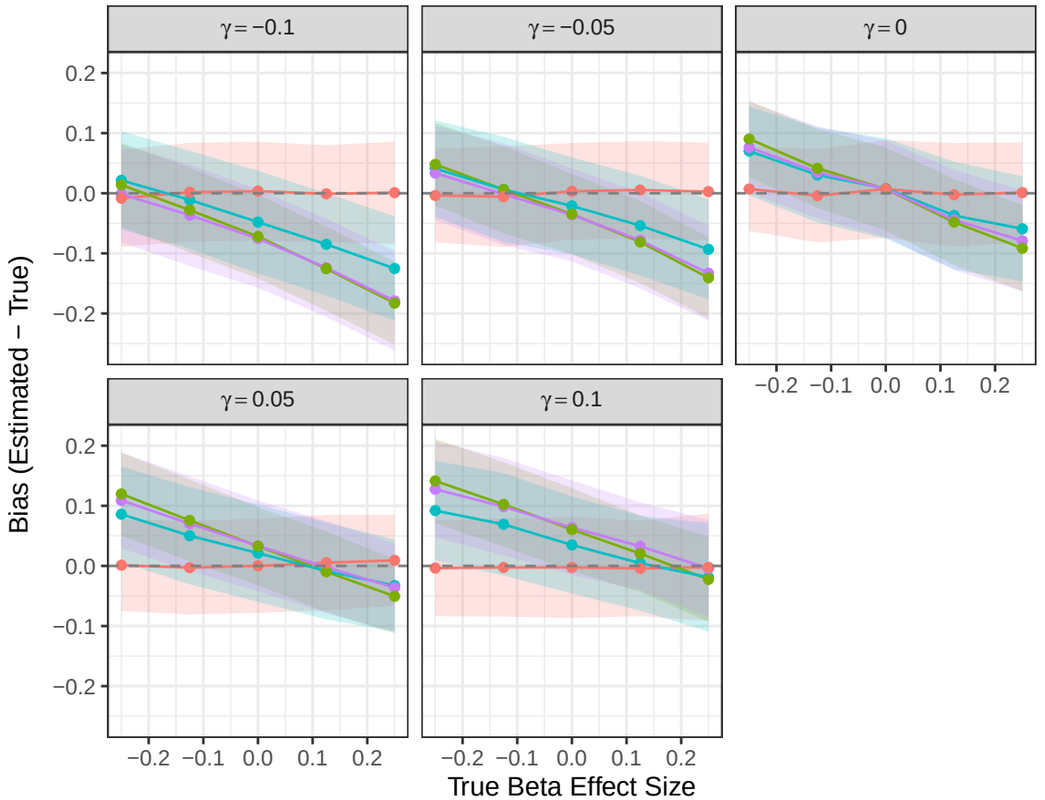
Error ribbons show Mean +/− 1 SD.

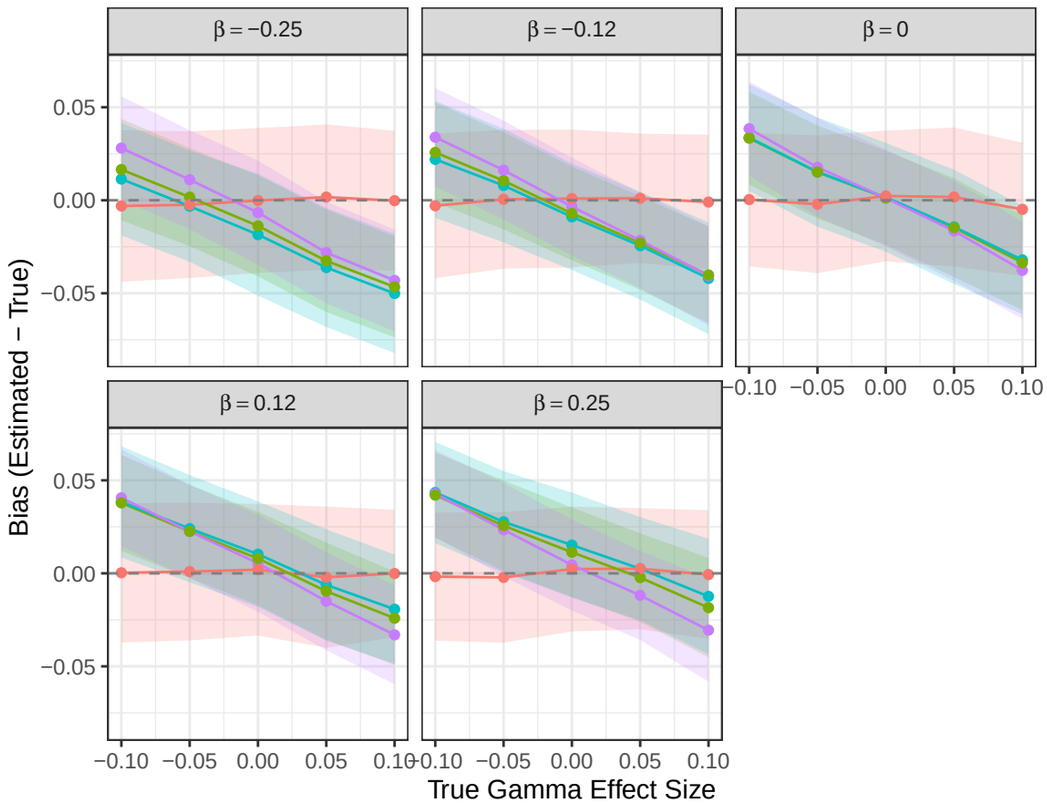
EXTREME NEGATIVE SKEW : Statistical Power



Red line = 5% Type I Error rate. Blue line = 80% Power.

STANDARD BIMODAL : Bias (Estimated − True)

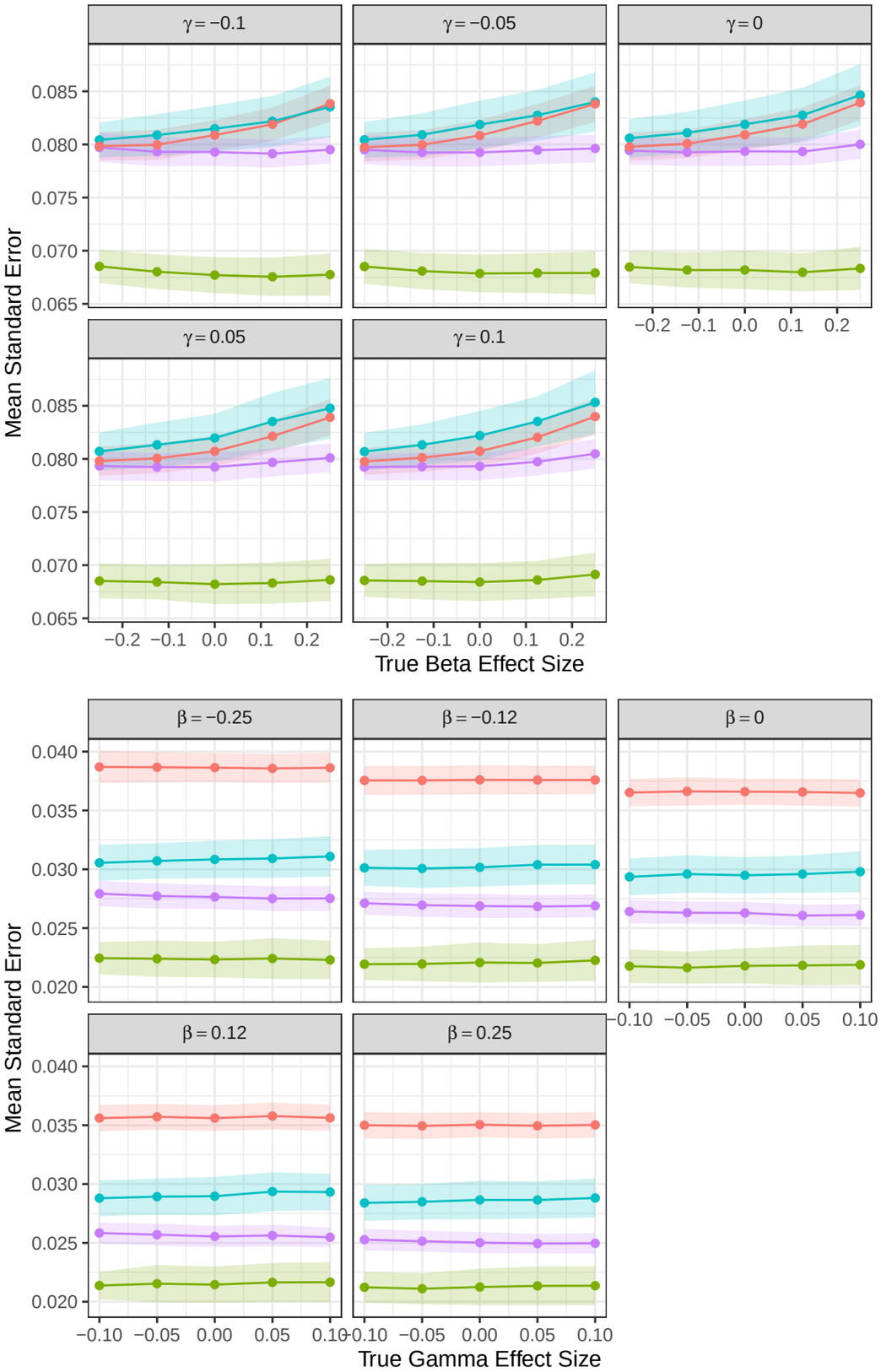




Method Gold Standard Mixture Model Noisy External Cutoff GMM Cutoff

Error ribbons show Mean +/− 1 SD.

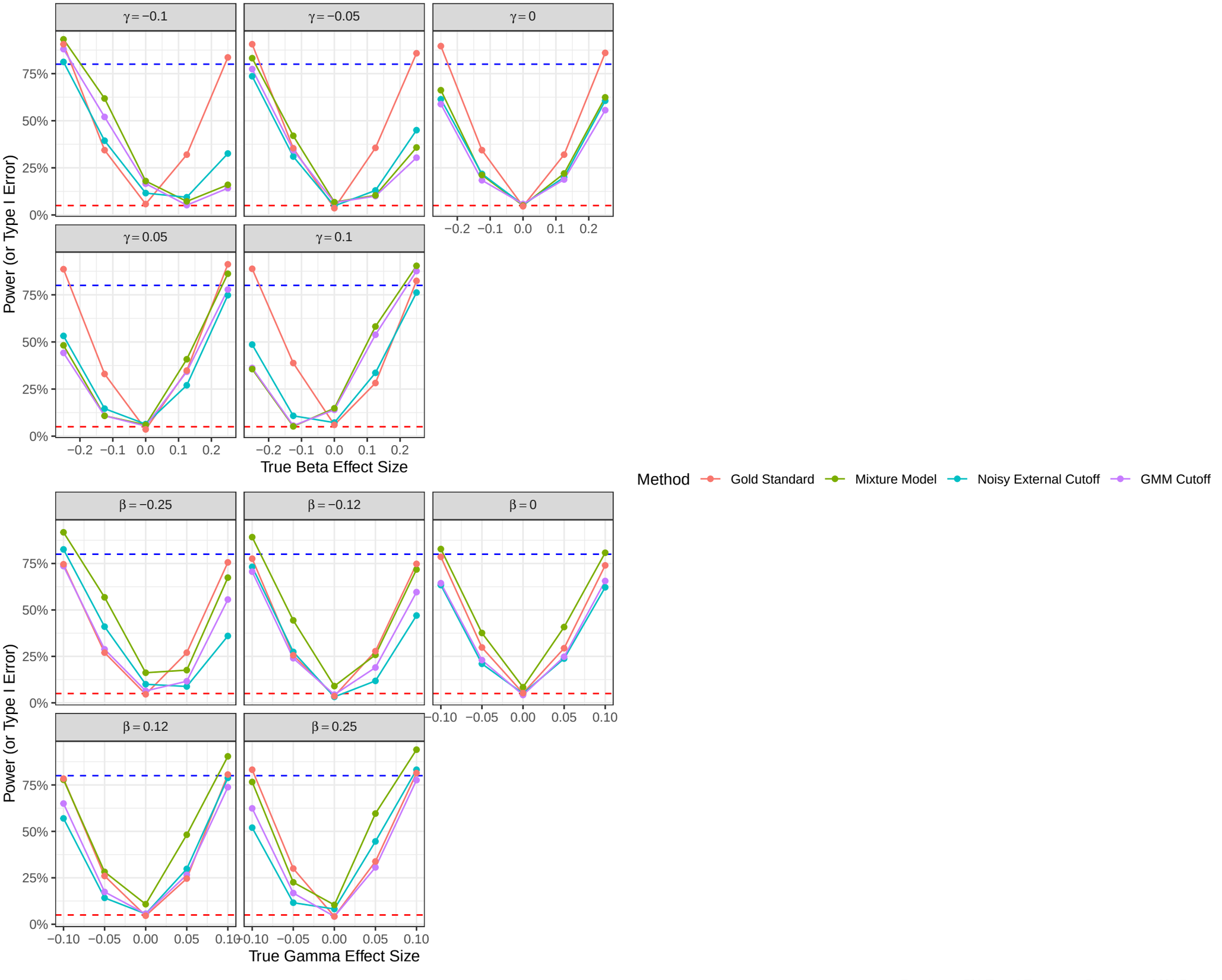
STANDARD BIMODAL : Mean Standard Error



Method — Gold Standard — Mixture Model — Noisy External Cutoff — GMM Cutoff

Error ribbons show Mean +/− 1 SD.

STANDARD BIMODAL : Statistical Power



Red line = 5% Type I Error rate. Blue line = 80% Power.