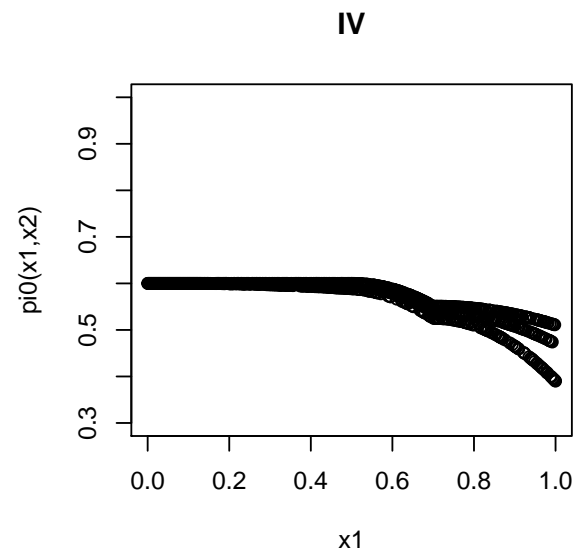
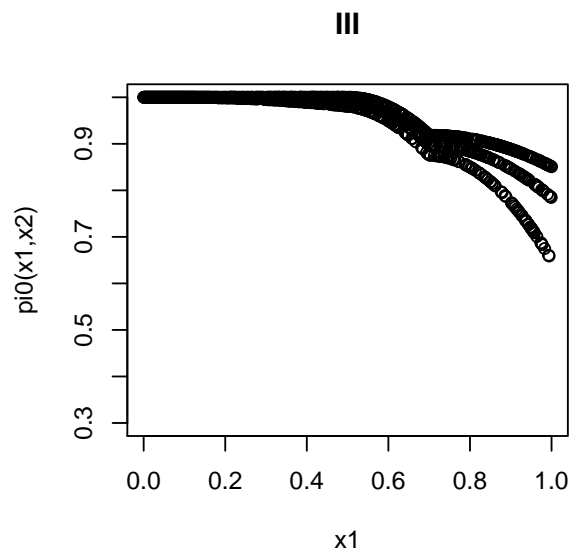
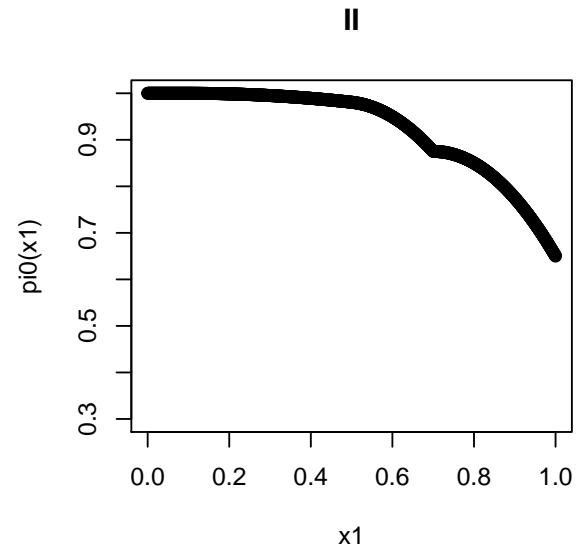
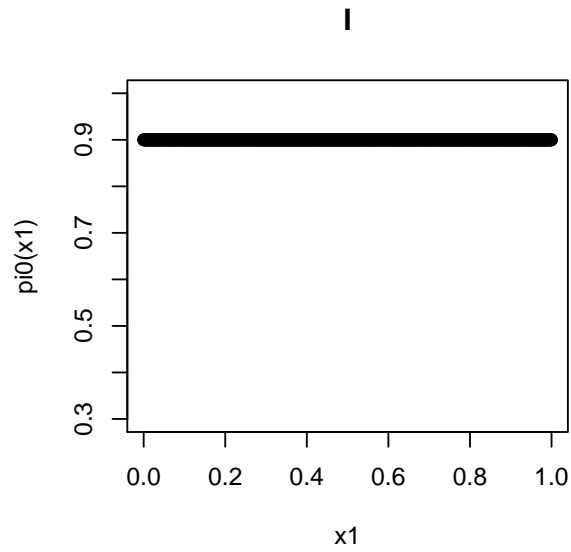


## Simulations, independence

Consider 1,000 tests in each simulation, 100 simulations per scenario, nominal FDR = 5%.  
The following 4 functions are considered for  $\pi_0(x)$ :



Estimated false discovery rates (FDR) and true positive rates (TPR). BL = Boca-Leek. W.S. = well-separated null and alternative, P.S. = poorly separated null and alternative. For III and IV, a dummy variable was used for  $x_2$ , along with linear or spline terms for  $x_1$ . Used reviewer's definition of "well-separated" and "poorly-separated." Used the theoretical null for the Scott method. For the t-test, considered 2 groups of 6 (so  $2 \times 6 = 10$  df) and used the t-statistics instead of the z-statistics for the Scott method.

$\pi_0(x)$	Distribution under $H_1$	Regression model	FDR				TPR			
			BL	Scott	Storey	BH	BL	Scott	Storey	BH
I	Beta(1,20)	Linear	0.05	0.90	0.05	0.04	0.00	1.00	0.00	0.00
II	Beta(1,20)	Linear	0.05	0.93	0.05	0.04	0.00	1.00	0.00	0.00
II	Beta(1,20)	Spline	0.06	0.93	0.05	0.04	0.00	1.00	0.00	0.00
III	Beta(1,20)	Linear	0.05	0.95	0.05	0.05	0.00	1.00	0.00	0.00
III	Beta(1,20)	Spline	0.06	0.95	0.05	0.05	0.00	1.00	0.00	0.00
IV	Beta(1,20)	Linear	0.06	0.57	0.05	0.03	0.12	1.00	0.05	0.00
IV	Beta(1,20)	Spline	0.08	0.57	0.05	0.03	0.15	1.00	0.05	0.00
I	Norm (W.S.)	Linear	0.05	0.05	0.05	0.04	0.51	0.51	0.51	0.50
II	Norm (W.S.)	Linear	0.05	0.06	0.05	0.05	0.49	0.64	0.48	0.47
II	Norm (W.S.)	Spline	0.06	0.06	0.05	0.05	0.49	0.64	0.48	0.47
III	Norm (W.S.)	Linear	0.06	0.06	0.05	0.05	0.45	0.60	0.44	0.43
III	Norm (W.S.)	Spline	0.06	0.06	0.05	0.05	0.46	0.61	0.44	0.43
IV	Norm (W.S.)	Linear	0.05	0.05	0.05	0.03	0.72	0.72	0.71	0.65
IV	Norm (W.S.)	Spline	0.05	0.05	0.05	0.03	0.72	0.72	0.71	0.65
I	Norm (P.S.)	Linear	0.06	0.05	0.05	0.05	0.03	0.03	0.03	0.03
II	Norm (P.S.)	Linear	0.05	0.05	0.05	0.05	0.03	0.05	0.03	0.02
II	Norm (P.S.)	Spline	0.05	0.05	0.05	0.05	0.03	0.05	0.03	0.02
III	Norm (P.S.)	Linear	0.08	0.04	0.07	0.07	0.02	0.04	0.02	0.02
III	Norm (P.S.)	Spline	0.08	0.05	0.07	0.07	0.03	0.05	0.02	0.02
IV	Norm (P.S.)	Linear	0.04	0.04	0.04	0.03	0.08	0.08	0.07	0.06
IV	Norm (P.S.)	Spline	0.04	0.04	0.04	0.03	0.08	0.08	0.07	0.06
I	T (W.S.)	Linear	0.06	0.21	0.06	0.05	0.16	0.55	0.15	0.14
II	T (W.S.)	Linear	0.05	0.21	0.05	0.04	0.13	0.64	0.12	0.11
II	T (W.S.)	Spline	0.05	0.21	0.05	0.04	0.14	0.65	0.12	0.11
III	T (W.S.)	Linear	0.06	0.27	0.06	0.05	0.09	0.55	0.08	0.08
III	T (W.S.)	Spline	0.07	0.27	0.06	0.05	0.10	0.55	0.08	0.08
IV	T (W.S.)	Linear	0.05	0.09	0.05	0.03	0.52	0.73	0.52	0.40
IV	T (W.S.)	Spline	0.05	0.09	0.05	0.03	0.53	0.73	0.52	0.40
I	T (P.S.)	Linear	0.08	0.46	0.08	0.08	0.00	0.08	0.00	0.00
II	T (P.S.)	Linear	0.07	0.44	0.06	0.06	0.00	0.11	0.00	0.00
II	T (P.S.)	Spline	0.07	0.44	0.06	0.06	0.00	0.11	0.00	0.00
III	T (P.S.)	Linear	0.08	0.60	0.08	0.08	0.00	0.08	0.00	0.00
III	T (P.S.)	Spline	0.09	0.60	0.08	0.08	0.00	0.08	0.00	0.00
IV	T (P.S.)	Linear	0.04	0.15	0.03	0.03	0.01	0.14	0.01	0.00
IV	T (P.S.)	Spline	0.05	0.15	0.03	0.03	0.01	0.14	0.01	0.00

Estimated false discovery rates (FDR) and true positive rates (TPR). BL = Boca-Leek. W.S. = well-separated null and alternative, P.S. = poorly separated null and alternative. For III and IV, a dummy variable was used for  $x_2$ , along with linear or spline terms for  $x_1$ . Extended "well-separated" and "poorly-separated" definition to chisquared test, generating means from the absolute value of a normal distribution with mean 9, respectively 1. For the chisquared test, 1 df corresponds to a 2x2 table, 4 df to a 3x3 table. Used the z-values obtained from back-transforming the p-values for the Scott method in this case.

$\pi_0(x)$	Distribution under $H_1$	Regression model	FDR				TPR			
			BL	Scott	Storey	BH	BL	Scott	Storey	BH
I	Chisq 1 df (W.S.)	Linear	0.05	0.90	0.05	0.04	0.51	1.00	0.51	0.50
II	Chisq 1 df (W.S.)	Linear	0.05	0.93	0.05	0.04	0.48	1.00	0.47	0.46
II	Chisq 1 df (W.S.)	Spline	0.05	0.93	0.05	0.04	0.49	1.00	0.47	0.46
III	Chisq 1 df (W.S.)	Linear	0.05	0.95	0.05	0.05	0.44	1.00	0.43	0.42
III	Chisq 1 df (W.S.)	Spline	0.05	0.95	0.05	0.05	0.45	1.00	0.43	0.42
IV	Chisq 1 df (W.S.)	Linear	0.05	0.57	0.05	0.03	0.72	1.00	0.71	0.65
IV	Chisq 1 df (W.S.)	Spline	0.05	0.57	0.05	0.03	0.72	1.00	0.71	0.65
I	Chisq 4 df (W.S.)	Linear	0.05	0.90	0.05	0.05	0.31	1.00	0.31	0.30
II	Chisq 4 df (W.S.)	Linear	0.05	0.93	0.05	0.05	0.28	1.00	0.28	0.27
II	Chisq 4 df (W.S.)	Spline	0.05	0.93	0.05	0.05	0.29	1.00	0.28	0.27
III	Chisq 4 df (W.S.)	Linear	0.06	0.95	0.05	0.05	0.25	1.00	0.24	0.23
III	Chisq 4 df (W.S.)	Spline	0.06	0.95	0.05	0.05	0.25	1.00	0.24	0.23
IV	Chisq 4 df (W.S.)	Linear	0.05	0.57	0.05	0.03	0.52	1.00	0.52	0.45
IV	Chisq 4 df (W.S.)	Spline	0.05	0.57	0.05	0.03	0.53	1.00	0.52	0.45
I	Chisq 1 df (P.S.)	Linear	0.04	0.90	0.04	0.03	0.03	1.00	0.03	0.03
II	Chisq 1 df (P.S.)	Linear	0.06	0.93	0.05	0.05	0.02	1.00	0.02	0.02
II	Chisq 1 df (P.S.)	Spline	0.06	0.93	0.05	0.05	0.02	1.00	0.02	0.02
III	Chisq 1 df (P.S.)	Linear	0.05	0.95	0.04	0.04	0.02	1.00	0.02	0.02
III	Chisq 1 df (P.S.)	Spline	0.05	0.95	0.04	0.04	0.02	1.00	0.02	0.02
IV	Chisq 1 df (P.S.)	Linear	0.04	0.57	0.03	0.03	0.07	1.00	0.07	0.06
IV	Chisq 1 df (P.S.)	Spline	0.04	0.57	0.03	0.03	0.08	1.00	0.07	0.06
I	Chisq 4 df (P.S.)	Linear	0.07	0.90	0.06	0.06	0.01	1.00	0.01	0.01
II	Chisq 4 df (P.S.)	Linear	0.05	0.93	0.05	0.05	0.01	1.00	0.01	0.01
II	Chisq 4 df (P.S.)	Spline	0.05	0.93	0.05	0.05	0.01	1.00	0.01	0.01
III	Chisq 4 df (P.S.)	Linear	0.06	0.95	0.06	0.06	0.01	1.00	0.01	0.01
III	Chisq 4 df (P.S.)	Spline	0.07	0.95	0.06	0.06	0.01	1.00	0.01	0.01
IV	Chisq 4 df (P.S.)	Linear	0.05	0.57	0.05	0.04	0.02	1.00	0.02	0.01
IV	Chisq 4 df (P.S.)	Spline	0.05	0.57	0.05	0.04	0.02	1.00	0.02	0.01