Panel Cointegrating Polynomial Regressions: Group-Mean Fully Modified OLS Estimation and Inference
(Supplementary Material)

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A Additional Finite Sample Results

Table 7: Bias and RMSE of the estimators of β_1 in the individual specific intercepts only case with zero drifts.

		$N=10$			$N=20$			$N=100$		
T	ρ_1,ρ_2	$\hat{\beta}_1$	$\hat{\beta}_1^+$	$\hat{\beta}_{P,1}^+$	$\hat{\beta}_1$	$\hat{\beta}_1^+$	$\hat{\beta}_{P,1}^+$	$\hat{\beta}_1$	$\hat{\beta}_1^+$	$\hat{\beta}_{P,1}^+$
Bias, $\rho_3=0$										
100	0	−0.00	0.00	−0.00	−0.00	−0.00	−0.00	0.00	0.00	0.00
	0.3	0.24	0.06	0.01	0.24	0.05	0.01	0.25	0.06	0.01
	0.6	0.92	0.28	0.10	0.92	0.28	0.09	0.92	0.28	0.09
	0.9	3.47	1.42	1.30	3.51	1.46	1.25	3.49	1.44	1.19
250	0	−0.00	−0.00	−0.00	−0.00	−0.00	0.00	−0.00	−0.00	−0.00
	0.3	0.10	0.01	0.00	0.10	0.01	0.00	0.10	0.01	0.00
	0.6	0.42	0.09	0.03	0.42	0.09	0.03	0.42	0.09	0.03
	0.9	2.09	0.66	0.47	2.10	0.67	0.44	2.10	0.67	0.42
500	0	0.00	0.00	0.00	−0.00	−0.00	−0.00	0.00	0.00	0.00
	0.3	0.05	0.01	0.00	0.05	0.00	0.00	0.05	0.00	0.00
	0.6	0.23	0.04	0.01	0.22	0.04	0.01	0.23	0.04	0.01
	0.9	1.31	0.37	0.19	1.31	0.36	0.18	1.32	0.38	0.17
Bias, $\rho_3=0.9$										
100	0	−0.01	−0.00	−0.00	−0.01	−0.01	−0.01	0.02	0.02	0.01
	0.3	0.23	0.05	0.02	0.22	0.04	0.00	0.27	0.09	0.03
	0.6	0.91	0.27	0.17	0.86	0.24	0.14	0.96	0.32	0.19
	0.9	3.51	1.37	1.47	3.33	1.16	1.33	3.53	1.45	1.53
250	0	−0.00	−0.00	−0.00	0.00	0.00	0.00	−0.00	−0.00	−0.00
	0.3	0.10	0.01	0.00	0.11	0.02	0.01	0.10	0.01	0.00
	0.6	0.43	0.10	0.05	0.43	0.09	0.05	0.42	0.09	0.05
	0.9	2.16	0.70	0.62	2.10	0.64	0.63	2.10	0.63	0.60
500	0	0.00	0.00	−0.00	−0.01	−0.01	−0.00	0.00	0.00	0.00
	0.3	0.05	0.01	0.00	0.04	−0.01	−0.00	0.05	0.00	0.00
	0.6	0.23	0.05	0.02	0.21	0.02	0.02	0.23	0.04	0.02
	0.9	1.35	0.39	0.29	1.29	0.34	0.27	1.33	0.38	0.29
RMSE, $\rho_3=0$										
100	0	0.50	0.50	0.09	0.34	0.35	0.06	0.16	0.16	0.02
	0.3	0.69	0.65	0.12	0.51	0.45	0.08	0.32	0.22	0.03
	0.6	1.35	1.00	0.24	1.16	0.73	0.17	0.98	0.42	0.11
	0.9	4.15	2.95	1.53	3.87	2.34	1.37	3.57	1.65	1.21
250	0	0.17	0.17	0.03	0.12	0.12	0.02	0.05	0.05	0.01
	0.3	0.25	0.23	0.05	0.19	0.16	0.03	0.12	0.07	0.01
	0.6	0.58	0.39	0.09	0.51	0.28	0.06	0.44	0.15	0.03
	0.9	2.42	1.37	0.60	2.26	1.07	0.51	2.13	0.77	0.43
500	0	0.08	0.08	0.02	0.06	0.06	0.01	0.02	0.02	0.00
	0.3	0.12	0.11	0.02	0.09	0.08	0.02	0.06	0.04	0.01
	0.6	0.30	0.19	0.04	0.26	0.14	0.03	0.23	0.07	0.02
	0.9	1.51	0.78	0.28	1.41	0.61	0.23	1.34	0.44	0.18
RMSE, $\rho_3=0.9$										
100	0	1.02	1.02	0.52	1.02	1.03	0.48	1.01	1.03	0.45
	0.3	1.36	1.33	0.69	1.35	1.34	0.65	1.34	1.32	0.60
	0.6	2.28	2.02	1.11	2.21	2.04	1.04	2.21	2.00	0.96
	0.9	5.91	5.65	3.65	5.48	5.30	3.31	5.54	5.41	3.19
250	0	0.36	0.36	0.20	0.35	0.35	0.18	0.35	0.35	0.17
	0.3	0.50	0.49	0.28	0.49	0.48	0.25	0.49	0.48	0.24
	0.6	0.95	0.80	0.47	0.94	0.79	0.43	0.93	0.79	0.41
	0.9	3.32	2.62	1.76	3.21	2.48	1.63	3.23	2.52	1.56
500	0	0.17	0.18	0.10	0.17	0.17	0.09	0.16	0.17	0.08
	0.3	0.25	0.25	0.14	0.25	0.24	0.13	0.24	0.23	0.12
	0.6	0.50	0.41	0.24	0.49	0.40	0.22	0.47	0.38	0.20
	0.9	2.06	1.49	0.95	2.00	1.42	0.89	1.96	1.35	0.81

Note: See note to Table 1 in the main document.

Table 8: Bias and RMSE of the estimators of β_1 in the individual specific intercepts and linear trends case with zero drifts.

		$N=10$			$N=20$			$N=100$		
T	ρ_1,ρ_2	$\hat{\beta}_1$	$\hat{\beta}_1^+$	$\hat{\beta}_{P,1}^+$	$\hat{\beta}_1$	$\hat{\beta}_1^+$	$\hat{\beta}_{P,1}^+$	$\hat{\beta}_1$	$\hat{\beta}_1^+$	$\hat{\beta}_{P,1}^+$
Bias, $\rho_3=0$										
100	0	0.00	0.00	−0.00	−0.00	−0.00	−0.00	0.00	0.00	0.00
	0.3	0.31	0.10	0.02	0.31	0.10	0.02	0.31	0.10	0.02
	0.6	1.19	0.61	0.25	1.19	0.61	0.25	1.20	0.61	0.24
	0.9	4.62	3.76	2.71	4.65	3.76	2.67	4.64	3.76	2.64
250	0	−0.00	−0.00	0.00	−0.00	−0.00	0.00	−0.00	−0.00	0.00
	0.3	0.13	0.02	0.01	0.13	0.02	0.01	0.13	0.02	0.01
	0.6	0.54	0.19	0.07	0.54	0.19	0.07	0.54	0.19	0.06
	0.9	2.79	1.77	1.10	2.78	1.77	1.04	2.79	1.78	1.02
500	0	0.00	0.00	0.00	−0.00	−0.00	−0.00	−0.00	−0.00	0.00
	0.3	0.07	0.01	0.00	0.06	0.01	0.00	0.06	0.01	0.00
	0.6	0.29	0.08	0.03	0.28	0.07	0.02	0.29	0.07	0.02
	0.9	1.74	0.90	0.46	1.73	0.88	0.43	1.74	0.89	0.42
Bias, $\rho_3=0.9$										
100	0	−0.01	−0.00	−0.00	−0.01	−0.01	−0.01	0.02	0.02	0.02
	0.3	0.30	0.10	0.05	0.29	0.08	0.03	0.34	0.14	0.07
	0.6	1.18	0.60	0.41	1.14	0.58	0.37	1.24	0.67	0.44
	0.9	4.65	3.77	3.28	4.52	3.62	3.15	4.73	3.90	3.36
250	0	−0.00	−0.00	−0.00	0.00	0.00	0.00	−0.00	−0.00	−0.00
	0.3	0.13	0.03	0.01	0.13	0.03	0.01	0.13	0.02	0.01
	0.6	0.55	0.19	0.12	0.55	0.19	0.12	0.54	0.19	0.12
	0.9	2.86	1.83	1.50	2.77	1.73	1.44	2.83	1.82	1.47
500	0	0.00	0.00	−0.00	−0.01	−0.01	−0.00	0.00	0.00	0.00
	0.3	0.07	0.01	0.00	0.05	−0.00	−0.00	0.07	0.01	0.01
	0.6	0.30	0.08	0.05	0.27	0.06	0.04	0.29	0.08	0.05
	0.9	1.77	0.91	0.69	1.70	0.84	0.64	1.74	0.89	0.66
RMSE, $\rho_3=0$										
100	0	0.51	0.52	0.11	0.35	0.36	0.07	0.17	0.17	0.03
	0.3	0.73	0.67	0.16	0.55	0.47	0.11	0.38	0.24	0.05
	0.6	1.56	1.17	0.38	1.39	0.92	0.31	1.24	0.69	0.25
	0.9	5.09	4.37	2.85	4.89	4.09	2.74	4.69	3.83	2.65
250	0	0.18	0.18	0.04	0.12	0.12	0.03	0.05	0.05	0.01
	0.3	0.27	0.24	0.06	0.21	0.17	0.04	0.15	0.08	0.02
	0.6	0.69	0.44	0.13	0.61	0.33	0.10	0.56	0.23	0.07
	0.9	3.05	2.15	1.21	2.91	1.95	1.10	2.82	1.82	1.03
500	0	0.08	0.08	0.02	0.06	0.06	0.01	0.03	0.03	0.01
	0.3	0.13	0.12	0.03	0.10	0.08	0.02	0.07	0.04	0.01
	0.6	0.36	0.21	0.06	0.32	0.15	0.04	0.30	0.10	0.03
	0.9	1.90	1.15	0.53	1.81	1.02	0.47	1.75	0.92	0.43
RMSE, $\rho_3=0.9$										
100	0	1.06	1.07	0.59	1.06	1.07	0.54	1.05	1.07	0.53
	0.3	1.42	1.38	0.80	1.42	1.40	0.74	1.41	1.39	0.71
	0.6	2.47	2.18	1.34	2.42	2.20	1.25	2.43	2.18	1.22
	0.9	6.62	6.17	4.64	6.29	5.93	4.40	6.33	6.07	4.45
250	0	0.38	0.38	0.23	0.36	0.37	0.21	0.37	0.37	0.20
	0.3	0.53	0.52	0.32	0.53	0.51	0.29	0.53	0.51	0.29
	0.6	1.05	0.86	0.55	1.05	0.86	0.52	1.05	0.86	0.50
	0.9	3.87	3.21	2.39	3.79	3.07	2.26	3.82	3.14	2.25
500	0	0.18	0.18	0.11	0.18	0.18	0.10	0.17	0.18	0.10
	0.3	0.27	0.26	0.16	0.26	0.25	0.15	0.26	0.25	0.14
	0.6	0.56	0.44	0.27	0.54	0.42	0.25	0.53	0.42	0.24
	0.9	2.44	1.78	1.27	2.36	1.71	1.18	2.34	1.68	1.14

Note: See note to Table 1 in the main document.

Table 9: Bias and RMSE of the estimators of β_2 in the individual specific intercepts only case with non-zero drifts.

		$N=10$			$N=20$			$N=100$		
T	ρ_1,ρ_2	$\hat{\beta}_2$	$\hat{\beta}_2^+$	$\hat{\beta}_{P,2}^+$	$\hat{\beta}_2$	$\hat{\beta}_2^+$	$\hat{\beta}_{P,2}^+$	$\hat{\beta}_2$	$\hat{\beta}_2^+$	$\hat{\beta}_{P,2}^+$
Bias×100, $\rho_3=0$										
100	0	−0.16	−0.29	−0.00	0.18	0.14	−0.04	0.46	0.45	0.01
	0.3	−20.54	−4.49	−0.38	−20.26	−4.00	−0.31	−19.88	−3.59	−0.17
	0.6	−73.12	−14.48	−4.03	−73.12	−14.66	−3.23	−72.57	−14.21	−2.34
	0.9	−199.08	52.22	−25.80	−196.49	55.68	−25.20	−196.34	50.57	−22.46
250	0	−0.14	−0.14	−0.00	−0.03	−0.03	0.02	0.02	0.02	0.01
	0.3	−4.80	−0.73	−0.06	−4.67	−0.55	−0.02	−4.59	−0.50	−0.03
	0.6	−19.62	−3.52	−0.78	−19.42	−3.09	−0.59	−19.40	−3.17	−0.51
	0.9	−83.35	0.11	−6.78	−82.58	0.93	−6.17	−83.45	−0.31	−5.86
500	0	−0.03	−0.03	0.01	0.02	0.02	−0.00	−0.02	−0.02	0.00
	0.3	−1.01	−0.10	0.00	−0.92	−0.03	−0.01	−0.98	−0.09	−0.00
	0.6	−4.42	−0.64	−0.12	−4.24	−0.50	−0.13	−4.37	−0.62	−0.10
	0.9	−24.69	−2.33	−1.45	−24.22	−2.06	−1.47	−24.69	−2.54	−1.29
Bias×100, $\rho_3=0.9$										
100	0	1.07	0.56	0.19	0.94	0.93	1.12	1.21	1.06	0.05
	0.3	−18.90	−2.99	−0.52	−19.55	−2.82	0.48	−18.22	−2.13	−0.69
	0.6	−69.74	−10.60	−3.42	−72.76	−11.83	−3.11	−69.01	−10.05	−4.18
	0.9	−195.18	66.28	17.62	−197.82	70.29	12.74	−189.32	72.69	5.10
250	0	−0.20	−0.25	0.00	0.28	0.30	0.06	0.04	−0.02	−0.07
	0.3	−4.85	−0.83	−0.14	−4.29	−0.08	−0.03	−4.56	−0.64	−0.24
	0.6	−19.64	−3.50	−1.23	−19.14	−2.54	−1.02	−19.39	−3.41	−1.32
	0.9	−82.72	1.73	−0.54	−83.23	4.45	−0.47	−82.87	2.45	−2.41
500	0	0.01	0.01	0.01	0.06	0.06	0.06	−0.04	−0.04	−0.00
	0.3	−0.94	−0.04	−0.02	−0.91	0.01	0.06	−0.96	−0.10	−0.02
	0.6	−4.25	−0.46	−0.24	−4.31	−0.46	−0.14	−4.25	−0.61	−0.24
	0.9	−23.98	−1.24	−1.08	−24.91	−2.03	−1.00	−24.34	−2.45	−1.39
RMSE×10, $\rho_3=0$										
100	0	5.92	5.99	0.78	4.16	4.22	0.44	1.84	1.86	0.16
	0.3	7.90	7.73	1.10	5.75	5.44	0.62	3.11	2.42	0.22
	0.6	13.86	11.50	1.93	11.14	8.23	1.12	8.18	3.87	0.45
	0.9	33.36	29.69	7.13	27.53	21.48	4.66	21.49	10.96	2.70
250	0	0.93	0.93	0.18	0.63	0.64	0.11	0.28	0.29	0.04
	0.3	1.39	1.30	0.26	1.00	0.88	0.16	0.61	0.40	0.06
	0.6	3.03	2.14	0.46	2.51	1.47	0.28	2.06	0.72	0.12
	0.9	11.08	6.99	2.07	9.76	4.97	1.37	8.66	2.26	0.75
500	0	0.19	0.19	0.05	0.13	0.13	0.03	0.06	0.06	0.01
	0.3	0.29	0.26	0.07	0.20	0.18	0.05	0.13	0.08	0.02
	0.6	0.67	0.45	0.13	0.55	0.31	0.08	0.46	0.15	0.03
	0.9	3.21	1.78	0.59	2.82	1.25	0.39	2.55	0.61	0.19
RMSE×10, $\rho_3=0.9$										
100	0	12.07	12.18	4.83	11.77	11.82	4.22	11.01	11.00	3.53
	0.3	16.02	15.66	6.39	15.44	15.09	5.63	14.49	14.12	4.73
	0.6	26.42	23.61	10.02	25.14	22.02	8.73	23.74	20.80	7.36
	0.9	60.78	62.98	29.71	57.44	57.07	25.30	54.93	54.56	20.87
250	0	2.02	2.04	1.04	2.00	2.01	0.91	1.95	1.96	0.81
	0.3	2.88	2.82	1.44	2.87	2.77	1.27	2.80	2.71	1.13
	0.6	5.48	4.65	2.41	5.50	4.58	2.13	5.36	4.47	1.89
	0.9	18.82	15.71	8.65	18.94	15.54	7.67	18.14	14.79	6.74
500	0	0.43	0.43	0.25	0.44	0.44	0.24	0.43	0.43	0.23
	0.3	0.63	0.61	0.36	0.65	0.62	0.34	0.65	0.61	0.32
	0.6	1.29	1.06	0.62	1.31	1.06	0.59	1.32	1.05	0.56
	0.9	5.64	4.33	2.52	5.62	4.14	2.33	5.63	4.14	2.20

Note: The column labels $\hat{\beta}_2$, $\hat{\beta}_2^+$ and $\hat{\beta}_{P,2}^+$ denote the group-mean OLS estimator, the group-mean FM-OLS estimator and the pooled FM-OLS estimator, respectively, of β_2.

Table 10: Bias and RMSE of the estimators of β_2 in the individual specific intercepts and linear trends case with non-zero drifts.

		$N=10$			$N=20$			$N=100$		
T	ρ_1,ρ_2	$\hat{\beta}_2$	$\hat{\beta}_2^+$	$\hat{\beta}_{P,2}^+$	$\hat{\beta}_2$	$\hat{\beta}_2^+$	$\hat{\beta}_{P,2}^+$	$\hat{\beta}_2$	$\hat{\beta}_2^+$	$\hat{\beta}_{P,2}^+$
Bias×100, $\rho_3=0$										
100	0	−0.46	−0.57	−0.09	0.03	0.02	−0.00	0.36	0.38	0.01
	0.3	−17.35	−6.55	−0.63	−16.98	−5.76	−0.32	−16.52	−5.27	−0.17
	0.6	−57.10	−27.00	−4.21	−57.14	−26.96	−2.71	−56.59	−26.18	−1.71
	0.9	−108.17	−63.97	−22.18	−109.86	−64.64	−16.50	−110.02	−66.29	−11.84
250	0	−0.16	−0.16	0.02	−0.00	0.00	0.02	0.02	0.03	0.02
	0.3	−4.01	−1.01	−0.07	−3.78	−0.75	−0.05	−3.74	−0.74	−0.03
	0.6	−15.78	−5.42	−0.94	−15.38	−4.90	−0.72	−15.37	−4.99	−0.53
	0.9	−56.03	−26.62	−9.76	−54.83	−25.65	−8.05	−55.56	−26.54	−6.51
500	0	−0.02	−0.02	−0.00	0.04	0.04	0.00	−0.02	−0.02	−0.00
	0.3	−0.83	−0.15	−0.02	−0.75	−0.07	−0.01	−0.82	−0.14	−0.01
	0.6	−3.62	−1.03	−0.22	−3.47	−0.88	−0.18	−3.61	−1.02	−0.15
	0.9	−18.46	−8.79	−2.77	−18.08	−8.40	−2.52	−18.64	−8.98	−2.17
Bias×100, $\rho_3=0.9$										
100	0	1.06	0.85	0.38	0.97	1.09	1.15	1.34	1.31	0.16
	0.3	−15.55	−4.65	−1.14	−16.07	−3.94	−0.23	−14.50	−3.81	−1.36
	0.6	−53.92	−23.12	−8.73	−56.61	−23.56	−8.04	−52.32	−22.80	−8.88
	0.9	−109.33	−68.18	−39.02	−111.87	−61.76	−35.04	−102.11	−61.90	−35.58
250	0	−0.27	−0.32	−0.02	0.34	0.32	0.13	0.07	0.01	−0.02
	0.3	−4.11	−1.23	−0.34	−3.36	−0.30	−0.08	−3.72	−0.88	−0.32
	0.6	−15.83	−5.68	−2.45	−14.97	−4.38	−1.95	−15.55	−5.42	−2.32
	0.9	−55.11	−27.71	−16.24	−54.59	−24.10	−14.99	−56.38	−27.47	−16.23
500	0	−0.01	−0.02	−0.01	0.06	0.06	0.06	−0.04	−0.04	−0.02
	0.3	−0.79	−0.13	−0.06	−0.77	−0.04	0.02	−0.79	−0.16	−0.08
	0.6	−3.44	−0.89	−0.52	−3.65	−0.89	−0.42	−3.46	−1.01	−0.54
	0.9	−17.61	−8.01	−5.42	−19.49	−8.96	−5.43	−18.24	−9.06	−5.54
RMSE×10, $\rho_3=0$										
100	0	6.12	6.18	0.93	4.29	4.33	0.55	1.88	1.90	0.20
	0.3	8.07	7.93	1.29	5.78	5.58	0.77	2.94	2.49	0.28
	0.6	13.29	11.85	2.24	10.24	8.65	1.34	6.78	4.46	0.51
	0.9	26.28	25.13	6.98	20.48	18.65	4.48	13.43	10.34	2.00
250	0	0.95	0.96	0.21	0.65	0.66	0.13	0.29	0.29	0.05
	0.3	1.39	1.33	0.30	0.98	0.90	0.19	0.55	0.41	0.07
	0.6	2.82	2.22	0.53	2.23	1.55	0.33	1.69	0.82	0.14
	0.9	8.96	7.04	2.36	7.39	5.19	1.61	5.97	3.33	0.87
500	0	0.19	0.19	0.06	0.13	0.13	0.04	0.06	0.06	0.01
	0.3	0.29	0.27	0.08	0.20	0.18	0.05	0.12	0.08	0.02
	0.6	0.64	0.47	0.14	0.50	0.33	0.09	0.40	0.17	0.04
	0.9	2.80	1.99	0.71	2.33	1.51	0.49	1.98	1.06	0.28
RMSE×10, $\rho_3=0.9$										
100	0	12.42	12.54	5.19	12.21	12.25	4.59	11.28	11.30	3.88
	0.3	16.38	16.03	6.84	15.94	15.59	6.09	14.73	14.42	5.18
	0.6	26.19	24.06	10.71	25.10	22.77	9.36	23.38	21.19	8.02
	0.9	53.20	51.98	25.76	50.44	48.66	22.09	47.78	45.41	18.74
250	0	2.10	2.12	1.10	2.06	2.07	0.99	2.01	2.02	0.89
	0.3	2.99	2.92	1.53	2.92	2.84	1.37	2.87	2.79	1.24
	0.6	5.54	4.81	2.55	5.42	4.67	2.30	5.35	4.61	2.07
	0.9	17.44	15.07	8.45	17.05	14.53	7.74	16.70	13.96	6.92
500	0	0.45	0.45	0.27	0.46	0.46	0.26	0.44	0.44	0.25
	0.3	0.66	0.63	0.38	0.67	0.64	0.37	0.66	0.62	0.35
	0.6	1.31	1.10	0.67	1.33	1.10	0.63	1.34	1.08	0.61
	0.9	5.57	4.45	2.71	5.52	4.33	2.54	5.55	4.31	2.44

Note: See note to Table 9.

Table 11: Bias and RMSE of the estimators of β_3 in the individual specific intercepts only case with non-zero drifts.

		$N=10$			$N=20$			$N=100$		
T	ρ_1,ρ_2	$\hat{\beta}_3$	$\hat{\beta}_3^+$	$\hat{\beta}_{P,3}^+$	$\hat{\beta}_3$	$\hat{\beta}_3^+$	$\hat{\beta}_{P,3}^+$	$\hat{\beta}_3$	$\hat{\beta}_3^+$	$\hat{\beta}_{P,3}^+$
Bias×1,000, $\rho_3=0$										
100	0	5.03	6.31	0.22	2.61	2.89	0.05	0.30	0.07	0.00
	0.3	152.17	47.96	0.88	148.95	44.55	0.40	147.60	40.34	0.18
	0.6	499.76	156.55	5.87	495.40	148.34	3.64	494.82	143.39	2.20
	0.9	1051.39	−15.37	24.90	1046.81	−22.56	22.13	1040.73	−37.91	19.34
250	0	0.67	0.69	−0.00	0.11	0.07	−0.02	−0.17	−0.17	−0.01
	0.3	13.16	2.83	0.05	12.45	1.75	0.01	12.05	1.56	0.02
	0.6	51.37	11.23	0.61	50.48	9.21	0.41	49.90	9.22	0.33
	0.9	189.06	4.25	4.51	188.20	0.99	3.91	188.52	4.06	3.53
500	0	0.01	0.00	−0.00	−0.04	−0.04	0.00	0.03	0.03	−0.00
	0.3	1.14	0.09	−0.00	1.04	0.04	0.00	1.15	0.13	0.00
	0.6	5.07	0.72	0.05	4.82	0.59	0.06	5.02	0.79	0.04
	0.9	26.51	2.08	0.58	25.63	1.72	0.58	26.43	2.62	0.48
Bias×1,000, $\rho_3=0.9$										
100	0	−10.77	−8.29	−2.52	1.15	1.37	−3.36	−12.82	−10.97	−1.15
	0.3	134.73	37.42	1.58	150.25	40.73	−1.39	133.88	29.56	1.02
	0.6	483.64	149.11	12.91	503.08	143.28	7.32	480.02	131.59	7.90
	0.9	1059.33	−15.49	−89.44	1071.01	−73.05	−87.42	1011.94	−76.23	−65.45
250	0	1.31	1.44	0.30	−0.49	−0.45	−0.11	0.39	0.55	0.19
	0.3	13.97	3.42	0.60	11.13	0.75	−0.01	12.61	2.69	0.43
	0.6	52.81	11.63	2.31	47.86	7.61	1.31	50.38	11.02	1.71
	0.9	192.98	5.32	−2.11	184.10	−4.97	−3.47	185.88	−2.15	−2.41
500	0	0.04	0.04	0.00	0.03	0.03	−0.02	0.01	0.01	0.02
	0.3	1.10	0.12	0.02	1.17	0.14	0.00	1.06	0.09	0.04
	0.6	4.74	0.57	0.19	5.07	0.76	0.17	4.73	0.69	0.21
	0.9	24.92	0.66	0.42	26.81	2.21	0.54	25.55	2.43	0.85
RMSE×100, $\rho_3=0$										
100	0	39.07	39.55	1.81	26.85	27.14	0.93	11.91	12.08	0.29
	0.3	51.51	49.90	2.52	37.06	34.50	1.30	21.06	15.71	0.41
	0.6	87.73	73.40	4.32	70.13	51.52	2.25	54.22	26.41	0.74
	0.9	178.03	170.02	15.07	144.44	118.41	8.31	113.33	53.31	3.33
250	0	3.35	3.36	0.18	2.21	2.23	0.10	0.98	0.99	0.04
	0.3	4.78	4.62	0.26	3.28	3.01	0.15	1.81	1.35	0.05
	0.6	9.24	7.31	0.46	7.29	4.89	0.26	5.51	2.32	0.10
	0.9	27.86	19.97	2.01	23.96	14.28	1.20	19.96	6.40	0.54
500	0	0.33	0.33	0.03	0.23	0.23	0.02	0.10	0.10	0.01
	0.3	0.49	0.47	0.04	0.34	0.32	0.02	0.19	0.14	0.01
	0.6	1.03	0.77	0.07	0.78	0.54	0.04	0.57	0.25	0.02
	0.9	4.13	2.71	0.31	3.44	1.94	0.20	2.83	0.91	0.09
RMSE×100, $\rho_3=0.9$										
100	0	68.91	69.32	16.39	65.08	64.28	12.90	60.20	59.97	9.62
	0.3	88.72	85.89	21.46	83.59	79.73	16.85	77.51	75.16	12.75
	0.6	140.75	124.85	33.22	132.77	114.64	25.36	125.44	108.99	19.54
	0.9	278.05	301.59	91.20	260.08	274.66	69.55	249.19	257.44	54.13
250	0	6.17	6.22	1.79	5.47	5.48	1.39	5.32	5.33	1.12
	0.3	8.82	8.56	2.46	7.75	7.41	1.92	7.70	7.38	1.55
	0.6	16.43	13.61	4.06	14.77	11.93	3.17	14.85	12.03	2.56
	0.9	48.35	39.68	14.19	45.03	36.87	11.45	43.89	35.59	8.90
500	0	0.57	0.57	0.22	0.67	0.67	0.21	0.60	0.60	0.17
	0.3	0.83	0.79	0.31	1.00	0.94	0.29	0.87	0.81	0.24
	0.6	1.73	1.37	0.53	2.02	1.56	0.51	1.79	1.32	0.42
	0.9	7.18	5.50	2.16	7.60	5.31	1.93	7.17	5.00	1.63

Note: The column labels $\hat{\beta}_3$, $\hat{\beta}_3^+$ and $\hat{\beta}_{P,3}^+$ denote the group-mean OLS estimator, the group-mean FM-OLS estimator and the pooled FM-OLS estimator, respectively, of β_3.

Table 12: Bias and RMSE of the estimators of β_3 in the individual specific intercepts and linear trends case with non-zero drifts.

		$N=10$			$N=20$			$N=100$		
T	ρ_1,ρ_2	$\hat{\beta}_3$	$\hat{\beta}_3^+$	$\hat{\beta}_{P,3}^+$	$\hat{\beta}_3$	$\hat{\beta}_3^+$	$\hat{\beta}_{P,3}^+$	$\hat{\beta}_3$	$\hat{\beta}_3^+$	$\hat{\beta}_{P,3}^+$
Bias×1,000, $\rho_3=0$										
100	0	6.34	7.35	0.29	2.68	2.76	−0.03	0.56	0.53	−0.01
	0.3	134.46	55.31	1.35	130.11	50.04	0.49	128.72	46.25	0.25
	0.6	414.80	200.36	7.74	409.18	189.70	4.08	408.25	184.02	2.19
	0.9	626.82	383.32	28.60	632.16	365.06	14.59	620.53	346.50	6.28
250	0	0.66	0.70	−0.02	0.09	0.06	−0.03	−0.19	−0.20	−0.02
	0.3	11.39	3.21	0.06	10.60	2.16	0.03	10.19	1.90	0.02
	0.6	42.85	13.81	0.85	41.74	12.03	0.59	41.15	11.86	0.41
	0.9	129.15	44.86	8.10	128.65	44.57	6.12	128.93	45.57	4.53
500	0	−0.00	−0.00	0.00	−0.07	−0.07	0.00	0.03	0.03	0.00
	0.3	0.95	0.12	0.01	0.84	0.05	0.01	0.97	0.17	0.01
	0.6	4.17	1.01	0.11	3.92	0.87	0.09	4.15	1.09	0.07
	0.9	19.74	7.47	1.38	18.66	6.73	1.20	19.67	7.72	0.97
Bias×1,000, $\rho_3=0.9$										
100	0	−12.75	−12.41	−4.18	−0.22	−1.28	−4.11	−12.50	−11.39	−1.60
	0.3	112.98	39.86	2.29	129.65	44.09	0.10	115.11	35.98	3.07
	0.6	392.13	186.89	28.59	415.25	180.29	21.97	393.30	175.65	23.18
	0.9	623.75	410.68	79.63	653.38	360.82	60.51	587.35	352.85	62.40
250	0	1.36	1.53	0.29	−0.67	−0.61	−0.22	0.20	0.37	0.14
	0.3	12.20	4.01	0.84	9.05	0.98	0.05	10.52	2.83	0.59
	0.6	44.12	14.84	3.95	38.74	10.10	2.60	41.32	13.63	3.23
	0.9	132.37	51.62	19.47	122.80	39.09	16.23	125.93	45.35	17.32
500	0	0.04	0.05	0.01	0.01	0.00	−0.01	0.02	0.03	0.03
	0.3	0.91	0.17	0.05	0.96	0.14	0.03	0.89	0.15	0.08
	0.6	3.82	0.87	0.38	4.18	1.02	0.38	3.89	1.01	0.43
	0.9	17.89	6.12	3.70	20.10	7.40	3.78	18.99	7.76	3.87
RMSE×100, $\rho_3=0$										
100	0	40.28	40.85	2.14	27.51	27.76	1.13	12.19	12.34	0.39
	0.3	52.29	51.04	2.98	36.96	35.12	1.58	20.01	16.11	0.54
	0.6	83.88	75.38	5.07	64.50	53.02	2.72	46.47	28.80	0.94
	0.9	144.19	152.33	15.18	110.42	107.41	8.58	74.22	57.49	3.09
250	0	3.38	3.41	0.21	2.24	2.26	0.12	1.00	1.01	0.05
	0.3	4.76	4.64	0.30	3.25	3.06	0.17	1.71	1.38	0.06
	0.6	8.78	7.39	0.54	6.73	5.02	0.31	4.73	2.46	0.12
	0.9	23.35	19.53	2.31	18.93	14.04	1.45	14.30	7.48	0.68
500	0	0.34	0.34	0.03	0.24	0.23	0.02	0.10	0.10	0.01
	0.3	0.50	0.48	0.04	0.34	0.33	0.03	0.18	0.15	0.01
	0.6	1.01	0.80	0.08	0.73	0.55	0.05	0.50	0.27	0.02
	0.9	3.65	2.74	0.38	2.87	2.05	0.25	2.20	1.15	0.13
RMSE×100, $\rho_3=0.9$										
100	0	70.77	71.11	17.38	67.03	66.28	13.88	61.91	61.93	10.59
	0.3	90.35	87.83	22.63	85.41	82.18	18.02	79.44	76.98	13.91
	0.6	138.09	126.91	34.56	130.84	119.19	26.80	124.10	112.04	21.13
	0.9	245.65	260.32	79.39	229.37	247.77	60.32	221.87	229.77	48.09
250	0	6.40	6.45	1.90	5.68	5.68	1.49	5.47	5.47	1.26
	0.3	9.08	8.84	2.62	7.95	7.68	2.06	7.84	7.55	1.73
	0.6	16.35	14.07	4.32	14.44	12.22	3.41	14.52	12.28	2.87
	0.9	43.61	38.45	13.61	39.32	34.45	11.30	39.27	33.36	9.04
500	0	0.60	0.60	0.24	0.69	0.69	0.22	0.62	0.62	0.19
	0.3	0.87	0.83	0.33	1.02	0.96	0.32	0.89	0.84	0.27
	0.6	1.73	1.43	0.57	1.98	1.59	0.55	1.77	1.36	0.47
	0.9	6.71	5.38	2.28	6.91	5.40	2.09	6.57	5.03	1.83

Note: See note to Table 11.

Table 13: Bias and RMSE of the estimators of β_2 in the individual specific intercepts only case with zero drifts.

		$N=10$			$N=20$			$N=100$		
T	ρ_1,ρ_2	$\hat{\beta}_2$	$\hat{\beta}_2^+$	$\hat{\beta}_{P,2}^+$	$\hat{\beta}_2$	$\hat{\beta}_2^+$	$\hat{\beta}_{P,2}^+$	$\hat{\beta}_2$	$\hat{\beta}_2^+$	$\hat{\beta}_{P,2}^+$
Bias×100, $\rho_3=0$										
100	0	−0.80	−0.84	−0.03	0.17	0.12	−0.01	−0.51	−0.48	0.02
	0.3	−1.05	−1.33	−0.03	0.40	0.49	−0.02	−0.74	−0.73	0.03
	0.6	−1.85	−2.17	0.00	1.11	1.62	−0.05	−0.94	−0.80	0.05
	0.9	−4.15	−7.24	0.47	3.67	6.90	−0.43	−1.26	−1.67	0.13
250	0	−0.29	−0.28	−0.01	0.15	0.15	0.01	0.03	0.03	0.00
	0.3	−0.39	−0.33	−0.01	0.25	0.23	0.01	−0.00	0.01	0.00
	0.6	−0.44	−0.25	−0.02	0.39	0.30	0.03	−0.10	−0.07	0.00
	0.9	0.65	2.28	−0.08	1.16	0.47	0.13	−0.54	−0.69	−0.01
500	0	0.15	0.16	−0.00	0.05	0.05	0.00	−0.01	−0.01	0.00
	0.3	0.24	0.23	−0.00	0.04	0.06	0.00	−0.01	−0.02	0.00
	0.6	0.44	0.40	−0.00	0.05	0.13	0.00	−0.03	−0.04	0.00
	0.9	1.30	1.10	0.01	0.29	0.64	0.02	0.00	−0.00	−0.00
Bias×100, $\rho_3=0.9$										
100	0	1.37	1.60	−0.61	0.68	0.74	0.13	0.55	0.65	0.52
	0.3	0.41	2.14	−0.84	1.51	1.10	0.05	0.77	1.12	0.62
	0.6	−1.91	3.92	−1.11	1.82	0.40	−0.32	−0.34	1.65	0.52
	0.9	−7.73	11.33	1.79	1.37	−9.45	−0.51	−5.18	2.85	0.61
250	0	−0.04	0.07	−0.00	0.01	0.10	0.18	0.31	0.37	0.07
	0.3	−0.03	0.23	0.07	−0.08	0.04	0.25	0.31	0.49	0.07
	0.6	−0.21	0.14	0.11	−0.22	0.01	0.50	−0.07	0.52	−0.05
	0.9	−1.69	−0.75	0.81	1.28	0.17	2.03	−2.58	−2.19	−1.34
500	0	0.17	0.16	0.08	0.00	−0.01	−0.02	−0.13	−0.11	−0.06
	0.3	0.38	0.22	0.12	−0.07	−0.06	−0.03	−0.25	−0.18	−0.09
	0.6	1.02	0.38	0.22	−0.24	−0.14	−0.05	−0.67	−0.41	−0.17
	0.9	5.09	2.27	1.01	−1.33	−1.13	−0.60	−1.54	−0.02	−0.27
RMSE×10, $\rho_3=0$										
100	0	7.41	7.49	0.47	5.22	5.29	0.24	2.31	2.34	0.08
	0.3	9.45	9.49	0.66	6.79	6.76	0.33	2.96	2.98	0.11
	0.6	14.53	13.86	1.11	10.71	10.00	0.57	4.58	4.42	0.18
	0.9	31.83	34.94	3.81	23.36	24.89	2.07	9.93	10.85	0.69
250	0	1.60	1.61	0.12	1.13	1.13	0.06	0.52	0.52	0.02
	0.3	2.22	2.20	0.16	1.57	1.54	0.09	0.71	0.70	0.03
	0.6	3.95	3.55	0.29	2.80	2.48	0.15	1.24	1.12	0.05
	0.9	11.71	10.86	1.26	8.32	7.51	0.64	3.68	3.43	0.21
500	0	0.56	0.56	0.04	0.38	0.38	0.02	0.17	0.17	0.01
	0.3	0.80	0.79	0.06	0.55	0.54	0.03	0.25	0.24	0.01
	0.6	1.52	1.32	0.10	1.03	0.90	0.05	0.47	0.40	0.02
	0.9	5.45	4.50	0.48	3.76	3.18	0.24	1.71	1.42	0.08
RMSE×10, $\rho_3=0.9$										
100	0	13.78	13.79	4.93	13.19	13.27	4.06	12.62	12.81	3.53
	0.3	18.03	17.61	6.45	17.23	16.87	5.40	16.57	16.40	4.67
	0.6	29.10	25.87	9.90	27.83	25.01	8.40	27.13	24.28	7.18
	0.9	64.90	64.91	27.98	59.43	60.65	24.28	58.35	60.79	20.06
250	0	3.12	3.13	1.19	3.03	3.02	1.01	2.90	2.90	0.87
	0.3	4.34	4.24	1.64	4.30	4.11	1.40	4.11	3.94	1.21
	0.6	8.05	6.81	2.72	8.04	6.58	2.32	7.71	6.36	2.00
	0.9	24.92	20.39	9.20	24.00	18.92	7.72	23.61	18.79	6.82
500	0	1.08	1.08	0.41	1.02	1.03	0.36	1.01	1.02	0.30
	0.3	1.57	1.51	0.58	1.48	1.43	0.50	1.47	1.41	0.42
	0.6	3.15	2.51	0.98	2.95	2.36	0.85	2.93	2.33	0.71
	0.9	11.86	8.59	3.73	11.28	8.03	3.21	11.08	7.72	2.66

Note: See note to Table 9.

Table 14: Bias and RMSE of the estimators of β_2 in the individual specific intercepts and linear trends case with zero drifts.

		$N=10$			$N=20$			$N=100$		
T	ρ_1,ρ_2	$\hat{\beta}_2$	$\hat{\beta}_2^+$	$\hat{\beta}_{P,2}^+$	$\hat{\beta}_2$	$\hat{\beta}_2^+$	$\hat{\beta}_{P,2}^+$	$\hat{\beta}_2$	$\hat{\beta}_2^+$	$\hat{\beta}_{P,2}^+$
Bias×100, $\rho_3=0$										
100	0	−0.32	−0.32	−0.12	0.17	0.14	−0.04	−0.51	−0.53	0.02
	0.3	−0.35	−0.81	−0.16	0.51	0.64	−0.06	−0.71	−0.76	0.03
	0.6	−0.84	−1.29	−0.24	1.65	1.61	−0.07	−0.81	−0.82	0.06
	0.9	−3.41	−3.61	−0.23	6.43	5.59	−0.07	−0.09	−0.21	0.28
250	0	−0.38	−0.40	−0.00	0.18	0.17	0.02	0.05	0.05	0.01
	0.3	−0.48	−0.49	−0.00	0.30	0.26	0.02	0.03	0.03	0.02
	0.6	−0.51	−0.53	−0.01	0.49	0.33	0.04	−0.07	−0.04	0.03
	0.9	0.84	1.26	−0.00	1.46	0.13	0.15	−0.39	−0.52	0.07
500	0	0.16	0.16	0.01	0.07	0.07	0.00	0.00	0.00	0.00
	0.3	0.24	0.23	0.01	0.06	0.08	0.01	−0.01	−0.01	0.00
	0.6	0.44	0.40	0.02	0.07	0.15	0.01	−0.02	−0.02	0.00
	0.9	1.25	1.11	0.14	0.48	0.72	0.01	0.04	0.08	0.02
Bias×100, $\rho_3=0.9$										
100	0	1.31	1.64	−0.47	0.69	0.79	0.58	0.75	0.78	0.57
	0.3	0.02	1.52	−0.74	1.37	1.54	0.74	1.31	1.48	0.73
	0.6	−3.35	2.41	−1.24	1.30	1.35	0.96	1.12	1.68	0.88
	0.9	−12.55	4.81	−0.55	−1.50	−5.84	1.17	−0.88	−2.55	1.76
250	0	−0.00	0.09	−0.05	−0.03	0.03	0.19	0.34	0.42	0.10
	0.3	−0.04	0.25	−0.04	−0.06	−0.03	0.24	0.41	0.59	0.12
	0.6	−0.31	0.18	−0.12	0.01	−0.09	0.50	0.24	0.65	0.01
	0.9	−2.84	−1.14	−0.64	3.18	0.87	1.79	−1.05	−1.73	−1.02
500	0	0.15	0.13	0.08	0.06	0.05	0.00	−0.07	−0.06	−0.03
	0.3	0.37	0.22	0.13	0.02	0.02	0.00	−0.15	−0.10	−0.05
	0.6	1.01	0.44	0.25	−0.09	−0.04	−0.01	−0.43	−0.29	−0.10
	0.9	5.05	2.77	1.06	−0.59	−1.05	−0.42	−0.27	0.02	−0.07
RMSE×10, $\rho_3=0$										
100	0	7.62	7.70	0.63	5.31	5.36	0.35	2.36	2.39	0.13
	0.3	9.67	9.70	0.88	6.85	6.82	0.49	3.02	3.04	0.18
	0.6	14.57	14.06	1.46	10.53	10.01	0.82	4.61	4.47	0.31
	0.9	28.25	29.39	4.33	20.45	21.47	2.52	8.90	9.38	0.99
250	0	1.64	1.65	0.16	1.15	1.15	0.09	0.53	0.53	0.03
	0.3	2.28	2.25	0.22	1.60	1.57	0.12	0.72	0.72	0.05
	0.6	3.99	3.62	0.38	2.81	2.52	0.22	1.25	1.13	0.08
	0.9	11.00	10.25	1.57	7.85	7.21	0.90	3.45	3.22	0.34
500	0	0.58	0.58	0.05	0.39	0.39	0.03	0.18	0.18	0.01
	0.3	0.82	0.81	0.08	0.56	0.55	0.04	0.25	0.25	0.02
	0.6	1.54	1.35	0.13	1.04	0.92	0.08	0.47	0.41	0.03
	0.9	5.27	4.48	0.62	3.61	3.14	0.36	1.66	1.41	0.14
RMSE×10, $\rho_3=0.9$										
100	0	14.18	14.23	5.29	13.61	13.69	4.36	13.01	13.18	3.90
	0.3	18.44	18.04	6.92	17.66	17.38	5.75	16.96	16.87	5.14
	0.6	28.98	26.45	10.60	27.74	25.64	8.86	26.93	24.89	7.88
	0.9	58.18	57.18	24.88	53.71	52.84	20.75	51.79	52.10	18.54
250	0	3.22	3.23	1.26	3.11	3.12	1.09	2.99	2.99	0.96
	0.3	4.44	4.36	1.74	4.42	4.24	1.51	4.23	4.07	1.33
	0.6	8.03	6.99	2.90	8.08	6.82	2.50	7.74	6.58	2.22
	0.9	22.80	19.74	9.29	22.23	18.75	7.86	21.80	18.48	7.05
500	0	1.11	1.11	0.44	1.06	1.07	0.39	1.05	1.05	0.33
	0.3	1.62	1.55	0.62	1.53	1.48	0.54	1.51	1.46	0.46
	0.6	3.18	2.59	1.06	2.98	2.45	0.92	2.94	2.41	0.78
	0.9	11.31	8.62	3.94	10.70	8.15	3.36	10.47	7.87	2.87

Note: See note to Table 9.

Table 15: Bias and RMSE of the estimators of β_3 in the individual specific intercepts only case with zero drifts.

		$N=10$			$N=20$			$N=100$		
T	ρ_1,ρ_2	$\hat{\beta}_3$	$\hat{\beta}_3^+$	$\hat{\beta}_{P,3}^+$	$\hat{\beta}_3$	$\hat{\beta}_3^+$	$\hat{\beta}_{P,3}^+$	$\hat{\beta}_3$	$\hat{\beta}_3^+$	$\hat{\beta}_{P,3}^+$
Bias×1,000, $\rho_3=0$										
100	0	0.40	1.53	0.93	4.47	4.28	0.23	3.79	4.12	0.03
	0.3	249.11	75.94	1.18	254.81	82.85	−0.03	253.47	79.19	−0.28
	0.6	822.13	275.95	−2.38	829.68	279.37	−5.10	823.06	275.89	−4.78
	0.9	1601.51	309.73	−59.33	1609.33	319.66	−64.24	1588.05	297.96	−53.37
250	0	−1.71	−1.63	0.07	−0.78	−0.88	0.02	0.00	0.01	0.01
	0.3	40.91	5.06	0.07	42.58	6.31	−0.01	43.69	7.72	−0.02
	0.6	167.68	33.81	−0.33	170.97	35.71	−0.57	172.61	38.04	−0.54
	0.9	566.16	67.20	−9.39	571.94	69.18	−9.51	574.70	73.90	−8.53
500	0	0.26	0.25	0.03	−0.14	−0.16	0.00	0.03	0.04	0.00
	0.3	11.76	1.58	0.04	11.24	1.16	−0.00	11.41	1.40	−0.01
	0.6	49.63	9.07	−0.00	48.84	8.60	−0.11	49.04	8.84	−0.11
	0.9	224.90	35.10	−1.41	223.30	35.18	−2.05	222.92	34.97	−1.86
Bias×1,000, $\rho_3=0.9$										
100	0	−12.46	−10.96	2.49	−0.72	3.24	1.80	6.46	9.24	1.36
	0.3	232.05	66.80	8.57	248.24	86.61	6.93	256.45	89.71	4.26
	0.6	792.70	258.61	25.57	819.75	290.87	19.91	823.53	271.68	10.65
	0.9	1550.19	291.44	−60.11	1583.94	285.67	−81.88	1563.83	239.19	−88.08
250	0	−1.51	−1.22	0.05	1.25	1.23	−0.02	1.17	1.31	0.35
	0.3	41.24	5.39	0.53	45.65	9.36	0.37	43.99	8.55	0.67
	0.6	169.44	35.24	4.16	175.57	39.90	2.75	170.34	38.42	2.37
	0.9	576.18	77.41	−1.36	575.59	66.25	−4.15	563.40	73.14	−6.79
500	0	−0.23	−0.21	−0.06	−1.13	−1.15	−0.06	−0.37	−0.35	−0.02
	0.3	11.23	1.05	0.04	10.24	−0.03	−0.02	11.20	0.88	0.01
	0.6	49.10	8.41	0.92	48.14	7.05	0.55	49.23	8.05	0.38
	0.9	225.31	36.47	2.55	224.25	33.16	1.66	225.43	32.79	−0.13
RMSE×100, $\rho_3=0$										
100	0	54.87	55.41	2.67	38.16	38.46	1.21	17.04	17.28	0.36
	0.3	72.81	69.37	3.71	54.22	48.91	1.69	33.02	23.01	0.50
	0.6	128.27	102.89	6.21	108.43	75.35	2.94	87.84	41.72	0.98
	0.9	249.17	238.50	21.69	212.28	169.84	12.32	170.24	81.32	6.29
250	0	7.62	7.65	0.42	5.29	5.33	0.20	2.36	2.38	0.06
	0.3	11.17	10.43	0.59	8.30	7.15	0.28	5.42	3.28	0.08
	0.6	23.99	16.84	1.02	20.67	11.63	0.50	18.07	6.30	0.15
	0.9	72.01	46.44	4.27	65.02	33.06	2.29	59.14	16.04	1.06
500	0	1.83	1.83	0.10	1.29	1.30	0.05	0.57	0.58	0.01
	0.3	2.83	2.54	0.14	2.13	1.80	0.07	1.39	0.81	0.02
	0.6	6.78	4.30	0.25	5.85	3.09	0.12	5.10	1.58	0.04
	0.9	26.87	14.41	1.14	24.57	10.26	0.60	22.76	5.58	0.25
RMSE×100, $\rho_3=0.9$										
100	0	95.56	95.71	20.74	88.79	89.21	15.62	83.21	83.49	11.76
	0.3	120.82	119.59	26.94	114.05	110.95	20.33	108.59	105.61	15.47
	0.6	187.54	171.08	40.74	182.95	160.83	30.92	176.10	153.30	23.59
	0.9	363.82	415.78	109.91	346.95	368.18	87.45	332.75	348.76	64.44
250	0	14.17	14.19	3.25	13.10	13.06	2.53	12.45	12.43	1.87
	0.3	19.45	18.90	4.45	18.55	17.46	3.45	17.47	16.60	2.57
	0.6	35.84	29.64	7.34	35.16	27.53	5.67	32.97	26.03	4.23
	0.9	98.56	81.13	24.45	95.86	73.14	18.63	90.85	70.41	13.96
500	0	3.30	3.30	0.81	3.15	3.15	0.63	3.17	3.17	0.48
	0.3	4.81	4.55	1.13	4.56	4.35	0.88	4.58	4.34	0.67
	0.6	9.84	7.52	1.92	9.49	7.12	1.49	9.42	7.11	1.14
	0.9	35.34	24.26	7.19	34.10	22.62	5.49	33.66	22.14	4.20

Note: See note to Table 11.

Table 16: Bias and RMSE of the estimators of β_3 in the individual specific intercepts and linear trends case with zero drifts.

		$N=10$			$N=20$			$N=100$		
T	ρ_1,ρ_2	$\hat{\beta}_3$	$\hat{\beta}_3^+$	$\hat{\beta}_{P,3}^+$	$\hat{\beta}_3$	$\hat{\beta}_3^+$	$\hat{\beta}_{P,3}^+$	$\hat{\beta}_3$	$\hat{\beta}_3^+$	$\hat{\beta}_{P,3}^+$
Bias×1,000, $\rho_3=0$										
100	0	1.64	1.40	0.91	3.48	3.04	0.13	4.11	4.11	0.05
	0.3	225.21	83.93	1.46	228.10	88.25	0.02	228.93	86.73	−0.15
	0.6	709.53	321.16	1.32	712.28	326.56	−2.12	710.50	324.72	−2.28
	0.9	1106.10	629.84	−32.52	1095.89	647.43	−38.39	1094.61	642.00	−32.27
250	0	−1.81	−1.71	0.11	−0.85	−0.94	0.01	−0.00	0.01	0.00
	0.3	36.69	5.63	0.16	38.61	7.02	0.00	39.73	8.48	−0.02
	0.6	148.12	37.98	0.26	152.12	40.37	−0.14	153.68	42.72	−0.22
	0.9	439.64	127.94	−4.01	452.42	133.81	−4.46	452.71	138.03	−4.53
500	0	0.22	0.24	0.03	−0.13	−0.14	0.01	0.03	0.04	0.00
	0.3	10.75	1.70	0.04	10.27	1.30	0.02	10.46	1.52	−0.00
	0.6	44.89	9.80	0.10	44.10	9.29	0.01	44.39	9.53	−0.04
	0.9	188.92	47.85	−0.04	187.78	46.82	−0.65	187.81	47.56	−0.85
Bias×1,000, $\rho_3=0.9$										
100	0	−11.28	−12.26	1.63	0.40	3.33	1.52	6.31	8.78	0.81
	0.3	208.32	78.07	11.13	224.67	94.07	9.60	230.87	97.28	6.50
	0.6	681.21	309.69	44.21	707.76	338.38	36.93	707.87	322.28	27.34
	0.9	1065.05	680.79	100.67	1091.84	674.05	67.84	1063.03	612.88	50.69
250	0	−1.47	−1.30	0.10	1.79	1.87	0.19	1.29	1.43	0.40
	0.3	37.33	6.10	0.97	42.31	10.72	0.91	40.19	9.44	1.03
	0.6	150.52	39.78	6.45	157.31	45.22	4.92	151.65	43.63	4.46
	0.9	454.41	144.27	25.76	454.17	131.99	18.14	442.42	143.36	16.54
500	0	−0.12	−0.09	−0.03	−1.14	−1.14	−0.09	−0.34	−0.32	−0.01
	0.3	10.39	1.33	0.14	9.24	0.07	−0.00	10.29	1.03	0.07
	0.6	44.60	9.37	1.39	43.32	7.60	0.84	44.62	8.77	0.77
	0.9	190.83	50.33	8.62	187.50	43.43	6.34	190.36	46.21	5.09
RMSE×100, $\rho_3=0$										
100	0	55.92	56.43	3.10	38.84	39.10	1.48	17.41	17.59	0.51
	0.3	72.93	70.32	4.26	53.69	49.46	2.06	31.44	23.52	0.70
	0.6	121.55	104.13	6.98	100.12	77.10	3.49	77.48	45.11	1.20
	0.9	207.19	212.64	20.38	168.13	157.08	11.27	123.23	92.87	4.87
250	0	7.73	7.76	0.48	5.38	5.40	0.25	2.41	2.42	0.08
	0.3	11.16	10.56	0.68	8.21	7.26	0.35	5.14	3.35	0.11
	0.6	22.78	17.04	1.17	19.27	11.94	0.60	16.29	6.65	0.19
	0.9	61.57	45.72	4.60	54.43	33.49	2.43	47.24	19.61	0.92
500	0	1.87	1.87	0.11	1.33	1.33	0.06	0.58	0.59	0.02
	0.3	2.84	2.59	0.16	2.12	1.85	0.09	1.32	0.82	0.03
	0.6	6.49	4.39	0.28	5.50	3.18	0.15	4.66	1.63	0.05
	0.9	23.79	14.55	1.28	21.35	10.68	0.69	19.31	6.41	0.23
RMSE×100, $\rho_3=0.9$										
100	0	97.69	97.76	21.80	91.78	92.22	16.69	85.97	86.30	12.95
	0.3	122.81	121.06	28.19	116.83	114.41	21.51	111.32	108.54	16.92
	0.6	185.28	173.51	42.52	180.24	164.06	32.33	173.76	157.20	25.62
	0.9	328.85	367.26	99.21	312.47	327.63	74.52	299.38	309.90	57.37
250	0	14.56	14.56	3.43	13.46	13.41	2.69	12.79	12.76	2.04
	0.3	19.87	19.36	4.70	18.94	17.95	3.66	17.87	17.05	2.81
	0.6	35.51	30.27	7.74	34.69	28.31	5.98	32.61	26.72	4.62
	0.9	90.43	78.19	24.17	87.34	72.17	18.47	82.93	68.68	13.92
500	0	3.38	3.38	0.85	3.23	3.23	0.67	3.25	3.25	0.51
	0.3	4.89	4.65	1.19	4.65	4.46	0.94	4.67	4.46	0.72
	0.6	9.72	7.67	2.01	9.34	7.30	1.59	9.28	7.29	1.22
	0.9	32.80	24.26	7.40	31.47	22.73	5.68	31.13	22.35	4.34

Note: See note to Table 11.

Table 17: Empirical null rejection probabilities of Wald-type tests for $H_0 : \beta_1 = 5, \beta_2 =$-3, $\beta_3 = 0.3$ in the individual specific intercepts only case with zero drifts.

		$N = 10$					$N = 20$					$N = 100$				
T	ρ_1, ρ_2	W_{TB}	W_{rob}	W^+	W^+_{rob}	W^+_P	W_{TB}	W_{rob}	W^+	W^+_{rob}	W^+_P	W_{TB}	W_{rob}	W^+	W^+_{rob}	W^+_P
							$\rho_3 = 0$									
100	0	0.06	0.08	0.08	0.09	0.06	0.06	0.07	0.08	0.08	0.06	0.06	0.06	0.07	0.07	0.06
	0.3	0.22	0.12	0.12	0.12	0.11	0.23	0.12	0.11	0.11	0.11	0.40	0.24	0.11	0.11	0.11
	0.6	0.59	0.19	0.14	0.14	0.19	0.68	0.25	0.12	0.12	0.23	0.97	0.71	0.17	0.17	0.46
	0.9	0.89	0.25	0.21	0.21	0.72	0.94	0.30	0.21	0.20	0.89	1.00	0.59	0.35	0.24	1.00
250	0	0.06	0.06	0.07	0.06	0.06	0.05	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05
	0.3	0.25	0.10	0.09	0.10	0.09	0.28	0.12	0.09	0.09	0.09	0.52	0.29	0.08	0.08	0.08
	0.6	0.71	0.23	0.11	0.11	0.13	0.82	0.33	0.11	0.11	0.14	1.00	0.90	0.14	0.14	0.24
	0.9	0.97	0.32	0.17	0.17	0.46	0.99	0.43	0.15	0.14	0.64	1.00	0.93	0.29	0.22	0.99
500	0	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.05	0.05	0.05	0.06	0.06	0.05
	0.3	0.26	0.10	0.08	0.08	0.08	0.30	0.11	0.08	0.08	0.07	0.57	0.31	0.08	0.08	0.07
	0.6	0.76	0.24	0.09	0.10	0.10	0.86	0.37	0.09	0.09	0.10	1.00	0.95	0.13	0.13	0.16
	0.9	0.98	0.40	0.14	0.14	0.30	1.00	0.59	0.14	0.13	0.41	1.00	0.99	0.30	0.26	0.93
							$\rho_3 = 0.3$									
100	0	0.08	0.07	0.10	0.08	0.14	0.10	0.07	0.12	0.07	0.24	0.22	0.07	0.23	0.07	0.61
	0.3	0.25	0.11	0.15	0.11	0.21	0.30	0.12	0.16	0.11	0.31	0.57	0.20	0.28	0.11	0.67
	0.6	0.61	0.18	0.16	0.13	0.30	0.71	0.24	0.17	0.13	0.41	0.96	0.55	0.35	0.16	0.77
	0.9	0.90	0.28	0.29	0.26	0.75	0.95	0.32	0.30	0.25	0.87	1.00	0.58	0.57	0.34	0.99
250	0	0.07	0.05	0.08	0.06	0.14	0.10	0.07	0.11	0.07	0.22	0.24	0.07	0.25	0.07	0.60
	0.3	0.29	0.10	0.12	0.09	0.18	0.35	0.12	0.15	0.10	0.27	0.66	0.21	0.30	0.09	0.65
	0.6	0.74	0.22	0.13	0.10	0.22	0.84	0.32	0.17	0.11	0.33	0.99	0.72	0.35	0.13	0.71
	0.9	0.97	0.33	0.23	0.19	0.52	0.99	0.44	0.23	0.17	0.70	1.00	0.81	0.50	0.25	0.96
500	0	0.07	0.05	0.08	0.05	0.13	0.10	0.06	0.10	0.06	0.23	0.24	0.05	0.24	0.05	0.60
	0.3	0.30	0.09	0.11	0.08	0.16	0.37	0.11	0.13	0.08	0.26	0.70	0.22	0.28	0.08	0.63
	0.6	0.79	0.23	0.13	0.10	0.20	0.88	0.34	0.15	0.10	0.30	1.00	0.80	0.33	0.11	0.67
	0.9	0.99	0.41	0.19	0.15	0.39	1.00	0.56	0.22	0.15	0.54	1.00	0.94	0.50	0.21	0.90
							$\rho_3 = 0.6$									
100	0	0.19	0.07	0.22	0.08	0.31	0.30	0.07	0.33	0.08	0.49	0.64	0.07	0.66	0.08	0.86
	0.3	0.40	0.11	0.28	0.12	0.38	0.50	0.12	0.38	0.13	0.56	0.81	0.13	0.69	0.11	0.88
	0.6	0.70	0.18	0.31	0.16	0.46	0.80	0.21	0.41	0.16	0.61	0.96	0.28	0.72	0.16	0.91
	0.9	0.94	0.31	0.46	0.34	0.77	0.97	0.33	0.53	0.33	0.86	1.00	0.44	0.81	0.41	0.98
250	0	0.18	0.06	0.19	0.06	0.31	0.31	0.07	0.32	0.07	0.48	0.68	0.06	0.69	0.06	0.86
	0.3	0.42	0.09	0.24	0.09	0.36	0.56	0.11	0.37	0.10	0.53	0.85	0.12	0.72	0.09	0.88
	0.6	0.79	0.18	0.28	0.11	0.40	0.87	0.24	0.39	0.12	0.57	0.98	0.34	0.72	0.12	0.89
	0.9	0.98	0.31	0.38	0.23	0.62	0.99	0.36	0.46	0.22	0.76	1.00	0.49	0.77	0.25	0.96
500	0	0.19	0.05	0.20	0.05	0.30	0.30	0.05	0.30	0.05	0.49	0.68	0.05	0.68	0.06	0.85
	0.3	0.45	0.09	0.24	0.08	0.35	0.57	0.09	0.35	0.08	0.53	0.86	0.12	0.70	0.08	0.87
	0.6	0.84	0.19	0.27	0.10	0.38	0.90	0.24	0.38	0.10	0.54	0.99	0.39	0.71	0.10	0.88
	0.9	0.99	0.35	0.34	0.18	0.51	1.00	0.42	0.43	0.18	0.67	1.00	0.60	0.76	0.19	0.93
							$\rho_3 = 0.9$									
100	0	0.58	0.08	0.61	0.09	0.63	0.76	0.08	0.78	0.09	0.79	0.96	0.08	0.97	0.09	0.97
	0.3	0.74	0.12	0.67	0.14	0.69	0.86	0.12	0.82	0.15	0.83	0.98	0.13	0.97	0.16	0.98
	0.6	0.89	0.19	0.70	0.22	0.74	0.95	0.19	0.83	0.22	0.85	0.99	0.21	0.97	0.23	0.98
	0.9	0.98	0.40	0.80	0.49	0.84	0.99	0.40	0.87	0.48	0.92	1.00	0.43	0.98	0.51	0.99
250	0	0.58	0.05	0.60	0.06	0.61	0.77	0.07	0.78	0.07	0.80	0.96	0.06	0.96	0.06	0.97
	0.3	0.77	0.09	0.66	0.10	0.66	0.88	0.10	0.81	0.11	0.83	0.98	0.10	0.97	0.11	0.98
	0.6	0.92	0.15	0.68	0.15	0.69	0.96	0.16	0.82	0.15	0.84	1.00	0.17	0.97	0.15	0.98
	0.9	1.00	0.32	0.75	0.33	0.78	1.00	0.34	0.85	0.34	0.88	1.00	0.34	0.98	0.34	0.98
500	0	0.57	0.05	0.58	0.05	0.62	0.76	0.06	0.76	0.06	0.80	0.96	0.06	0.96	0.06	0.97
	0.3	0.77	0.09	0.63	0.09	0.65	0.88	0.09	0.80	0.09	0.82	0.99	0.09	0.97	0.10	0.97
	0.6	0.93	0.14	0.65	0.12	0.67	0.97	0.15	0.81	0.12	0.84	1.00	0.15	0.97	0.12	0.97
	0.9	1.00	0.29	0.71	0.25	0.74	1.00	0.30	0.84	0.25	0.85	1.00	0.33	0.97	0.25	0.98

Note: See note to Table 3 in the main document.

Table 18: Empirical null rejection probabilities of Wald-type tests for $H_0 : \beta_1 = 5, \beta_2 = -3, \beta_3 = 0.3$ in the individual specific intercepts and linear trends case with zero drifts.

		$N = 10$					$N = 20$					$N = 100$				
T	ρ_1, ρ_2	W_{TB}	W_{rob}	W^+	W^+_{rob}	W^+_P	W_{TB}	W_{rob}	W^+	W^+_{rob}	W^+_P	W_{TB}	W_{rob}	W^+	W^+_{rob}	W^+_P
							$\rho_3 = 0$									
100	0	0.07	0.08	0.09	0.09	0.07	0.07	0.08	0.08	0.09	0.07	0.06	0.07	0.08	0.08	0.07
	0.3	0.24	0.15	0.14	0.14	0.12	0.25	0.15	0.12	0.12	0.13	0.46	0.31	0.13	0.13	0.16
	0.6	0.66	0.29	0.21	0.20	0.34	0.75	0.38	0.22	0.22	0.46	0.99	0.86	0.49	0.44	0.94
	0.9	0.96	0.60	0.62	0.62	0.98	0.99	0.75	0.75	0.73	1.00	1.00	0.99	1.00	0.99	1.00
250	0	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.06	0.05	0.06	0.06	0.06	0.06
	0.3	0.27	0.12	0.10	0.11	0.10	0.30	0.14	0.10	0.10	0.10	0.58	0.36	0.09	0.09	0.10
	0.6	0.76	0.31	0.15	0.15	0.20	0.86	0.43	0.15	0.15	0.24	1.00	0.96	0.32	0.28	0.63
	0.9	0.99	0.58	0.47	0.46	0.87	1.00	0.75	0.59	0.56	0.98	1.00	1.00	0.99	0.96	1.00
500	0	0.05	0.05	0.06	0.06	0.05	0.05	0.06	0.06	0.06	0.05	0.05	0.06	0.06	0.06	0.06
	0.3	0.27	0.10	0.08	0.08	0.08	0.32	0.13	0.08	0.08	0.08	0.63	0.38	0.08	0.08	0.08
	0.6	0.80	0.30	0.11	0.11	0.13	0.89	0.47	0.12	0.12	0.16	1.00	0.98	0.23	0.21	0.38
	0.9	0.99	0.59	0.34	0.33	0.66	1.00	0.78	0.43	0.41	0.87	1.00	1.00	0.95	0.88	1.00
							$\rho_3 = 0.3$									
100	0	0.08	0.07	0.11	0.09	0.13	0.10	0.07	0.13	0.08	0.21	0.23	0.08	0.26	0.09	0.52
	0.3	0.27	0.14	0.17	0.13	0.20	0.32	0.15	0.18	0.12	0.28	0.61	0.25	0.33	0.13	0.60
	0.6	0.69	0.29	0.26	0.22	0.41	0.79	0.38	0.31	0.24	0.53	0.98	0.72	0.62	0.38	0.84
	0.9	0.96	0.65	0.69	0.66	0.97	0.99	0.79	0.82	0.77	0.99	1.00	0.98	0.99	0.97	1.00
250	0	0.08	0.06	0.09	0.06	0.11	0.10	0.07	0.11	0.07	0.20	0.26	0.06	0.27	0.07	0.52
	0.3	0.31	0.12	0.13	0.10	0.17	0.37	0.15	0.16	0.11	0.25	0.69	0.25	0.32	0.10	0.57
	0.6	0.79	0.31	0.18	0.15	0.26	0.88	0.43	0.23	0.16	0.38	1.00	0.80	0.50	0.23	0.70
	0.9	0.99	0.61	0.56	0.52	0.84	1.00	0.76	0.69	0.60	0.93	1.00	0.98	0.98	0.90	0.99
500	0	0.07	0.04	0.07	0.05	0.12	0.10	0.06	0.11	0.06	0.19	0.26	0.06	0.26	0.05	0.51
	0.3	0.33	0.10	0.11	0.08	0.16	0.40	0.13	0.14	0.08	0.23	0.72	0.25	0.31	0.08	0.55
	0.6	0.83	0.32	0.15	0.11	0.20	0.92	0.43	0.19	0.12	0.30	1.00	0.85	0.44	0.17	0.63
	0.9	1.00	0.62	0.44	0.38	0.65	1.00	0.78	0.54	0.43	0.81	1.00	0.99	0.93	0.76	0.97
							$\rho_3 = 0.6$									
100	0	0.20	0.08	0.24	0.09	0.32	0.31	0.08	0.35	0.09	0.49	0.67	0.08	0.69	0.09	0.84
	0.3	0.43	0.13	0.31	0.13	0.40	0.54	0.15	0.41	0.14	0.57	0.84	0.17	0.74	0.14	0.87
	0.6	0.77	0.29	0.41	0.24	0.55	0.86	0.33	0.52	0.26	0.68	0.98	0.45	0.83	0.30	0.92
	0.9	0.98	0.67	0.78	0.69	0.92	1.00	0.73	0.87	0.75	0.96	1.00	0.84	0.98	0.85	0.99
250	0	0.20	0.06	0.21	0.06	0.31	0.33	0.07	0.34	0.07	0.47	0.70	0.06	0.71	0.06	0.84
	0.3	0.46	0.11	0.27	0.10	0.37	0.59	0.12	0.40	0.11	0.54	0.87	0.15	0.74	0.10	0.86
	0.6	0.84	0.27	0.34	0.15	0.46	0.91	0.32	0.46	0.17	0.61	0.99	0.45	0.79	0.18	0.89
	0.9	0.99	0.59	0.67	0.52	0.82	1.00	0.67	0.78	0.57	0.89	1.00	0.80	0.96	0.68	0.98
500	0	0.20	0.06	0.21	0.06	0.30	0.32	0.05	0.33	0.05	0.48	0.70	0.06	0.71	0.06	0.84
	0.3	0.47	0.10	0.26	0.09	0.35	0.59	0.11	0.38	0.09	0.52	0.88	0.14	0.74	0.09	0.86
	0.6	0.87	0.26	0.30	0.12	0.40	0.93	0.31	0.42	0.12	0.56	0.99	0.47	0.77	0.13	0.87
	0.9	1.00	0.57	0.57	0.39	0.68	1.00	0.64	0.68	0.41	0.80	1.00	0.80	0.93	0.51	0.95
							$\rho_3 = 0.9$									
100	0	0.60	0.09	0.64	0.10	0.65	0.77	0.09	0.80	0.10	0.81	0.96	0.09	0.97	0.10	0.97
	0.3	0.76	0.14	0.70	0.16	0.71	0.88	0.15	0.84	0.17	0.85	0.98	0.15	0.97	0.17	0.98
	0.6	0.92	0.27	0.76	0.29	0.78	0.96	0.27	0.87	0.28	0.88	1.00	0.30	0.98	0.30	0.98
	0.9	0.99	0.65	0.91	0.68	0.93	1.00	0.65	0.95	0.68	0.96	1.00	0.68	0.99	0.71	0.99
250	0	0.59	0.06	0.61	0.06	0.64	0.78	0.06	0.79	0.07	0.81	0.97	0.07	0.97	0.07	0.98
	0.3	0.79	0.10	0.68	0.11	0.69	0.89	0.11	0.82	0.12	0.84	0.99	0.12	0.98	0.12	0.98
	0.6	0.94	0.21	0.73	0.17	0.74	0.98	0.22	0.85	0.18	0.87	1.00	0.24	0.98	0.19	0.98
	0.9	1.00	0.52	0.86	0.51	0.87	1.00	0.54	0.92	0.52	0.93	1.00	0.56	0.99	0.55	0.99
500	0	0.60	0.05	0.61	0.06	0.64	0.78	0.06	0.79	0.06	0.81	0.97	0.06	0.97	0.07	0.97
	0.3	0.79	0.09	0.66	0.09	0.68	0.89	0.09	0.82	0.09	0.83	0.99	0.10	0.97	0.10	0.98
	0.6	0.94	0.18	0.69	0.13	0.71	0.98	0.19	0.84	0.13	0.85	1.00	0.21	0.98	0.14	0.98
	0.9	1.00	0.46	0.81	0.38	0.82	1.00	0.47	0.90	0.37	0.90	1.00	0.50	0.99	0.40	0.99

Note: See note to Table 3 in the main document.

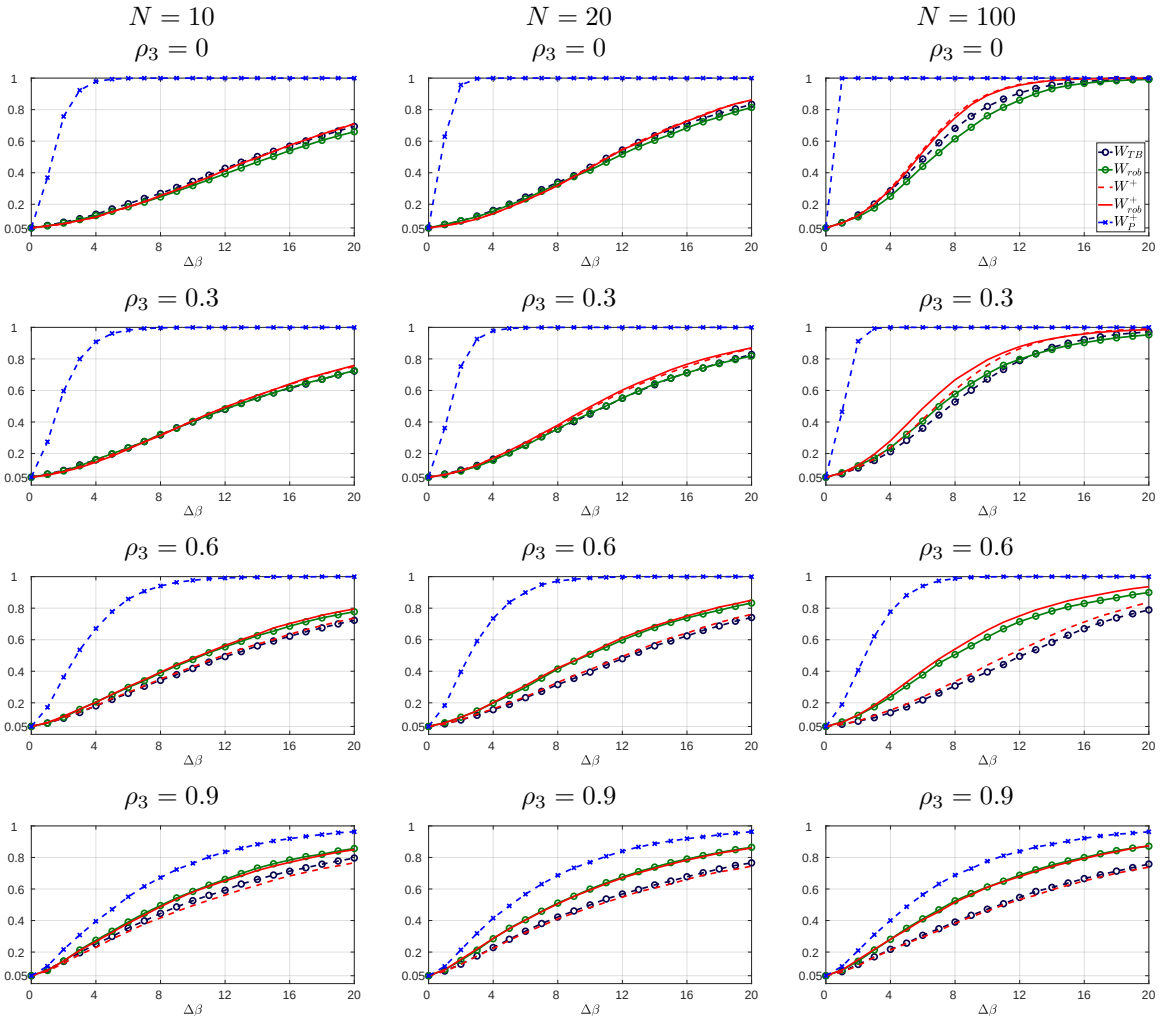

Figure 4: Size corrected power of the tests for $T = 100$ and $\rho_1, \rho_2 = 0.6$ in the individual specific intercepts only case with zero drifts.

Note: See note to Figure 1 in the main document.

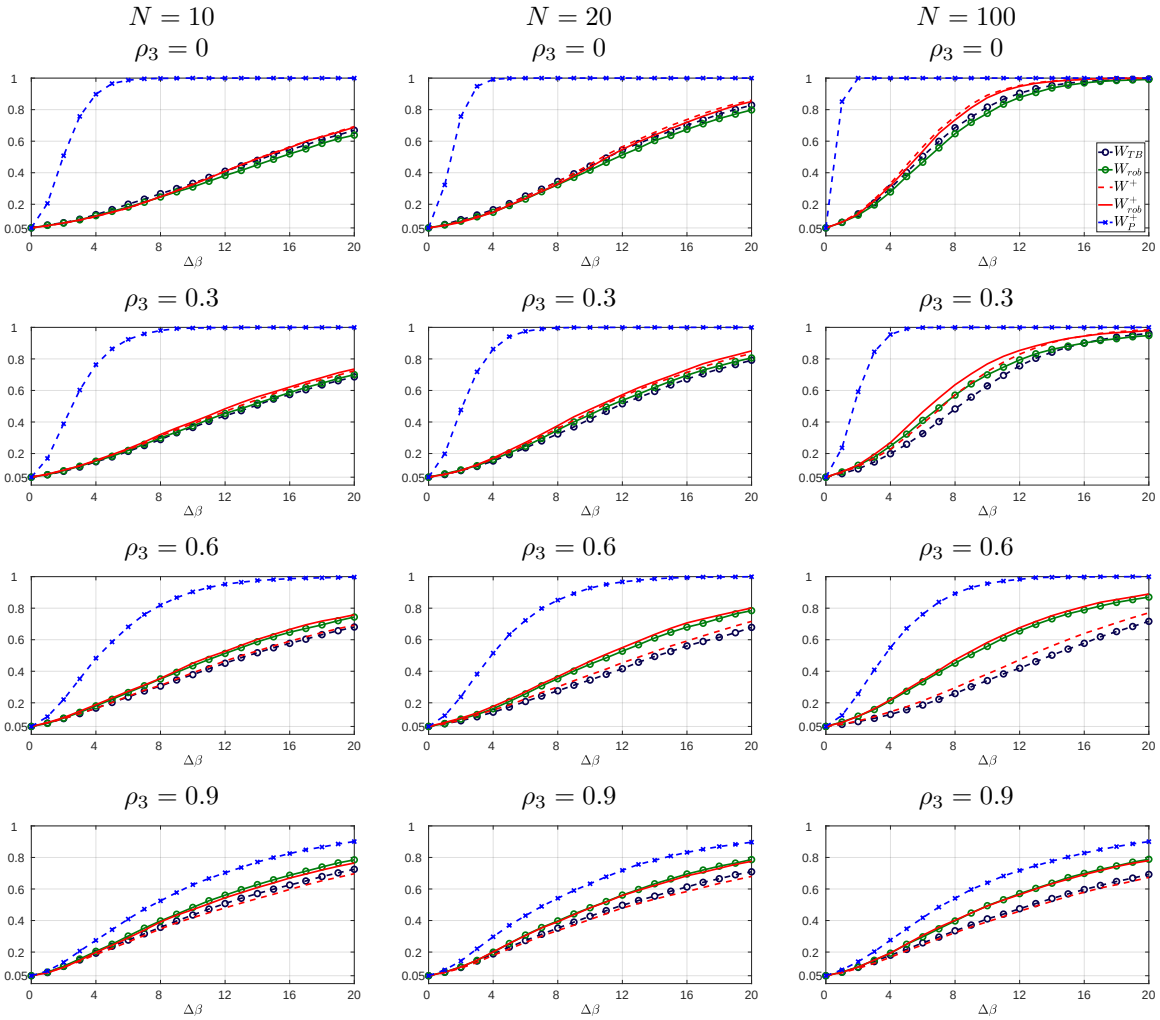

Figure 5: Size corrected power of the tests for $T = 100$ and $\rho_1, \rho_2 = 0.6$ in the individual specific intercepts and linear trends only case with zero drifts.

Note: See note to Figure 1 in the main document.