random\_X\_and\_structured\_Beta 0.7 0.65 0.8 0.8 0.6 observed 0.5 0.6 0.6 0.60 -0.4 -0.4 0.55 -0.4 0.2 0.025 0.05 0.2 0.4 300 600 1200 500 1000 2000 0.1 2400 4800 100 200 0.72 -0.7 0.8 0.71 0.8 ORC\_fine 0.70 -0.6 -0.6 0.5 0.69 -

Beta\_FPR

0.025

0.05

0.1

batch\_effect



0.4

200

500

р

100

1000

2000

20

40

S

60

0

80

4800

0.4

0.2

0.4

300

600

1200

Ν

2400

random\_X\_and\_structured\_Beta observed 3800 0.025 0.05 0.1 0.2 0.4 Beta\_SSE 3750 -ORC\_fine **-**0.025 0.05 0.4 0.1 0.2 batch\_effect Ν р S

method  $\leftarrow$  IBMR\_int - $\triangle$  · IBMR\_no\_Gamma + · subset - $\times$  relabel

random\_X\_and\_structured\_Beta 1.02 1.00 -1.0 -1.000 0.975 0.98 0.98 0.8 observed 0.950 0.96 0.925 0.6 -0.90 -0.900 -0.025 0.05 0.2 300 100 500 1000 2000 0.1 0.4 600 1200 2400 4800 200 Beta\_TPR 1.050 -1.00 -1.000 1.025 -0.95 0.998 ORC\_fine 0.995 0.90 0.996 0.85 0.975 -0.990 0.994 0.80 -0.992 0.950 -300 1200 100 0.025 0.4 4800 500 0.05 0.2 600 200 2000 80 0.1 2400 1000 0 20 40 60 batch\_effect Ν р S

method → IBMR\_int -△ · IBMR\_no\_Gamma + · subset -× relabel

random\_X\_and\_structured\_Beta 0.57 0.8 -0.6 0.55 0.54 0.6 opserved 0.50 0.51 0.5 -0.48 0.4 0.45 0.4 0.45 0.025 0.05 300 1200 4800 100 2000 0.1 0.2 600 2400 200 500 1000 80 0.7 0.45 0.43 0.44 0.6 ORC ORC 10.42 0.5 0.40 0.42 0.4 0.41 0.35 0.40 -0.3 0.40 0.2 0.30

error

0.025

0.05

0.1

batch\_effect

0.4

0.2

300

600

1200

Ν

2400

4800

method → IBMR\_int -△· IBMR\_no\_Gamma → subset -× relabel

100

200

500

р

1000

2000

20

40

S

60

80

random\_X\_and\_structured\_Beta 15 15 13 -20 12 observed 11 12 -15 -10 9 -0.025 0.05 300 1200 4800 2000 0.1 0.2 0.4 600 2400 100 200 500 1000 KL\_divergence 20 -10 10 · 7.4 15 **-**7.3 ORC\_fine 7.2 7.1 7.0 0.025 300 100 0.05 0.4 1200 2400 4800 200 0.1 0.2 600 500 1000 2000 20 40 80 batch\_effect Ν

method → IBMR\_int -△· IBMR\_no\_Gamma + subset -× relabel