Cumulative distributions AdamOptimizer **QNGOptimizer** approx='block-diag',  $\lambda$ =0  $\beta_1 = 0.9, \beta_2 = 0.99, \varepsilon = 10^{-8}$ 1.0 stepsize=0.01 stepsize=0.01 stepsize=0.025 stepsize=0.025 Probability of occurrence 0.8 stepsize=0.05 stepsize=0.05 stepsize=0.075 stepsize=0.075 stepsize=0.1 stepsize=0.1 0.6 stepsize=0.125 stepsize=0.125 stepsize=0.15 stepsize=0.15 stepsize=0.175 stepsize=0.175 0.4 stepsize=0.2 stepsize=0.2 stepsize=0.225 stepsize=0.225 stepsize=0.25 stepsize=0.25 0.2 (a) (b) 0.0 MomentumQNGOptimizer MomentumOptimizer  $\rho$ =0.9, approx='block-diag',  $\lambda$ =0  $\rho = 0.9$ 1.0 stepsize=0.01 stepsize=0.01 stepsize=0.025 stepsize=0.025 Probability of occurrence 0.8 stepsize=0.05 stepsize=0.05 stepsize=0.075 stepsize=0.075 stepsize=0.1 stepsize=0.1 0.6 stepsize=0.125 stepsize=0.125 stepsize=0.15 stepsize=0.15 stepsize=0.175 stepsize=0.175 0.4 stepsize=0.2 stepsize=0.2 stepsize=0.225 stepsize=0.225 stepsize=0.25 stepsize=0.25 0.2 (c) (d) 0.0 50 100 150 200 0 100 150 50 200 0 steps steps