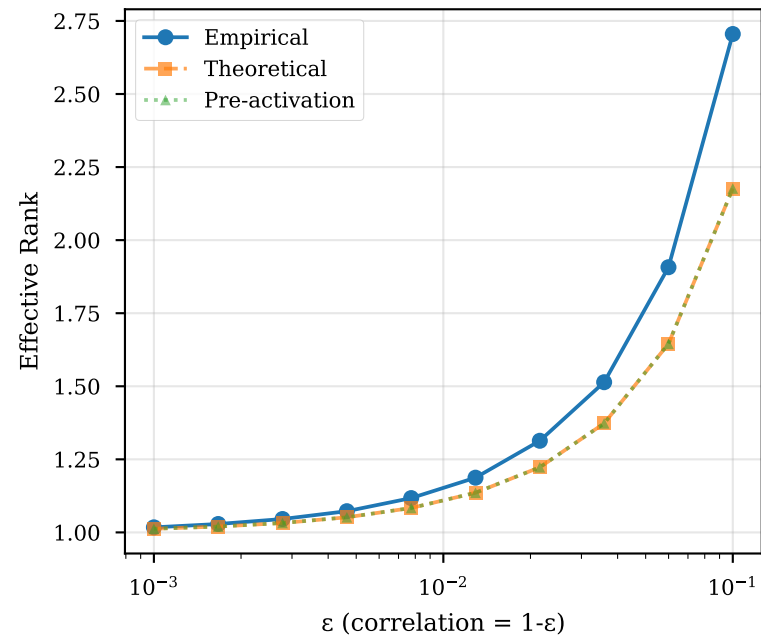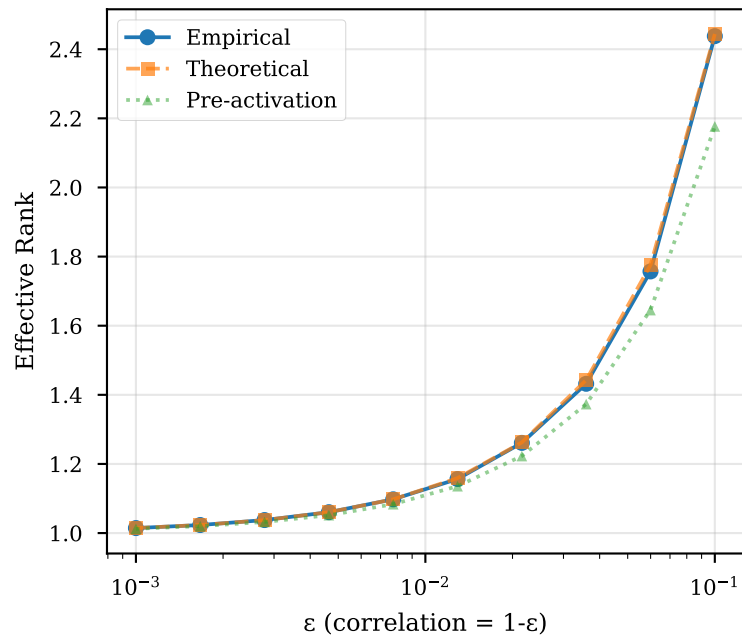Effective Rank Recovery: Theory vs Empirical