



**S3 Fig. The four dynamic states in networks with larger sizes.** We simulated networks with larger sizes of  $N = 5000, 10000, 15000$ . With the increase of synaptic parameter  $\tau_d^I$ , four dynamic states AS, Cri, SS and P can be identified as in Fig 1 in the main text. Thus, these states are robust feature of the model. In the raster plot of each case, only the spikes of 2000 neurons are shown for clarity. Parameters are as follows:  $r_0 = 1.6 /ms, \tau_d^I = 4, 8, 11, 14 ms$  for  $N = 5000$ ;  $r_0 = 3.2 /ms, \tau_d^I = 4, 8, 10, 13ms$  for  $N = 10000$ ;  $r_0 = 4.8 /ms, \tau_d^I = 4, 8, 9.5, 11 ms$  for  $N = 15000$ .