The coupling between a bulk vortical flow and a surfactant-influenced interface in a stationary open cylinder driven by the constant rotation of the bottom disk is investigated. The time-discretized equations are solved using an efficient and effective spectral-Galerkin method recently developed. It is found through numerical simulation that the base axisymmetric flow is unstable to three-dimensional perturbations for sufficiently large rotation rates. (Received September 22, 2009)