Cut cell meshes avoid the expensive procedure of body-fitted meshes for complex geometries. However, several issues arise with this approach, like the small-cell problem. Dealing with these is an active field of research for hyperbolic differential equations. The recent domain of dependence stabilization for discontinuous Galerkin methods addresses this problem by redistributing mass in between the neighborhood of a small cut cell on a semi-discrete level. It shows some promising results in experiments and was proven to possess a stable semi-discretization for linear equations. Our aim is to extend this to a fully-discrete stability analysis. In this talk, we present the framework and techniques to obtain strong stability by applying explicit Runge-Kutta methods and elaborate on further gained insights of the stability mechanisms that affect the time step restriction.