Two problems:

- The barrel cross section is much bigger than the back nozzle, thus the active chamber depressurizes much faster than the back chamber (if they have the same volume)

- If the active chamber have the same volume, when the piston goes back, the pressure in the active chamber drops to half, loosing propulsion power

Mass Flow Rate in Choked Conditions:

$$\dot{m} \propto A$$

$$\frac{A_{barrel}}{A_{nozzle}} \sim 7$$

$$\frac{\dot{P}_{chamber} V_{chamber}}{\dot{P}_{back} V_{back}} \sim 7$$

We want:

$$\frac{V_{chamber}}{V_{back}} > 7$$

To avoid that the active chamber empties faster than the back chamber