Planets outside our own solar system have been sighted now for more than 20 years. Studies of the dynamics inside Earth-like exo-solar planets have by and large been based on traditional type of thinking used in mantle convection for the planet Earth. Yet we know that exo-solar planets can have masses several times greater than the Earth. Inside rocky exo-planets with masses several to ten times greater than the Earth, enormous pressures greater than several TPas can exist in the deep mantle. Recent computations from density functional theory have demonstrated the existence of several phase transitions in the deep mantle of these large exo-planets. We have employed compressible mantle convection models and studied systematically the dynamics of exo-solar planets from earth-like mass of 1 to 2 earth masses all the way to 20 Earth masses. We will show for the first time ever that the dynamics are strongly impacted by the mass of the exo-planet. Previous work on dynamics of exo-planets have all been based on a particular exo-planet with a fixed mass. Yet in astrophysics it is well-known that the interior dynamics depend critically on the stellar mass because of the influence of equation of state under high-temperature and pressure conditions. Exo-plaents should prove to be of no exception, since the temperature and pressure inside their mantles can reach as high as 10,000 K and several TPas. These conditions are very different from the Earth's mantle.