

# Beyond Dominance and Nash: Ranking Equilibria by Critical Mass

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## **Abstract**

Strategic interactions pose central issues that are not adequately explained by the traditional concepts of dominant strategy equilibrium (DSE), Nash equilibrium (NE), and their refinements. A comprehensive analysis of equilibrium concepts within the von Neumann-Nash framework of n-person optimization reveals a decreasing hierarchy of n nested concepts ranging from DSE to NE. These concepts are defined by the “critical mass,” the number of players needed to adopt and sustain the play of a strategy profile as an equilibrium. In games with  $n > 2$  players, the  $n-2$  intermediate concepts shed light on observed large social systems, implementation, decentralization, and replication in production, operations and political games. Our approach provides a new perspective on equilibrium concepts that we believe to be of interest to researchers in the fields of economics and other applications of game theory