

Author: Daniel Arce

Title: Cybersecurity and Market Share in Digital Ecosystems with Network Externalities

Abstract: Digital ecosystems with network externalities compete for users and face cyberattacks. This paper introduces a game-theoretic benchmark that endogenizes ecosystems' defense, users' adoption, and hackers' targeting within the context of (own-side) network externalities. An ecosystem's cybersecurity strategy corresponds to their defensive intensity to both protect users' network benefits and increase defensive opaqueness. Monotone comparative statics characterize strategic complements and substitutes. The analysis shows ecosystems' cybersecurity strategies are strategic complements; market share increases in cybersecurity; and hacker targeting increases in market share regardless of an ecosystem's defenses. Paradoxically, more need not be better within this complex system, as conditions exist whereby hackers appear to increase attacks when an ecosystem increases security. In addition, the ecosystems-users-hackers triad can sustain non-monopolistic competition despite strong network externalities.