TITLE: Product Design in Strategic Firm Decision-Making

ABSTRACT: This seminar will present two studies applying game theoretic models to examine the role of product design in profit-seeking firm behavior. The first study investigates when product design choices should be considered strategic decisions and whether the structure of retail distribution channels affects optimal design. The study reveals that heterogeneity among consumers in their relative preferences for product attributes plays a key role in coupling design to strategic decisions: When preferences are homogeneous (logit), optimal design is decoupled from pricing, competition, and channel structure. But the presence of heterogeneity (mixed logit) couples design decisions with strategic positioning, leading different channel structures to imply different profit-maximizing designs. The second study investigates the role of public policy by characterizing oligopolistic equilibrium vehicle design responses to U.S. Corporate Average Fuel Economy (CAFE) policy, which penalizes firms whose sales-weighted average fuel economy falls below the standard. The study models firms as responding to CAFE policy not only by pricing vehicles to shift sales volume, but also by redesigning vehicles. In such a system, equilibrium design responses to CAFE policy follow a characteristic pattern, and standards set too high are fundamentally ineffective.