Does Inventory Increase Sales? The Billboard and Scarcity Effects in U.S. Automobile Dealerships Santiago Gallino

Joint work with Gérard Cachon and Marcelo Olivares

Abstract:

Beyond the obvious stockout effect (you cannot sell a car you don't have) what is the relationship between inventory and sales? Inventory might signal a popular, and therefore a desirable, product, thereby increasing sales (a billboard effect). Or, inventory might encourage a consumer to continue her search (on the theory that she can return if nothing else is found), thereby decreasing sales (a scarcity effect). We seek to identify these effects in U.S. automobile sales. Our primary research challenge is the endogenous relationship between inventories and demand - dealers influence their inventory in anticipation of demand. Hence, our estimation strategy relies on weather shocks at upstream production facilities to create exogenous variation in downstream dealership inventory. We find that the impact of adding a vehicle of a particular model to a dealer's lot depends on which cars the dealer already has. If the added vehicle expands the available set of sub-models (e.g., adding a four-door among a set that is exclusively two-door), then sales increase. But if the added vehicle is of the same sub-model as an existing vehicle, then sales actually decrease. Hence, expanding variety should be the first priority when adding inventory - adding inventory without expanding variety is actually detrimental. Based on this insight, given a fixed set of cars, they should be allocated among a group of dealers so as to maximize each dealer's variety. Our data indicate that the implementation of this strategy could increase expected sales by 2% without changing the total number of vehicles in the market or even the number of vehicles at each dealership.