

**Price and Efficiency in a Market for Generic Drugs in China**  
(Job Market Paper)

In the U.S., drug prices are determined primarily by market competition. In the European Union, reference pricing policies are popular. In China, the government has adopted low-bid auctions to determine the prices of generic drugs. While some papers study drug price regulations, we know little about how these three pricing mechanisms (auctions, competition, and reference pricing) compare for surplus and why. I develop a tractable model of auctions with selective entry and (endogenous) downward sloping demand and use it to study the equilibrium of generic drugs in a large province in China for which I have hand-collected the data.

The novelty of these auctions is that unlike in standard auctions, where prizes are exogenously fixed, here the winner has the exclusive right to sell the auctioned drug (e.g., acetaminophen 10 mg capsule) to public hospitals in a province but faces competition from other drugs (e.g., acetaminophen 5 mg tablet). Thus, the prize (the profit) depends on the demand from public hospitals and the wholesale prices of competing drugs. I use a Nested-Logit discrete choice framework for demand, where public hospitals choose drugs given the wholesale prices. For supply, I model firms as bidders with private information about their variable costs. They submit wholesale price bids if they decide to participate in the auction.

To identify the demand parameters, I apply the “Hausman instrument” to the share-equations. I exploit the monotonicity of equilibrium bidding strategies to identify drug-specific distributions of marginal cost of manufacturing. I observe bids from all qualifying firms for 17 analgesics and 13 antacids. I find that profit margins are 43 - 69% for analgesics and 40 - 64% for antacids. Complicated drug formulations (e.g., via syringe) are more costly to produce than others (e.g., tablets).

I use the estimates to simulate pricing and welfare under Bertrand competition and reference pricing (a price ceiling). Drug prices tend to be higher under competition than for auctions, which is consistent with theoretical predictions. Nonetheless, producer and consumer surplus under the two systems are almost the same. Reference pricing can lower drug expenditures and therefore increases consumer surplus. However, producer surplus is smaller, which for some drugs lowers total welfare. Reference pricing can be effective to improve consumer welfare.

JEL Classification: D44, L11, I11, I18

Keywords: Pharmaceuticals, Auction, Reference Pricing, Generic Drugs.