Some Lessons from Successes and Failures of Electronic Trading

September 2002

Daniel Huttenlocher

Electronic Trading

- The late 90’s brought a lot of hype about revolutionary new electronic markets
  - Has proven largely unfounded
    - Most markets remain relatively unchanged
  - How these markets actually work illustrates why
- Focus on what works where
  - Don’t expect new market structures to succeed just due to “efficiencies” of going electronic
  - Recognize value provided by intermediaries
  - Understand when market-based price discovery mechanisms are effective for determining prices
In This Talk

- Consider what trading is, and what it isn’t
  - Purchasing is different from trading
- Look at price discovery in trading
  - Exchanges, auctions, bilateral negotiation
- Why price discovery mechanisms aren’t well suited to non-trading activity
- Exchanges are the lowest value price discovery mechanism
  - Brokers, auctioneers 100x more in many cases
  - Passive mechanism requiring high liquidity

Type of Transaction is Important

- **Trading**: buying and selling for profit
  - Commodity items
    - Widely agreed upon: stocks, bonds, options
    - Items don’t depend on who seller is
- **Purchasing**: buying for use/consumption
  - May be commodity or specialized items
  - Often small number of sellers (producers)
- **Collecting**: buying for hobby
  - One-of-a-kind items
    - Who seller is matters
  - Often eventually re-sold
Price Setting Mechanisms

- **Fixed price**: set by seller
  - Universal or regional price
  - Promotional price
  - Differentiated price (price discrimination)
    - E.g., commonly used by airlines

- **Price discovery**: set by buyer(s) and seller(s) together
  - Negotiation, with or without broker/agent
  - Auction, forward and reverse
  - Exchange, continuous two-way auction often with “market makers” or “specialists”

Which Mechanisms Work Where

- Fixed price is used for purchasing
  - Seller constrained by cost of goods
  - Buyer and seller want predictability of prices
    - Negotiation may set a contract price for some time period, not per transaction (discovery)
  - Surplus goods are major exception

- Price discovery is used for trading and collecting
  - Value of goods less constrained by their cost
  - For collectors, price discovery is part of the fun
Price Discovery Mechanisms

- Buyer(s) and seller(s) together setting price

<table>
<thead>
<tr>
<th>Many Buyers</th>
<th>One Buyer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auction</td>
<td>Negotiation</td>
</tr>
<tr>
<td>Exchange</td>
<td>Reverse Auction</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>One Seller</th>
<th>Many Sellers</th>
</tr>
</thead>
</table>

Price Discovery Costs

- Inability to plan because of variable price
  - E.g., negotiating your pay and expenses for housing and food every day
    - Based on market conditions
  - Particularly problematic if you need to buy/sell for reasons separate from the market price

- Difficulty of determining price for unique or rare items, thinly traded items
  - Such as the value of your services

- Time and expertise required to determine fair or best price
Cost-Benefit of Price Discovery

- Good for items where transaction price can be highly variable
  - Trading: little intrinsic value, being re-sold
  - Collecting: being re-sold, one-of-a-kind
  - Surplus: get whatever value can
  - Cost of production not dominant factor
    - Could include purchase of items with low marginal cost such as software
- Need knowledgeable buyers and sellers, time to negotiate
  - Process must be worthwhile to both parties

Differentiated Price is not Discovery

- Prices can be “dynamic” in either case
  - With price discovery, buyers and sellers assign value for each transaction
    - E.g., movement of a stock or bond price
  - With price discrimination, seller sets price based on purchaser, time, etc.
    - E.g., Amazon.com experiment, airline seats
- Key difference from discovery is that price is set by seller not cooperatively
  - Yield management, customer loyalty, etc. by seller versus joint agreement on value
An Illustration

- Difference between price discovery and price discrimination
  - Price discrimination used by most vendors
    - Preferred/large customer discounts
  - Price discovery not appropriate mechanism because both sides want predictability

- Travel is a good example
  - Most hotels and airlines negotiate volume-based discounts with large companies or consolidators
  - Priceline a relatively small part of the picture
    - Only surplus seats from vendor’s point of view
    - Most passengers not that flexible

Another Illustration

- Sunbid web site – for new Sun computers
  - McNealy: “price lists will be obsolete”
  - Buyers bidding for equipment – price discovery
    - Little actual interest due to high cost, low benefit

- But Sun is a large user of Ebay
  - For selling refurbished (surplus) hardware
  - Note that general auction site more effective than Sun-only site
    - Buyers want to see other sellers of used Sun equipment as well as other brands
    - Seller wants to be rid of excess inventory
**What is an Exchange?**

- Characterized by participation of multiple buyers and multiple sellers
- Many definitions – use financial markets
  - Organization of traders that facilitates their trading according to a set of rules
  - Presence of two-way continuous markets
    - Bids (buyers) and asks (sellers)
  - Rules help ensure “orderly” markets
    - Market makers or specialists who must provide two-way markets
    - Wide dissemination of trade prices, bid-asks

**Where Exchanges Work**

- Commodity items
  - Many people buying and selling the same thing
    - Took years to agree on agricultural futures
- Highly liquid items
  - “Readily salable”
    - A single transaction does not move the price
  - Only commodity items can be liquid
- Even many financial instruments don’t trade on exchanges – via broker-dealers
  - Corporate bonds, mortgage bonds, etc.
What Is Liquidity?

- Liquidity is an abstract notion
  - Individual transaction not moving market price
  - Transaction volume a good indicator (for a given transaction size)
- For liquidity, need
  - Two-way market (bids and asks)
  - Enough transactions to always have good estimate of market price
- Being one of a crowd rather than standing alone

Characteristics of Illiquid Markets

- First bid or offer grants a “free option” to the other side
  - A firm commitment whereas other can take it or leave it
- Leads to wide markets
  - Low bids and high offers
- Nobody willing to go first
  - Brokers play important role in finding counterparties – playing matchmaker
- Trust and relationships beyond a single transaction become important
  - Counterparty for trade matters
Role of Intermediaries

- For most illiquid transactions broker or agent is natural
- Build trust relationships with small number of counterparties
  - Don’t need to learn all other parties, let intermediary vet them
    - E.g., 10,000 participants and 10 brokers
- Hide who the final counterparty is
  - Ability to provide anonymity
- Want several brokers so can cross-check their prices

B2B “Exchanges”

- Bring together buyers and sellers of items for business use
  - Sellers are generally producers/vendors
  - Buyers are generally consumers/users
- Items may or may not be commodities
- Transaction model often not true exchange, with simultaneous bids and offers
  - Can be auctions or reverse auctions (but generally no vetting role)
- Revenue model usually fee per transaction
  - Value must be high to produce much revenue
Problems With B2B “Exchanges”

- Identity of counterparty matters
  - Transactions are purchases, not trades
    - Generally limited number of suppliers/buyers
  - Low liquidity
    - Longer-term trust relationship important
- Absence of continuous markets
  - Exchange bid-offer mechanism problematic, granting “free option”
- Lack of commodity items
  - Producers resist commoditization
  - Purchasers often require specific items or suppliers

Speculators Make Markets Work

- For instance commodities markets
  - Primarily agricultural or natural resource items (futures contracts)
- Could try introducing “B2B” futures
  - Need stable set of agreed upon commodities
  - Speculators want potential for price volatility
    - E.g., weather and prices of agricultural goods
  - Bandwidth, power, chips all seem to be “good” candidates
    - But are they true commodities with many suppliers?
Some Illustrations

- Exchanges need multiple buyers and sellers who want a price discovery mechanism
  - Dell procurement site, open 4 months
    - Not providing value beyond supplier agreements
  - Hundreds (thousands?) of small B2B exchanges
    - Bigger ones such as Ventro

- B2B exchange software companies
  - Ariba, I2, FreeMarkets, ... all now positioned as enterprise software for purchasing/supply chain
  - Commerce One waited longer before moving away from e-Marketplaces

New Equities Exchanges

- ECN/ATS – Alternative Trading Systems
  - Flow of orders, with or without market makers
  - Exchange mechanism, matching bids and asks

- Now 40% of NASDAQ trading volume
  - Most did not exist 5 years ago
  - SEC order handling rules gave initial liquidity

- Expanding into NYSE stocks

- Becoming competing regulated exchanges
  - Island application to SEC
  - Archipelago/Pacific Exchange partnership
Exchange Revenues

- Equities exchanges are the big success
  - However still have low revenues
  - Around $10 trillion traded on NASDAQ last year
    - Resulting in around $1 billion in transaction revenue to “exchanges” – .01%
- Estimates of B2B “trading” volume around $5-$7 trillion
  - If similar percentage, not a very big market
- Exchanges for benefit of members or participants who are true value providers
  - A form of public utility or cooperative

High Value Intermediaries

- Enable transactions that would not have occurred (timeliness, anonymity)
  - **Brokers** – proactive search for counter parties
  - **Auctioneers** – bring together large number of potential bidders
  - **Dealers** – take positions in order to get transactions done
- When high cost of waiting, these services have large potential value
  - Brokers receive much higher fees than exchanges for block equity transactions
Broker-Dealer Electronic Trading

- Increase efficiency of low margin business
  - Retail web sites for individual investors
    - Can’t make money on $10 trades with human brokers, but can electronically
- Increase value of higher margin business
  - Automate handling of large institutional orders
    - Match with other customers where possible
    - Route intelligently to limit information leakage
  - Assist institutional traders and salespeople
    - Find possible counterparties given market conditions
  - Still early in the deployment of such systems

No Magic in Electronic Trading

- Enron Online
  - Markets in various “new commodities”
    - Often take positions
  - Electronic trading platform for posting markets
    - Similar to trading operations of investment banks (broker-dealers) but more automated
- However very different revenue numbers
  - Reporting of trading volume versus fees
    - Enron trading “revenue” more than that from largest investment banks combined
  - Spreads/commissions more accurate measure
    - Watch out for other online sites like Priceline
Electronic Auctions

- Remove physical barriers to participation
  - For items with national/global appeal
- Lower search costs for potential bidders
  - Small number of places to look for the item
  - Tools for searching items offered
- Provide ratings of buyers and sellers
  - Vet the participants
- Network effect for these benefits
  - Ebay has majority of the market
- Value much higher than for exchanges
  - 5-7% of transaction (vs 0.01% for NASDAQ)

Growth of Online Auctions

- Network effects will likely lead to further mergers/closures
  - Unless auction sites cannot continue to protect against consolidators
- Growth in existing markets slowing
  - Does main street use auction sites or alternatives such as newspaper ads?
- New markets may be harder sell
  - National/global appeal important
    - Questionable for real estate, used cars, etc.
Summary

- Negotiation, auctions, exchanges all price discovery mechanisms
  - Not same as “dynamic pricing” by the seller
- Price discovery not appropriate to all transactions
  - Needs to be worth overhead for both parties
  - Most useful when cost not good basis for price
- Exchanges need two-way markets and relatively liquid commodities
- Intermediaries provide most of the value in trading: auctioneers, broker-dealers
  - Lots of room for improvement via automation