Leavey School of Business

Conflict and Coordination in Multi-channel Distribution : Perspectives for Antitrust Policy from the Supply Chain Management community

American Antitrust Institute

Invitational Symposium

Washington DC

June 22, 2011

Santa Clara University

Professor Andy Tsay

Leavey School of Business

Santa Clara University

- Oldest university in California
  - established by Jesuits in 1851 on a mission site
  - California joined US just one year earlier
- Top-20-ranked MBA/ EMBA, for Silicon Valley working professionals
  - evening/weekend classes
  - emphasis on high-tech

Agenda

- What is a ***supply chain***?
- What is a ***(distribution) channel***?
- The ***customer's perspective***: what different channels mean to us
- The ***supply chain manager's perspective***: issues in channel choice
  - Intermediated vs. Direct?
  - How about using both?

Supply chain. (*a*) (collectively) the routes or means by which supplies (esp. those for a military force) are received; (*b*) *Business*, the chain of processes involved in the production and distribution of a commodity.

1910 R. MORRIS *Railroad Admin.* i. 23 A railroad is better off than an army because..nobody is trying to cut its supply chain.

1956 *Operations Research* **7** 10 It is possible to supply the steel at approximately this rate..provided no link in the supply chain breaks.

1962 W. E. MOORE *Conduct of Corporation* xiii. 183 The sales or marketing manager is concerned with the other end of the supply chain, the securing of orders and delivery of the product.

From *OXFORD ENGLISH DICTIONARY* (added 5/2003)

Modern usage

- More than just the physical path of materials
- Three distinct flows
  - Materials
  - Information
  - Funds
- ***Supply Chain Management*** (SCM) = taking a ***systemwide perspective***, beyond one factory's walls
  - emphasis on managing relationships across interfaces (between firms, or between steps in value chain)

Booz-Allen & Hamilton claims to have coined the term SCM in 1982. (Oliver *et al*, *Strategy+Business*, Q2 2001)

What's a channel, and what does it mean for you?—

How many ways can you buy a ….?

iPhone

iPod Touch

iPad

A manufacturer's channels

	Intermediated	**Mfr-controlled**
Bricks-and-mortar	Best Buy, Walmart, etc.	Apple store
Virtual	Bestbuy.com, Walmart.com, Amazon.com, etc.	Apple.com

Best Buy - Santana Row

3090 Stevens Creek Blvd
San Jose, CA 95128
Phone: 408-241-6040
GEO: 37.322704, -121.94843

Map & Directions
See full store details
Weekly Ad

OF VIRUS AND SPYWARE PROTECTION ARE INCLUDED WITH EVERY PC PURCHASE
DE TO A FULL YEAR OF PROTECTION
ONLY $19.99

VISION
AMD

PRICES
ON OUR LATEST LAPTOPS
FROM THE TOP BRANDS

NEW

Check out our complete selection at BestBuy.com/laptops

SAMSUNG
TOSHIBA
Leading Innovation >>>
Gateway

AMD Dual-Core E-350 Accelerated Processor with Radeon™ HD 6310 Discrete-Class Graphics
SKU: 2755065
-349.99

Intel® Core™ i3 Processor
SKU: 2833077
-399.99

Intel® Core™ i3 Processor
SKU: 2839062
-449.99

intel CORE i3 Processor Rating NEW

intel CORE i5 Processor Rating NEW

BEST BUY® EXCLUSIVE

Intel® Core™ i5 Processor with Turbo Boost Technology
4-way processing, Windows® 7 Home Premium, Intel® Wireless Display Technology and webcam
SKU: 2678499
-829.99

GREAT PRICES
on all MacBooks and iMacs,[1]
plus get FREE SHIPPING at BestBuy.com®

Authorized Reseller

Find an Apple Shop in a Best Buy® store near you at BestBuy.com/Apple

SAVE $100 ON ANY LAPTOP, NETBOOK OR TABLET
with purchase and 2-year activation of ANY mobile broadband device[2]

verizon

Samsung 4G Mobile Hotspot SCH-LC11
Connect up to 5 Wi-Fi-enabled devices on the go with the lightning fast 4G network from Verizon. SKU: 2035347
Reg. Price $99.99

SAVE $50

OUR LOWEST ADVERTISED PRICE
49.99 After Savings[2]
With new 2-year activation

SAVE 50% ON THE BUY BACK PROGRAM
WHEN YOU BUY A GEEK SQUAD® BLACK TIE™ PROTECTION PLAN AND A BUY BACK PLAN TOGETHER.

[1] Does not include Apple iPod. Anti-virus software chosen, based on AV-Test, ONLINE, 11 OCT 2010. Webroot SK 10 BRS4039, Kaspersky SK 10 BRS4043, Symantec NO 10, 11 OCT 10. Online offer may vary. [2] Laptop screens are measured diagonally. [3] Battery life tested using MobileMark 2007. Battery life will vary depending on the product configuration, product model, applications loaded on the product, power management setting of the product, and the product features used by the customer. As with all batteries, the maximum capacity of this battery will decrease with time and usage. [4] Requires in-store activation of a new CLEAR or Best Buy Connect service plan with 2-year agreement. [5] Apple products are not available in all stores. Available at BestBuy.com/Apple. [6] Excludes Apple products, iPad, CLEAR USB modems, CLEAR spots and non-contract mobile broadband. Subscription, credit approval, usage fees and termination fees may apply. Products must be purchased on same receipt to receive savings. See a Customer Specialist for details or go to BestBuy.com/InstallationAndSetup for additional carrier device selection. Offer not available at BestBuy.com®. [7] $99.99 Mobile Hotspot - $50 Instant Savings = $49.99 With New 2-Year Activation. [8] Carriers, coverage and products may vary by store. Available in New Jersey. Carrier requirements may include data plan subscription, credit approval, usage fees and termination fees. [9] Products must be purchased on same receipt to receive savings. Geek Squad® Black Tie™ Protection Plans are available at a variety of price and coverage levels. Additional terms and conditions apply. Please refer to the actual terms and conditions for a complete description of the limitations of the offer. See inside back cover for Buy Back Program details. Offer not available online. ACQ1191 3

amazon.com

Hello. Sign in to get personalized recommendations. New customer? Start here.

Your Amazon.com | Today's Deals | Gifts & Wish Lists | Gift Cards

Shop All Departments | Search All Departments

All Electronics | Brands | Bestsellers | Audio & Home Theater | Camera & Photo | Car Electronics & GPS | Cell Phones & Accessories | Computer

Click for larger image and other views

View and share related images

Watch Interactive Guide [Flash]

Apple iPod touch 8 GB (4th Generation) NEWEST MODEL

by Apple

(1,748 customer reviews) | Like (1,281)

NEWEST VERSION

List Price: ~~$229.00~~

Price: $199.99 & this item ships for **FREE with Super Saver Shipping**. Details

You Save: $29.01 (13%)

75 new from $193.00 **107 used** from $147.00 **18 refurbished** from $167.99

Capacity: 8 GB

8 GB | 32 GB | 64 GB

In Stock.

Ships from and sold by **Amazon.com**. Gift-wrap available.

Want it delivered Tuesday, June 21? Order it in the next 26 hours and 36 minutes, and choose **One-Day Shipping** at checkout. Details

Apple Store, San Francisco

Store Information

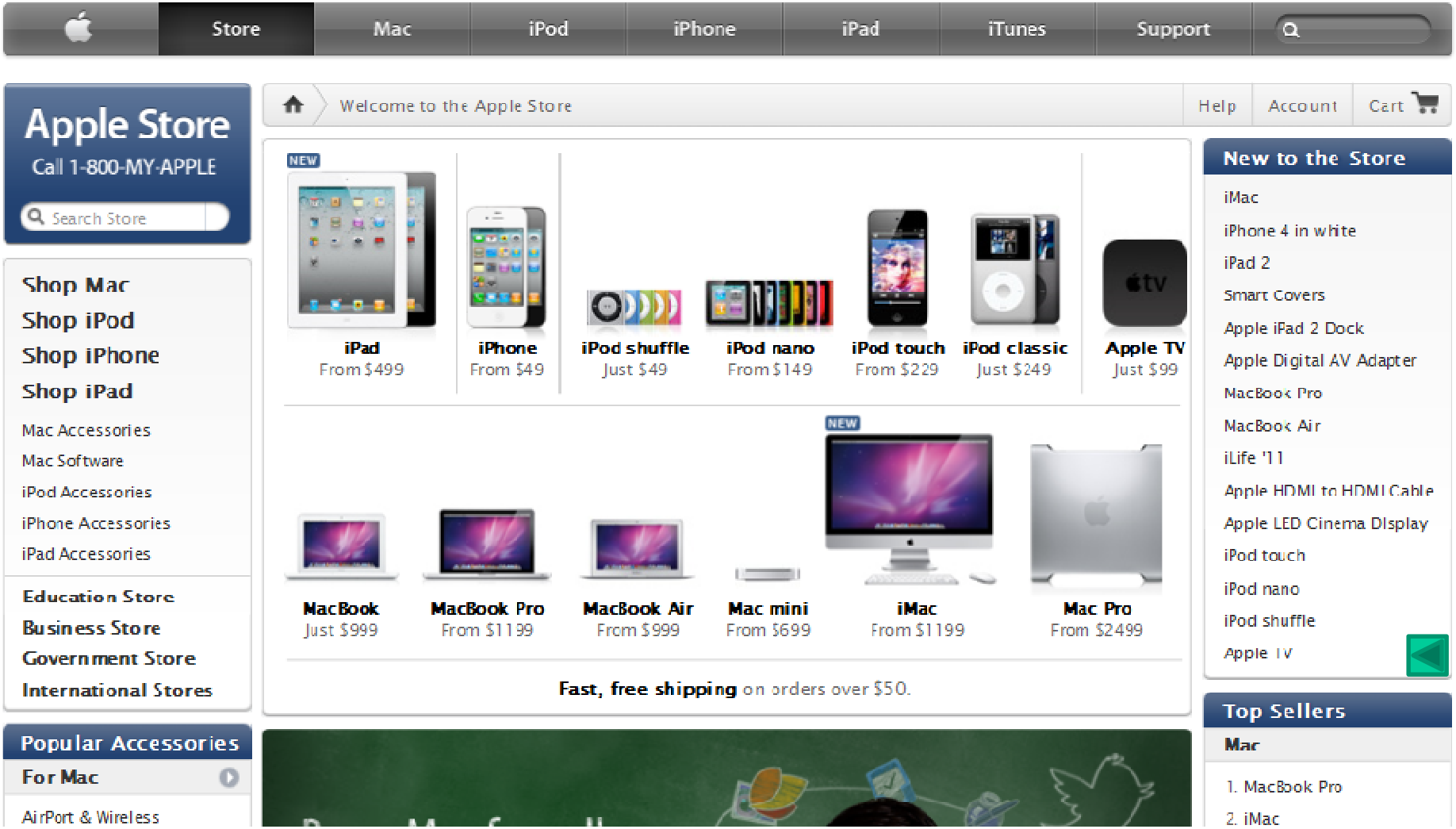
Address:
One Stockton Street
San Francisco, CA 94108
(415) 392-0202

Driving Directions & Map ▸

Store hours:

Mon – Sat:	9:00 a.m. – 9:00 p.m.
Sun:	10:00 a.m. – 8:00 p.m.

http://store.apple.com/us :

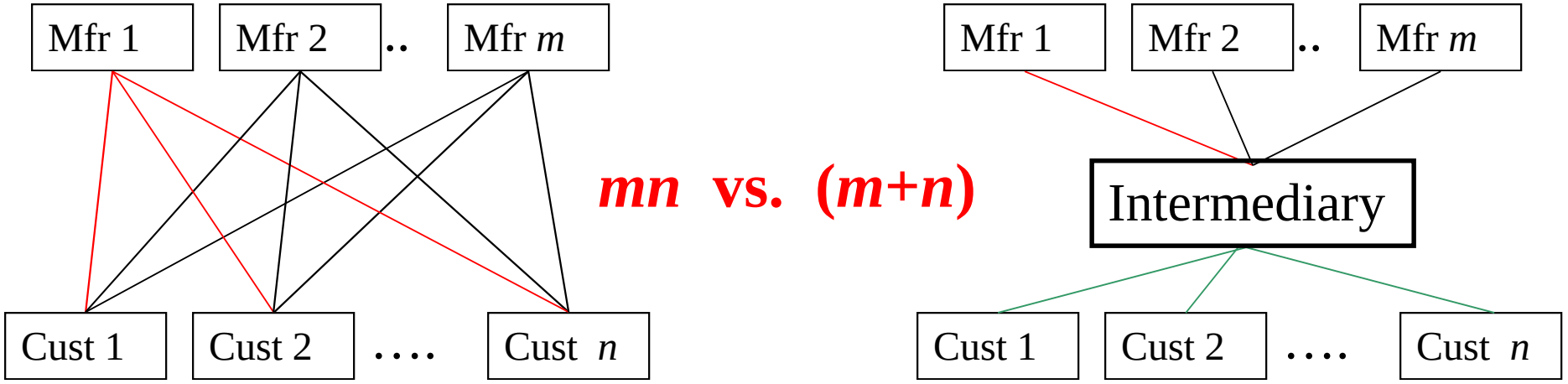


The supply chain perspective:

Manufacturers & Intermediaries

*– A **Love-Hate** Relationship*

Love



- Distribution requires building brand/product awareness, providing market coverage, gathering market info., breaking bulk, processing orders, customer support, etc.

Total cost = (# of links)*(cost per link)

"It is an old axiom of marketing that it is possible to eliminate wholesalers (or any middlemen, for that matter) but impossible to eliminate their functions."

~Stern *et al*. 1996

Hate

- Reasons to “dis-intermediate”:
  - intermediaries carry only small ***assortments*** of a manufacturer's products
  - direct control of distribution and pricing can lead to higher ***profit margins***
  - intermediaries can use their ***power*** to extract various concessions from the manufacturer
  - manufacturers can provide a ***broader product selection in a better ambiance with higher service*** in direct outlets
  - more ***flexibility*** in experimenting with product attributes
  - closer ***contact with customers***
  - protection from ***crises faced by intermediaries***

Recent developments: more reasons to "Be Direct" online

- ***Expanding role of the Internet*** → new access to customers, new capabilities for information flow
- ***Information and materials handling technologies*** → increased feasibility for a producer to also perform sales/distribution activities
- ***Pervasive logistical networks (FedEx, UPS, etc,)*** → coverage of the "Last Mile"

Hybrid strategies have grown in popularity, with a major inflection point during the Dot-com boom

- Different channels can appeal to different segments
- Total market coverage may increase
- But…

Channel conflict !

From a May 1999 letter from Home Depot to more than 1,000 of its suppliers:

"Dear Vendor, It is important for you to be aware of Home Depot's current position on its' [sic] vendors competing with the company via e-commerce direct to consumer distribution.

"***We think it is short-sighted for vendors to ignore the added value that our retail stores contribute to the sales of their products***....

"We ***recognize that a vendor has the right to sell through whatever distribution channels it desires***.

"However, we too have the right to be selective in regard to the vendors we select and ***we trust that you can understand that a company may be hesitant to do business with its competitors***."

~Brooker, *Fortune*, 8/16/1999

Mimicking Dell, Compaq to Sell Its PCs Directly

WSJ.com THE WALL STREET JOURNAL. ONLINE

By GARY MCWILLIAMS

November 11, 1998;
Page B1

"Compaq Computer Corporation...is expected to unveil today an aggressive new effort to sell personal computers ***directly to customers, bypassing the dealers who helped make it the world's largest seller of PC's.***

Compaq's battle plan: use Internet and telephone-sales operations to reach the fast-growing small and medium-size business PC market."

DELL had already proven the viability of Internet-direct sales for PCs well before 1999

Forbes.com

The World's Billionaires

Forbes Staff **3.9.11**

Michael Dell

$14.6 B

Net Worth Calculated March 2011

+ Follow Michael Dell 51

Age: **46**

Source: **Dell, self-made**

Residence: **Austin, TX**

Country of citizenship: **United States**

Education: **Dropout, University of Texas Austin**

Marital Status: **Married**

World's Billionaires

#44 **overall**

#16 **in United States**

Forbes 400

#15

PC industry in the 1990s

Objectives of the remainder of this presentation

- Comparing the different types of multi-channel research
- Understanding the research methodology prevalent in the supply chain management academic community

How to think about the research on conflict in multi-channel systems

- This problem is studied in Economics, Marketing, and Supply Chain Management
  - Harder and harder to distinguish among these disciplines
- Better to just categorize the research as Descriptive vs. Prescriptive
  - Descriptive: characterize how the actors *actually do* behave
    - e.g., When adding a new channel, does free-riding actually occur? In what direction?
  - Prescriptive: how *should* the actors behave?
    - e.g., Assuming that a new channel affects demand in a given way, should the new channel be included? What contract should be used with the new channel partner?

Defining the scope

- At least one channel must contain an ***independent intermediary***
  - no intermediary → no conflict
- Channel conflict requires both the following between the same two parties:
  - ***horizontal competition*** across channels (usually for either demand or supply)
  - ***vertical competition*** within intermediated channels
- The prescriptive research draws heavily from Classical Microeconomics and Game Theory

Representing horizontal and vertical competition

Basic model

- One manufacturer, one retailer
- Single period, single product
- Linear costs
- No capacity constraints
- Deterministic demand curves, usually ***linear***
  - Either assume them directly or derive from specified consumer preferences
- Each channel sets price p_i

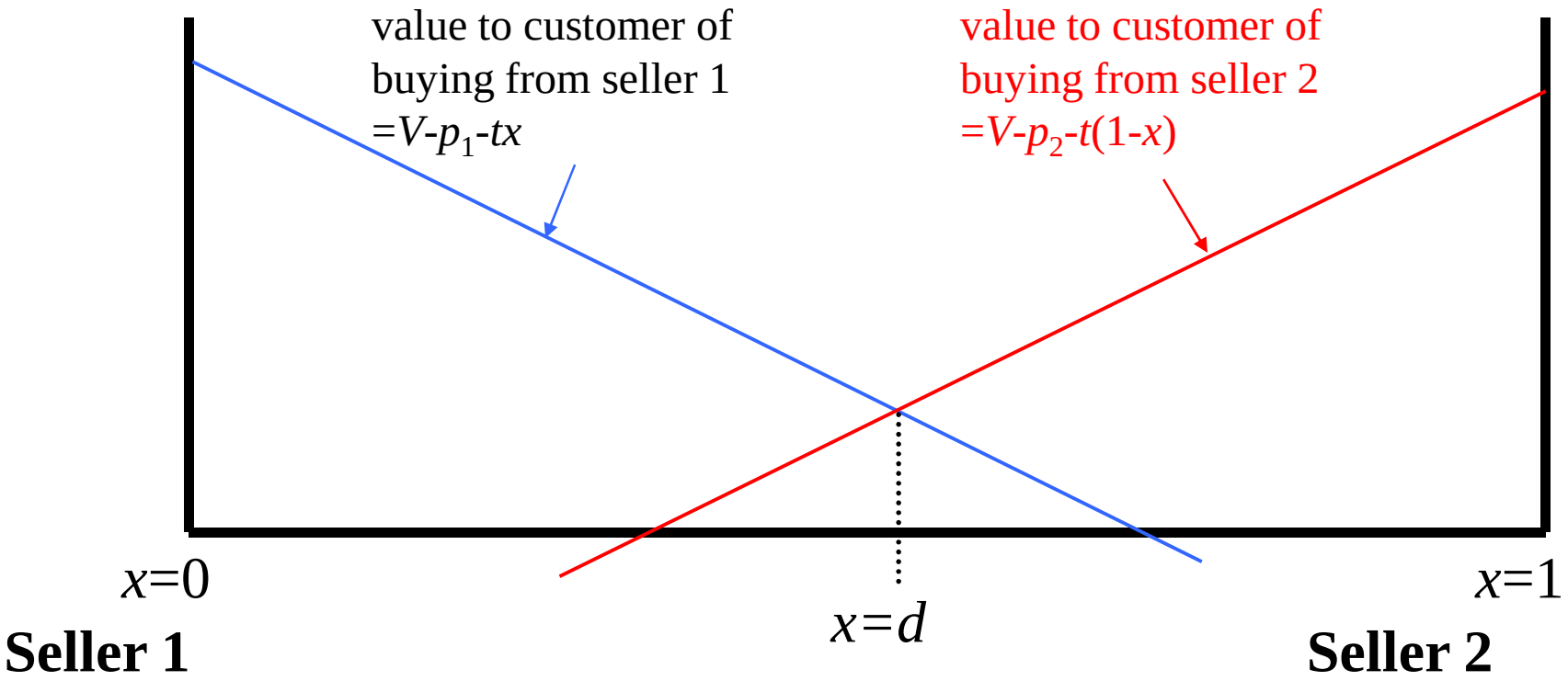
Horizontal competition
Method 1: Hotelling model

- Reconciling the Bertrand model with reality
- Premise:
  - Customers incur "travel" costs
  - So competing sellers that are "geographically" separated can each have some pricing power over part of the market → can charge higher than marginal cost (vs. Bertrand outcome)

Horizontal competition

Method 1: Hotelling model

- Formulation:
  - consumers are uniformly distributed along a linear city of length 1
  - two sellers of the same product are located at opposite ends of the segment
  - consumers have transportation costs of t per unit of length (can represent more abstract forms of inconvenience)
  - all consumers value the product at V
  - Seller i (=1,2) sells for price p_i
- Derive the demands $D_1(p_1,p_2)$ and $D_2(p_1,p_2)$



Locate the "indifferent consumer":

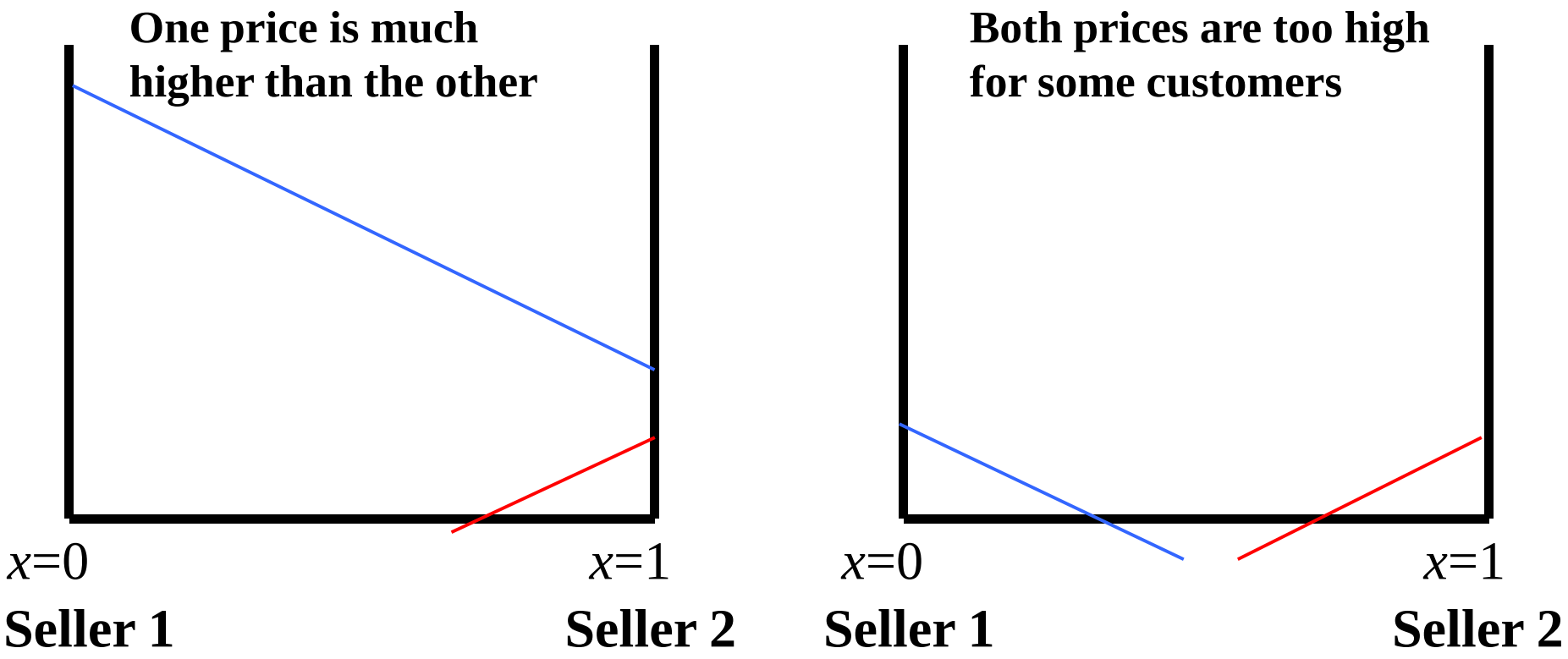
$V-p_1-td = V-p_2-t(1-d) \rightarrow d=1/2+(p_2-p_1)/(2t)$

So $D_1=1/2+(p_2-p_1)/(2t)$

$D_2=1-D_1=1/2+(p_1-p_2)/(2t)$

1/*t* is a measure of competitive intensity

But there are other scenarios….



So the demand curves are actually piecewise linear in p_1 and p_2 → differentiability problems

Horizontal competition

Method 2: Assume the demand curves

- Desired properties: $dD_i/dp_i \leq 0$ and $dD_i/dp_j \geq 0$
- Usually linear for tractability
- Example:

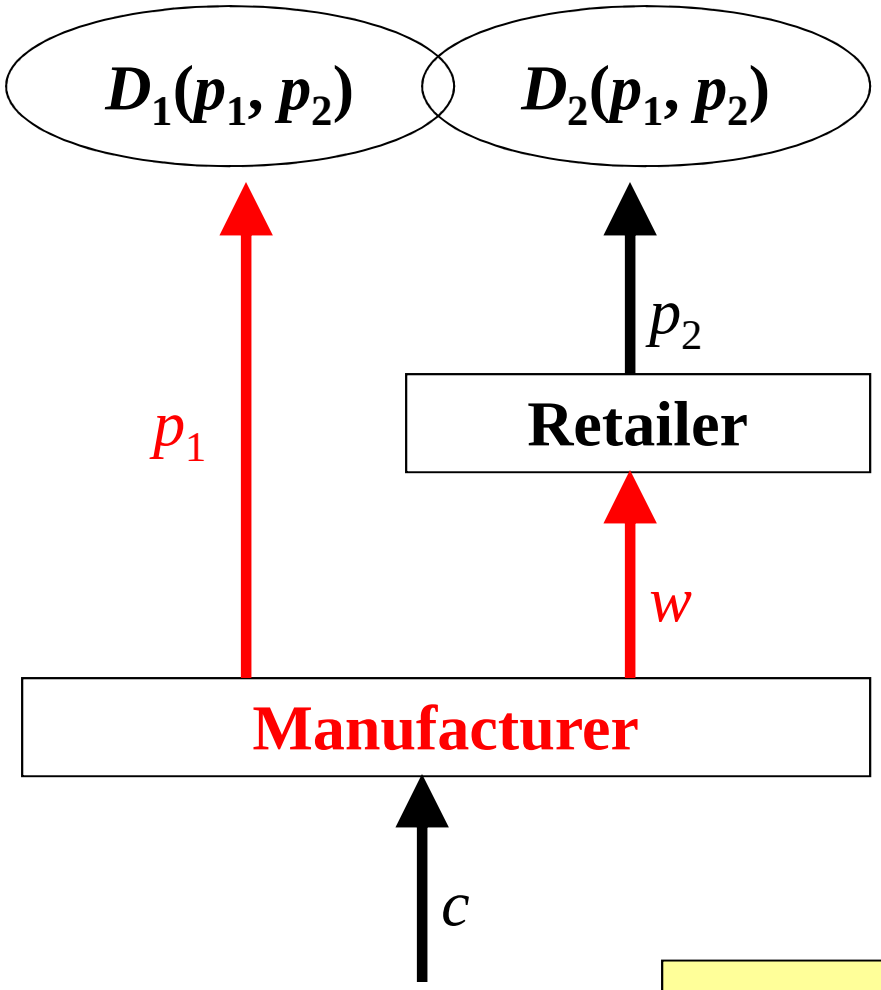
$$D_1 = A_1 - \alpha p_1 + \beta p_2$$
$$D_2 = A_2 - \alpha p_2 + \beta p_1$$

- vs. Hotelling
  - Resulting profit functions are smooth and differentiable
  - But no representation of individual consumers
  - Different notion of effect of adding/subtracting sellers
    - Above example: Adding seller 2 can only increase seller 1's sales (at given prices)
    - Hotelling: Adding seller 2 can never increase seller 1's sales (at given prices)

Vertical competition

- Manufacturer has unit production cost ***c*** (given), and sells to retailers at unit wholesale cost ***w*** (decision variable)
- Typically, manufacturer is assumed to be Stackelberg leader in choosing ***w***

Horizontal + Vertical competition



Retailer: Choose p_2 to maximize $\Pi_R=(p_2-w)D_2$

Manufacturer: Choose w and p_1 to maximize $\Pi_M=(p_1-c)D_1+(w-c)D_2$

Solve by reverse induction for

$w^*, p_1^*, p_2^*, D_1^*, D_2^*, \Pi_R^*, \Pi_M^*$

What's missing?

- Competition is only in price
- The only differences between the channels are ***decision control*** and ***markup structure***
- Ignores channel-specific differences in costs of doing business
    - e.g., Logistics costs

One extension: add a single non-price factor

- Let demands be $\boldsymbol{D_i(p_i, p_j, s_i, s_j)}$
  - s_i = "service"/"sales effort" in channel *i* can be provided at some cost
- Desired properties:
  - $dD_i/ds_i \geq 0$
  - dD_i/ds_j ?
    - spillover vs. cannibalization
- Example:

$$\boldsymbol{D_i = A_i - \alpha p_i + \beta p_j + \gamma s_i - \delta s_j}$$

cost of providing s_i is $\eta_i s_i^2$

Typical research questions

- Manufacturer:
  - Managing the hybrid system: how to jointly manipulate wholesale price and direct channel price (and effort)
  - Channel choice: solve for decisions and profits under single-channel alternatives, and compare
  - Channel coordination: any way to overcome the horizontal and vertical inefficiencies?
- Retailer:
  - How does competition from manufacturer as seller affect choice of retail price (and service)?
  - Preferred system?
- Customers
  - Which types of customers will buy from each channel?
  - Analysis of consumer surplus

Messages from this body of work

- A manufacturer channel might be a way for a manufacturer to implicitly influence retailers when explicit control would be illegal or difficult
  - e.g., achieve price control
- A hybrid system might be better for both firms
  - if true, channel conflict would be an irrational fear
- Findings may be dependent on assumption of manufacturer monopoly
  - the models do not consider multi-channel system vs. multi-channel system

Research opportunities

Assessment of current literature

- Simple models only
- Hasn’t adequately captured the flavor of how online and physical channels differ
- Hasn’t studied the full range of policies that can be used to mitigate channel conflict

Areas requiring more work

- Representing channel characteristics
  - Pricing
    - Dynamic pricing
    - Auctions
  - Non-financial aspects of the purchase
    - Experiential aspects of shopping
    - Ease of return
    - Delivery delay
  - Non-price product attributes
    - Customization
  - Operational costs
    - Non-linearities
  - Demand uncertainty
  - Alternative types of multi-channel strategies
    - More complex topologies
    - Unbundling and reassigning channel functions

Areas requiring more work

- Evaluating distribution strategies
  - Company objectives besides (expected) profit
    - Non-financial
    - Risk sensitivity
  - Channel power structure

Re: Operational differences between the supply chains of online and bricks-and-mortar retail channels

	Online retail	*Retail stores*
Assortment?	•Broader (but some items can be drop-shipped from other sources)	•Narrower
Inventory levels?	•Lower safety stock due to centralization of slow-movers (risk pooling) •Online sales facilitates dynamic pricing to "sell what you have"	•Higher because distributed
Warehouses?	•Pick-and-pack at individual item level	•Efficient handling of large pallets
Reverse supply chain? (customer returns)	•Extensive additional infrastructure	•Handle through existing infrastructure
Overall logistics effort for seller?	•Higher due to "last mile" problem	•Lower since buyer does some of the work

"Firms either have to have their supply chain set up to have ***high transportation costs if they are dealing with Internet delivery*** or very ***low transportation costs if they are dealing with a traditional retail store delivery***.

"The two don’t mix.

"Ultimately, designing a supply chain to serve both traditional and Internet retail channels well is difficult."

~Metters & Walton (2007)

"It is our thesis that moving to a multi-channel Internet purchasing option with an existing physical store network can create ***significant operational diseconomies of scope***."

…

"The ***move to a multi-channel Internet retail strategy requires a move to a multi-channel supply chain strategy***, and ***this may not be in the best interest of the firm***."

~Metters & Walton (2007)

Thank you!

Professor Andy Tsay

atsay@stanfordalumni.org