Aggregators, Search, and the Economics of New Media Institutions

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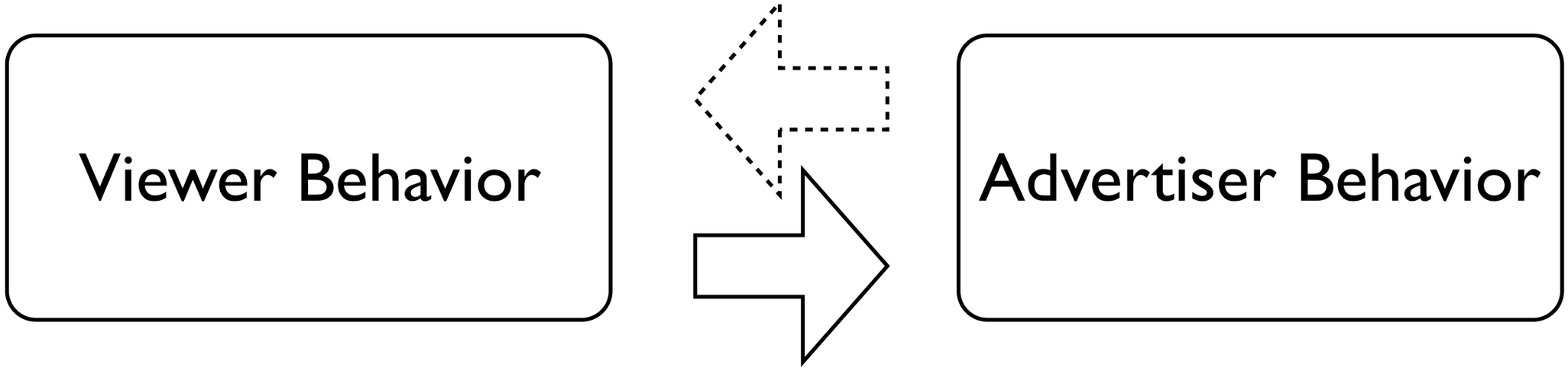
Motivation

The term "parasite" comes from the Greek word *parasitos*, used to refer to someone who ate at someone else's table without providing anything in return. It's a useful way to think of new aggregators like the *Huffington Post*…" – Robert Levine, *Free Ride*, 2011.

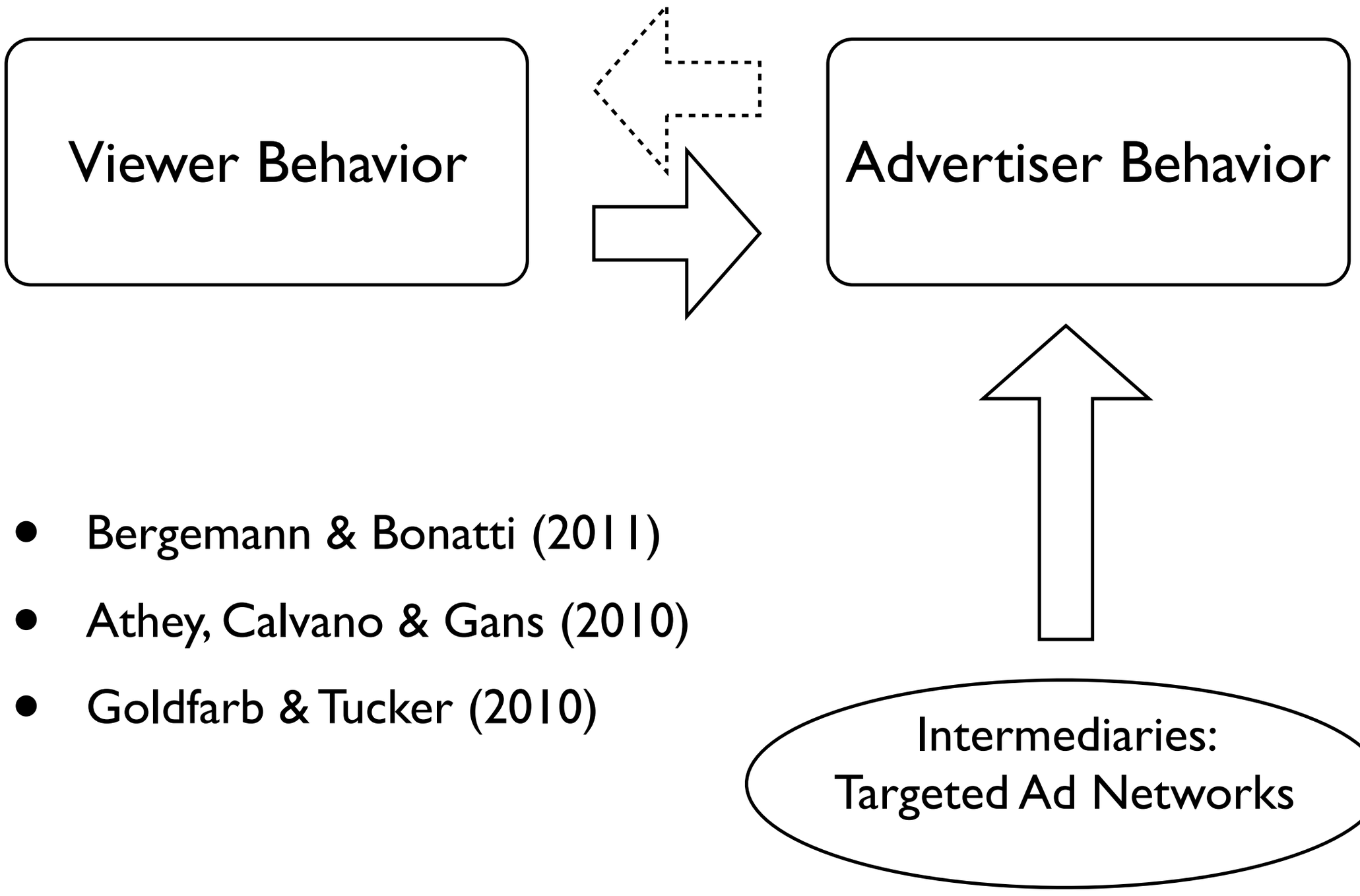
"Promiscuity is not a good thing in relationships, but it's a great thing in news." – Arianna Huffington, *Huffington Post*

Literature: Two Sided Markets

- Anderson & Coate (2005)
- Gabszewitz et al. (2006)
- Ambrus & Reisinger (2006)
- Anderson, Foros & Kind (2010)

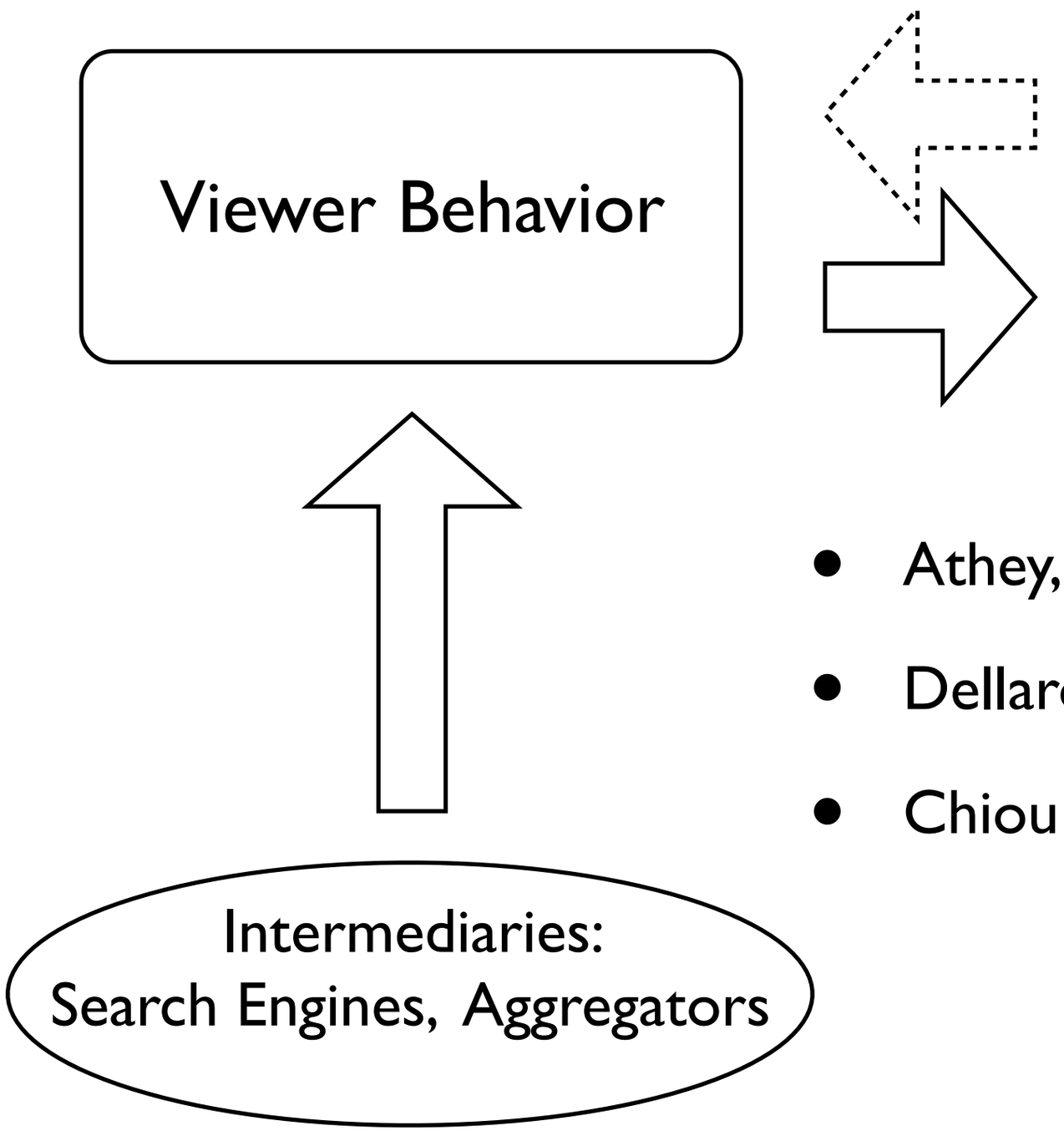


Literature: Intermediaries Affect Advertisers



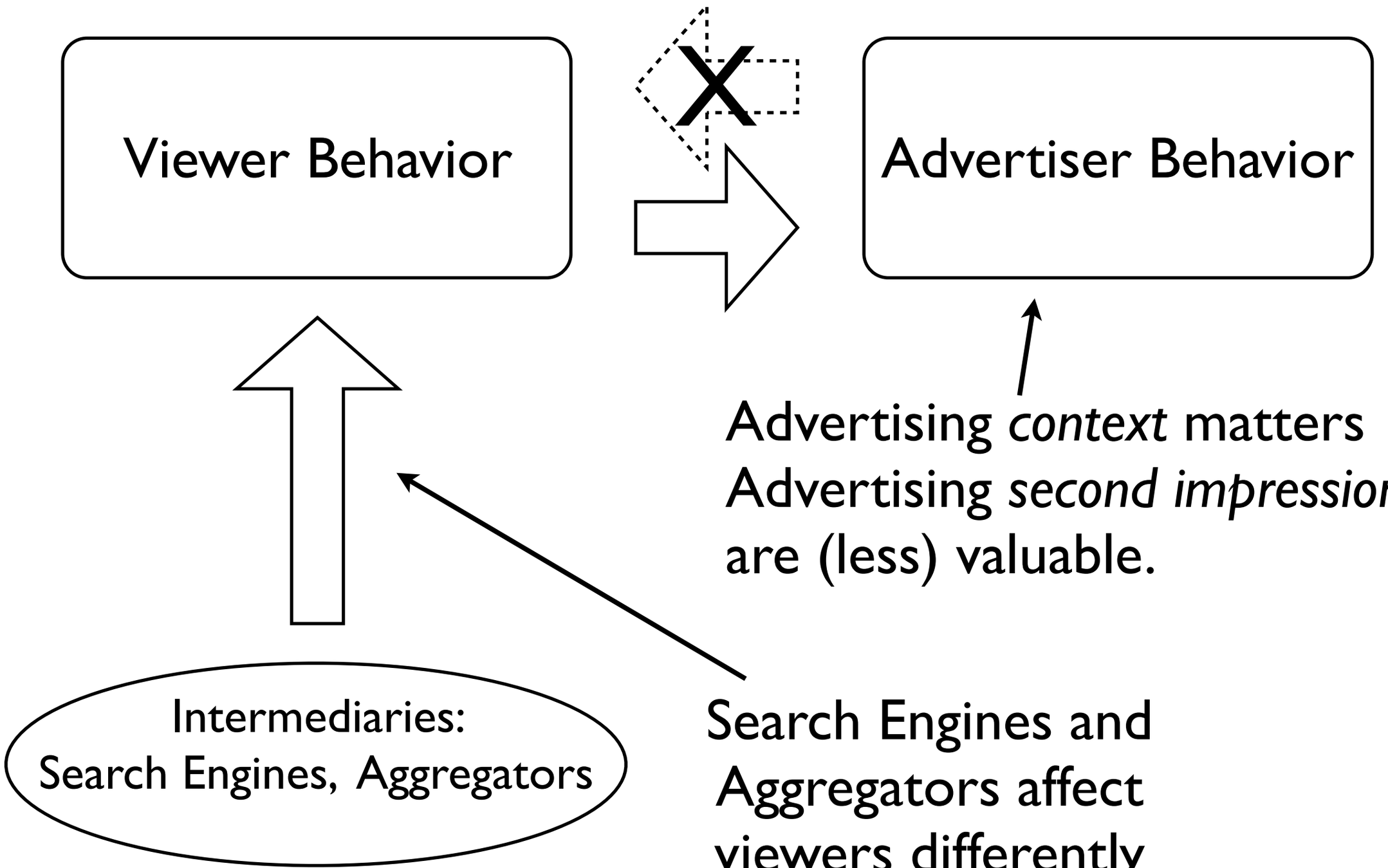
- Bergemann & Bonatti (2011)
- Athey, Calvano & Gans (2010)
- Goldfarb & Tucker (2010)

Literature: Intermediaries Affect Viewers



- Athey, Calvano & Gans (2010)
- Dellarocas, Katona & Rand (2010)
- Chiou & Tucker (2010)

Our Contribution



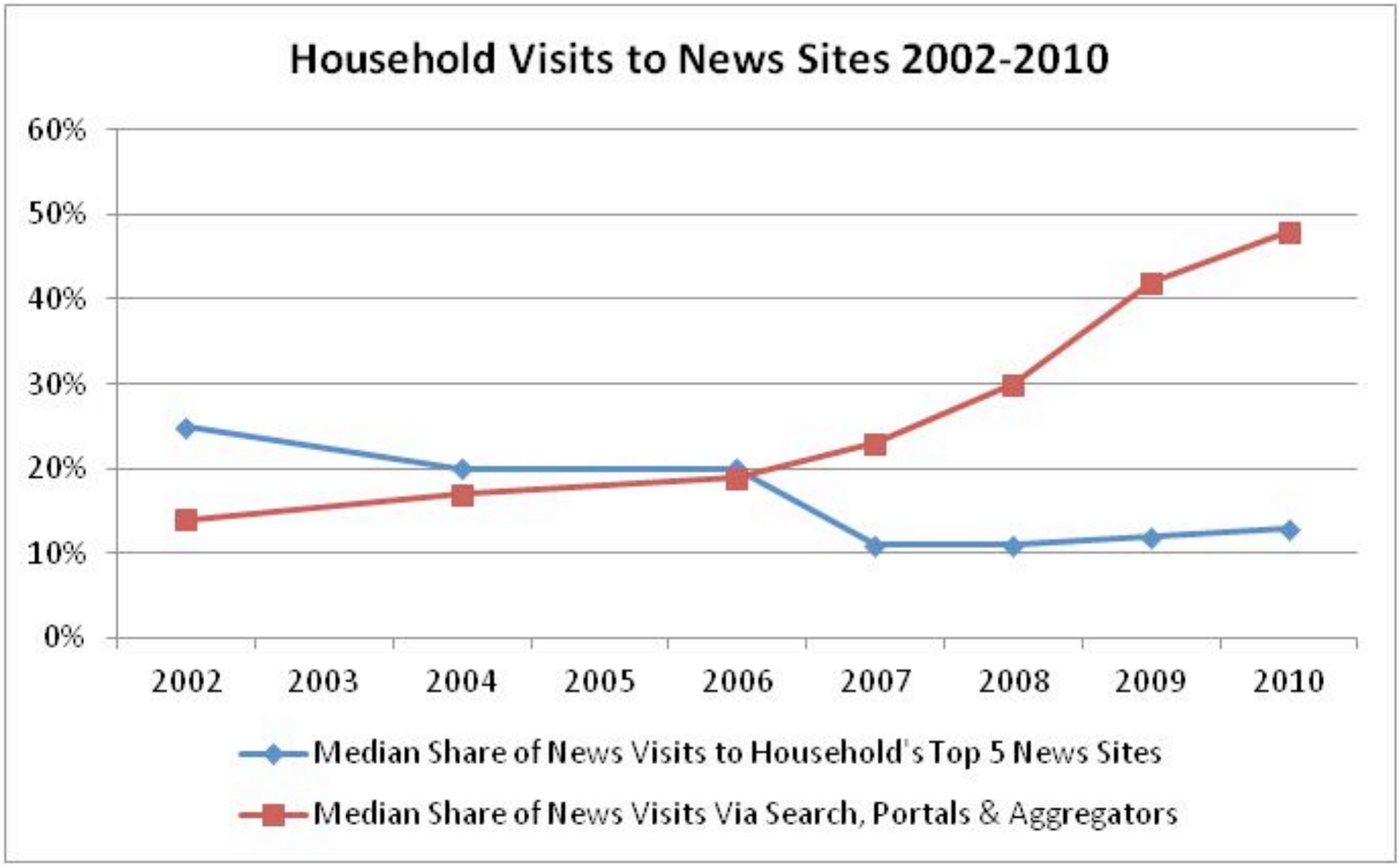
Advertising *context* matters
Advertising *second impressions* are (less) valuable.

Search Engines and Aggregators affect viewers differently

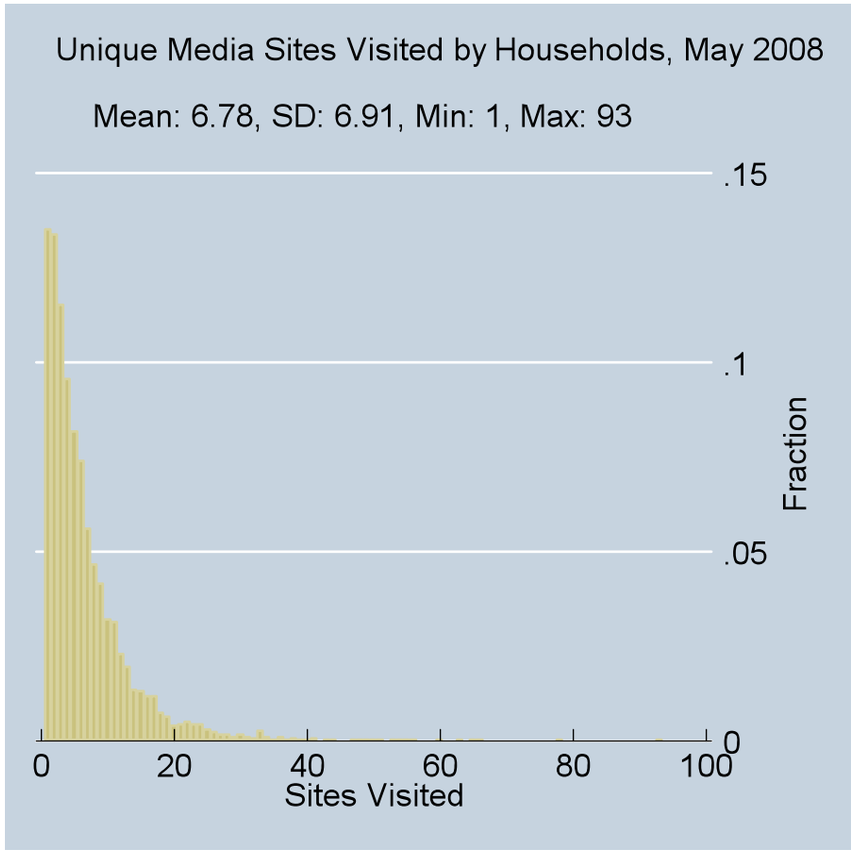
Viewer Model: Motivating Data 1

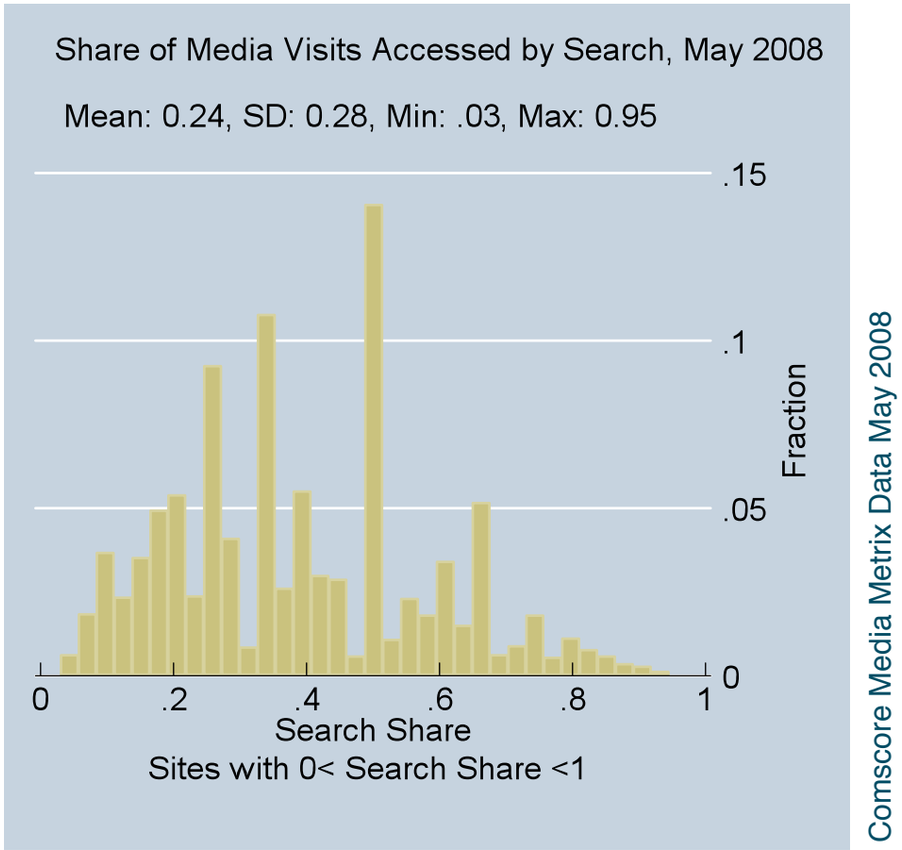
- ComScore Media Metrics, 2002-2010
- About 50,000 Household/Year, 360,000 Total
- 8,500 News Sites (Newspapers, Radio, Television, Internet)
- Referring Domains – Search, Aggregators, Social Media

Viewer Model: Motivating Data 2



Viewer Model: Motivating Data 3





Regressions on this data show that holding viewing time constant, heavy "searchers:"

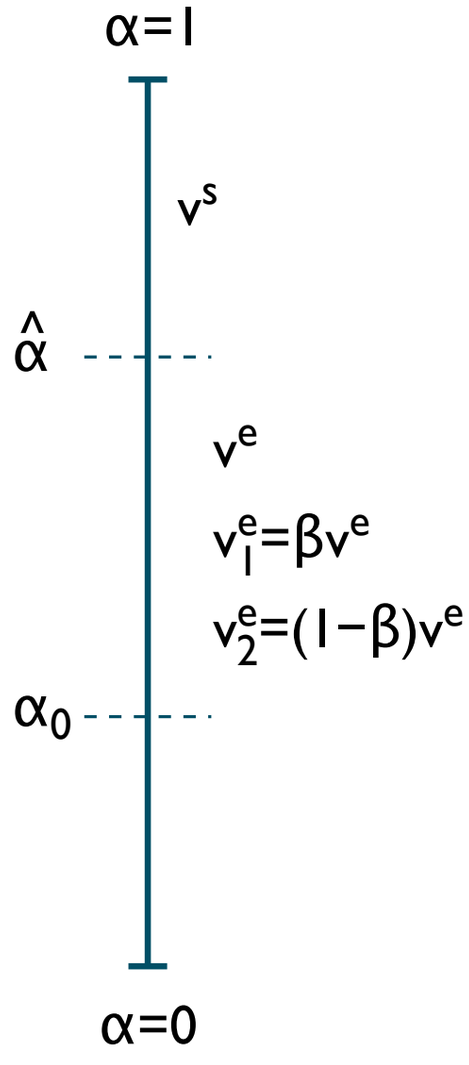
- Visit more unique media sites
- Read fewer pages per site
- Spend less time per site

Viewer Model: Details

- Stylized model to capture **switching** vs. **exclusive** viewing behavior
- 2 Content outlets
- Fixed reading time *T*
- Search cost *t*
- Diminishing marginal utility of reading time generates "switching" behavior
- Tie breaker: fraction β view outlet 1, (1−β) on outlet 2

$$U(T_{ik}, \alpha_i) = a_i T_{ik}^a$$

$$\max \{0, U(T, \alpha_i) - t, U(T/2, \alpha_i) - t + U(T/2, \alpha_i) - t\}$$



Advertiser Model

- Stylized model to capture **single-homing** versus **multi-homing** advertisers

- Horizontally differentiated **context**: "niche" versus "mass market" advertisers (lipstick versus Taco Bell)

- "First impressions" worth σ

- "Second impressions" worth γ × σ

$$
\begin{aligned}
&R_{12}(\theta_j, \mathbf{v}) \\
&= (\sigma - \theta_j)v_1^e \\
&+(\sigma - (1-\theta_j))v_2^e \\
&+(\sigma + \gamma\sigma - \theta_j - (1-\theta_j))v^s \\
&-p_1(\mathbf{v}) - p_2(\mathbf{v})
\end{aligned}
$$

Outlets

- Each outlet sets advertising price to maximize profit

$$\Pi_1 = A\overline{\theta}p_1(\mathbf{v}) \qquad \Pi_2 = A(1-\underline{\theta})p_2(\mathbf{v})$$

- Equilibrium prices are *monopoly* prices that depend on exclusive and switching viewers

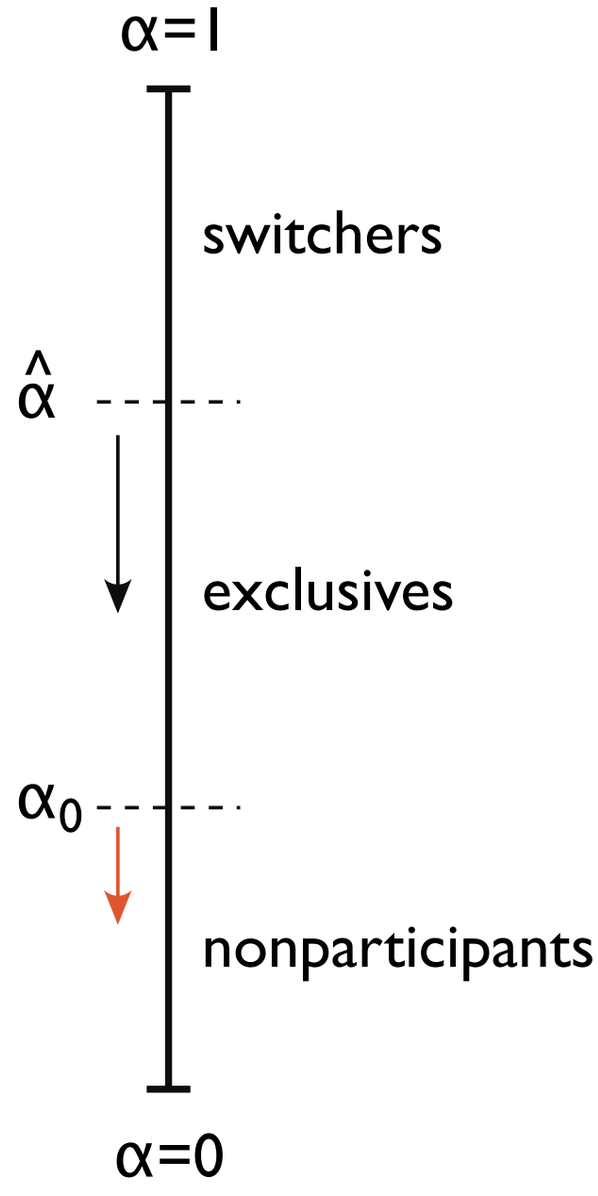
$$p_1^*(\mathbf{v}) = \frac{\sigma v_1^e + \gamma\sigma v^s}{2} \qquad p_2^*(\mathbf{v}) = \frac{\sigma v_2^e + \gamma\sigma v^s}{2}$$

- If second impressions are worthless, then only exclusive viewers matter (Anderson, Foros, Kind 2010)

- …and exclusive viewers raise prices and profits more

Search and Viewers

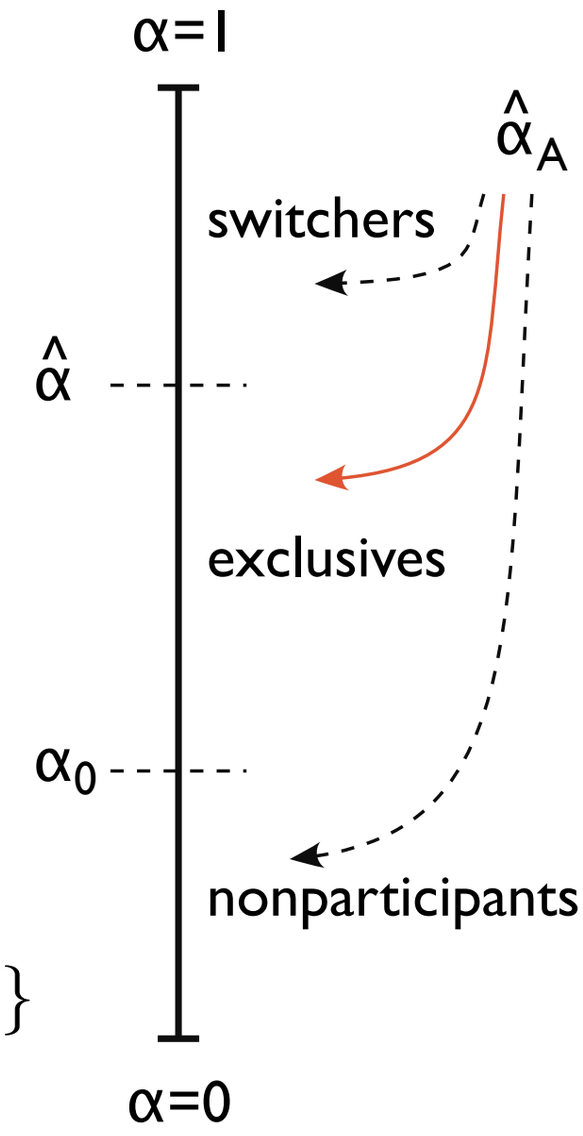
- Search improvements lower *t*
  - Switching increases
  - Participation also increases
- Total exclusives still fall
- …but by η percent as much as without the participation effect
- participation effect has more benefit for high β outlet



Aggregators and Viewers

- Aggregator lets viewers see both outlets for one transaction cost *t*
- "Non-parasitic" setup:
  - Aggregator does not sell its own advertising
  - All viewers "click through" from aggregator to content outlets
- Price or use cost p_A
- Aggregator may increase switching viewers without increasing participation

$$\max \{0,\ U(T,\alpha_i) - t,\ U\left(\frac{T}{2},\alpha_i\right) + U\left(\frac{T}{2},\alpha_i\right) - 2t,\ U\left(\frac{T}{2},\alpha_i\right) + U\left(\frac{T}{2},\alpha_i\right) - t - p_A\}$$



Effect on Advertising Prices

- δ more switchers increase advertising price.
- Fewer exclusives decrease advertising price.
- Search lowers price on high-β outlets

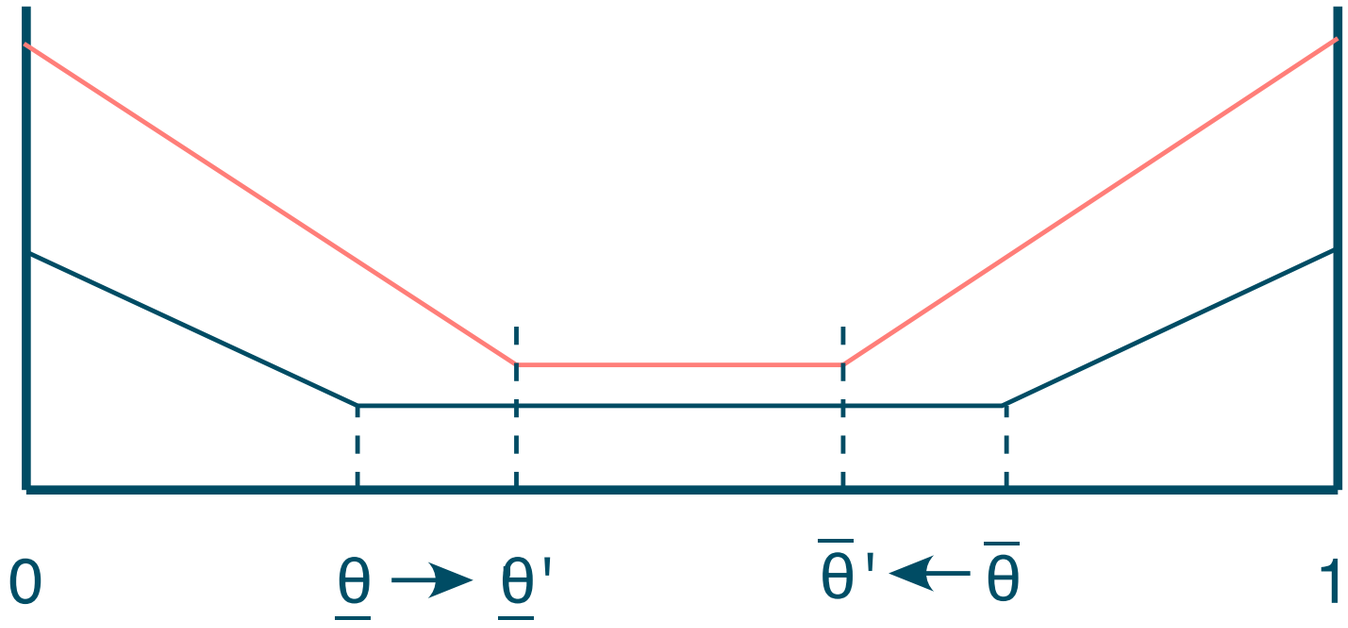
$$dp_1^{*s} = \frac{1}{2}\sigma\left(-\eta\beta + \gamma\right)\delta$$

- Aggregator effect is similar but more negative

$$dp_1^{*a} = \frac{1}{2}\sigma\left(-\beta + \gamma\right)\delta$$

Effect on Advertiser Multi-Homing

- More viewer switching leads to less advertiser multi-homing
- Decrease in advertiser multi-homing larger for aggregator



Effect on Content Outlet Profits

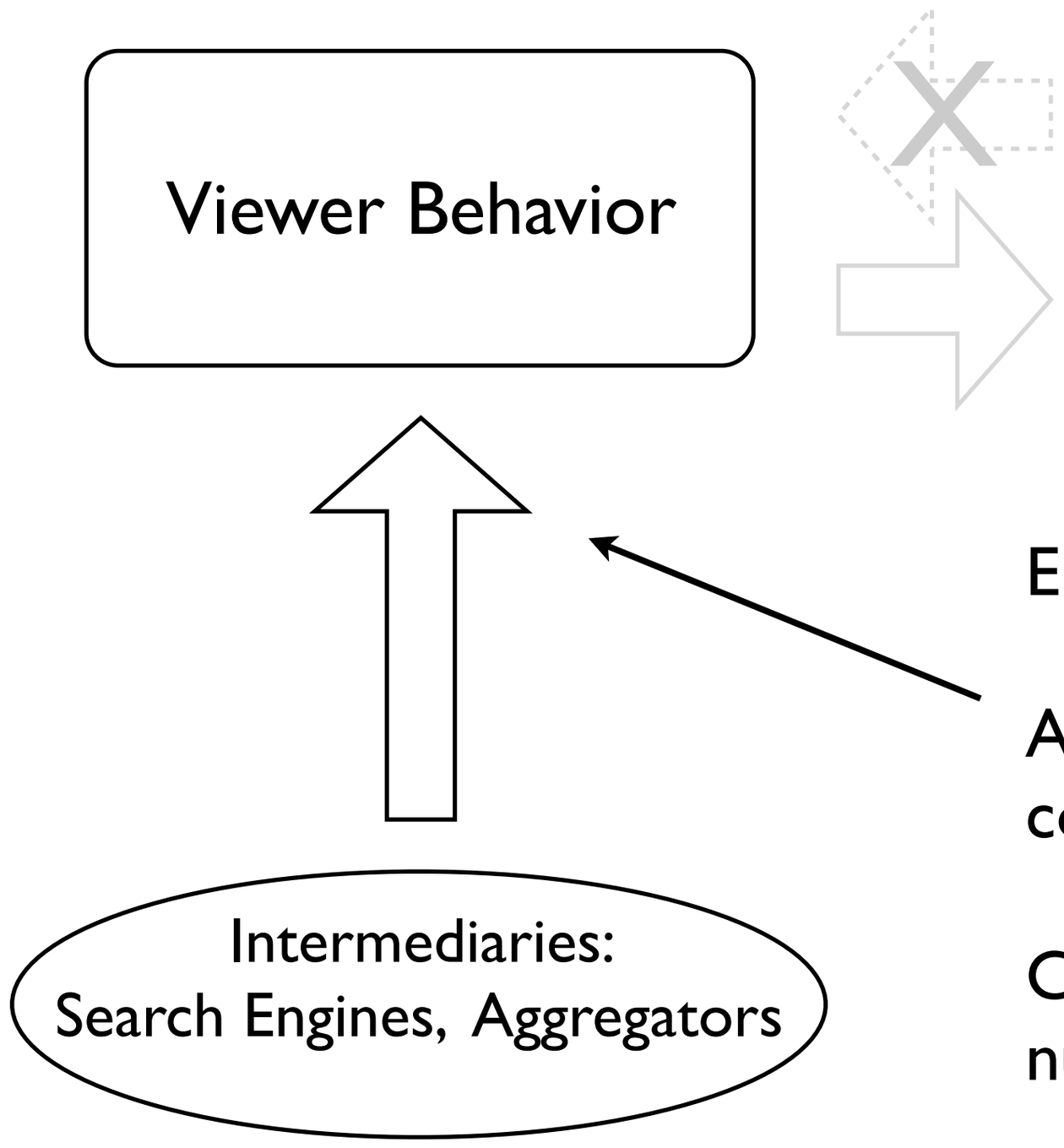
- δ more switchers increase content outlet profits.
- Fewer exclusives decrease content outlet profits.
- Search lowers profits on high-β outlets

$$d\Pi_1^{*s} = \frac{\partial \Pi_1^*}{\partial v^s}\delta + \frac{\partial \Pi_1^*}{\partial v_1^e}(-\eta\beta\delta)$$

- Aggregator effect is similar but more negative

$$d\Pi_1^{*a} = \frac{\partial \Pi_1^*}{\partial v^s}\delta + \frac{\partial \Pi_1^*}{\partial v_1^e}(-\beta\delta)$$

Where Next?

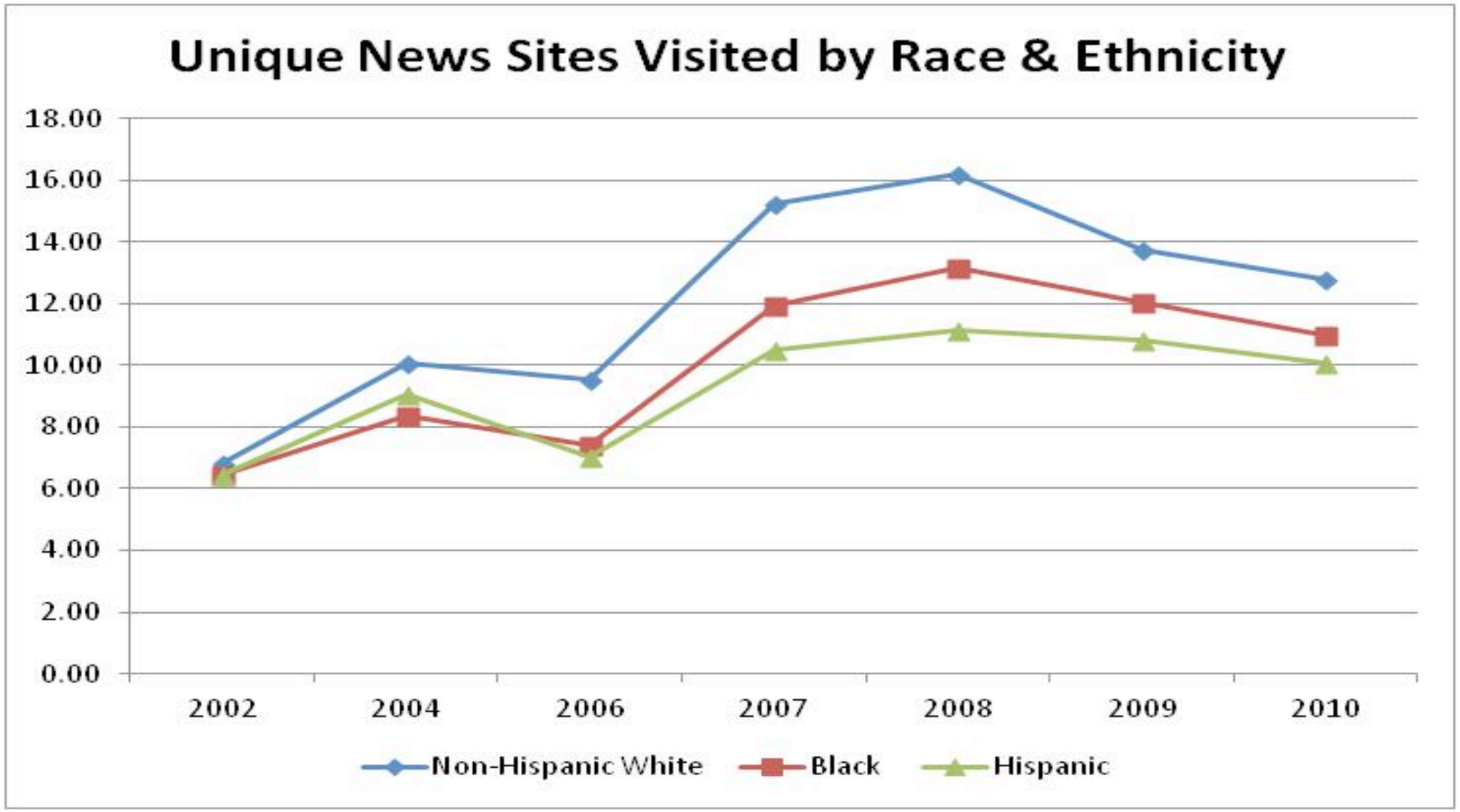


Empirically test relationship

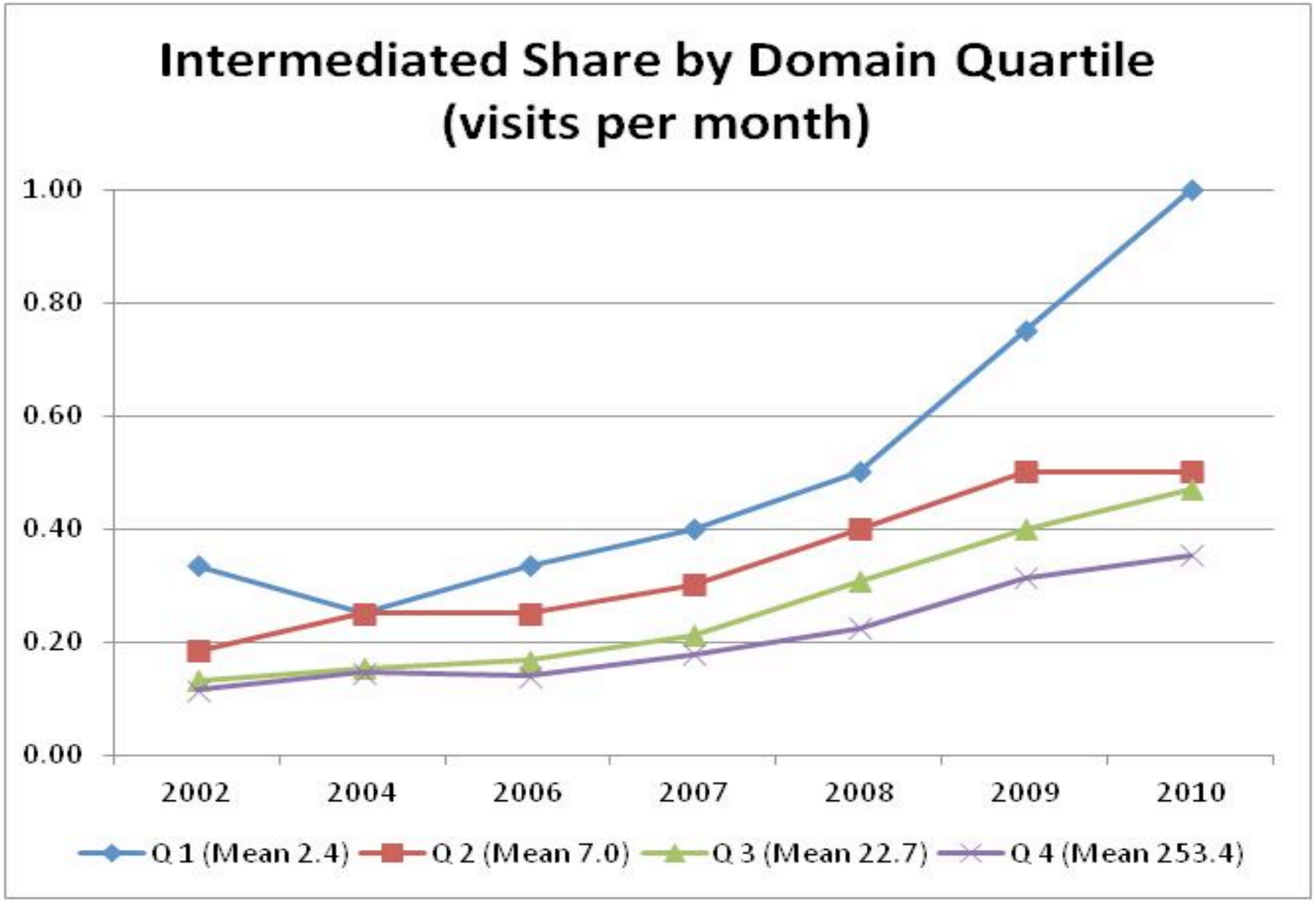
Allow for more than two content outlets (long tail)

Could intermediaries *reduce* number of sites viewed?

Intermediation Decreases Long Tail?



But Intermediation Facilitates Long Tail?



Conclusion

Viewers

- Aggregators *and* improved search increase switching.
- Aggregators may increase switching but not participation.
- Those that prefer variety benefit most from aggregation.

Advertisers

- Increase in viewer switching reduces multi-homing.
- Niche firms benefit more than mass market firms.

Outlets

- Increased participation increases outlet profits.
- Increased viewer switching decreases "popular" outlet profits; might increase "unpopular" outlet profits.