

THE DEMAND FOR ATTENTION AND MAIL

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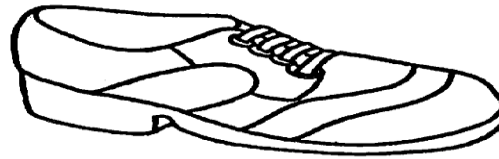
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The Demand for Attention and Mail

- Background and Motivation
- Literature Review
- Direct Mail Demand
 - Saturation Mail
 - Targeted Mail
- Results on Postal Operator Profits in the Ad Market
- Conclusions and Future Research

Background

- Fall in single piece mail
- Transaction bulk mail – will the other shoe drop?



- Direct Mail
 - Steady share of ad spend
 - Growing share of postal finance (at least in US)
- Models
 - Letter market, parcel market
 - Less on the role of the Postal Operator (PO) in the ad market

Background

- Time is ripe to understand the PO as part of the market for eyeballs (consumer attention)
- Literature – mostly concerning online advertising
- Goal – integrate this work into more traditional postal models

Background

- Market for Eyeballs



- Advertisers' WTP for attention
- Ad media compete for scarce attention
- Resell to fill advertiser demand

Background

- Familiar role for Postal Operators
 - Free delivery
 - Content in exchange for Attention
 - Resold (postage) to anyone wanting to put an ad in the mailbox
- Mail targeted geographically, demographically
- ‘Discovery’ of targeting a little like ‘discovery’ of America
- Somebody was already there
- Still, online different



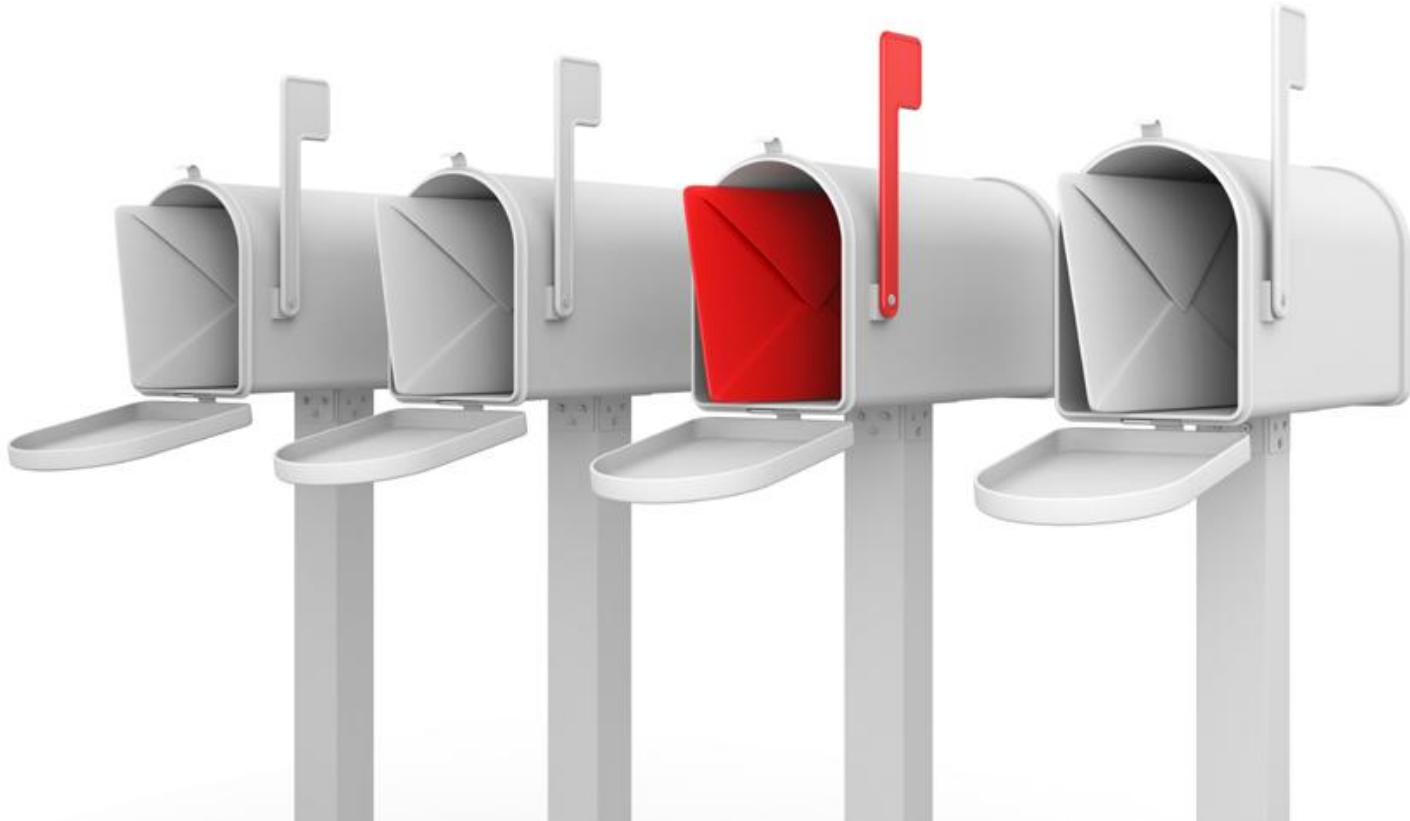
Literature on Targeting

- De Donder *et al* (2011) – exploration of impact of alternate delivery on PO finance
 - Trace sender utility thru to demand  prices, output, Welfare under different comp. scenarios
- Our objective – look behind sender utility to its roots in the behavior of advertisers



- Especially study the sensitivity of advertiser demand for mail products to targeting efforts by the PO

Targeting by Mail



Literature on Targeting

- Happily there is a literature



Iyer *et al* (2005) – impact on product market

Ad market analysis:

Athey and Gains (2010)

Chen and He (2006); Athey and Ellison (2008)

Bergemann and Bonatti (2010)

Probabilistic Matching Model

Determinants of the Prob of a match

Targeting by Posts

- Fundamentally – letters are physical messages to people
 - Esp. current customers
- Communication vs Broadcast
- ZIP Code and other geographic targeting
- Demographic targeting – surveys of buying behavior
- Feedback Loop
 - PURLs, ImB
 - Scannable codes, USPSOIG (2013b)



A Model of Direct Mail Demand

- Incumbent Postal Operator (PO) with 2 products:
 - Saturation mail: M_A, P_A
 - Targeted mail: M_T, P_T
- Demand for direct mail derived from π max by product firms
- π depends on prob of a sale
- A sale occurs whenever a message advertising product x reaches a household with an interest in x
- Revenue from a sale - \$1 (to make things easy)
- Characteristics of demand different for saturation and targeted mail.

Demand for Saturation Mail

Profit function for firm sending saturation messages:

$$\pi_A = HS_x(1 - e^{-M_A}) - P_A M_A,$$

where

H - households,

S_x - share of H interested in x ,

$(1 - e^{-\frac{M_A}{H}})$ - prob that a household interested in x will receive a message about x .

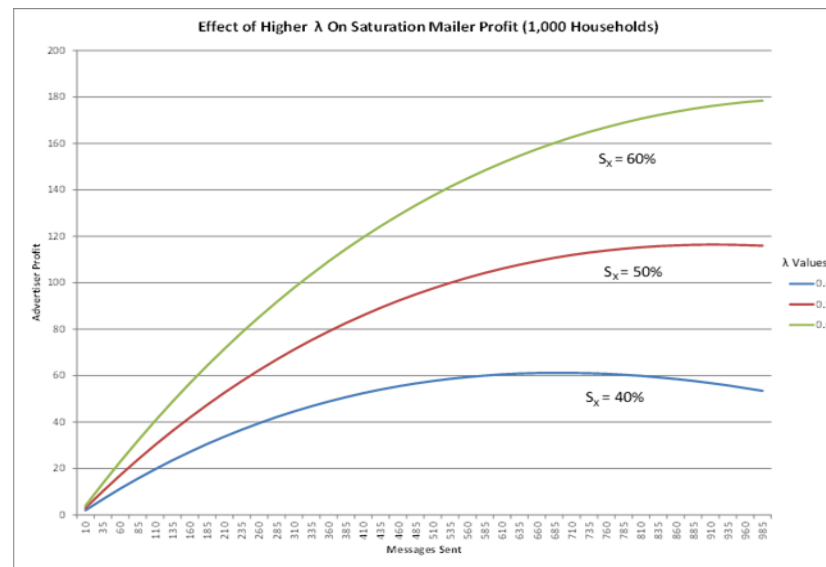
Demand for Saturation Mail



- Some explanation of $(1 - e^{-\frac{M_A}{H}})$
- CDF – prob that some message gets through
- The related density function: prob that a single given message reaches an interested buyer: $\lambda e^{-\lambda/x}$
- but, on average, this will be just equal to the share of H interested in x, so we have the definition:
 - $S_x \equiv \lambda e^{-\lambda/x}$
- where λ is a rate reflecting the concentration of x buyers in H, and x an index of firm size.

Demand for Saturation Mail

- Incorporating this result into the profit function gives



- Advertise profit as $f(m, H, \lambda)$
- Profit is increasing and concave in M_A
- Impact of λ is increase prob (match) and raise π_A

Demand of Saturation Mail

- First Order Conditions yield the demand relation:

$$• M_A = H \left\{ \ln(\lambda) - \left(\frac{\lambda}{x} \right) - \ln P_A \right\} .$$

- Demand is increasing in firm size and H
- Decreasing in the price of saturation mail
- Impact of concentration (λ):
 - Only the largest firms buy ads
 - The effect more pronounced the greater λ .

Demand for Targeted Mail

- Profit function

$$\pi_T = HS_{Tx} \left(1 - e^{-\frac{M_T}{S_TH}} \right) - P_T M_T,$$

- where
- S_T - the share of H that is targeted
- S_{Tx} - the share of targeted households with an interest in x
- $\left(1 - e^{-M_T/S_TH} \right)$ - the prob that a targeted household will get a M_T about x.

Demand for Targeted Mail

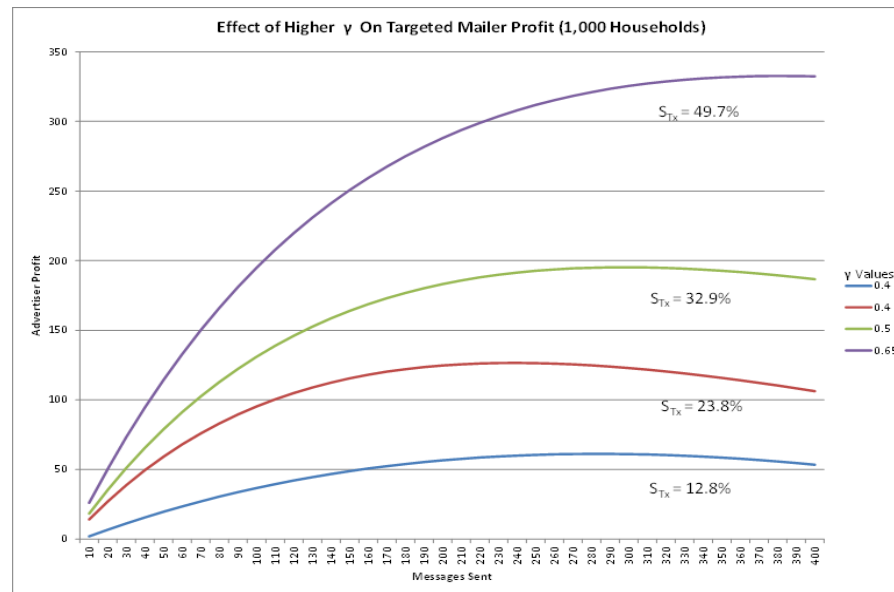
- As before we can define an expression for the share of x buyers in the targeted subpopulation using the density function:

$$• S_{Tx} \equiv \lambda \gamma e^{\frac{-(\lambda+\gamma)}{x}} e^{\gamma}.$$

- where γ , the targeting parameter, is a measure of the concentration of the consumers in the targeted households.
- Impact of both λ and γ .

Demand for Targeted Mail

- Advertiser profit increases with M_T and shifts upward as targeting increases.



Demand for Targeted Mail

- First Order Conditions yield an expression for demand:
- $$M_T = \left[\left(\frac{\gamma\lambda}{\gamma+\lambda} \right) e^{-\lambda H} \right] \ln(\gamma + \lambda) - \frac{\gamma+\lambda}{x} + \gamma + \lambda - \ln P_T$$
- which is increasing in H and firm “size” and
- Decreasing in P_T

Demand for Targeted Mail

- The impact of targeting on demand is shown by
 - $\frac{\partial M_T}{\partial \gamma}$ = ugly and potentially ambiguous



- but likely to be positive for large firms.

Results

- Strategy: plug demand functions into PO profit function:
 - $\pi = P_A M_A + P_T M_T - C_A M_A - C_T M_T - F_A - F_T$
- but Nonlinear demand functions
- Two Approaches
 - Linearize with Taylor series
 - Study the impact of changes in variables
 - Reasonable results – positive impact on WTP from H, x, MC
 - Numerical Approximation of calibrated model
 - Equilibrium values

Results

- Saturation Mail
 - Increased concentration of buyers raises both PO and advertiser profits
 - Increased delivery cost raises P_A and P_T and lowers profits.

Results

- Targeted Mail
 - Increased targeting raises profits
 - Less Targeted Mail sent
 - Targeted mail has higher marginal cost and price
 - Targeted Mail markup is significantly greater than Saturation mail
 - But it is more profitable, despite its higher price, for both advertising firms and the PO.
 - Increase in γ raises both PO and advertiser profits
 - PO can raise P_T even as M_T increases
 - Because of the demand shift from targeting.

Conclusions and Future Research

- Extend advertising demand analysis to PO products
- Derive direct mail demand from advertising firm behavior
 - To better understand sender utility
- Impact of targeting on PO and advertise profits > 0 .
- Targeting shifts demand so sometimes it is an alternative to a defensive price decrease (future research)
- Welfare increase (sort of) – only consider limited postal products and customers (future research)
- Unlimited ad budgets – independent action in the two markets (future research)

And so,

Thanks

