Towards a 21st Century Postal Service

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Original plan of talk

• Combination of
  – Narrow, “postal nerd”- type analysis of postal pricing issues
  – My recommendations of various aspects of postal policy
Off the web *today*:

A bipartisan group of senators introduced legislation on Wednesday that would undertake a sweeping restructuring of the U.S. Postal Service, aiming to put the ailing organization back on the path to financial stability.

The legislation, authored by Joe Lieberman (I-Ct.), Susan Collins (R-Maine), Tom Carper (D-Del.) and Scott Brown (R-Mass.), would address the Postal Service's financial woes on a number of fronts, including a refund of pension overpayments and reforms to the obligation to prepay employees' retirement health benefits.

The bill comes in response to the urgent situation confronting the Postal Service, which is facing a projected loss of $10 billion this year and has warned that it could become insolvent by the middle of next year if Congress does not act.
Revised Introduction and Summary

• Background
  – Intro to “postal economics”
  – US postal regulation

• The current crisis:
  – Drop in volume
    • 20% off 2005 peak
  – Pension and Health Care overfunding
    • $75 BILLION (cumulative); $5 - $7 billion per year

• Proposed structural changes
  – Close post offices
  – 5 day delivery
  – Lower service quality
Postal Service Mail Flows
Stylized Postal Network
Economies of scale concentrated in collection and delivery functions – “the (first and) last mile”
US Postal Era I (1792 – 1971): Ben Franklin’s Post Office Department

- The *Post Office Department* was a Cabinet-level department of the US Government
  - Postmaster General was “last in line” to succeed US President.
- *Congress* controlled rates, senior appointments, employee wages, etc.
  - Obvious problem with political patronage, etc.
- Not surprisingly, Congress was willing to grant generous wage increases to postal employees, but unwilling to raise rates.
  - E.g., the 3 cent stamp was in place for a quarter century!
  - Growing taxpayer subsidies – $12 billion per year by 1970.

- The Postal Reform Act of 1970 (PRA) created the independent *United States Postal Service* (USPS), effective July 1, 1971.
- Rates set by Postal Rate Commission (PRC) on a “cost recovery” basis – *no taxpayer subsidy*.
- Regulatory battles were about *rate structure* rather than *rate level*.
  - E.g. Do 3rd Class rates go up more or less than 1st Class rates
- PRC forced the Postal Service to introduce and expand *work-sharing discounts*.
  - Effectively “privatized” large share of postal sector value added
  - PRC’s “avoided cost” discount policy promoted end-to-end cost efficiency for the postal sector
PRC regulation under PRA remarkably effective at controlling real mail prices

<table>
<thead>
<tr>
<th>Year</th>
<th>Nominal</th>
<th>1983 $</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>0.08</td>
<td>0.1975</td>
</tr>
<tr>
<td>1974</td>
<td>0.10</td>
<td>0.2029</td>
</tr>
<tr>
<td>1976</td>
<td>0.13</td>
<td>0.2285</td>
</tr>
<tr>
<td>1978</td>
<td>0.15</td>
<td>0.2301</td>
</tr>
<tr>
<td>1981</td>
<td>0.18</td>
<td>0.1980</td>
</tr>
<tr>
<td>1982</td>
<td>0.20</td>
<td>0.2073</td>
</tr>
<tr>
<td>1985</td>
<td>0.22</td>
<td>0.2045</td>
</tr>
<tr>
<td>1988</td>
<td>0.25</td>
<td>0.2113</td>
</tr>
<tr>
<td>1991</td>
<td>0.29</td>
<td>0.2129</td>
</tr>
<tr>
<td>1995</td>
<td>0.32</td>
<td>0.2100</td>
</tr>
<tr>
<td>1999</td>
<td>0.33</td>
<td>0.1981</td>
</tr>
<tr>
<td>2001</td>
<td>0.34</td>
<td>0.1925</td>
</tr>
<tr>
<td>2002</td>
<td>0.37</td>
<td>0.2057</td>
</tr>
<tr>
<td>2006</td>
<td>0.39</td>
<td>0.1926</td>
</tr>
<tr>
<td>2007</td>
<td>0.41</td>
<td>0.1977</td>
</tr>
<tr>
<td>2008</td>
<td>0.42</td>
<td>0.1917</td>
</tr>
<tr>
<td>2009</td>
<td>0.44</td>
<td>0.2051</td>
</tr>
</tbody>
</table>

- The Postal Accountability and Enhancement Act of 2006 (PAEA) changed the regulatory environment facing the Postal Service from cost based to price based.
- Under the PRA the battles were about the rate structure, the overall rate level was not at issue: rates would be high enough to allow the Postal Service to cover its costs.
- PAEA granted the Postal Service pricing flexibility to set its rates as it wished as long as average rates did not increase more than the rate of inflation.
  - Gave the Postal Service limited incentive to earn profits
  - Allowed Postal Service to incur losses
  - Reduced PRC’s ability to set “avoided cost” work-sharing rates
The Current Crisis: A “Perfect Storm”

• Volume declines resulting from both cyclical and secular trends:
  – Global Financial Crisis (GFC)
  – Electronic substitution

• Federal Government use of the Postal Service as a “cash cow”
  – Pension overfunding
  – Health care overfunding

• PAEA
  – Prevents real rate increases
Mail Volumes have long been highly cyclical, but tend to recover along with the economy.
This time is probably different. No rebound insight from GFC cyclical drop in volumes!

Exhibit 6: Volume forecasts to 2020

Volume forecasts
Billions of pieces

- Base Case¹
- Worst Case – Based on European Union Broadband Usage²

Benchmarking of mail trends in highly internet-enabled countries suggests that if online diversion achieves the worst-case penetration seen in the EU, the 2020 projection will fall below 120 billion pieces.

1 Baseline: Excludes all management actions not currently in the Postal Service budget beyond 2009. This assumes no major economic or other disruptions and no change in the postal oversight framework.

2 Worst case: Based on online diversion trends in highly internet-enabled European Union countries.

SOURCE: BCG analysis
Simplified analysis of the policy dilemma: why volume decline is not enough

- Volume is forecast to decline drastically by 2010
  - Leads to losses of $abcd$ at regulated price of $p^{10}$

- Two solutions:
  - Raise price to $p^{20}$
  - Lower cost curve to $AC^{2020}$, i.e., operate at $e$
    - Eliminate health and pension overfunding
    - Eliminate “waste and inefficiency”
    - Reduce quality of service
      - Post office
      - Delivery days
      - Eliminate overnight delivery standards

- Guess which mailers prefer?
  - Neither!
No Crisis without PAEA

- Under the PRA regulatory regime, the Postal Service would request (and be granted) real rate increases.
- Postal rates would go up in real terms, but by how much?
- Study by Cohen and McBride for the OIG indicate: not much at all – depending on the severity of volume decline

<table>
<thead>
<tr>
<th>Initial Volume</th>
<th>2009 177.5 B</th>
<th>150 B</th>
<th>125 B</th>
<th>100 B</th>
<th>75 B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted* Breakeven Revenue/Income</td>
<td>$70.7 B</td>
<td>$67.1 B</td>
<td>$60.0 B</td>
<td>$53.1 B</td>
<td>$46.7 B</td>
</tr>
<tr>
<td>Adjusted* Average Revenue per Piece</td>
<td>40.9¢</td>
<td>49.0¢</td>
<td>55.2¢</td>
<td>65.3¢</td>
<td>84.2¢</td>
</tr>
</tbody>
</table>

* After taking into account price elasticities and raising prices to breakeven
Plenty of “room” for such increases. US rates are very low by international standards.

### International Comparison of the Price of a First-Class Stamp

<table>
<thead>
<tr>
<th>Country</th>
<th>Prices in Purchasing Power Parity (U.S. $)</th>
<th>Per Capita Volume as a % of U.S. Per Capita Volume</th>
<th>EBIT Margin 2007*</th>
<th>EBIT Margin 2008*</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand</td>
<td>0.32</td>
<td>33%</td>
<td>5.8%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Australia</td>
<td>0.37</td>
<td>32**</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Spain</td>
<td>0.41</td>
<td>20</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>US</td>
<td>0.42</td>
<td>100</td>
<td>(6.8)</td>
<td>(3.7)</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.49</td>
<td>49</td>
<td>5.6</td>
<td>5.7</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>0.53</td>
<td>57</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Great Britain</td>
<td>0.54</td>
<td>46</td>
<td>0</td>
<td>0.9</td>
</tr>
<tr>
<td>Ireland</td>
<td>0.56</td>
<td>24</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Sweden</td>
<td>0.59</td>
<td>49</td>
<td>6.3</td>
<td>3.6</td>
</tr>
<tr>
<td>Belgium</td>
<td>0.59</td>
<td>na</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>France</td>
<td>0.60</td>
<td>42</td>
<td>5.9</td>
<td>2.6</td>
</tr>
<tr>
<td>Austria</td>
<td>0.62</td>
<td>43</td>
<td>11.5</td>
<td>10.1</td>
</tr>
<tr>
<td>Germany</td>
<td>0.64</td>
<td>35</td>
<td>3.1</td>
<td>3.4</td>
</tr>
<tr>
<td>Denmark</td>
<td>0.64</td>
<td>40</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.67</td>
<td>16</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Japan</td>
<td>0.69</td>
<td>25</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Italy</td>
<td>0.71</td>
<td>14</td>
<td>0.7</td>
<td>(0.3)</td>
</tr>
<tr>
<td>Finland</td>
<td>0.72</td>
<td>57</td>
<td>5.2</td>
<td>4.4</td>
</tr>
<tr>
<td>Norway</td>
<td>0.78</td>
<td>53</td>
<td>0.3</td>
<td>(0.4)</td>
</tr>
</tbody>
</table>

*Note: The first unit of postage in these countries is 20 grams vs. 28 grams (1 ounce) in the United States.
Changes in Health and Pension Funding would also greatly mitigate crisis.

- The Postal Service would need to seek substantial *real* rate increases only under the most pessimistic volume forecasts.

<table>
<thead>
<tr>
<th>Initial Volume (billions)</th>
<th>Base Case Breakeven Increase Above CPI</th>
<th>Breakeven Increase Above CPI Health and Pension Proposal</th>
<th>Annual Increase Above CPI Health and Pension Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>24.3%</td>
<td>6.8%</td>
<td>0.6%</td>
</tr>
<tr>
<td>125</td>
<td>39.9</td>
<td>17.3%</td>
<td>1.5%</td>
</tr>
<tr>
<td>100</td>
<td>65.5</td>
<td>34.3%</td>
<td>2.7%</td>
</tr>
<tr>
<td>75</td>
<td>113.4</td>
<td>66.2%</td>
<td>4.7%</td>
</tr>
</tbody>
</table>
Conclusions: “I come to praise the Postal Service, not to bury it.”

• Postal Service “Crisis” sounds worse than it is in economic terms.
  – Postal Service remains a valuable part of nation’s infrastructure
• Financial difficulty due simultaneous impact of
  – Cyclical and secular volume declines
  – Federal Budget deficit shenanigans
  – Flawed recent regulatory reform
• Legislation can solve the accounting problem
• *Intelligent* regulatory policy needs to help the Postal Service manage the decline in mail volumes.
Introduction: Toward a 21\textsuperscript{st} Century Postal Service

• What if the cyclical decline in volumes from the Global Financial Crisis portends a long-run secular trend?
• Even a declining postal sector remains a vital part of a nations transportation and communications infrastructure.
• Public policy during the transition is vitally important:
  – E.g., railroad example.
• Specific policy issues to be addressed:
  – Public versus Private ownership
  – Vertical Structure
  – Horizontal Scope
  – Regulatory and Antitrust policy
    • Monopoly and Universal Service
Declining, but vital, transportation and communications infrastructure

- USPS is at the core of the crucial “mailing industry” involving
  - Millions of jobs
  - Hundreds of billions of dollars of commerce

- Economies of scale in (collection and) delivery creates both challenges and opportunities; e.g.,
  - Declining volumes raise unit costs
  - But, encourages alternative uses and consolidation.

- Focusing on this core competency of the Postal Service, the “(first and) last mile” of the postal network is the key to future survival and success.

- Requires vision and innovation on the part of both the USPS and key policy makers.
Railroad regulation: what *not* to do!

• Railroads play a vital role in the US 21st century transportation sector, and their future prospects look bright.
  – However, few would argue that their role in the US economy and society is but a pale reflection of what it was a hundred years ago.
• Railroads’ natural advantages were drastically reduced by
  – Automobiles *and* paved highways in the 1920s
  – Air travel in the 1950s
• But this technological misfortune was severely aggravated by a half century of policy failures in Washington.
• (Different) policy mistakes could be equally costly for the future evolution of the postal sector.
Diversification beyond core competency can be disastrous

• Had it not been acquired by one of its divested offspring, AT&T may well have gone from *world’s largest corporation* to *bankrupt* in record time.
  – At Divestiture, commentators feared for the RBOCs and their old fashioned, regulated monopoly business.
    • The RBOCs were “burdened” with many *line of business* restrictions that prevented them from diversification

• The “New AT&T” had many real advantages in technology, capital and brand recognition.

• But it used its new found freedom to “leverage” these assets into disaster after disaster.
  – Despite what looked to be substantial economies of scope.

• Makes one skeptical of USPS’s ability to “leverage its brand” into new and exciting markets.
My view: the proper goal for USPS is to focus on the (first and) last mile of the network

- Postal Service’s collection and delivery network is the core infrastructure of the nation’s postal and delivery sector.
- USPS should develop and enhance this core competency
  - Avoiding “AT&T-style” side ventures that waste resources and managerial attention
- Policy to further this objective will need to deal with the following issues:
  - Ownership Structure: Public versus Private
  - Vertical Structure: What to do with the “competitive middle”?
  - Regulatory and Antitrust Policy
    - Monopoly
    - Universal Service
Ownership Structure: How to Decide between Public or Private?

• I take as given that the Postal Service will remain a large vertically integrated network characterized by
  – Strong economies of scale and economies of scope (due to technology).
  – Substantial Universal Service Obligations (due to POLITICS)
• In *theory*, either a (regulated) public enterprise or (regulated) private firm could do the job efficiently.
• But a *private* firm would (somehow) have to be paid to perform the USO.
• *The US has a terrible record in accomplishing this in any liberalized network industry*: e.g., rail, telecom, airlines.
Historically, the Postal Service has been a leader in the “corporatization” of the sector

• Move from Post Office Department to Postal Service produced many gains – primarily by reducing political meddling.
• But, still problems with
  – Cost Incentives
  – Union Wage Premium
• Would Privatization mitigate these and other incentive problems?
• Definitely!
• But, I would first like to try more extensive corporatization;
  – State Owned Enterprises (SOEs) handle such problems elsewhere: e.g., Australia, NZ, Canada, France
The Postal Service Should Continue as a Regulated State Owned Enterprise (SOE)

• Based on international experience:
  – SOE do not suffer from a pervasive “wage premium” problem.
  – SOE can be made to be at least somewhat “cost (and profit) conscious.”
  – SOE can be forced to raise and deploy capital reasonably responsibly.

• However, the SOE ownership structure cannot be expected to deal with the horizontal and vertical scope of the Postal Service.

• As in other network industries, REGULATION will be required to guard against:
  – Cross-subsidization
  – Vertical “misbehavior”
Vertical Structure:
Wither End-to-End integration?

• Always a tension in liberalized network industries between:
  – Economies of vertical integration and
  – “Misbehavior” by the integrated incumbent

• Under the US Postal Reform Act tension was alleviated by regulatory imposed “cost-based” work-sharing discounts and the Letter Monopoly.
  – Price cap regulation under PAEA may undo this.

• Future USPS focusing on the “(first and) last mile” will be an End-to-End provider from the perspective of “Aunt Minnie”

• However, activity “between the ends” will be determined by the interaction of cost-based regulation and market forces.
Regulatory Policy: Fixed Price or Cost Plus?

• How to regulate an end-to-end, largely “retail” service combined with a “(first and) last mile” delivery network?

• Retail services (e.g., single piece) should be regulated via price caps.
  – Predictable and transparent
  – Encourage cost efficiency and innovation

• Delivery/access services should be regulated on an avoided cost basis: i.e., “outside” the PAEA price caps.
  – Promote end-to-end cost minimization
  – Provide reliable “platform” for mailing sector
  – Promote competition in “partial service markets”
Regulatory Policy: Universal Service

• Much, too much, is made about Universal Service
  – In danger of becoming the “tail wagging the postal dog.”
• *Current* provision of USO is not cheap
  – 10% of USPS revenues in 2007 (Cohen, McBride and Panzar)
• But alternative arrangements could greatly reduce costs:
  – 5 day delivery
  – Franchised retail outlets, etc.
• The USO may be either a “Competitive Advantage” or a “Burden”
• In any event, it should not be allowed to distort the postal marketplace
  – As in the US Telecom sector
Regulatory Policy: Monopoly

• Franchised (legal) monopoly has its uses in protecting firms with strong scale economies from cream-skimming.
  – I have no objection to the use of monopoly local delivery franchises in the postal sector
  – However, most cream-skimming opportunities are linked to uniform pricing policies
    • The Postal Service of the future should employ uniform rates only for “single piece,” retail mail.

• I think the Letter and Mailbox monopolies can (soon) be dispensed with, given other reforms.
My Conclusions regarding the Postal Service of the Future (PSoF):

• PSoF should be a “boring,” but crucial part of the nation’s communications and transportation infrastructure.
  – This will be achieved by focusing on its (first and) last mile core competency.
• PSoF should provide an efficient platform for a robust, innovative, and evolving postal and delivery sector.
  – Access to this platform “refereed” by regulation, competition policy and market forces to ensure productive efficiency of the postal sector.
• The “public face” of the Postal Service will be streamlined so that it can continue to fulfill its traditional mission of “binding the nation together.”
  – Market Dominant retail services regulated by Price Caps
Postal Service Pricing Policies after the Introduction of Price Cap Regulation

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EARIE 2011, Stockholm
September 3, 2011
Introduction and Summary

• Motivation and Background
  – The Postal Accountability and Enhancement Act of 2006 (PAEA) subjected the US Postal Service to Price Cap regulation and Antitrust surveillance, both for the first time.

• Focus of Analysis:
  – Profitability Implications of Pricing Initiatives
  – Possible Antitrust Implications

• Topic Areas
  – Worksharing Discounts (i.e., Access Pricing)
  – Volume Discounts
  – Distribution Channel Discounts
Why Analyze Contribution (Profit) Maximizing Postal Service Strategies?

• To understand market implications of achievement of PAEA goal of giving Postal Service pricing flexibility and profit incentives.
• Easier to regulate a profit seeking firm
  – Much PRC attention previously devoted to “protecting the Postal Service from itself” in order to protect consumers
    • E.g., provisions of Negotiated Service Agreements (NSAs)
    • Reasonable concern wrt a public firm under break-even regulation
• PAEA attempted to enhance Postal Service incentives and provide flexibility to pursue them
  – What are the market implications?
Pricing Flexibility and Potential Antitrust Liability go Hand in Hand

PAEA granted pricing flexibility through the move to Price Cap regulation, but also subjected the Postal Service to antitrust scrutiny.

Pricing flexibility gives the Postal Service the ability to directly impact customers and competitors in ways that may give rise to antitrust liability.

Pricing flexibility limited by PRC decisions.
Worksharing Discounts under PAEA Price Cap Regulation
Postal operators typically offer a *worksharing discount* based (among other things) on where a mailer injects his volume into the mail stream.

The difference between the end-to-end rate and the discount rate can be viewed as the price of *access* to the remainder of the postal network.

Analysis will focus on a two stage vertical structure.
Worksharing under the PRA

- Worksharing the crowning achievement of postal regulation under the PRA.
  - “Liberalized” large share of postal sector
  - Enhanced economic efficiency of the postal sector (and the Postal Service).

- Guiding policy principle of PRC toward worksharing was the Efficient Component Pricing Rule (ECPR)
  - Worksharing discounts set equal to (unit) avoided costs of the Postal Service
  - ECPR decentralizes the minimization of postal sector end-to-end costs between Postal Service and upstream competitive providers.
Example: the beauty of ECPR pricing of worksharing

- Incumbent offers two products:
  - End-to-end service
  - Work-shared mail
- Stamp price = $p$
- Work-sharing discount $\delta$
  - Workshare price = $p - \delta$
- End-to-end demand = $D(p)$
- Fringe supply = $S(\delta)$
- I’s upstream unit cost = $t$
- I’s unit delivery cost = $c$
- I’s fixed costs = $F$

\[
\begin{align*}
\text{Efficient firms excluded at } \delta_l \\
\text{Inefficient firms participating at } \delta_h
\end{align*}
\]
Worksharing Issues under PAEA

• PRC classified workshared products (delivered) as Market Dominant.
  – PAEA retains Postal Service Delivery Monopoly
• But, “presorting” is a highly competitive component of such delivered products.
• Do such upstream component services constitute distinct “markets” for PAEA purposes?
  – If so, are they Competitive or Market Dominant?
• Are they “relevant antitrust markets”?
Worksharing Incentives upon Introduction of a Global Price Cap

• Initially, Postal Service regulated with ECPR pricing of worksharing
  – workshare discount equal to the Postal Service’s unit avoided costs
• Suppose the Postal Service were granted pricing flexibility for end-to-end prices and workshare prices.
  – Subject to Price Cap constraint
• What direction would it seek to change prices?
Example: shift from “cost based” to “global price cap” regulation

• Freed from “cost of service” regulation, the Incumbent seeks to maximize:

\[
\pi(p, \delta) = (p-t-c)[D(p)-S(\delta)] + (p-\delta-c)S(\delta) - F
\]

subject to:

\[
p(D^0 - S^0) + (p-\delta)S^0 \leq p^0(D^0 - S^0) + (p^0 - \delta^0)S^0
\]

• (Price cap index weights based upon last period quantities)

• Assuming the constraint holds with equality, solving yields:

\[
p^c(\delta) = p^0 + \frac{(\delta - \delta^0)S^0}{D^0}
\]

\[
\frac{dp^c}{d\delta} = \frac{S^0}{D^0} = \frac{S(\delta^0)}{D(p^0)} > 0
\]
Shift from “cost plus” and ECPR to “global price cap” regulation: discount decreases

\[
\frac{d \pi[p^c(\delta), \delta]}{d \delta} = \frac{\partial \pi}{\partial p} \frac{dp^c}{d \delta} + \frac{\partial \pi}{\partial \delta} = \frac{(p - t - c)D'(p)S(\delta^0)}{D(p^0)} + \frac{D(p)S(\delta^0)}{D(p^0)} + (t - \delta)S'(\delta) - S(\delta)
\]

Evaluating at \( \delta = \delta^0 = t \) and \( p = p^c(t) = p^0 \) yields

\[
\frac{d \pi[p^0, t]}{d \delta} = \frac{(p^0 - t - c)D'(p^0)S(t)}{D(p^0)} < 0
\]
Exclusion of equally efficient competitors

• Thus the shift to global price cap regulation may give the Postal Service the incentive to reduce the work-sharing discount *below* its unit cost savings.

• The result is the “exclusion of equally or more efficient competitors” in the fringe.
  – Note: this *may* be socially efficient

• Would antitrust authorities find this “exclusionary”
Quantity Discounts under PAEA
Quantity Discounts (e.g., NSAs) under PAEA

• Before PAEA, Negotiated Service Agreements (NSAs) involving quantity discounts were introduced as an opportunity to both increase economic efficiency and improve Postal Service profits.
  – Subject to detailed scrutiny by PRC

• How does PAEA affect quantity discounts?
  – Incentives of Postal Service
    • Introducing discounts
    • Adjusting discounts
  – Role for PRC oversight
    • Detailed supervision
    • Price Cap treatment
Basic Theory: Using *quantity discounts* to make *everyone* better off

- Two types of users:
  - High demand user(s) \( D_2(p) \).
  - Average users \( D_1(p) \).
- Suppose \( p^0 \) is the initial uniform price.
- Discounted price \( p^* = p^0 - \delta \) offered on all units in excess of initial demand, \( q_{20} = D_2(p^0) \).
- Large user expands purchases to \( q_{1*} = D_2(p^*) \), increasing his surplus by area \( abd \).
- Since \( p^* > c \), firm profits go up by area \( bdef \).
Limitations necessitating pre-PAEA PRC scrutiny of quantity discounts in NSAs

• If quantity discounts can lead to a Pareto improvement, why is PRC approval required?
  – Profit impacts on Postal Service
    • If Postal Service makes “money losing” deals with large customers, general mailers would be adversely affected under break-even regulation.
      – Possible outcome if Postal Service not a profit seeking enterprise
  – Postal Service customers primarily businesses
    • Feedback effect between “favored” customers and others.
      – Business not receiving discount adversely affected
      – Robinson Patman secondary line injury issues

• Are such concerns relevant under PAEA Price Caps?
Analysis of Quantity Discount incentives under Price Caps: Introducing QDs

• Initially, \( p = p^0 \), base volume \( B^0 = D_1(p^0) + D_2(p^0) \) and discounted volume \( V^0 = 0 \).

• Postal Service contribution from this service after introduction of quantity discount \( \delta \) (with threshold \( D_2(p) \)) is given by:

\[
\Pi = (p-c)[D_1(p)+D_2(p)] + (p-\delta-c)[D_2(p-\delta)-D_2(p)]
\]

• Price Cap constraint (holding other prices constant) is

\[
pB^0 \leq p^0B^0 \text{ or } p \leq p^0
\]

• Other customers automatically protected by Price Caps
Analysis of Quantity Discount incentives under Price Caps: Choice of Initial Discount

- Price Cap constraint results in a contribution maximizing Postal Service producing a Pareto Improvement.
- Price Cap constraint determines \( p = p^0 \)
- Postal Service free to choose \( \delta \) to maximize contribution, *given* initial, undiscounted rate of \( p^0 \).

\[
\max_{p, \delta} \Pi(p, \delta) = (p - c)[D_1(p) + D_2(p)] + (p - \delta - c)[D_2(p - \delta) - D_2(p)]
\]

subject to \( p \leq p^0 \) requires that

\[
\frac{\partial \Pi(p^0, \delta)}{\partial \delta} \equiv \Pi_\delta = -(p^0 - \delta - c)D_2'(p^0 - \delta) - [D_2(p^0 - \delta) - D_2(p^0)] = 0
\]

This equation defines optimal initial discount, \( \delta^*(p^0) \), given the initial price.
Analysis of Subsequent Discount Incentives under Standard (Laspeyres) Price Caps:

- Price Cap regulation continues to apply after a quantity discount is in place.
  - Changes (rate level, threshold and discount level) must satisfy cap.
- IF PAEA Price Cap took the standard Laspeyres form: i.e.,

\[ p^0 B^0 + (p^0 - \delta^0) V^0 \geq p B^0 + (p - \delta) V^0 \]

it can be shown that the firm would want to *increase* the discount and basic rate if the initial discount were optimally set: \( \delta^0 = \delta^*(p^0) \).

\[ p^0 B^0 + (p^0 - \delta^0) V^0 = p B^0 + (p - \delta) V^0 \]

\[ \Rightarrow p^c(\delta) = p^0 + \frac{(\delta - \delta^0)V^0}{B^0 + V^0} \]

Constrained contribution levels are given by

\[ \Psi(\delta) \equiv \Pi(p^c(\delta), \delta) \]

\[ \Psi'(\delta) = \Pi_p(p^c, \delta) \frac{dp^c}{d\delta} + \Pi_\delta(p^c, \delta) \]

Suppose \( \delta^0 = \delta^*(p^0) \). Then at \( \delta^0, p^0 \) the effect on contribution of a small increase in the discount (and base rate) is:

\[ \Psi'(\delta^0) = \Pi_p(p^0, \delta^0) \frac{dp^c}{d\delta} > 0 \]

because \( \Pi_\delta(p^0, \delta^*(p^0)) = 0 \).
Analysis of Subsequent Discount Incentives under PRC PAEA Price Cap Formula:

• However, the PRC has specified a different treatment for revenues associated with discounted volumes under NSAs:
  – “Mail volumes sent at rates under negotiated service agreements are to be included in the calculation of percentage change in rates as though they paid the appropriate rates of general applicability.”
• Impact of this rule is to restrict changes of discounts in place to basic rate reductions. In terms of our example the constraint is:

\[ p^0(B^0+V^0) \geq p(B^0+V^0) \text{ or } p^0 \leq p \]

• PRC Price Cap prevents using discount increases to raise basic rate
• Effect is to limit potential contribution gains and (probably) total surplus increases from Postal Service pricing flexibility.
Price Caps and Quantity Discounts for Inputs

• The vast majority of mail is sent by business to their customers or other business
  – It is an *input* into the production of their final product
• Imagine a *heterogeneous* competitive industry in which firms of different sizes use mail as an input
  – E.g., One large firm and a large number of small firms
• Giving the large firm a quantity discount NSA will:
  – Cause it to expand output
  – Lower equilibrium downstream price
  – Reduce profits of small firms
• **EVEN IF THE BASIC RATE IS UNCHANGED!**
Example of Quantity Discounts with Interdependent Demands

• Assume *fixed proportions*
• Mail input demanded equals output supply:

\[ D_1(r,p) = S_1(r,p) = S_1(r-p) \]

• Negotiated discount to large user results in output price falling from \( r^0 \) to \( r^1 \)
• Small firms profits fall by \( fgab \).
• Monopoly profits fall by \( abed \).
• Not a Pareto Improvement!
Results of Analysis of Quantity Discounts with Interdependent Demands

• Assume:
  – Initial uniform price of $p^0$
  – Discount $\delta$ and threshold $X$ negotiated with large user for sales over $X$
  – Postal Service has all the bargaining power.

• Then, it can be shown that:
  – There always exist incentives to introduce such quantity discounts
    • Intuition: the direct (“first order”) effect from introducing the discount outweighs the indirect (“second order”) effect on Postal Service profits when the discount is close to zero.
  – The optimal discount will involve a discounted rate greater than marginal cost.
    • Intuition: the direct effect of further rate reductions approaches zero as the discounted rate approaches marginal cost, while the negative feedback effect on Postal Service profits remains “large.”
  – Introducing the discount will increase total surplus.
    • Intuition: The expansion of total of final output benefits ultimate consumers more than it hurts Type 1 producers.
Channel Based Discounts
Pricing Different Distribution Channels under PAEA Price Cap Regulation

• Selling stamps at the Post Office window is expensive.
• Contribution can probably be increased by utilizing alternative distribution channels: e.g., Internet.
• Channel based discounts may facilitate this.
• What implications does PAEA Price Cap regulation hold for such a strategy?
  – Incentives to introduce channel based discounts
  – Extent of pricing flexibility
Channel Discount Example

- Initially, without channel discounts:
  \[ p = p_I = p^0 \]
  \[ W = W(p^0, p^0) = W^0 \]
  \[ I = I(p^0, p^0) = I^0 \]

- Laspeyres Price Cap constraint associated with discount would be given by
  \[ p^0W^0 + (p^0 - \delta)^0I^0 \geq pW^0 + (p - \delta)I^0 \]

- Solving yields feasible \( p, \delta \) pairs:
  \[ p^c(\delta) = p^0 + (\delta - \delta^0)I^0/((W^0 + I^0) \]
  \[ = p^0 + (\delta - \delta^0)s_{I}^0 \]

- \( p = \) price “at window”
- \( \delta = \) “Internet discount”
- \( c = \) unit cost at window
- \( c_I = \) unit cost over Internet
- \( p_I = p - \delta = \) Internet price

- \( W(p, p_I) = \) window quantity
  \[ W_w = \partial W/\partial p < 0; \quad W_I = \partial W/\partial p_I > 0 \]

- \( I(p, p_I) = \) Internet quantity
  \[ I_w = \partial I/\partial p > 0; \quad I_I = \partial I/\partial p_I < 0 \]

- \( \Pi(p, p_I) = \) Contribution
  \[ = (p-c)W(p, p_I) + (p_I-c)I(p, p_I) \]
Analysis of Channel Discount Example

• Introducing discount creates “slack” to raise basic rate.
• Is there an incentive to introduce discount (and raise basic rate)?
  “Normally,” YES!, assuming
  – comparable elasticities
  – lower costs ($c_i < c$)
• Rarely will there be an incentive for Pareto movement
  – Only if $p^0$ above contribution maximizing level of $p_i$.

\[
\Psi(\delta) \equiv \Pi(p^c(\delta), p^c(\delta) - \delta)
\]
\[
\Psi'(\delta) = \left( \Pi_W + \Pi_I \right) \frac{dp^c}{d\delta} - \Pi_I
\]
\[
= s^0_I \Pi_W - (1 - s^0_I) \Pi_I
\]
Need to determine sign of $\Psi'(0)$

"Effective regulation" of
Uniform price $\Rightarrow \Pi_W + \Pi_I > 0$
Window price $\Rightarrow \Pi_W > 0$
Internet price $\Rightarrow \Pi_I > 0$
Channel Discounts are an example of *rate de-averaging*

- *If permitted*, there is usually a profit incentive for de-averaging under Price Cap regulation.
- Efficiency (total surplus) likely to go up as a result.
- Unlikely for de-averaging to result in a WIN-WIN Pareto improvement.
- NB: the same conclusions can be reached regarding “de-averaging” to implement 3\textsuperscript{rd} Degree Price Discrimination!
Possible Antitrust Implications of Channel Based Discounts

• As noted, Channel Based Discounts likely to create winners and losers.

• Some of the losers may be those whose “business plan” is based on the inefficiency of the initial situation.

• With PAEA’s removal of the Postal Service antitrust exemption, such losers may find antitrust standing to sue for damages
  – Especially if Channel Based Discounts can be cast as 3rd Degree Price Discrimination: e.g., if there is no cost basis.
Conclusions

• PAEA designed to improve the incentives facing the Postal Service.

• Pricing flexibility granted by PAEA gives the Postal Service the ability to *directly* impact the bottom lines of mailers and competitors.
  – I.e., *not only* through the actions of the PRC.

• Losers may object:
  – To the PRC
  – To the Antitrust Authorities

• For good or ill, PRC decisions implementing PAEA affect both incentives and economic efficiency.