Environmental Costs and USO

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Overview

Research question:

What is the optimal scope of the USO under environmental considerations?

How can the optimum be achieved?

Method:

Theoretical model and numerical simulation

Main results:

Socially optimal USO depends on environmental costs

First best is attainable without constraints

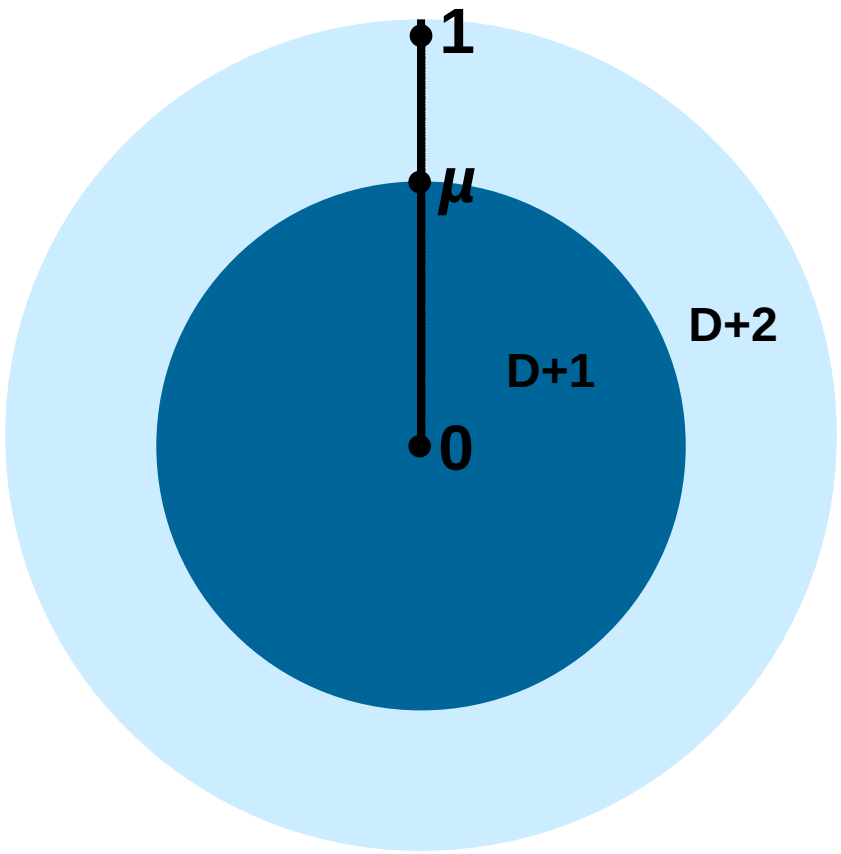
Not attainable under uniform pricing

Characterization of Ramsey solutions

Model

- One sender
- Continuum of receivers
- One postal operator (monopolist)
- Two exclusive products
  - D+1 mail delivered in area A_1
  - D+2 mail delivered in area A_2
- Constant marginal delivery cost (identical for both products)
- Transportation and environmental costs are convex in distance and larger for D+1 than D+2 mail
- Transportation costs are private, environmental costs are social costs

Partition of delivery area



Results (1/2)

- First-best
  - Marginal benefit equals marginal cost
  - Attainable through “Pigouvian” tax (marginal social cost)
    - => Prices reflect full (private and social) marginal cost
    - Interestingly, in simulation D+2 mail is more expensive than D+1 mail, because difference in marginal environmental costs (D+1>D+2) is smaller than difference in marginal transportation costs (D+1<D+2)
    - Empirical relevance: e.g. Switzerland

Results (2/2)

- Uniform pricing (no break-even constraint)
  - First best requires different prices for D+1 and D+2 product
  - Not attainable under uniform pricing
  - Effect on USO is ambiguous
  - D+1 area and mail volume increases slightly in simulation
- Second-best (operator/monopolist must break even)
  - No uniform-pricing constraint
    - Either first-best remains feasible
    - Or Ramsey-type second best
  - Uniform pricing
    - Uniform price and D+1 area increase with fixed cost

Applications

- Truck (D+1) vs. rail (D+2)
- Air (D+1) vs. surface (D+2)
  - Competitive cost advantage heavily depends on distance
  - Basic differences in cost function are only partially reflected in model
    - Relation of fixed vs. variable costs
    - => mail volume is critical
- National vs. international mail
- Application to national mail
  - Geographical distribution of senders and receivers is critical
  - => network optimization

Extensions (1/4)

- Inclusion of delivery costs
  - Large cost savings through reduction in delivery frequency
  - => D+2 mail would become significantly cheaper
- Theory of two-sided markets
  - Network externality of marginal receiver
  - Location/environmental costs of marginal receiver
- Effect of market liberalization
  - End-to-end competition w/o bypass
  - Work-sharing
- Technological neutrality of USO
  - Effect on environmental costs

Extensions (2/4)

- New technology

Printing The NYT Costs Twice As Much As Sending Every Subscriber A Free Kindle

Nicholas Carlson | Jan. 30, 2009, 4:35 PM | 121 Print

Tags: Media, Media, New York Times, Newspapers

Not that it's anything we think the New York Times Company should do, but we thought it was worth pointing out that it costs the Times about twice as much money to print and deliver the newspaper over a year as it would cost to send each of its subscribers a brand new Amazon Kindle instead.

Here's how we did the math:

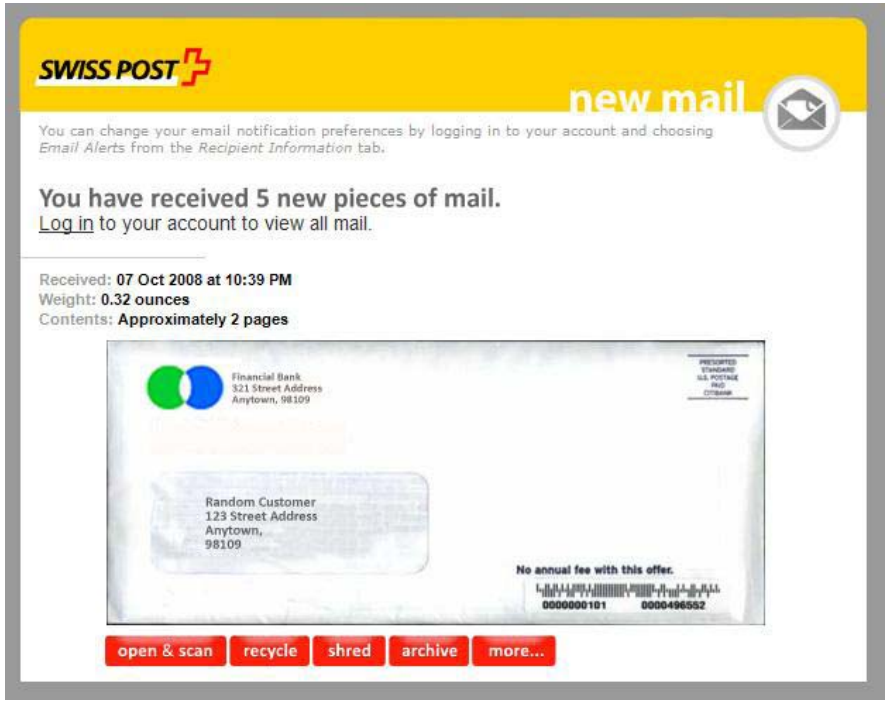
According to the Times's Q308 10-Q, the company spends $63 million per quarter on raw materials and $148 million on wages and benefits. We've heard the wages and benefits for just the newsroom are about $200 million per year.

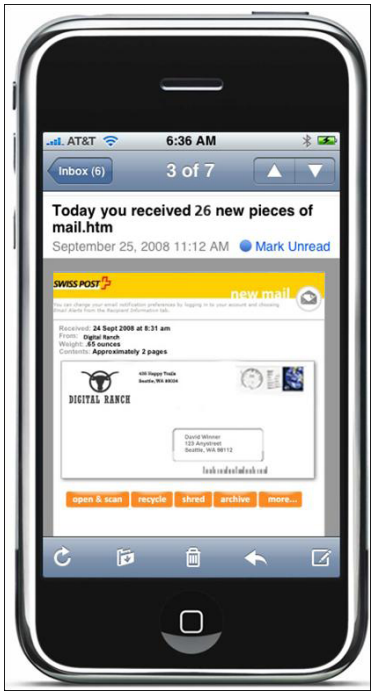
After multiplying the quarterly costs by four and subtracting that $200 million out, a rough estimate for the *Times*'s delivery costs would be $644 million per year.

Source: businessinsider.com

Extensions (3/4)

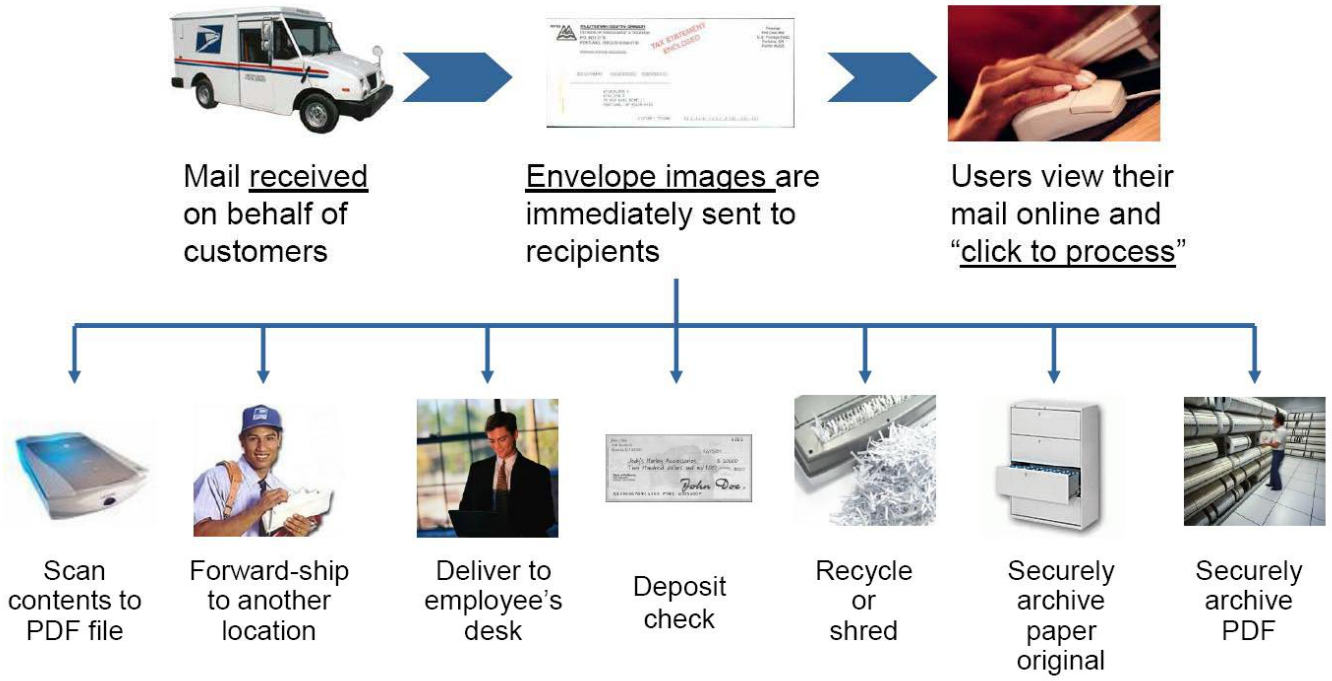
- Swiss Post Box
  - The receiver has the choice to open & scan, recycle, archive, transfer securely or ship to a physical address





Extensions (4/4)

- Choice of Technology



Thank you for your attention!