

# Inducing Optimal Quality Under Price Caps: Why, How, and Whether

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# Postal policy motivations

- PAEA-mandated PRC review of statutory postal price caps for “market dominant services”
- Concern over decline in service quality
  - Mostly delivery time, also days of service (3, 5, 6)
- John Kwoka filing for PRC Public Representative as example
  - I filed one on adjustments for declining demand to preserve solvency
- Recent PRC Notice: Allow a .25% increase in price if quality standards met
- If quality is a problem, what should be done?

## Theory side: Is quality a problem?

- **Ted Pearson paper at last CRRI/FSR Postal Conference looked like hedonic solution**
  - It wasn't; rather, it was about what postal costs today would be with today's quality at yesterday's estimated costs
  - But planted idea for looking at price/quality tradeoff
- **Claim that price caps provide incentive to reduce product quality**
  - Intuition: Save on quality without cutting price => higher profits
  - Intuition not quite right, though

## Why quality wouldn't be zero

- A price-capped firm loses demand if it reduces quality
- Implies a tradeoff between the marginal revenue from increasing purchases and the marginal cost of increasing quality
- With price caps, price typically exceeds marginal cost to recover the fixed costs that ostensibly make the firm a monopoly worth regulating, so  $P > MC$

## Also, Monopoly 101 -- supposedly

- Familiar “Monopoly 101” result:  
A monopolist may set quality above the optimal level
- Monopoly profit from increasing quality comes from increased willingness to pay of the marginal buyer
- Overall welfare comes from increasing willingness to pay averaged over all buyers
- Former could exceed latter, so a monopoly could set quality above the optimal level
- Or so the story goes ...



# Apples and oranges?

- **Optimal quality comes from solving simultaneously for optimal level of output**
  - **$P = MC$  of output at optimal quality**
  - **Average increase in WTP for quality just equals marginal cost of higher quality (over all output)**
  - **But if a firm is setting price equal to marginal cost, it would have no incentive to increase quality!**
- **Thus, this optimality condition isn't a market condition**
  - **Competition has multiple providers at multiple quality levels, with price equal to MC at both**
  - **Or only if there is one level of quality in the market, which makes "optimal quality" almost uninteresting**

## Which brings us to “Footnote 18”

- **General result: A price-capped firm will set quality below the optimal level given the capped price**
  - A price-capped firm will choose the level of quality  $Q^*$  that maximizes producer surplus
  - But increasing quality above  $Q^*$  would increase consumer surplus
  - Holding price constant, the price-capped firm captures none of that  $\Rightarrow Q^*$  below optimum at capped price
- I was sure this had to be known, and Sappington pointed to n. 18 of his 2005 JRE survey paper
- **Policy problem: How to internalize that CS effect?**

## But before policy, back to monopoly

- Footnote 18 also applies to a monopoly!
  - First-order condition for profit-maximizing quality holds price constant
  - With constant prices, get quality choice that maximizes profit but not consumer surplus
  - Monopoly quality could be higher than optimal, but it will be less than optimal quality given the monopoly price
- But “too little quality” result not always true
  - With multiple rivals, a firm’s increase in profit from increasing quality could come from rivals, with negative net benefit overall
  - Like Mankiw/Whinston “excessive entry” result



## Yet one more complication ...

- To deal with the quality problem, I thought there was a result that increasing the price cap increases quality
- Intuition: At higher prices, the profits from increasing demand from increasing product quality are greater
- But it turns out not to be that simple
  - If those with lower WTP would substantially increase purchases with higher quality, it may pay to increase quality at a lower cap
  - But if they aren't in the market because of a higher cap, that incentive to increase quality would disappear
  - Akin to how increase in demand can lead to lower price
  - But if this effect too big, a price cap may not be binding

## Getting around this

- Intuitive result that higher cap leads to higher quality holds if those with higher WTP would also increase demand more if quality increases
  - Weisman (2005) hedges this by saying that the result holds if the relationship between WTP and responsiveness to quality increases is “small”
- Is this reasonable?
  - On the one hand, one normally expects that those who value something more also value quality more
  - But in mail, those with low WTP because of a preference for email might be sensitive to timeliness
  - Core of Brennan-Crew (2014): USPS may still have market power despite huge demand decrease from email

## What should a quality policy look like?

- One may ask why not prescribe optimal price and quality?
- But that's contrary to case for price caps
- Usual argument for price caps based on incentive for regulated firm to control costs
- But that's important only because regulator can't verify costs
- Thus, we need a quality policy that does not presuppose regulator knowledge of the costs of providing quality
- Need to assume regulator knows value of quality to consumers—otherwise it doesn't know anything!

## Rules out using price as instrument

- Suppose regulator knew how price influenced quality
- That relationship requires knowing: Marginal cost of increasing output
  - Determines net profit increase from increasing price to increase quality
  - Sales could go up or down
- Marginal cost of increasing quality
  - Needed to balance against consumer surplus and possible profit benefits
- Contradicts “cost ignorance” virtue of PCR



## Could internalize the externality?

- The marginal benefit of quality per customer not captured by the regulated firm is the average increase in WTP per customer
- Suppose the regulated firm is given that amount as a subsidy for an increase in quality
  - Recall that we assume the regulator has a measure of quality and a sense of how much customers are willing to pay for it
  - Ignorance is not an option
- This would work ... but who pays the subsidy?
- “Other than that, Mrs. Lincoln ....”: Let’s rule out taxpayers



## If the ratepayers cover the subsidy ...

- Increase the price cap as a reward for higher quality
  - But since the quality externality equals the average WTP per unit ...
  - ... the price cap (per unit) has to go up by that WTP
- Implies that consumer welfare does not increase
  - All benefits of increasing quality go to the regulated firm
- Not unexpected, really
  - Efficiency implies giving firm full reward at margin
  - Loeb and Magat, Sappington and Sibley “ISS”
- Plus, welfare loss if price goes up
  - Wouldn't see if lump sum payment, but that's unlikely

## But even it that is OK, yet another mess

- To internalize quality externality at price cap  $P_0$ , increase cap to  $P_1$
- But at  $P_1$ , the quality level for  $P_0$  is not optimal
- Raise price to  $P_2$  to cover cost of incentive to increase quality to optimal level for  $P_1$
- Unfortunately, this doesn't appear to converge ...
- ... because of result that even at monopoly price, quality too low for that price

## So what's the alternative?

- **Regulator sets optimal quality level and penalize PCR firm for too little quality?**
  - **But regulator has to know cost to set quality**
  - **Also, non-negative profit constraint on PCR firm implies penalty cost passed on to ratepayers**
  - **Perverse outcome**
- **Perhaps PRC solution is “Nth best”**
  - **Negotiate quality standards with USPS**
  - **Institute small penalty for falling below standard (phrased as reward for meeting standard)**

## Concluding observations

- Price-capped firms will not minimize quality
- They will set quality too low relative to that price
- Result that monopoly quality choice could be above optimal quality not relevant, since the monopoly or regulated price will be above marginal cost
- Appropriate policy, in the spirit of price caps, is to give firm the incentive to set quality, but not prescribe quality assuming regulator knows costs
- If cost of inducement born by ratepayers, optimal inducement increases profits, not consumer surplus
- Left with  $N^{\text{th}}$  best “negotiation” policy
- Hope not “pull number out of hat”