

# Incentive Auctions

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15 July 2011

\* Special thanks to Larry Ausubel, Evan Kwerel, and Paul Milgrom for collaborating with me on this topic over the last dozen years. Thanks to the National Science Foundation for funding.

# Incentive auctions

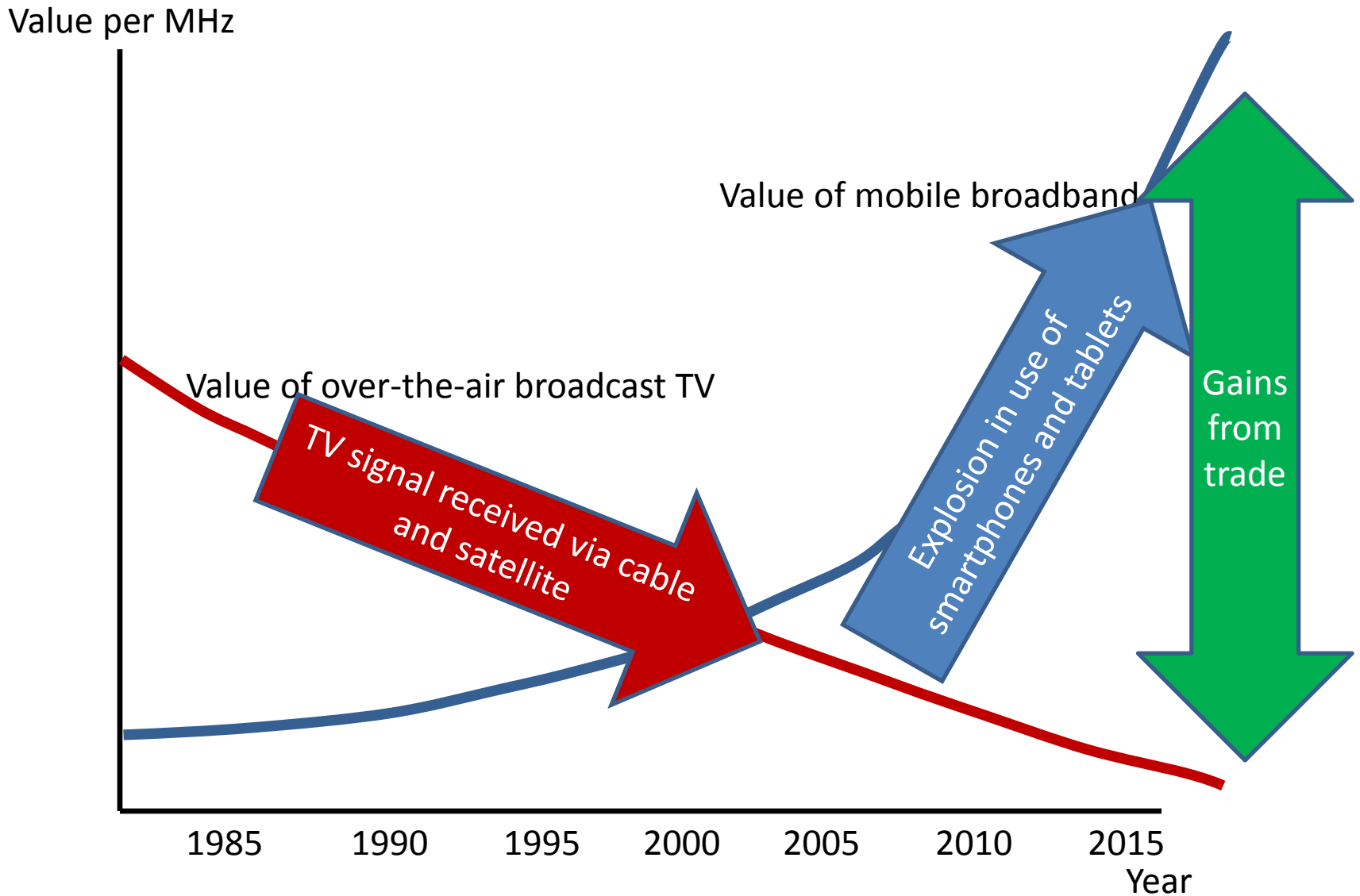


*Auction includes essential regulatory steps to address market failures in the secondary market for spectrum*

# Letter from 112 economists, 6 April 2011

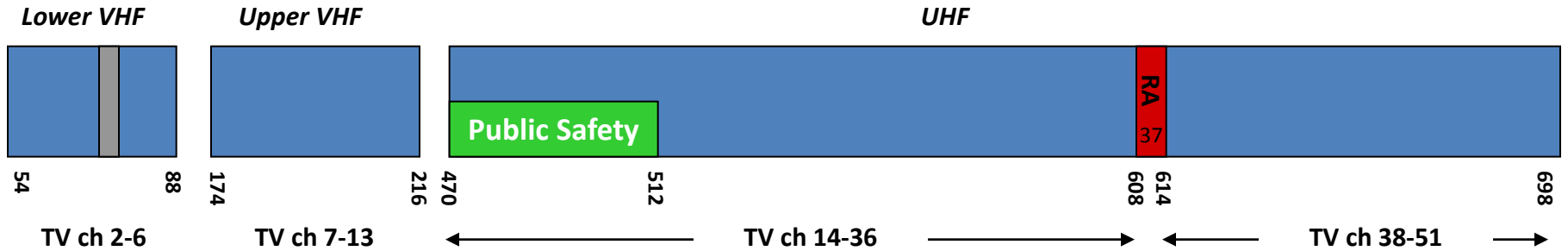


# Motivation

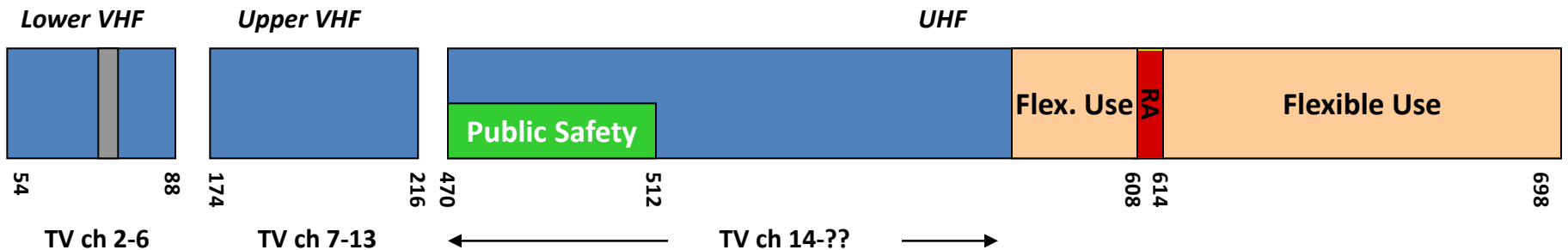


# VHF and UHF bands

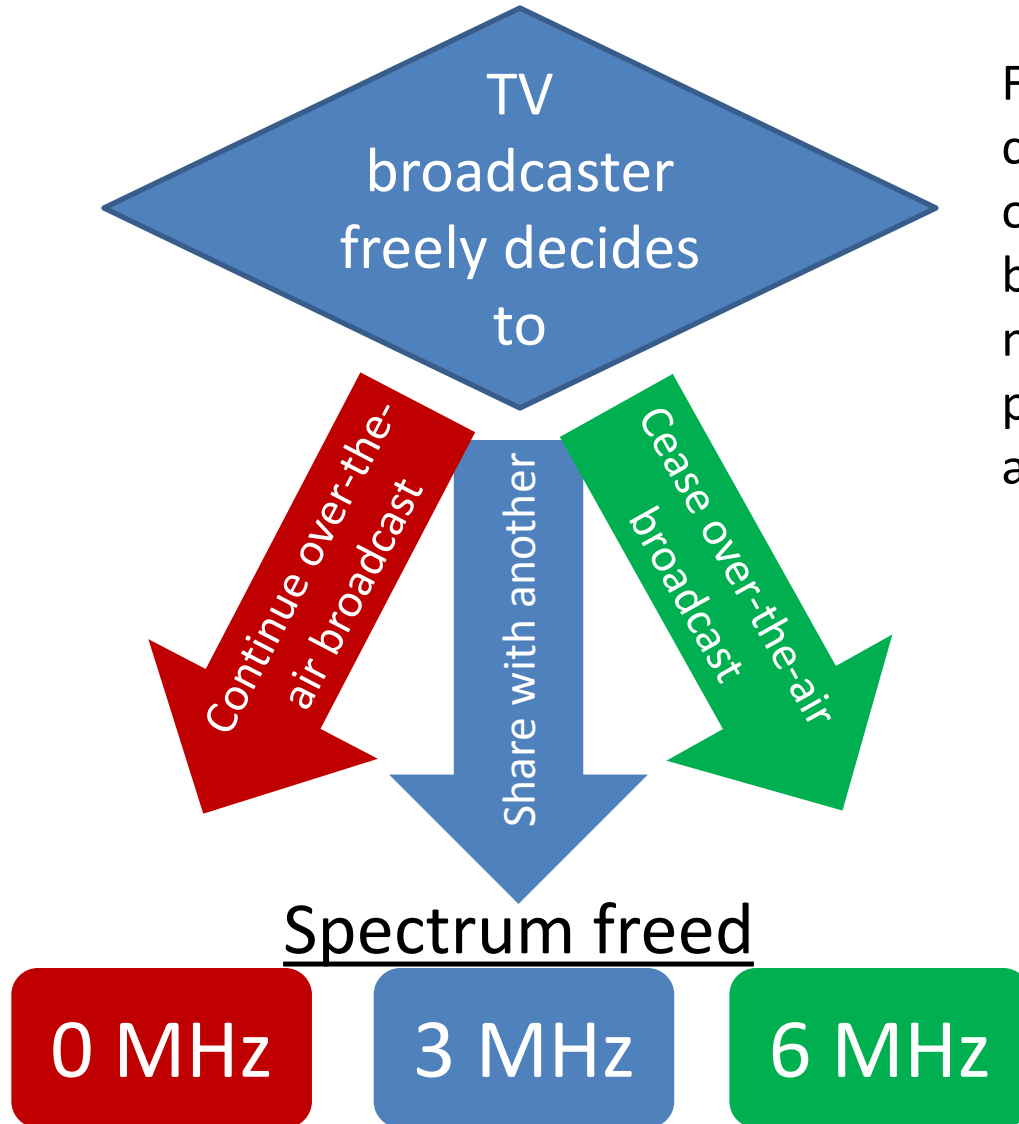
## Current uses (TV broadcast)



## Possible future uses



# Voluntary approach



For simplicity, I assume that channel sharing is only 2:1; other possibilities could also be considered, including negotiated shares with particular partners announced at qualification

# Why voluntary?

- *More likely to quickly clear spectrum*
  - Broadcasters benefit from cooperating
- *Lower economic cost of clearing*
  - Spectrum given up only by broadcasters who put smallest value on over-the-air signal
- *Market pricing for clearing*
  - Avoids costly administrative process
- *Efficient clearing*
  - Clear only when  
value to mobile operator > value to TV broadcaster

# Two approaches



Too complex  
due to  
repacking





Reverse  
auction to  
determine  
supply

TV  
broadcaster  
freely decides  
to

Continue over-the-  
air broadcast

Share with another

Cease over-the-air  
broadcast

Spectrum freed

0 MHz

3 MHz

6 MHz

- Mostly single channel
- Price discovery less important

=>

- Sealed-bid auction or descending clock
  - Price to cease
  - Price to share

# Washington DC

0 MHz

3 MHz

6 MHz

$P = \$30$

Reverse  
auction to  
determine  
supply

$S = 48$

7

Price =  $\$30/\text{MHzPop}$

13

9

26

22

31

18

41

37

47

44

35

# Washington DC

0 MHz

3 MHz

6 MHz

$P = \$20$

Reverse  
auction to  
determine  
supply

$S = 36$

7

Price = \$20/MHzPop

13

9

26

22

31

18

41

37

47

44

35

# Washington DC

0 MHz

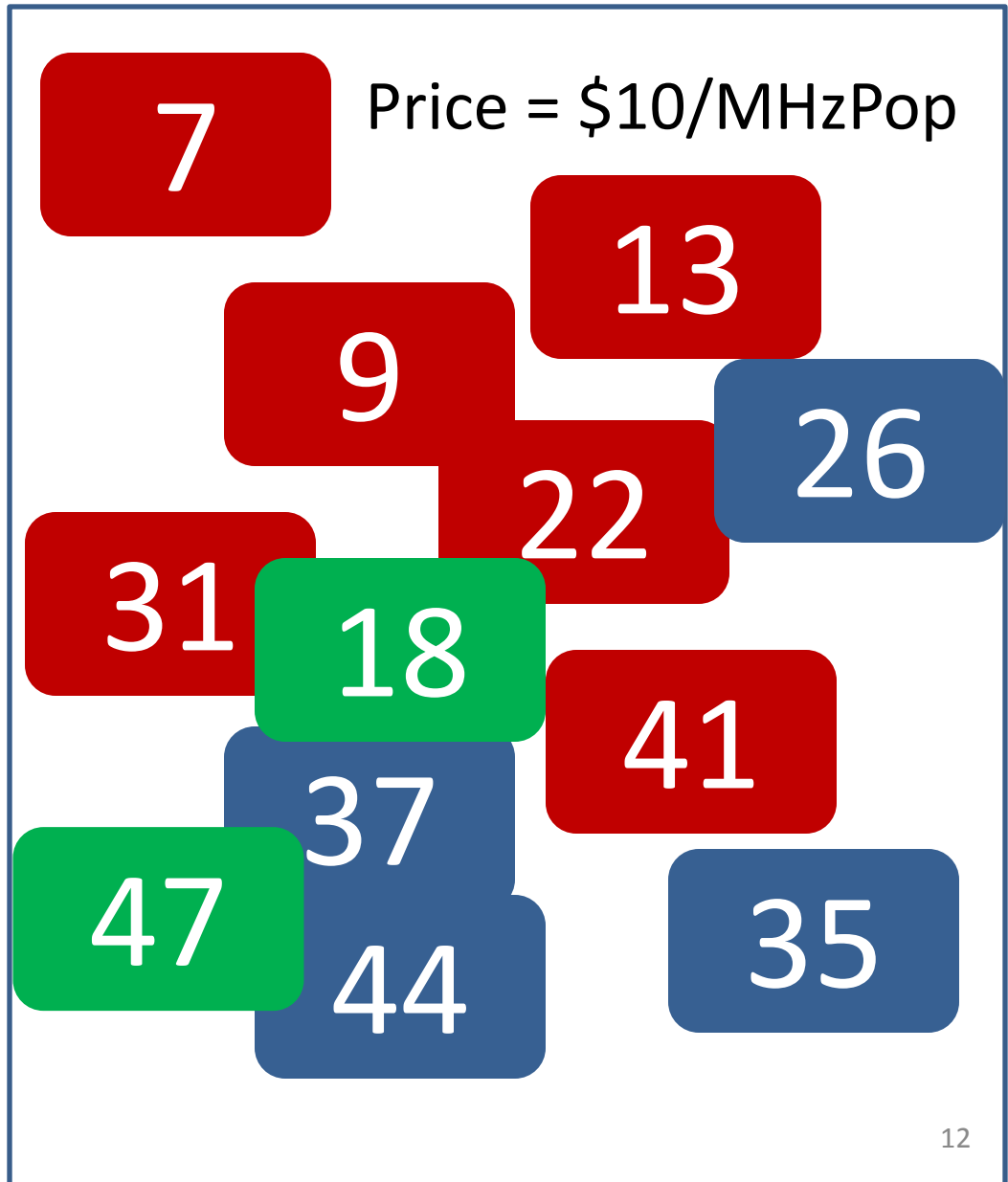
3 MHz

6 MHz

$P = \$10$

Reverse  
auction to  
determine  
supply

$S = 24$

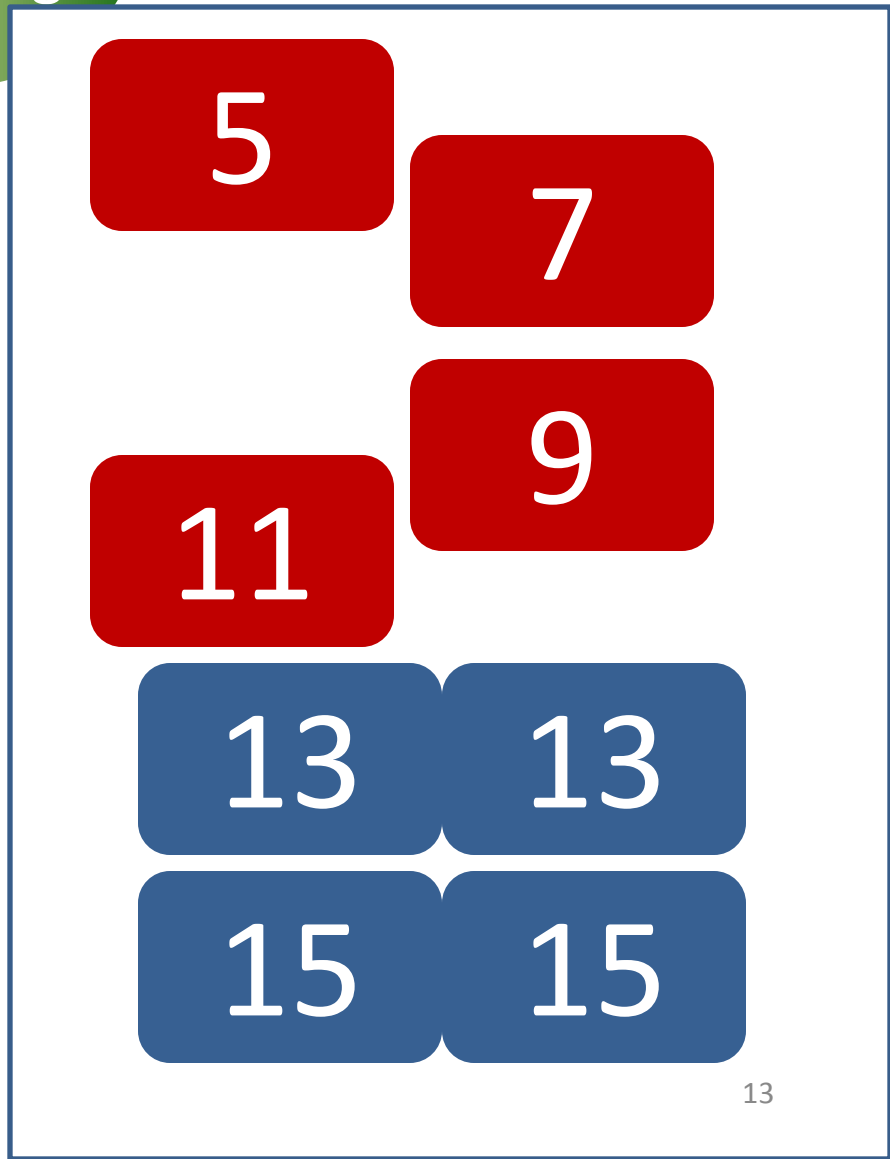
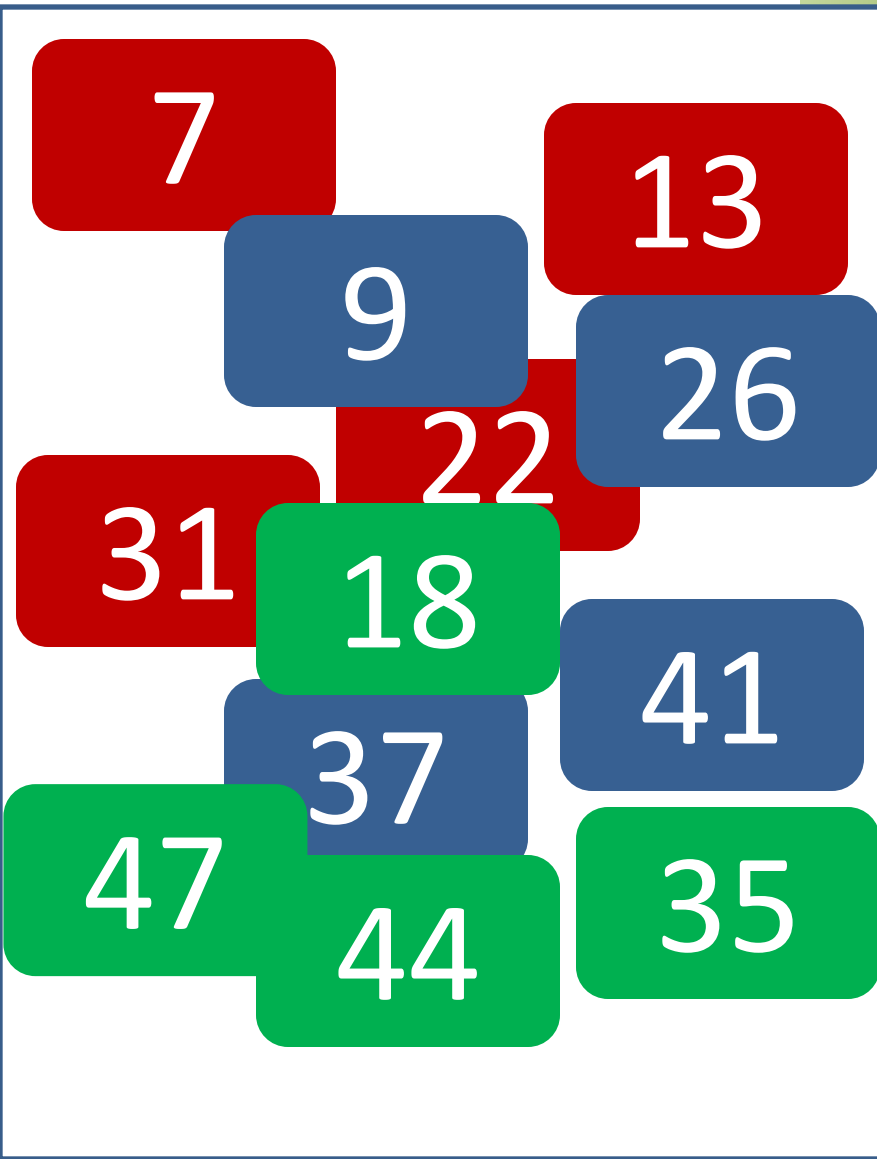


P = \$20

S = 36

Mandatory  
repacking

Supply =  
160 MHz





Forward  
auction to  
determine  
demand

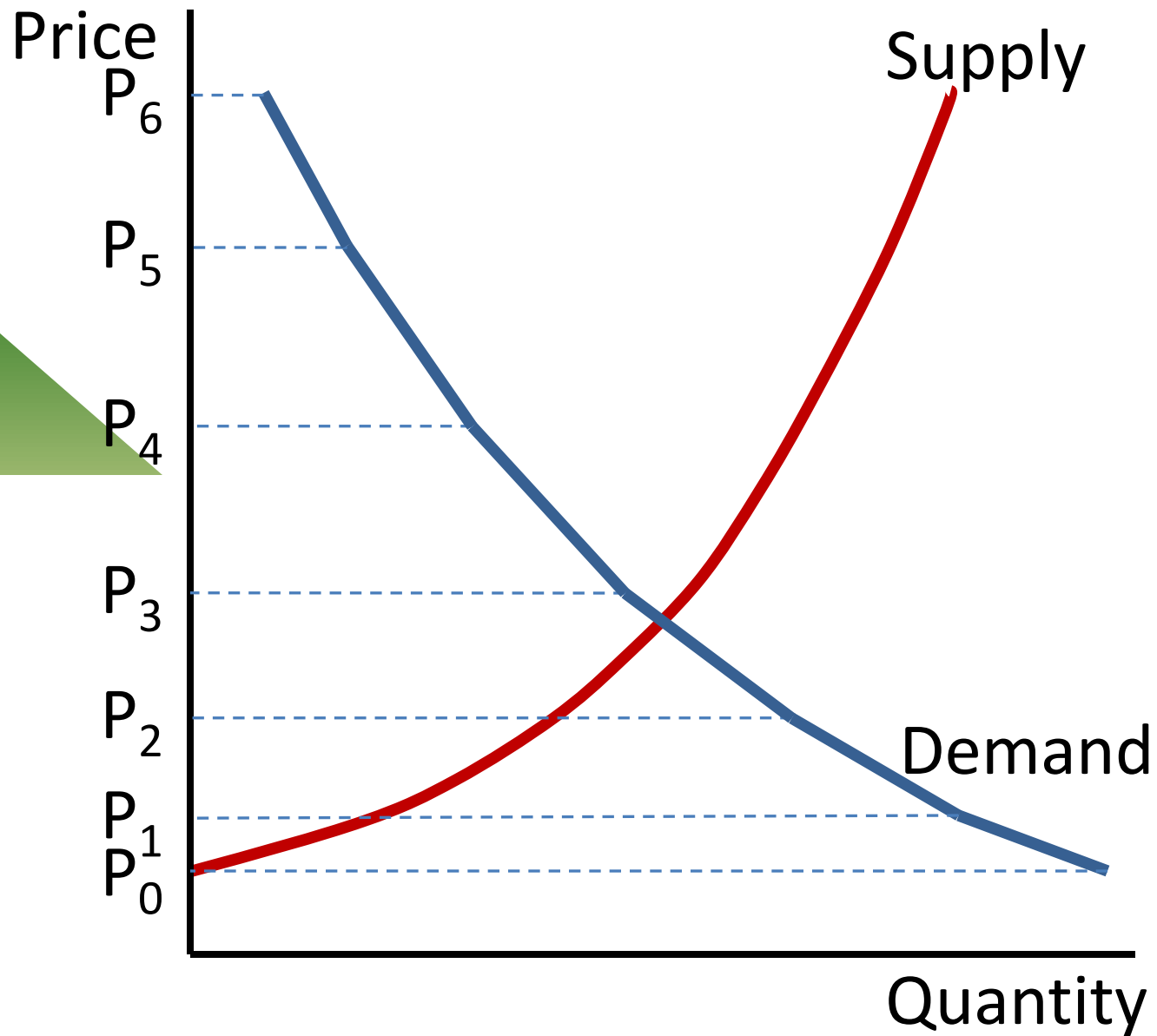
- Mobile operators want large blocks of contiguous paired spectrum for LTE (4G)
  - One to four  $2 \times 5$  MHz lots
- Complementarities strong both within and across regions
- Package clock auction ideal
  - Within region complementarities guaranteed with generic lots
  - Across region complementarities achieved through optimization of specific assignments

# Package clock auction: Overview

- Auctioneer names prices; bidder names package
  - Price increased if there is excess demand
  - Process repeated until no excess demand
- Supplementary bids
  - Improve clock bids
  - Bid on other relevant packages
- Optimization to determine assignment/prices
- No exposure problem (package auction)
- Second pricing to encourage truthful bidding
- Activity rule to promote price discovery

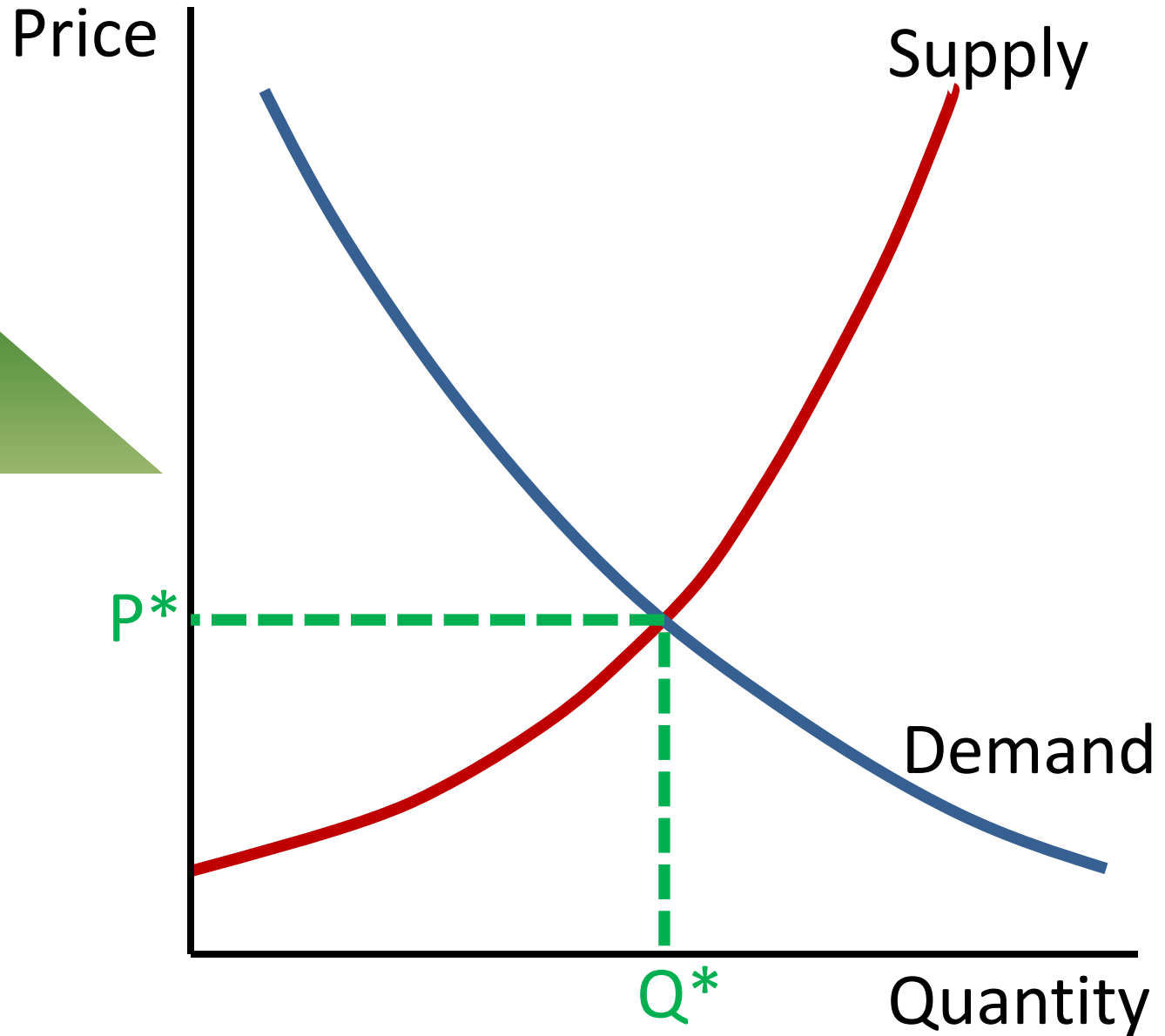
*For details see Peter Cramton, ["Spectrum Auction Design,"](#) Working Paper, University of Maryland, June 2009.*

Forward  
auction to  
determine  
demand



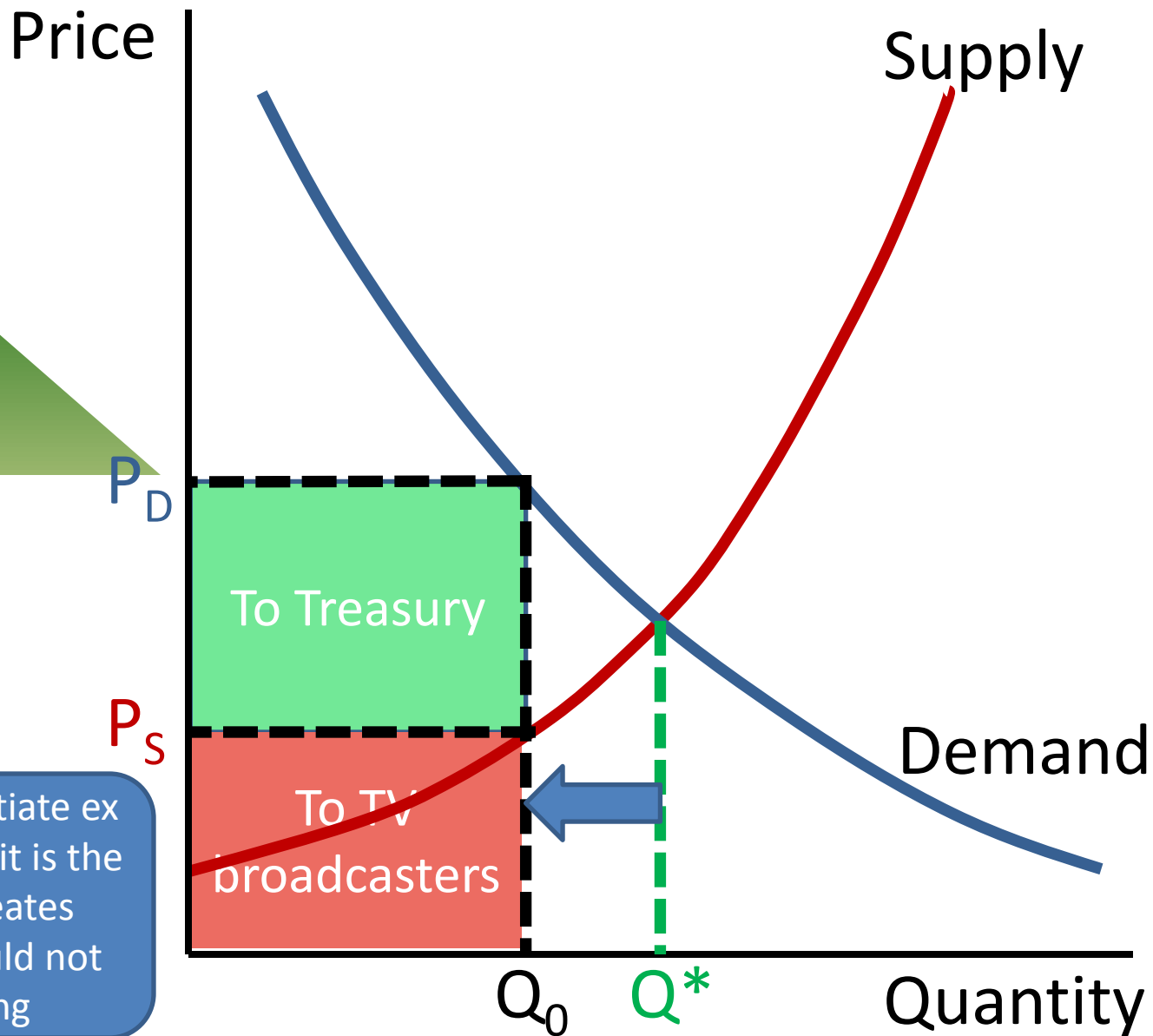


Forward  
auction to  
determine  
demand





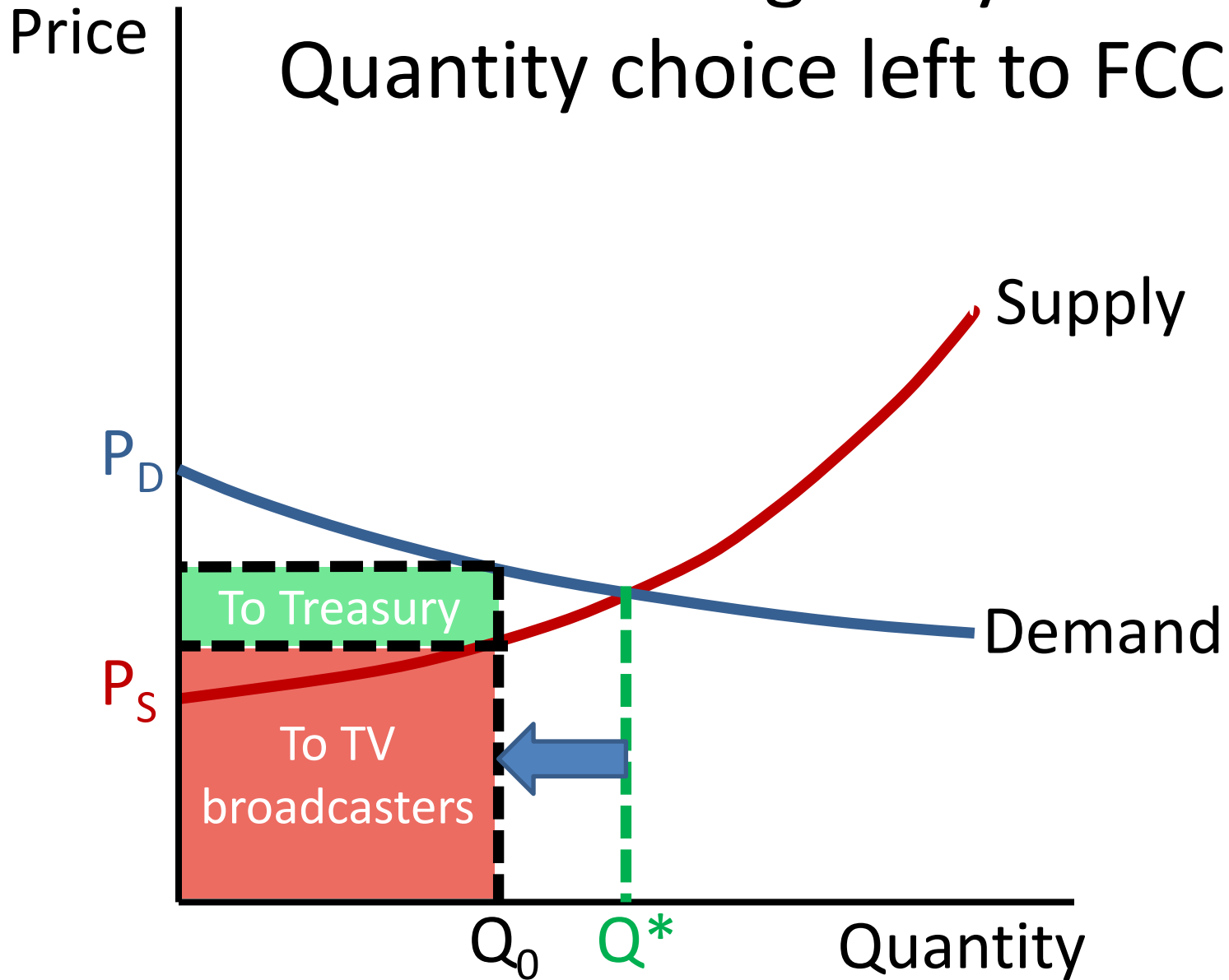
Broadcasters cannot negotiate ex post with operators, since it is the FCC's repacking that creates value; ex post trades would not benefit from repacking



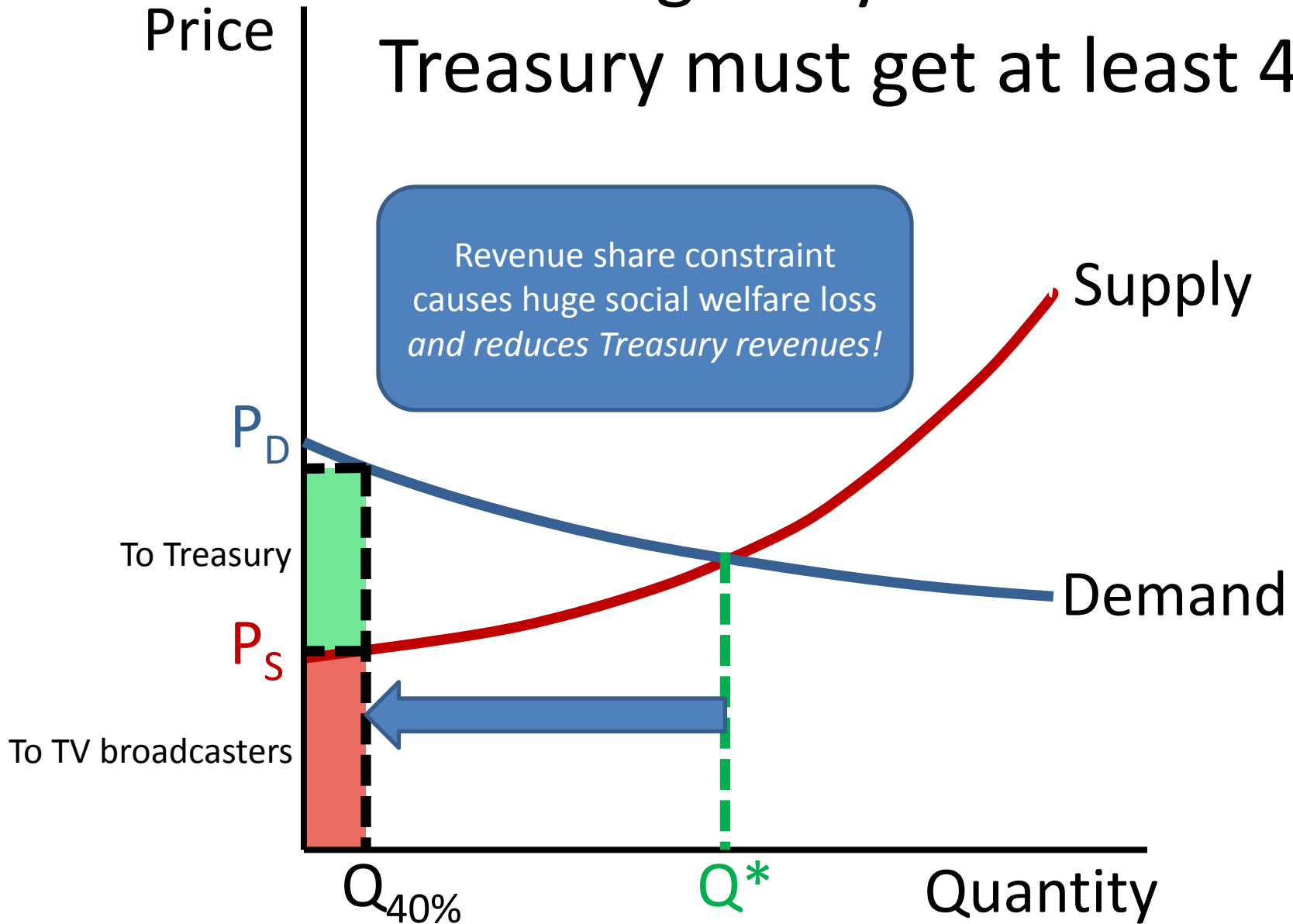
# Ways Congress can screw up

- Impose restrictions on which broadcasters can participate in the auction
  - Destroys competition in reverse auction
- Make repacking purely voluntary
  - Reverses status quo—FCC can relocate stations
  - Creates holdout problem in reverse auction
- Too greedy
  - Impose specific requirement on government revenue share (e.g., Treasury gets 40% of revenue)

# Not too greedy: Quantity choice left to FCC



# Too greedy constraint: Treasury must get at least 40%



# Ways FCC can screw up

- Impose restrictions on which broadcasters can participate in the auction
  - Destroys competition in reverse auction
- Make repacking purely voluntary
  - Reverses status quo—FCC can relocate stations
  - Creates holdout problem in reverse auction
- Adopt poor auction design
- Fail to address competition concerns

# Statutory language: Motivation

- Since 1993, the FCC has demonstrated an outstanding ability to design and implement auctions
- As a result of this outstanding record, Congress should provide the FCC with broad auction authority focused on key objectives
  - Transparency
  - Efficiency
  - Protections to assure success

# Statutory language: Objectives

- Transparency
- Efficiency: Put spectrum to its best social use
- Protections to assure program success
- Protections to assure best available science and practice

*Little more than these objectives is needed in legislation given the FCC's strong track record in designing and implementing auctions; details are apt to do more harm than good in this case.*



*The remaining slides provide suggestions to the FCC and further explanation on how to achieve objectives.*

## To meet objectives: Transparency

- Unless explicitly and narrowly justified to limit potential collusive behavior among bidders, *all elements of the market from qualification, to bidding, to award, to performance will be publically disclosed*
- Modern methods will be developed to promote the disclosure of essential market elements in simple and powerful data bases

# To meet objectives: Efficiency

- Auction design based on long-run efficiency objective:  
Put spectrum to its best use
  - Often consistent with best private use, *but*
  - Adjustments to reflect divergence between social and private value, as a result of competition issues in downstream market for wireless services
    - Important role for competition policy within auction
    - Important role for competition policy after auction
    - Important role for unlicensed spectrum to enhance competition
- Efficient auction format that
  - Accommodates both selling and buying of spectrum rights
  - Fosters effective price and assignment discovery in a multiple round format
  - Has a pricing and activity rule that encourages bidders to express true preferences throughout the auction process
- Bands, standards, and other rules optimized to achieve objective of long-run efficiency
- Auction design established in collaboration with industry and other stakeholders, but led with critical input from auction design experts with substantial experience in a diversity of auction design settings

# To meet objectives: Protections for participants

- Qualification
  - Rigorous and open qualification to bid
  - Deposit proportional to expected volume as a bid guarantee
- Performance
  - Clear rights and obligations for buyers and sellers
  - Simple methods to guarantee performance for parties at risk
- Competition
  - To assure competition in the auction and long-run competition in the downstream market for wireless services,
    - The FCC adopts a suitable competition policy within the auction
    - The FCC adopts a suitable regulatory policy in the wireless market

# To meet objectives: Protections for best practice

- The FCC auctions must be designed consistent with the best science and practice
  - Expert auction design services procured via competitive bid
- The FCC auctions must be implemented consistent with best science and practice
  - Expert auction implementation services procured via competitive bid
- Independent market monitor (as in all U.S. electricity markets)
  - An independent expert shall be retained with four-year terms by the Chair of the FCC
  - Independent market monitor reports directly to the Chair of the FCC
  - Independent market monitor has available all confidential information on the market
  - Independent market monitor reports on a regularly basis (annual report and two biannual reports) on the state of the market
    - Identifies potential problems
    - Makes recommendations on addressing potential problems
  - Independent market monitor is not a judge and does not make rulings