



# *How We Got Here: Lessons From History*

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# Outline

- From radio to cellular technology
- From cellular technology to cellular service
- From regulation to deregulation
- Where we go from here



# The first dropped call was experienced by...

- a. Ronald Reagan
- b. John Kennedy
- c. Winston Churchill
- d. Czar of Russia

# Mobile radio

- Push to talk in 1920s-30s
  - Car phone
  - No handoff. 75 mile limit.
  
- Motorola -- world's first hand-held portable two-way radio system, the *Handie-Talkie*.



Source: Motorola





# Early Indications of Wireless Competitive Impact

- 1915 – AT&T decides to not pursue cellular because of wireline monopoly
- Carterphone
  - Customer desire to integrate wireline and wireless
- Above 890 Decision
  - Opens door for MCI to compete with AT&T



# From radio to cellular

- Limited airwave space
  - New York City in 1981 (pre-cellular) mobile phone system could handle only 700 customers



Source: Motorola

- AT&T asks for more spectrum, but FCC declines



# Inventing cellular

- AT&T Bell Labs developed cellular technology in 1947
  - Area divided into “cells”
  - Customers could move from one cell to another
  - Greatly increased capacity
- By early 1970s, technology was ready for commercial application



# First cellular calls

- First private cell call made by Motorola's Martin Cooper in 1973
  - DynaTAC or The Brick
- First commercial cell call made by Ameritech's Bob Barnett from Soldier Field in Chicago to Alexander Graham Bell's grandson in Germany, 1983



Source: Rico Shen



# Getting permission

- AT&T needed a license to use the radio spectrum for cellular
  - Seeks FCC permission in 1950s and 1960s, but FCC continues to decline
- In 1970s, FCC authorizes
  - AT&T test of cellular in Newark and Philadelphia
  - Trials in Chicago (AT&T) and Baltimore (American Radio Telephone Service)



# Getting started

- Nordic countries begin using first generation cellular in 1981
- FCC authorizes cellular service for U.S. in 1982, but licensing is slow and awkward



# Regulatory Delays

- FCC says “no” to cellular several times
- FCC decides to reconsider in 1970s
- After about 15 years, FCC decides to license cellular
  - Cost to consumer
  - Chooses competition, but with confusion
- Breakup: AT&T gives away cellular



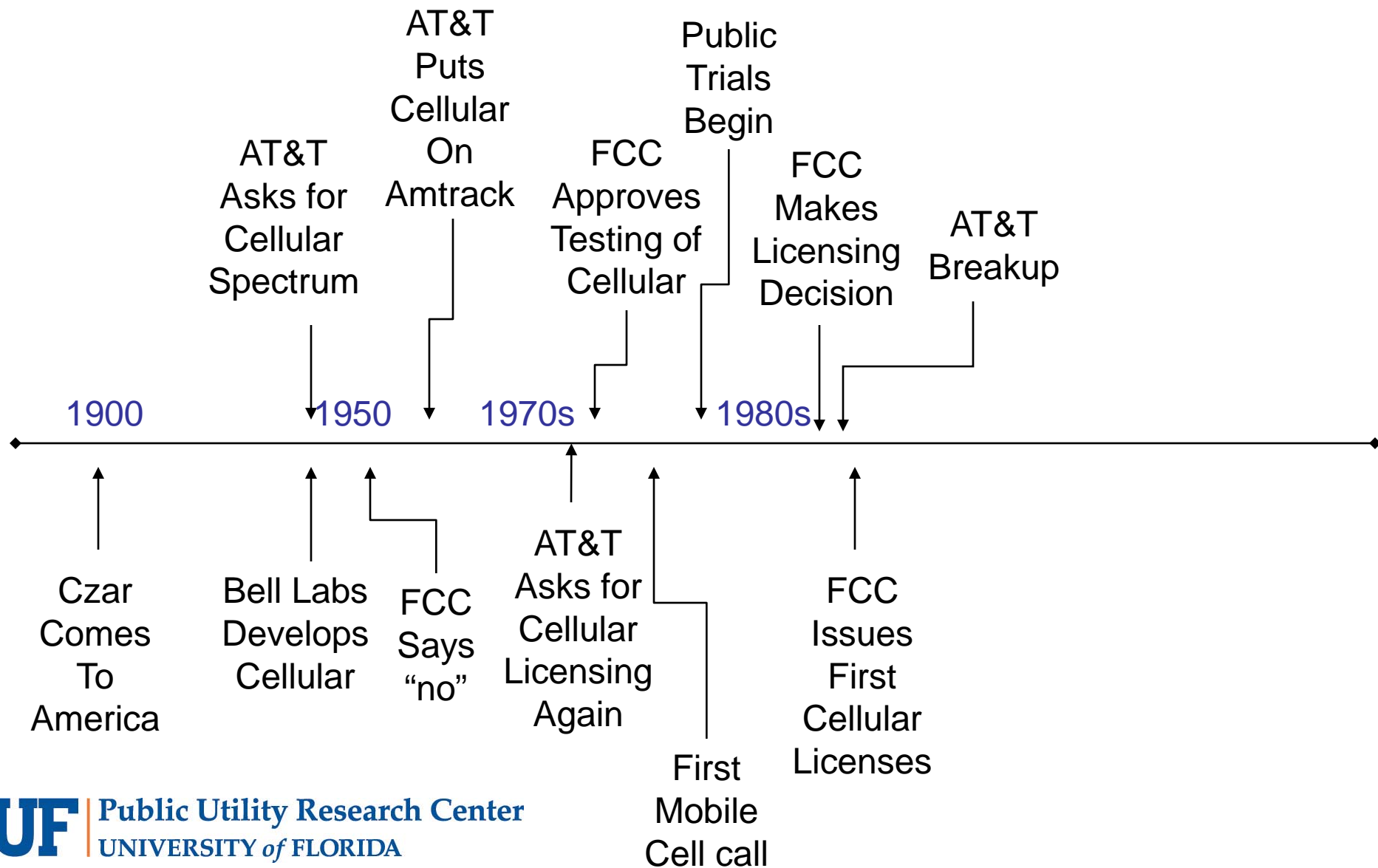
# FCC's First Cellular Licenses

- Duopoly
  - Wireline licenses issued and service begins
  - Non-wireline clumsy and long
- Non-wireline
  - Comparative hearings process
  - Lottery



# Comparative hearings

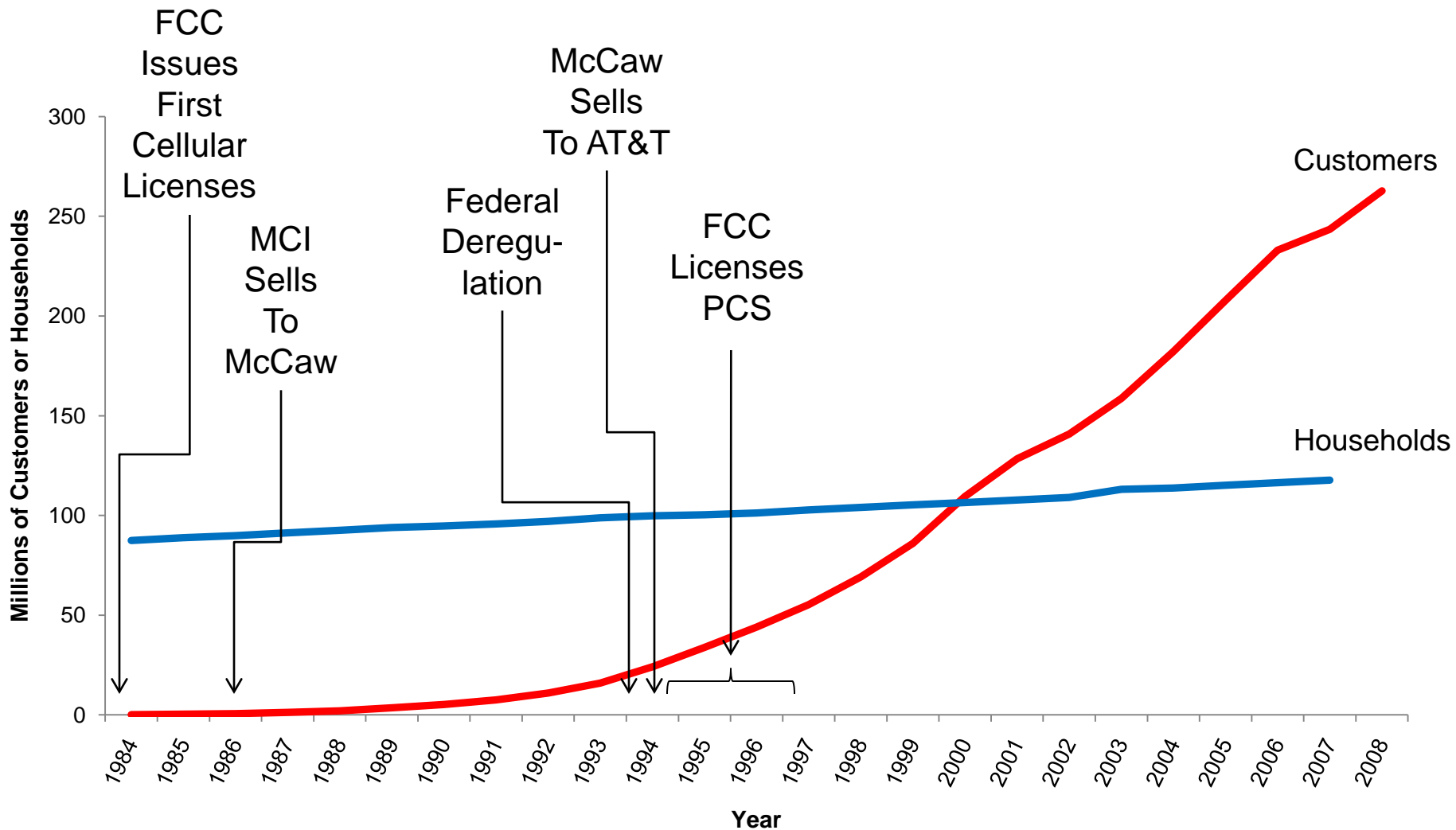
- Trying to determine who is a good provider
- How much paper was required to apply for the first FCC cellular licenses?
  - One company (Graphic Scanning) used two semi trucks to deliver its applications.
    - Graphic Scanning applied for a license in each of the first 30 markets
- FCC gets arbitrary. Then chooses lottery.



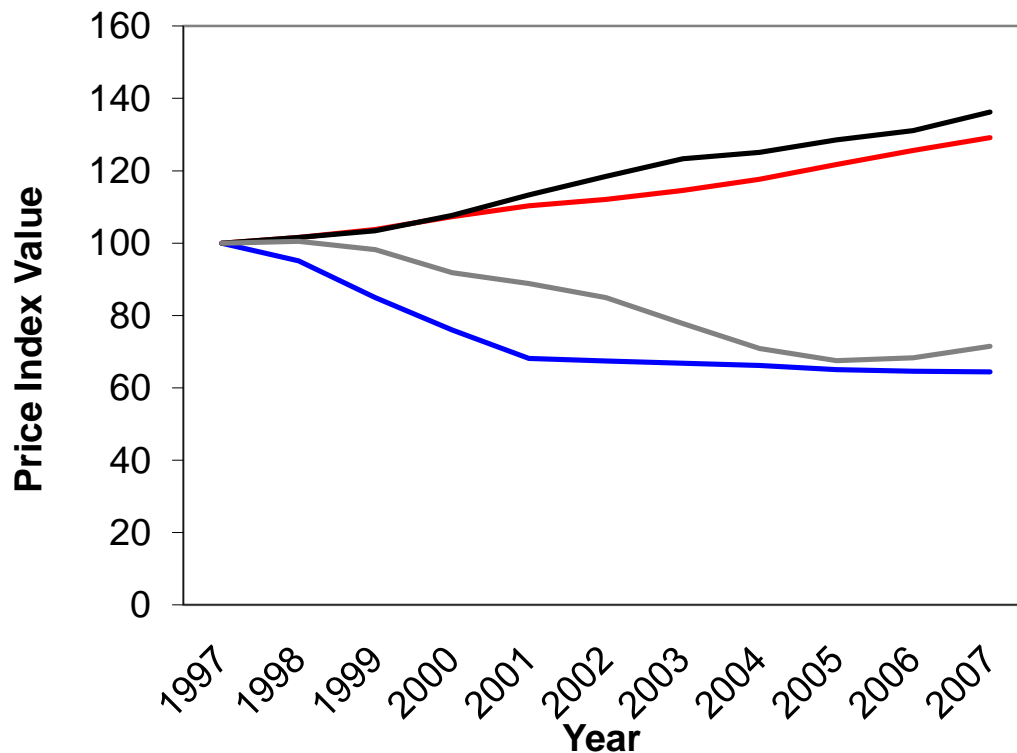


# Policy makers choose competition

- FCC decides to use auctions to license spectrum
- Federal deregulation in early 1990s
- FCC auctions PSC spectrum in mid 1990s
- Service grows



# U.S. Overall and Telecommunications CPIs, 1997-2007

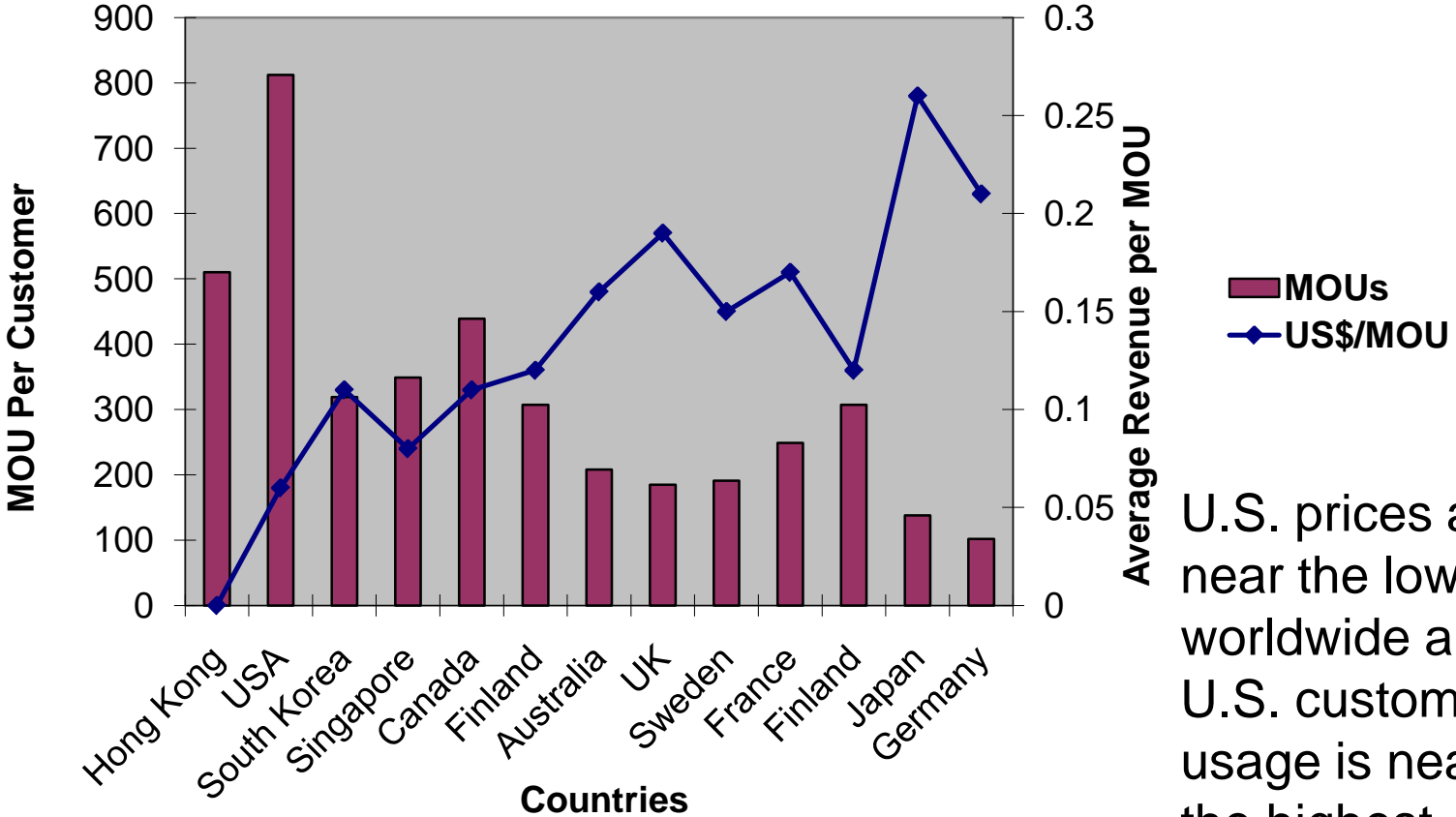


**Cellular leads all other telecommunications services in price declines in the U.S. since 1997.**

- CPI
- Cellular CPI
- Local Phone CPI
- Long Distance CPI



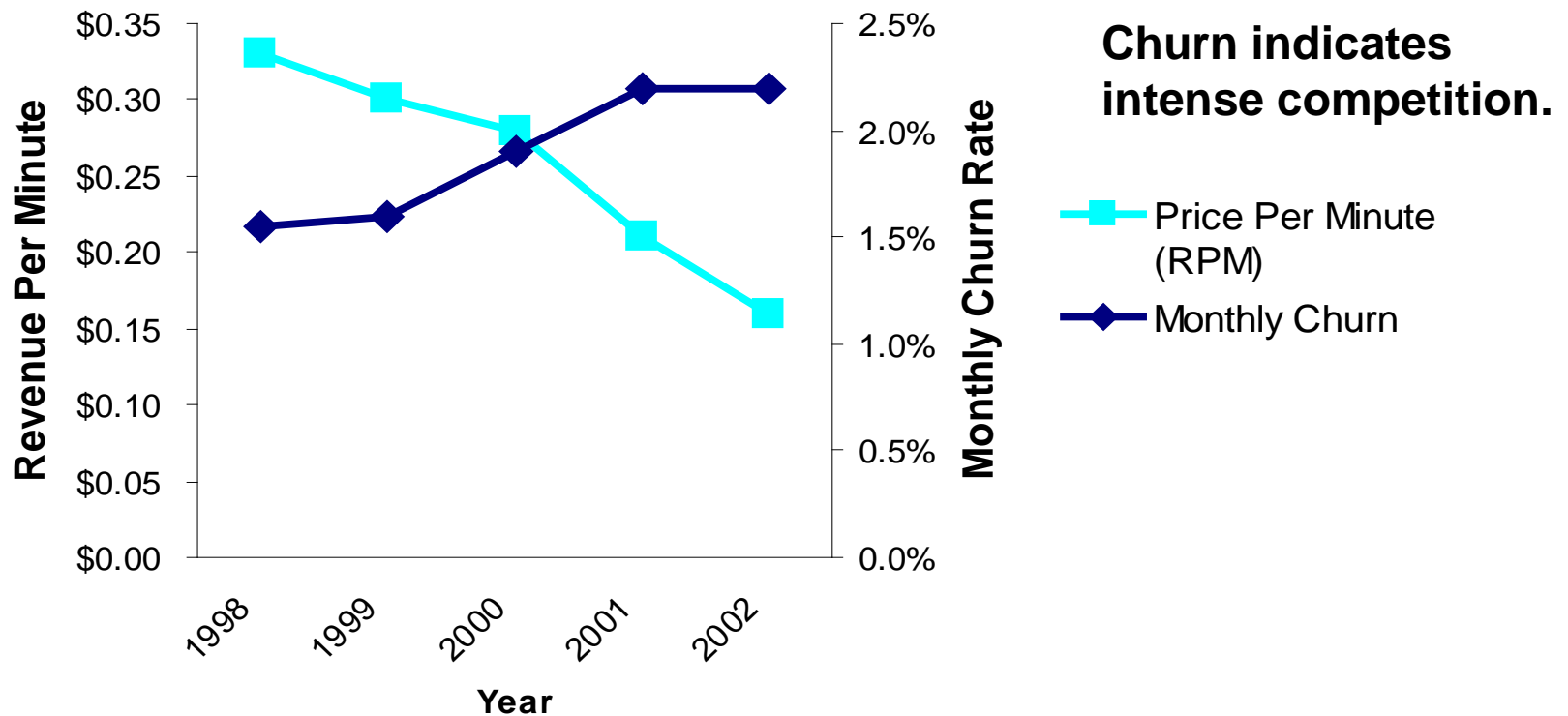
# Worldwide Usage and Prices



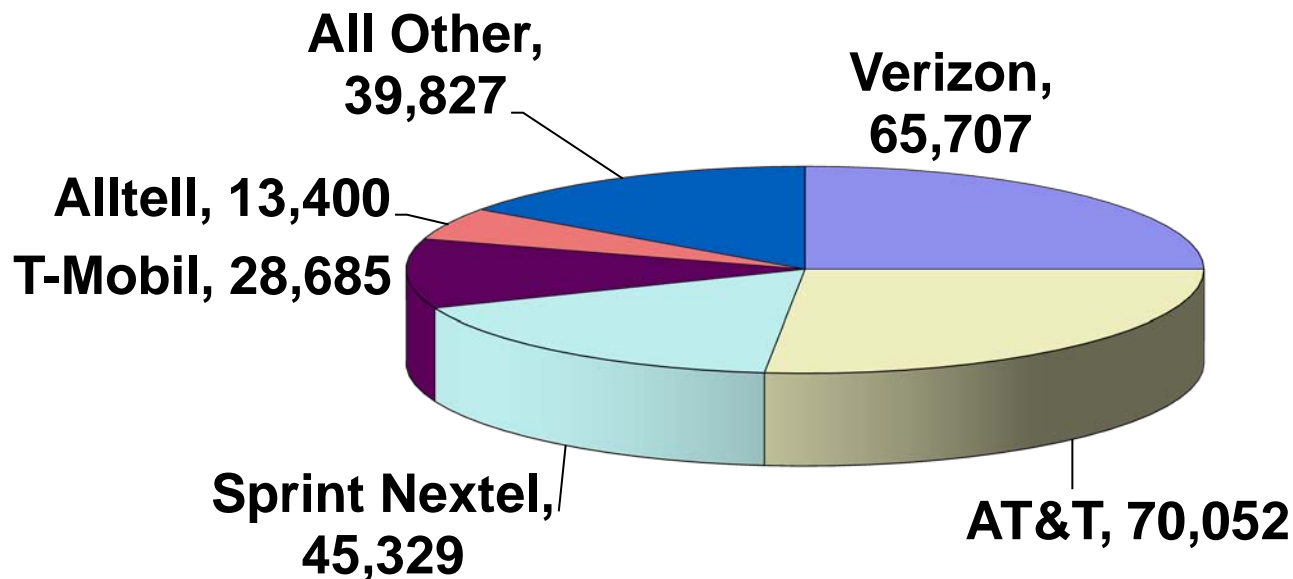
U.S. prices are near the lowest worldwide and U.S. customer usage is near the highest.

Source: FCC 12th Report

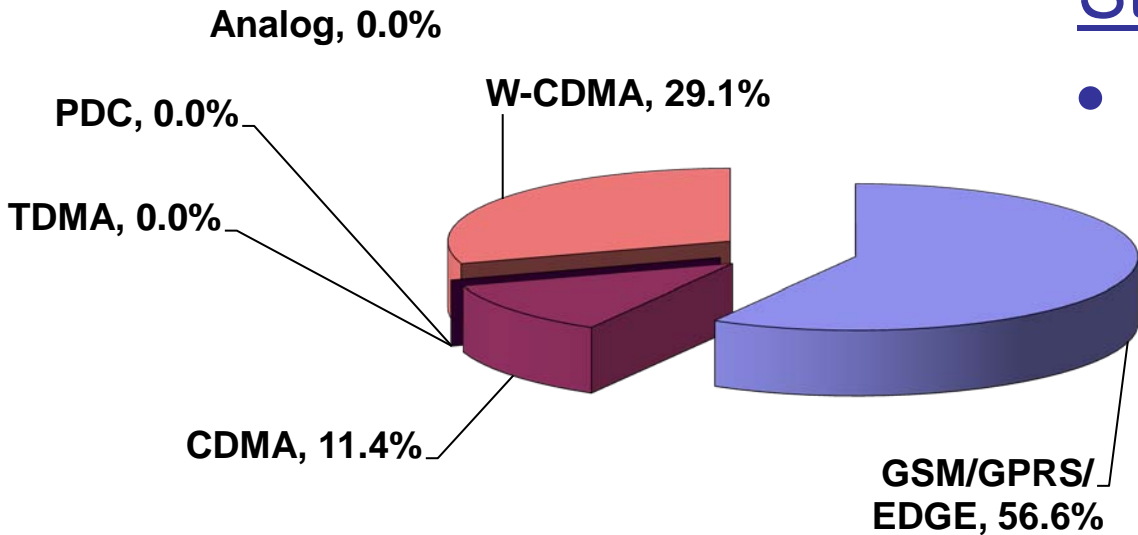
# U.S. Mobile Monthly Churn and Average Price, 1999-2002



# U.S. Mobile Subscribers by Operator, 2006 (000s)



# Mobile Subscribers by Technology Worldwide, 2013 Forecast



## Standards Competition

- Stronger incentive to expand networks
- Higher switching costs for customers

Over single technology



# Examples of Innovations

- Customized and Simplified Pricing
  - Menus of Options; Flat Rate Pricing; Sprint's Solution to Overages; Nationwide; International
- Intermodal features
  - Unified GUIs; e.g., Vodafone live!, Microsoft OS, Google wireless search
  - Interoperable features; e.g., IM, SMS
- Personalized mobile services; e.g., Qualcomm's MediaFlo, ESPN wireless, personal safety applications like uLocate



# Basic Lessons

- Regulatory delays in licensing cost customers and the industry
- Competition has been the most important driver of industry development
  - Market and price performance
  - Dynamics of Competition