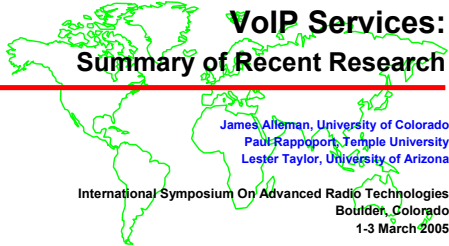


The Demand for Residential VoIP Services: Summary of Recent Research



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Paul Rappoport, Temple University
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International Symposium On Advanced Radio Technologies
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Agenda

- Overview
- Size of Market
- Demand for VoIP
- Simulations/Results
- Discussion/Cautions

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The Demand for VoIP

Overview

- What is VoIP?
- Who Wants to Buy VoIP?
- Market Factors

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The Demand for VoIP

Overview

- What is VoIP?
 - What it is not.
 - Packet switching

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The Demand for VoIP

What it is not

- Circuit Switching
 - Direct connection, opening a circuit.
 - Hang up, circuit is closed
 - Ten minute conversation
 - o 9.4 Megabytes
 - o Transmitted data wasted -- over 75%
 - o One talks the other listens

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The Demand for VoIP

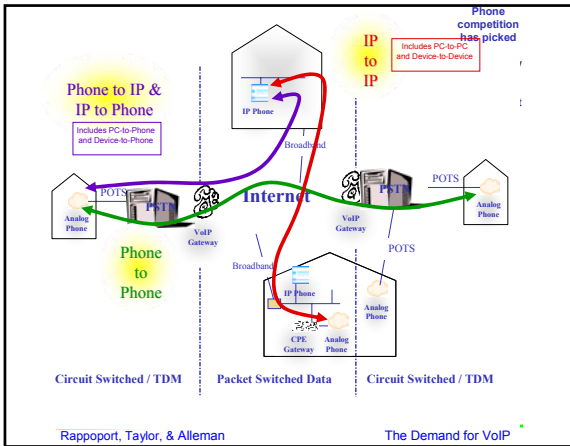
Packet switching - VoIP

- "Voice over IP (VoIP)
 - Protocols that transport real-time voice and signaling via Internet Protocol (IP)
 - Allows the user to place a call over IP networks

<http://www.personal.psu.edu/users/f/x/fxz122/project/voip.html>

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The Demand for VoIP



Overview

- **What is VoIP?**
- **Who Wants to Buy VoIP?**
 - Forrester Research Consumer Panel, 10 January 2005

Rappoport, Taylor, & Alleman

The Demand for VoIP

VoIP Market Off to a Slow Start

- **Adoption limited**
 - Only 23% of HH aware of VoIP
 - Less than 1% pay for VoIP
- **Weak Interest**
 - Less than 10% “interested” in VoIP

Forrester Research Consumer Panel, 10 January 2005

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The Demand for VoIP

VoIP Market Off to a Slow Start

- **Traditional Phone Service**
 - Satisfies most consumer’s price & quality needs
 - Most consumers are using local and LD enough to realize savings using VoIP
 - Consumers are not willing to give up their phone company

Forrester Research Consumer Panel 10 January 2005

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The Demand for VoIP

Profile of Current Users

- **Technically Proficient Users**
- **Users Younger & Mobile**
- **Users – Bargain Hunters**

Forrester Research Consumer Panel 10 January 2005

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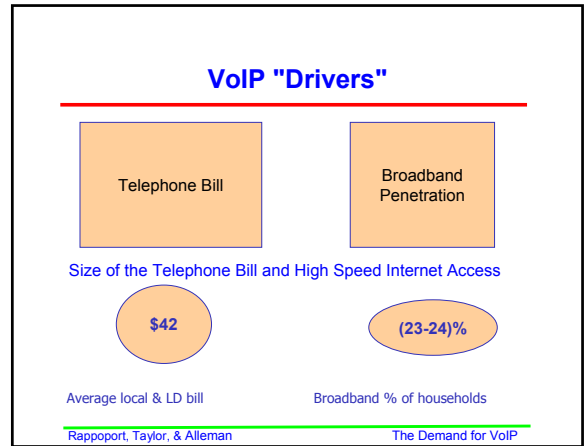
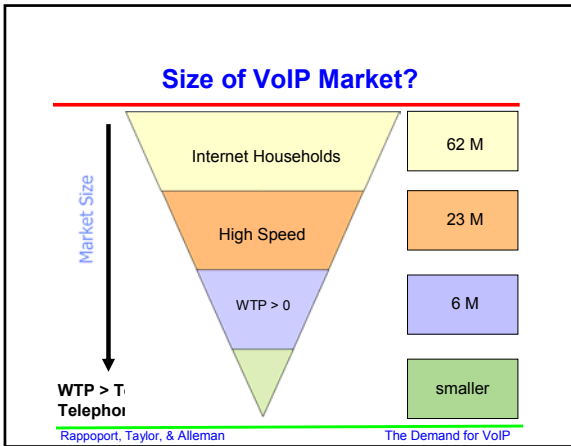
The Demand for VoIP

Overview

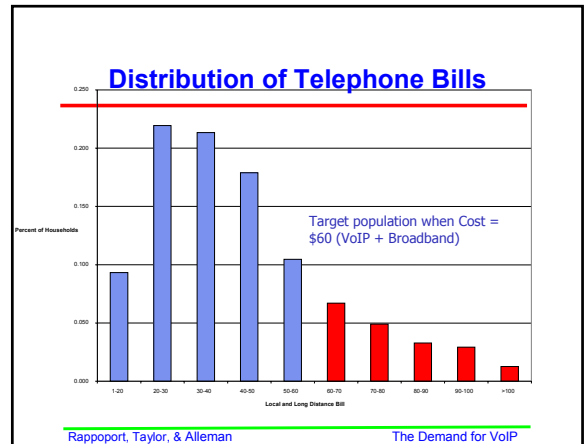
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- **Market Factors**
 - Relatively small market

Rappoport, Taylor, & Alleman

The Demand for VoIP



- ### Overview
- What is VoIP?
 - Who Wants to Buy VoIP?
 - Market Factors
 - Relatively small market
 - Distribution of Telephone Bills
 - o The Higher the Bill, the Larger the VoIP Benefit
- Rappoport, Taylor, & Alleman The Demand for VoIP



- ### Overview
- What is VoIP?
 - Who Wants to Buy VoIP?
 - Market Factors
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 - o The Higher the Bill, the Larger the VoIP Benefit
 - Key Driver: Broadband Growth
- Rappoport, Taylor, & Alleman The Demand for VoIP

- ### Key Driver: Broadband Growth
- Broadband Availability
 - Only for Best Practice VoIP
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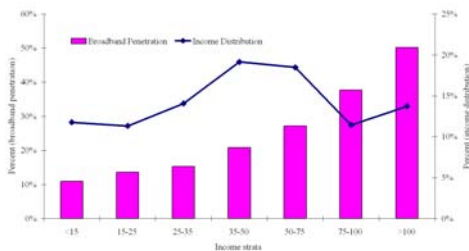
Key Driver: Broadband Growth

- **Broadband Availability**
 - Only for Best Practice VoIP
- **Broadband Growth Drivers?**
 - Content – Gaming – Entertainment – Shopping
 - Multimedia and video

Key Driver: Broadband Growth

- **Broadband Availability**
- **Broadband Growth Drivers?**
- **Price**
 - Discounting
 - Bundles
 - Triple Play (Voice – Video – Data)
 - Multimedia + Call Management

Distribution of Income & Broadband



Little room for broadband growth

Outline

- **What is VoIP?**
- **Who Wants to Buy VoIP?**
- **Market Factors**
- **Modeling Demand for VoIP**
 - Willingness to pay

Modeling Demand for VoIP

- **Focus on the Price**
 - Economic value bounded
- **Estimation of Price Elasticities**

Lognormal Demand Curves

- **Let:**
 - p_{i0} be the tolerance price of the i^{th} household
 - p be the actual market price
- **Then**
 - $q_i = 1$ if $p_{i0} > p$
 - $q_i = 0$ otherwise
- **Assuming that p_{i0} is distributed as a lognormal with parameters μ_p & σ_p^2**

Lognormal Demand

We have:

$$P(q_i = 1|p) = P(p_{io} > p) = 1 - \Lambda(p; \mu_p, \sigma_p^2)$$

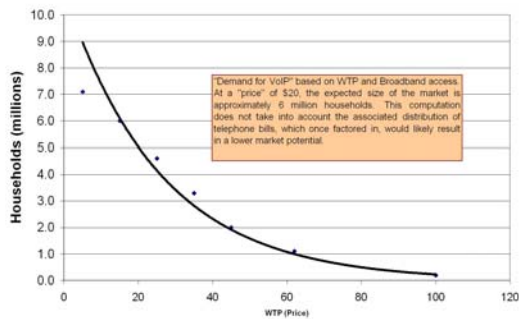
Let Q represent the proportion of buyers we have:

$$Q(p) = 1 - \Lambda(p; \mu_p, \sigma_p^2) \\ = \Lambda(1/p; \mu_p, \sigma_p^2)$$

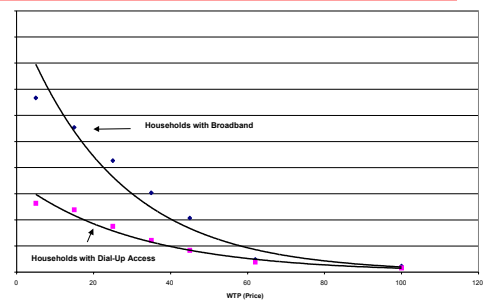
Data

- Sample of over 50,000 households from March, 2004
- Centris random digit dialing (RDD) omnibus survey
- Incorporated Willingness to Pay questions

Willingness to Pay for Voice-Over-IP



Willingness to Pay for Voice-Over-IP



Elasticities

WTP	Broadband Households	Non Broadband Households*
\$1-\$10	-0.20	-0.80
\$11-\$20	-0.59	-1.12
\$21-\$30	-0.98	-1.44
\$31-\$40	-1.37	-1.76
\$41-\$50	-1.76	-2.08
\$51-\$75	-2.54	-2.72

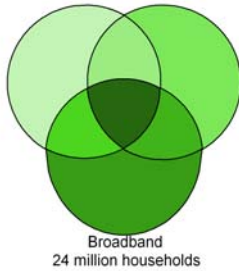
* Assuming \$20 month for broadband

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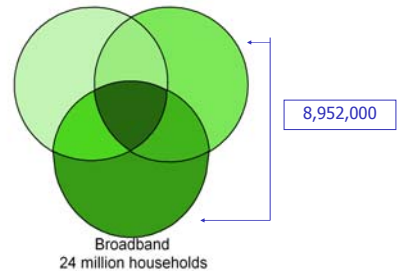
Market Potential I

Price (WTP) <\$40 12 million households Telephone bill >\$40 about 41 million households



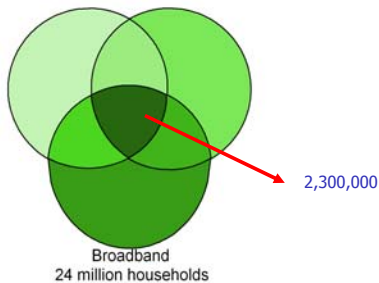
Market Potential II

Price (WTP) <\$40 12 million households Telephone bill >\$40 about 41 million households



Market Potential III

Price (WTP) <\$40 12 million households Telephone bill >\$40 about 41 million households



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Discussion/Cautions

- Price Matters
- Broadband Penetration Matters

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- Broadband Penetration Matters
 - Focusing simply on "interest in VoIP" leads to significant over estimation of market size

Discussion/Cautions

- **Price Matters**
- **Broadband Penetration Matters**
 - "interest in VoIP" leads to over estimation of market size
 - Relationships between "price" & the distribution of telephone bills & between "price" & the distribution of income important

Discussion/Cautions

- **Quality of service not addressed**

Discussion/Cautions

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- **Potential regulatory rulings not incorporated into WTP**

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- **RBOC responses not incorporated (e.g. Verizon's Freedom plan)**
- **ALL OF WHICH WILL LEAD TO LOWER ESTIMATES**