Measuring the Economic Impact of Broadband

William Lehr
Massachusetts Institute of Technology
wlehr@mit.edu

with
Robert Crandall  Robert Litan
AEI-Brookings

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Outline: Economic Impact of Broadband

- Results
- Why measuring economic impact is difficult
- Further thoughts and challenges
Growth in \( Y(t) = f(BB \text{ penetration, other variables}) \)

\( Y(t) \): Jobs, GDP

BB penetration = lines per capita

Other variables/controls
- Temperature (mean 1971-2004, °F)
- Tax Climate Index (1-10, higher is lower burden)
- Unionization (% labor force unionized)
- Education (% population college grads)
- Wage (average hourly earnings)
- Regional dummies (9 Census)

-- for state-level panel data set 2003-2005 (48 states)
-- non-farm, 2-digit industrial sectors
1% increase in BB penetration results in 0.2-0.3% higher job growth over one year, or ~300k additional jobs.

Impact strongest in service sectors (finance, education, healthcare) and manufacturing.

Impact on GDP positive, but not statistically significant.
## Measuring Broadband’s Economic Impact

From 1999 to 2002, American communities with broadband access did significantly better than those without.

By William H. Lehr, Carlos A. Osorio, Sharon E. Gillett ■ Massachusetts Institute of Technology
Marvin A. Sirbu ■ Carnegie Mellon University

<table>
<thead>
<tr>
<th>Economic Indicator</th>
<th>Results (controlled comparisons at zip code level)</th>
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<tbody>
<tr>
<td>Employment (Jobs)</td>
<td>BB added about 1-1.4% to growth rate 1998-2002</td>
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<td>Wages</td>
<td>No statistically measurable impact observed by 2002</td>
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<tr>
<td>Housing Rents (Proxy for Property Values)</td>
<td>More than 6% higher in 2000 where BB available by 1999</td>
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<tr>
<td>Business Establishments (Proxy for Number of Firms)</td>
<td>BB added about 0.5-1.2% to growth rate 1998-2002</td>
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<tr>
<td>Industry Mix</td>
<td>BB added about 0.3-0.6% to share of establishments in IT-intensive sectors, 1998-2002&lt;br&gt;BB reduced share of small (&lt;10 employees) establishments by about 1.3-1.6%, 1998-2002</td>
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--- Zip-code level panel (22k)<br>--- 1998-2002<br>--- Job, firm growth<br>--- (no measure of output)
Positive impacts consistent with other research: Information Technology yields significant excess returns!


Fuss and Waverman (2006): 60% of the slower productivity growth experienced by Canada (relative to US) in 2003 attributed to less intensive ICT use.


ETCetera…..
Why is it hard to measure economic impact broadband?

Broadband is infrastructure
- used to produce other goods/services
- spillover/multiplier effects produce un-measured benefits
- impact greatest in service sectors, which hard to measure

Broadband changes the way businesses operate, people live/work
- eCommerce, telecommuting, telemedicine, on-line education…
- restructures value chains (new firms, new skills needed)
- such changes take time (4.5% in 2001, 19.6% in 2006)

Broadband is a moving target
- Rapid innovation => rapid economic depreciation
- What is BB and how used changes over time
- Benefits depend on complementary inputs (PCs, network services, etc.)

Broadband data is not readily available
- Deregulation and growth competition => less public data
- Observe availability, but not adoption
- Broadband is local. Local context matters.

Broadband causality difficult to infer
- Does BB follow or produce growth?
- Is BB consumption or investment good?
Broadband access: what do we expect?

**Speed?**
- 0B: 50kbps
- 1B: 500kbps
- 2B: 5Mbps
- 3B: 50Mbps
- 4B: 500Mbps (?)

**Coverage?**
- Universal availability
- (similar service quality?)

**Services?**
- Voice (telephony)
- Video (TV)
- Data
  - Web
  - eMail
  - eCommerce
  - Gaming
  - Chat/Blog
  - Streaming video
  - P2P sharing

**Characteristics?**
- Always on
- Symmetric
- 3rd Party Apps
- Open platform

**Price?**
- No higher than today
  (~$100/mo triple play)
- Telephone, free?
- Data $20-30/month
- Video ??

**Consumer choice and competition?**
- $Billions in new investment
- Industry restructuring and entry
- New technologies/business models
Further observations on the broadband future

Broadband is the future of the Internet…
-- Rich interactive, multimedia content & communications
-- Imagine Google, YouTube, MySpace, Facebook, …. without BB
-- Imagine a business w/o BB, or if you have at home, going w/o
-- It’s an information, service economy
-- Entire ICT value chain depends on it
  chips -> computers -> net services -> applications + content

Broadband data will become more problematic to track
-- Already >80-90% availability, so need adoption data to measure
-- Once saturates will need usage data
-- Quality of BB? Customer choice (competition)?
Conclusions and future research

- Broadband appears to have positive measurable economic impact
  - Consistent with expectations, investment, and policy (whew!).

- Causality: Does BB follow economic growth or cause it?
  - Results stronger than expected (e.g., employment growth)
  - Are instruments used adequate econometric controls?

- Many more interesting questions remain to be answered…
  - What is impact on composition of employment (wages)? industry (investment, profitability?)
  - How does BB change behavior (firms, workers, consumers)?
  - How does public policy affect BB and its impact?
  - How does impact of BB vary with:
    - Technology: DSL/Cable v. WiFi v. FTTx
    - Business model: Open access? Competition?
    - National (regional) policies/demographics: Korea v. Europe v. US?
THANKS for your attention!

“I’m not going to shoot the messenger, but I’m also not going to renew his grant.”

Source: New Yorker magazine, May 1, 2006

Questions/comments
email: wlehr@mit.edu  web: http://csail.mit.edu/~wlehr

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