BEAs ICT Prices: Historical Analysis and Future Plans

Dave Wasshausen
BEA Advisory Committee Meeting
Suitland, MD
May 12, 2017
Historical Overview: BEA ICT Prices

• BEA’s collaborative work with IBM 1980s
  – Experimental PPIs in the late 80s

• Semiconductors 1990s

• PCs late 1990s

• Photocopying equipment early 2000s

• Software early 2000s
  – Purchased and own-account (function points)
## BEA Computer Prices

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Multiuser Computers</strong></td>
<td>BEA Hedonic Index (Speed, capacity &amp; chip density)</td>
<td>BLS PPIs (Large scale; Mid-range)</td>
<td>BLS PPI (Host computers, multiusers)</td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imported</td>
<td>BEA Hedonic Index (Speed, capacity &amp; chip density)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td>BEA Matched-Model</td>
<td>Experimental PPIs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imported</td>
<td>BEA Matched-Model</td>
<td>BLS PPIs and MPI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td>BEA Hedonic Index (Dot matrix, line, laser &amp; ink jet)</td>
<td>BEA Hedonic Index and BLS PPIs (Impact printers; laser printers; ink jet printers)</td>
<td>BLS PPI (Computer peripheral eq)</td>
<td></td>
</tr>
<tr>
<td>Imported</td>
<td>BEA Hedonic Index (Dot matrix, line, laser &amp; ink jet)</td>
<td>BEA Hedonic Index and BLS MPI (Printers)</td>
<td></td>
<td>BLS MPI (Computer acc., perip.&amp;parts)</td>
</tr>
</tbody>
</table>
BEA Multiuser Computers Price Index

<table>
<thead>
<tr>
<th>Period</th>
<th>BEA</th>
<th>PPI Large</th>
<th>PPI Mid</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993-1998</td>
<td>-26.8%</td>
<td>-6.7%</td>
<td>-13.5%</td>
</tr>
<tr>
<td>1999-2009</td>
<td>-18.5%</td>
<td>-19.4%</td>
<td>-17.6%</td>
</tr>
</tbody>
</table>
## Communications Equipment Price Index

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>42%</td>
<td>BR S PPIs</td>
<td>FRB prices</td>
<td>-2.0%</td>
</tr>
<tr>
<td>Wireless comm. eq.</td>
<td>5%</td>
<td></td>
<td></td>
<td>-7.2%</td>
</tr>
<tr>
<td>Wired data comm. apparatus</td>
<td>1%</td>
<td></td>
<td>BLS PPIs</td>
<td>-12.6%</td>
</tr>
<tr>
<td>Other wired comm. apparatus</td>
<td>2%</td>
<td></td>
<td></td>
<td>-9.0%</td>
</tr>
<tr>
<td>Telephone switchboard eq.</td>
<td>1%</td>
<td></td>
<td></td>
<td>-7.4%</td>
</tr>
<tr>
<td>Other*</td>
<td>33%</td>
<td></td>
<td>BLS PPIs</td>
<td>-0.3%</td>
</tr>
<tr>
<td>Imported</td>
<td>58%</td>
<td>BR S MPIs</td>
<td>FRB prices</td>
<td>-6.7%</td>
</tr>
<tr>
<td>Wireless comm. eq.</td>
<td>40%</td>
<td></td>
<td></td>
<td>-7.2%</td>
</tr>
<tr>
<td>Wired data comm. apparatus</td>
<td>1%</td>
<td></td>
<td>BLS MPIs</td>
<td>-12.6%</td>
</tr>
<tr>
<td>Other wired comm. apparatus</td>
<td>3%</td>
<td></td>
<td></td>
<td>-9.0%</td>
</tr>
<tr>
<td>Telephone switchboard eq.</td>
<td>1%</td>
<td></td>
<td></td>
<td>-7.4%</td>
</tr>
<tr>
<td>Other**</td>
<td>13%</td>
<td></td>
<td>BLS MPIs</td>
<td>-4.1%</td>
</tr>
</tbody>
</table>

AAGR: Average annual growth rate
Red denotes imputed value
* Includes search, detection and navigation instruments as well as installation/engineering services.
** Includes television receivers and broadcasting related equipment.
BEA Communications Equipment Price Index
### BEA Software Price Indexes

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepackaged</td>
<td>BEA Hedonic Index and Oliner &amp; Sichel Matched Model</td>
<td>BEA Matched-Model</td>
<td>BLS PPI with BEA Adjustment</td>
</tr>
<tr>
<td>Custom and Own Account</td>
<td>Input-Cost Measure (75%) + BEA Prepackaged Price Index (25%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- BEA adjustment for prepackaged software reflects historical differences between BEA hedonic and various matched-model price indexes.
- Input-cost measure includes compensation and intermediate inputs (including depreciation)
BEA Prepackaged Software Price Index

PPI for software maintenance and tech support: 0.9% AAGR

PPI for applications software: 0.5% (Currently used)

PPI for software, except games: -0.5% (Plan to use)

BEA prepackaged software price: -2.6%
BEA Custom Software: Price, Quantity & Expenditure

Custom software price index: 0.6% AAGR
Quantity index: 8.6%
Expenditure index: 9.2%
Recent focus and looking forward

- Recent focus on harmonizing accounts with international guidelines and promoting international consistency
  - Capitalizing intellectual property products
  - New satellite accounts (healthcare, arts and culture)
  - Supply-Use framework

- Increased integration of the national accounts
  - Integrated industry-level production account (BLS)
  - Integrated macroeconomic accounts (FRB)
  - Harmonized Quarterly GDP by Industry and by state

- Renewed emphasis on improving quality adjusted prices for information and communication technology products.
  - Digital Economy work with NTIA and ESA
  - Motivated by recent research
• Almost $270 billion in fixed investment in 2015
• Prices primarily reflect input-costs
• Recently purchased an extensive database tracking prices, functionality, and quality
• 8000 observations, spanning years 2006-2014
• Average annual rate of decline of price per FP is about 5%
Average Price Per Function Point

Telecommunications Industry

- $/FP
- Trendline

Year: 2006 to 2013
• Incorporating the more representative PPI for software excluding games beginning with the 2017 annual update

• BEA adjustment is old and will be updated with the 2018 comprehensive update
Looking Forward: Communication Eq

- Continue conferring with BLS and FRB
  - Plan to pick-up FRB price analysis

- As part of 2012 I-O Benchmark, update deflation-level categories to more closely align with current products
Looking Forward: Medical Equipment

• Private fixed investment in electro-medical equipment almost $50 billion

• Rapid rates of product innovation

• Initial analysis suggests that prices for imaging equipment range from about -25% per year for MRI and CTSCAN machines to about -10% per year for ultrasound machines.

Source: Authors’ calculations based on ECRI data
Source: Authors’ calculations based on ECRI data
Looking Forward: Wireless Services

Annual Minutes, Messages and Megabytes of Wireless Traffic

Billions of MOUs / Messages / MB

- 9.6 trillion MBs
- 218 billion MMS
- 1.9 trillion text messages
- 2.9 trillion minutes of use

Source: CTIA

Materials may not be reproduced or photocopied in any form without written permission from CTIA
© 2016 CTIA-The Wireless Association®
Looking Forward: Wireless Services

[Graph showing trends in wireless services with lines representing different categories: Real PCE-Cell, quantity index, CTIA's Minutes of use, messages, and MB, and Subscriber connections (CTIA).]
Conclusion

• Improving BEA ICT prices is a high priority

• Current and future activities:
  – Research and development
  – Collaboration
    • Efficient use of resources
    • Joint products and papers