Discussion of: Improving ICT Deflators in the National Accounts

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Summary

- Ana reported on BEA plans for new work on prices for three major ICT segments:
  - software (products and custom-produced)
  - wireless cell services and cell phones
  - medical equipment
- Dan’s work on will enable BEA to improve quality adjustment for PCs and tablets.
  - BEA’s current estimates imply no quality change since 2009 (chart)
- Tablets and cell phones currently are not featured components of private investment in BEA’s national accounts.
- These are solid, targeted plans.
Figure: Personal Computer Price Change, 1996 to 2014

Source: IDC, Inc.; Bureau of Economic Analysis
• Consider the recent wave of IT change, which centers on broadband, mobile and cloud technologies + a resurgence of high-speed computing techniques (parallel and grid computing).

• Where to find these developments in national price statistics?

• Many recent developments will appear as falling prices for ICT services
  • For example, within telecom, using data from *Telegeography*, Byrne and Corrado (2016) found that prices for *enterprise* fixed broadband services fell 8.2 percent per year since 2006.
  • By contrast, Corrado and Ukhaneva (2016) found hedonic prices for *residential* fixed broadband to be about flat since 2010 in the United States.
• With regard to cloud and related ICT services, Byrne and Corrado (2016) offer arguments implying these prices should fall no slower than the rate of decline in ICT asset prices.
  • Press reports suggest that cloud computing and storage services are falling very fast (in the 20 to 30 percent per year range) although such services usually are purchased along with software services, which in all likelihood would substantially moderate overall declines.
  • Note, total cost of cloud services (from purchasers’ perspective) includes high-speed broadband (WAN and LAN) services
• => Take stock of standard ICT asset price measures—computers, communications equipment, and software.
Investment perspective

ICT and software component shares

(a) ICT investment component shares
(b) Software investment component shares

Note. Investment excludes software products R&D.
Relative to computers, research on communications equipment prices has been limited.

Byrne and Corrado (2015) attempted to fill that gap by developing price indexes for 14 detailed product classes of communications equipment from 1963 on, including cell phones and the equipment that power high-speed broadband networks.

They found these prices fell at a relative steady pace since 1985: between 12 and 18 percent per year over the last decade.

And when these and prices for other components of communications equipment (e.g., broadcast and video equipment) are fed into an aggregate price index for communication equipment investment, real prices fall 10-1/2 percent per year from 2004 on (6 ppts faster than BEA’s price index).
Multiuser computers

- Research on PCs has been plentiful, but less attention has been placed on servers and other multiuser computers (MCs).
- Multiuser computers are divided into three classes—mainframes, servers, and supercomputers—because each plays a distinct role in the IT ecosystem.
  - To our knowledge, BEA has not conducted research on mainframes since the early 1990s, but they remained a significant class of MCs until relatively recently (2010/2012).
  - Also to our knowledge, supercomputers are not reflected in the US national accounts although according to Gartner estimates, US supercomputers currently account for 5-10 percent of MC spending (of which we estimate 1/3 are government computers and 2/3 are industrial).
- Servers are apparently the sole focus of the PPI, which BEA incorporated in the US national accounts in the late 1990s.
Figure: Alternative Server Price Indexes (percent change), 1993 to 2014

Note—Performance adjusted unit value uses SPEC benchmarks for Intel Xeon processors from 2002 on and the price per megaflop metric reported Hilbert and Lopez (2011) before that. The Byrne-Corrado series blends this performance indicator with the PPI, assigning a 1/3 weight to the PPI.
Many new software products have entered the market in the last ten years (chart).

Past research focussed on PC applications. Enterprise applications and systems software are understudied.

BLS does not publish all the data that it collects due to disclosure issues. In particular, a price index for systems software, one locus of recent innovation as cloud technologies become commoditized, is not published.

- The implied BLS systems software price index falls, whereas the BLS applications software index rises.
... especially in the business intelligence/data analytics space

Source: Matt Turck, FirstMark Capital. The Conference Board
Conclusions

- BEA was a leader in conducting research on ICT prices and in incorporating academic research price indexes through roughly the early 2000s.
- With regard to E&S investment, besides introducing new work that captures aspects of the most recent change, a thorough review of history also is warranted, e.g. (a partial list):
  - Communications equipment. A new index starting in 1947 is warranted.
  - Prices for desktop and laptop PCs from their inception to 2002 should be reviewed in light of Berndt and Rapport (2003).
- BEA is targeting many of the key areas in need of new work (especially software).
  - ... although I also suggest a fresh look at fixed broadband.
  - Enterprise broadband services (VPN, private lines, etc.) are distinct from consumer and “ordinary" commercial internet access services.
Declines in ICT asset prices are understated

Note: Real ICT asset price change is relative to the GDP deflator, in percentage points.
Thanks.


• “Prices for Communications Equipment: Rewriting the Record” (with Dave Byrne). September 2015. FEDS 2015-069.”