Accounting for Innovation in Consumer Digital Services

David Byrne\textsuperscript{a} and Carol Corrado\textsuperscript{b}

\textsuperscript{a}Federal Reserve Board

\textsuperscript{b}The Conference Board and Center for Business and Public Policy, McDonough School of Business, Georgetown University

Measuring and Accounting for Innovation in the 21st Century, NBER/CRIW Conference, Georgetown University, March 10-11, 2017
Slow productivity a puzzle from consumer digital point of view...

A CONSUMER’S JOURNEY TO CONTENT DISCOVERY

Source: Nielsen
Household digital network use has increased dramatically since 2000

(a) Broadband Use

(b) Mobile Device Use

(c) Prevalence of Telework
Questions addressed in paper:

- Does capitalizing consumer ICT goods help to capture the ongoing digital transformation of the economy?
- Does accounting for their intensity of the use change the story?
- Can we capture quality improvements in digital ICT capital services consumed by households?
• Relabeling household consumption as investment doesn’t change GDP
• But imputing service flows from that capital raises GDP, and its relatively big
• + there’s an extra kick to productivity b/c ICT output experiences relative price declines
Results: New research price index for PCE ICT investment goods

Declines in official digital goods asset prices are understated after 2000

Source. Bureau of Economic Analysis (official).
Results: Nominal Services, no utilization adjustment

- Relative growth in capital services through 2009.
- Investment has leveled off.
- Combined with price index shown in previous chart, real services growth averages nearly 20 percent per year.

Consumer digital goods investment and capital services
Results: Utilization

Estimates based on decomposing payments for digital access services according price per users/households (average price) vs intensity of use (volume), e.g., IP traffic.

(a) Drop in underutilization (diff log)

(b) Implied utilization, 2015=1
• Contribution to GDP growth **accelerates** 1/4 percentage points over the 2000 to 2015 period.

**Contribution to real GDP growth**
Implications for GDP—including implied volume of digital access services

- Contribution to GDP growth much larger over the 2000 to 2015 period.
- Contribution peaks in 2012.
Boundary expansion: The slowdown in labor productivity growth in the 2000’s does not necessarily imply that growth in consumer living standards has deteriorated (one-for-one).

Existing measures of digital goods and digital access services likely mismeasured.