

Highlights and Challenges of Measuring the Digital Economy



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Highlights and Challenges



The “digital economy” has various meanings, and presents measurement opportunities and challenges...

- Digital economy satellite account
- Measurement of the price and volume of digital goods and services in quality-adjusted terms
- New digital (intermediary) services, such as ride-sharing and other aspects of the “sharing economy”
- “Free” internet services supported by advertising and marketing arrangements

Toward a Digital Economy Satellite Account



- Supported through a reimbursable agreement with the National Telecommunications and Information Administration
- Consistent with OECD Advisory Group’s work on “Measuring GDP in a Digitalized Economy”
- Goals for the project:
 - Define the digital economy and capture its contribution to growth
 - Improve measures of high-tech goods and services
 - Update and improve information on digital economy
 - Provide more complete picture of international trade
 - Provide more information on e-commerce

Working Definition of the Digital Economy



- “The goods and services that serve as the basis for or that use information and communications technologies and computer networks to facilitate production and consumption.”
- Preliminary Results:
 - Digital economy about 6% of current dollar GDP in U.S. from 2009-2015;
 - 3.5 % real growth on average; .22 contribution to 2.2 percent GDP growth
 - Economic activity that can be considered “100 percent digital” (e.g., sharing economy not yet separately identified)

Digital infrastructure is the basic physical materials and organizational arrangements that support the existence and use of computer networks, which are the foundation of the digital economy.

This includes:

- Computer hardware
- Software
- Telecommunications equipment and services
- Connected devices
- Support services

E-Commerce



Broad term used to describe all transactions involving the purchase and/or sale of goods and services that occur over computer networks and includes:

- Business to business e-commerce, including manufacturing and wholesale e-commerce;
- Business to consumer e-commerce, including retail;
- Peer-to-peer (P2P) transactions, or what is sometimes referred to as the 'sharing' or 'on-demand' economy, which involve the exchange of goods and services between consumers facilitated through a digital application.

Digital Media

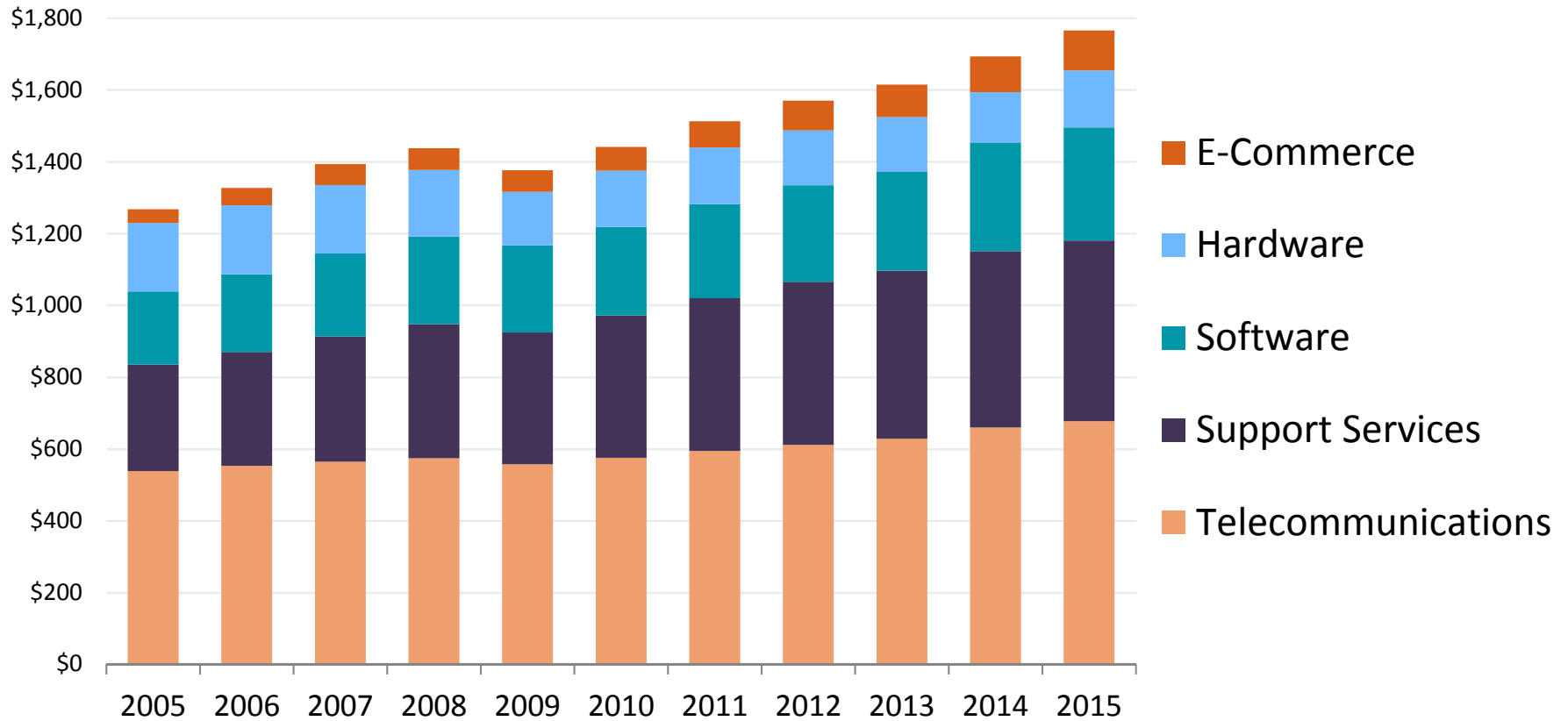


Digital media consists of content that is created, accessed, stored, or viewed on digital devices. It includes products that are intended to inform, educate, or entertain people.

Nominal Gross Output—Composition



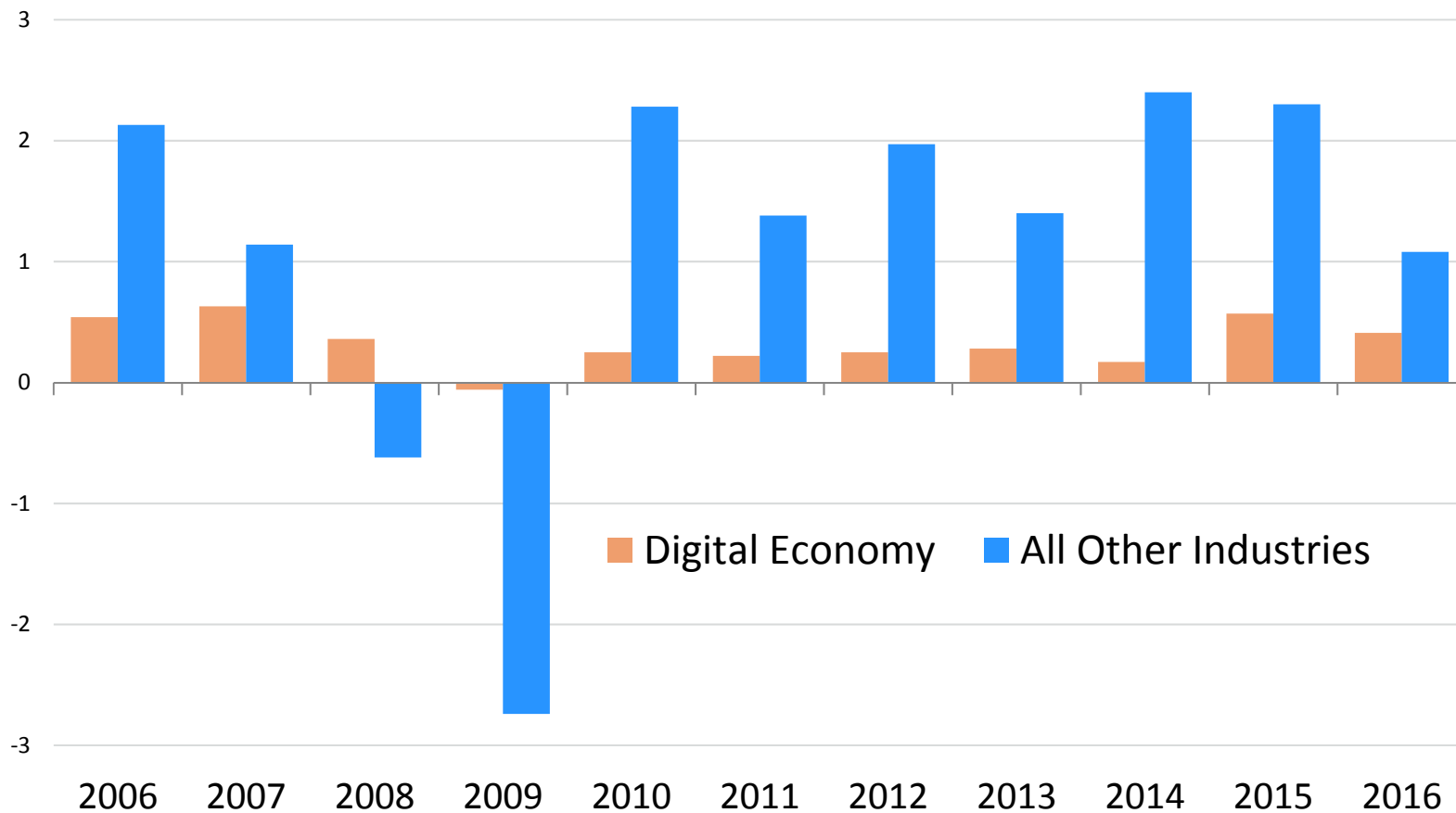
Nominal Gross Output (\$Billions)



- Digital economy gross output increased on average about 3.2 %—outpacing economy-wide growth of 2.9 % over period

Contributions to GDP Growth

Real Value Added

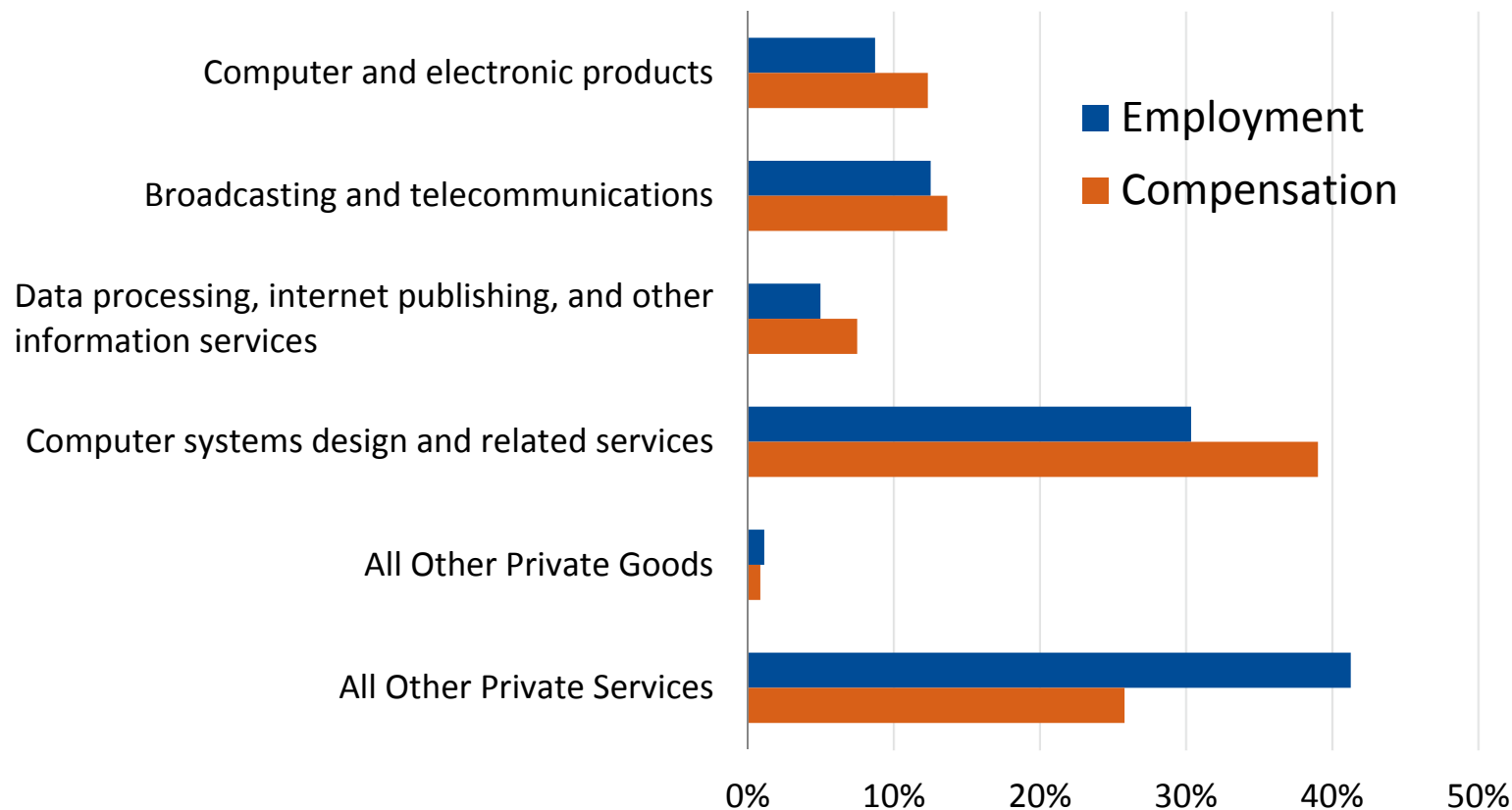


- The digital economy contribution to GDP was 0.46 percentage point in 2015

Employment and Compensation



Industry Share of Digital Economy's Employment and Compensation in 2016



- Digital economy employment totaled 6.6 million; compensation totaled \$588.7 billion

Toward a Digital Economy Satellite Accounts—Next Steps



- Circulate preliminary paper (December 2017/January 2018)
 - Adding data through 2016
- Contribute to ongoing work of the OECD Advisory Group on “Measuring GDP in a Digitalized Economy”
 - Early stages on the Advisory Group
 - First in-person meeting held in November 2017
- Advance research on:
 - Infrastructure: Prices for digital goods and services
 - E-commerce: Sharing economy
 - Digital media: “Free” digital content
 - Extensions beyond GDP (e.g., wellbeing)

ICT Price Measurement and Recent Changes in the Digital Economy



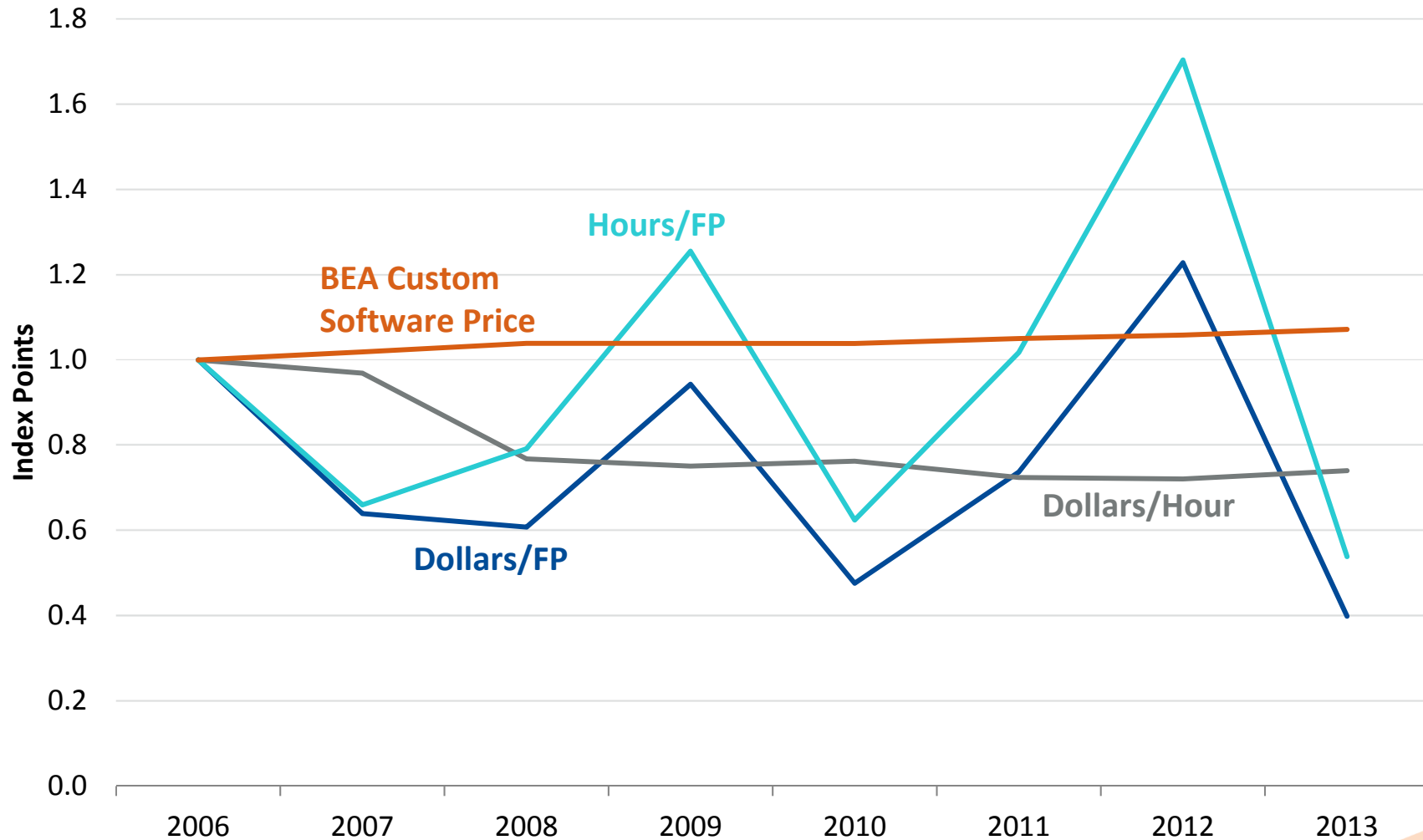
- Decreasing share of traditional desktop, laptop computers
- Growing importance of mobile equipment and services
 - Smartphones, tablets, wireless data service, Wi-Fi
- Growing importance of computing services
 - “Cloud” services, distributed computing
- Growing importance of other “tech” equipment:
 - Communications equipment, electro-medical equipment, instruments

Improving ICT Price Indexes

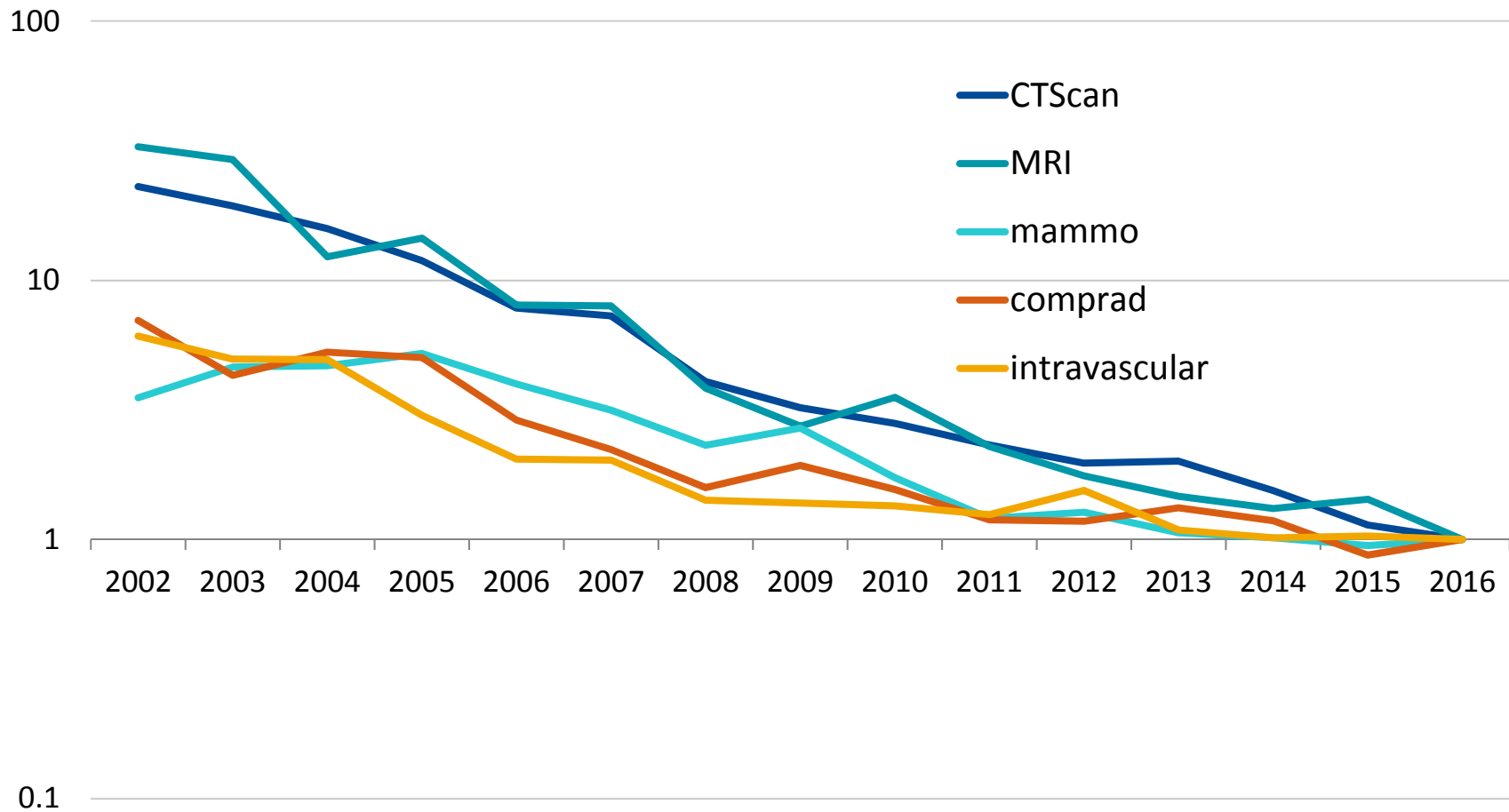


- BEA is studying new data sources to improve the way we measure digital goods and services:
 - Software
 - Enterprise
 - Custom/Inhouse ~ \$220B
 - Consume
 - Personal computers
 - Servers
 - Smart phones ~ \$40B
 - Cloud services
 - Medical equipment / Imaging equipment ~ \$40B

Function Points Database to Explore Quality-Adjusted Price Indexes for Custom Software



Matched Model Price Indexes for Medical/Imaging Equipment



Source: Authors' calculations based on ECRI data

How Big is the Sharing Economy?



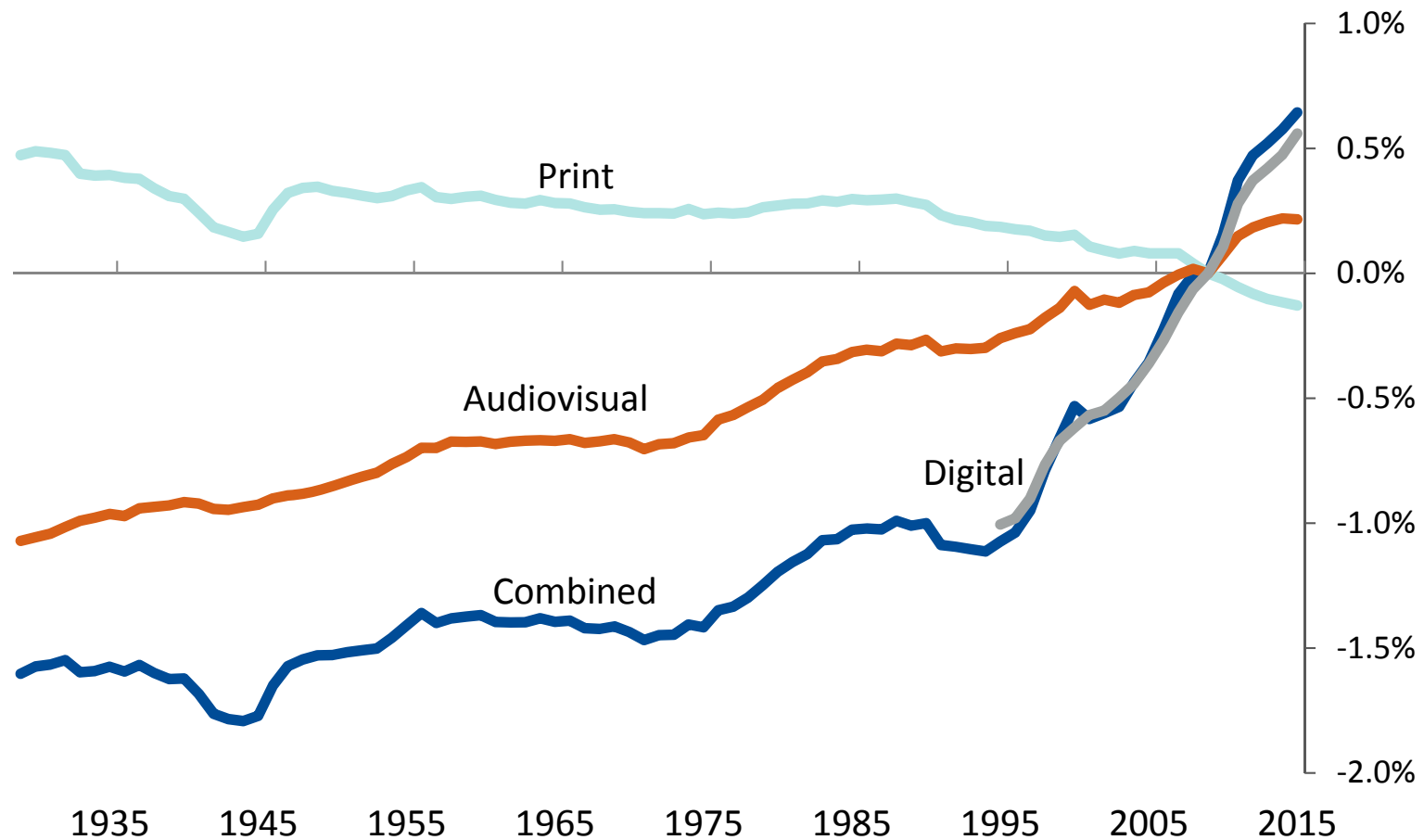
- Considerable interest in whether/how activities are measured
 - Firms are included in business registers and surveys through administrative/tax records, but statistical classification systems don't separately identify them
- Workers are often “independent contractors” rather than employees
 - Income classified as proprietors' income
 - Income reported to tax authorities, but well-known problems of underreporting may require adjustments
- For industries with a single large “sharing” firm, data restricted by nondisclosure rules

“Free” Advertising/Marketing-Supported Media



- Many Internet services do not involve direct payment of fees by users; rather are funded by advertising or marketing arrangements
 - Google search, Facebook, Instagram, etc.
 - BUT also Print newspapers/magazine, audio/visual
- *SNA 2008* treats the output of these service providers as intermediate consumption of the unit that pays for the advertising
- Consumers, however, undoubtedly value these services (and would be willing to pay for them)
- Economists argue that the value to consumers is “missing” in household final consumption expenditures/GDP
 - Measuring the “Free” Digital Economy in GDP and Productivity Accounts (Nakumera, Samuels, Soloveichik 2017). Presented at the IMF Statistical Forum

Change in GDP from “Free” Content



- From 1947 to 2015, GDP rises by 0.05 percentage point per year
- GDP growth was 3.22% per year over the same period

Conclusion and Discussion Points



- Measurement of the digital economy remains a priority and we look forward to further collaborations within the U.S. statistical system and with the expert community
 - What are your comments on the direction of the digital economy satellite account?
 - Is the research agenda the right set of priorities? Are there other areas to focus on?
 - Can we rethink data collections to better integrate enterprise and establishment information given the role of the enterprise in decision making (e.g., investments in tangible and intangible capital)? How can the statistical community move forward?
 - How can we best leverage the expertise of the broader measurement community within and outside the system?