Big Data Landscape, 2015-2020

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Global Conference on Big Data for Official Statistics

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U.S. DEPARTMENT OF COMMERCE
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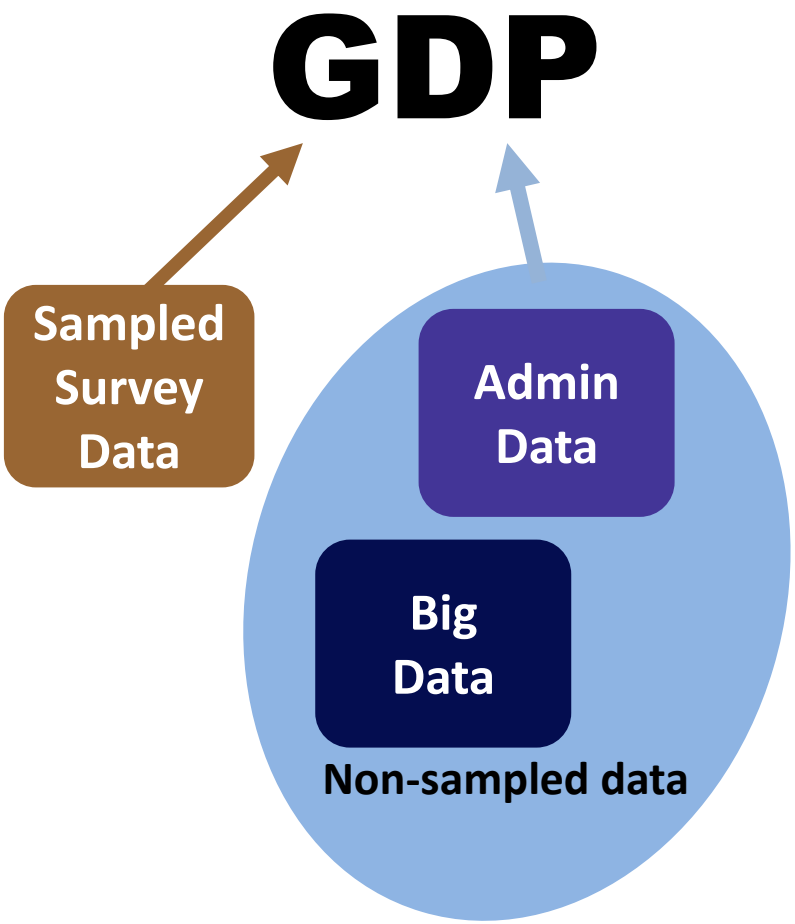
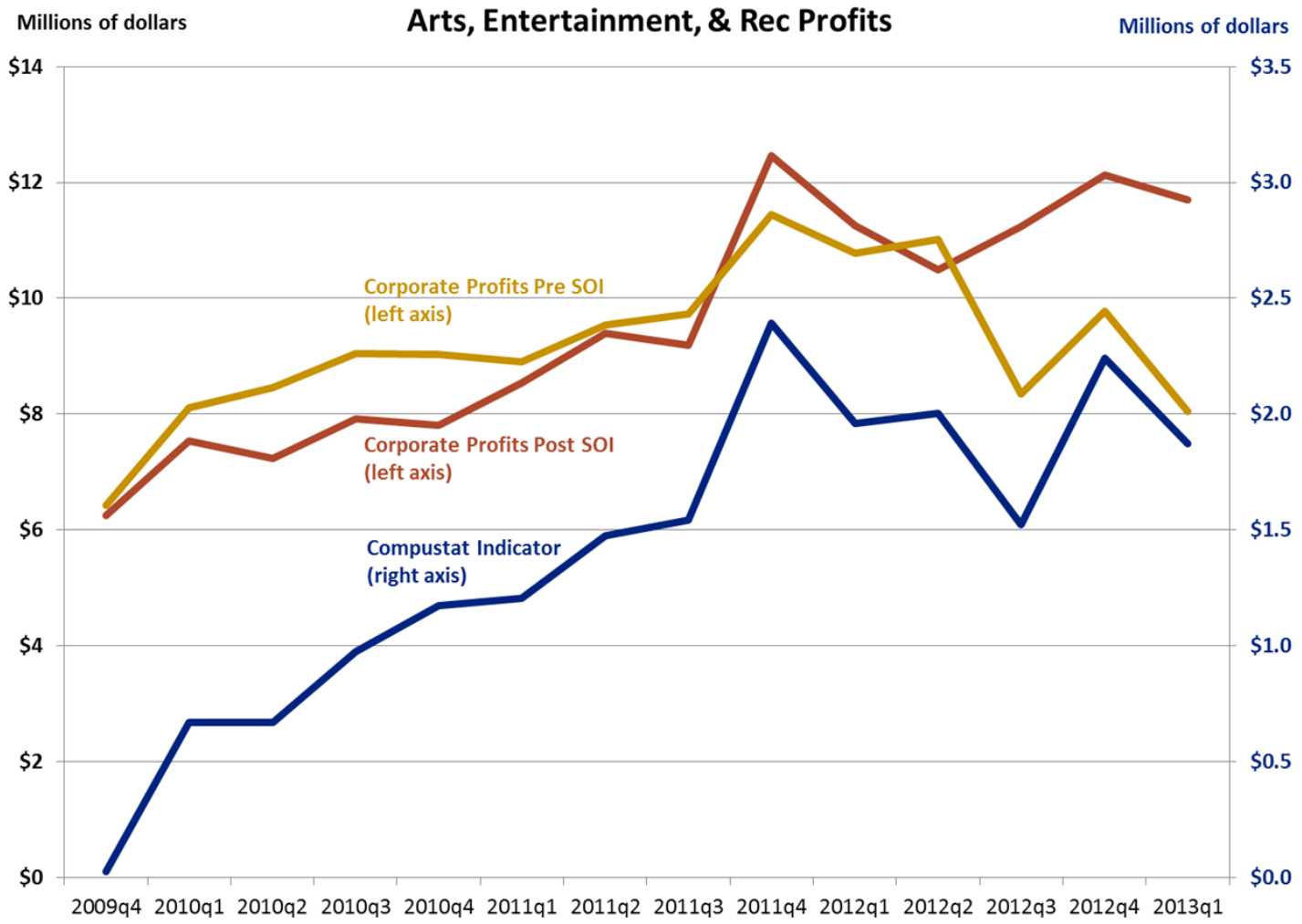
Where are we now?

- Official statistics use a variety of big data sources
- Current private source data for GDP estimation:
  - Ward's/Polk/JD Power (auto sales/price/registrations)
  - American Petroleum Institute (oil drilling)
  - *Variety* magazine (motion picture admissions)
  - IRS, Statistics of Income
  - DOL, Unemployment Insurance data
- Source data for Producer Price Index estimation (Bureau of Labor Statistics):
  - Stock exchange security trades
  - Medicare Part B reimbursements



U.S. Corporate Profits



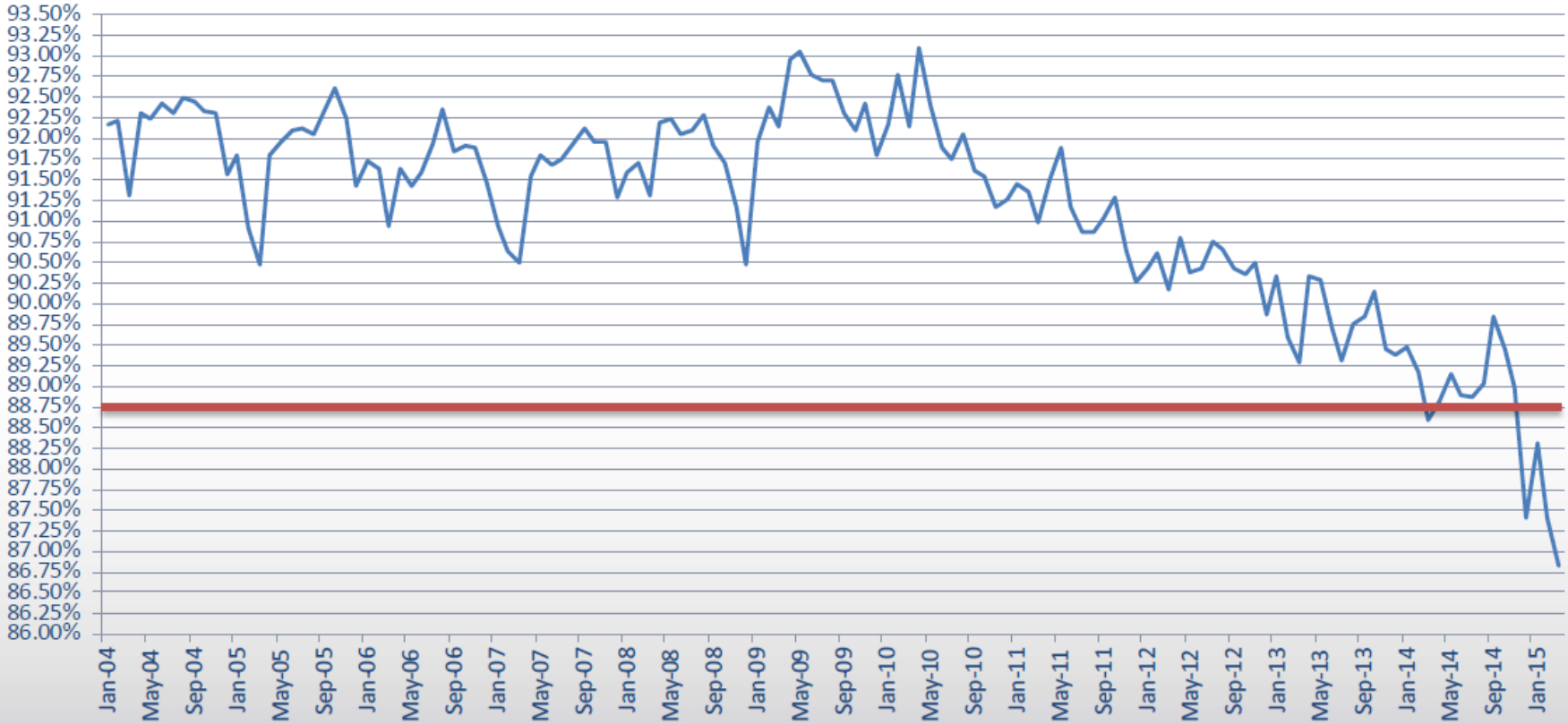
Some challenges with using big data

- How representative are the data?
- Do the concepts match those needed to measure output, prices, employment, etc.?
- Do the data provide consistent time series and classifications?
- Is it possible to bridge gaps in coverage?
- How timely are the data?
- How cost effective?
- What confidential issues arise and how limiting are they?

Are big data the answer?

- Need to continue efforts to explore Big Data as the landscape facing government agencies has changed:
  - Shrinking budgets
  - Increasing demand for more timely and detailed data
  - Increasing respondent burden
  - Emerging providers of economic statistics
  - Declining response rates

CPS-Response Rates by Month: January 2004 to Present

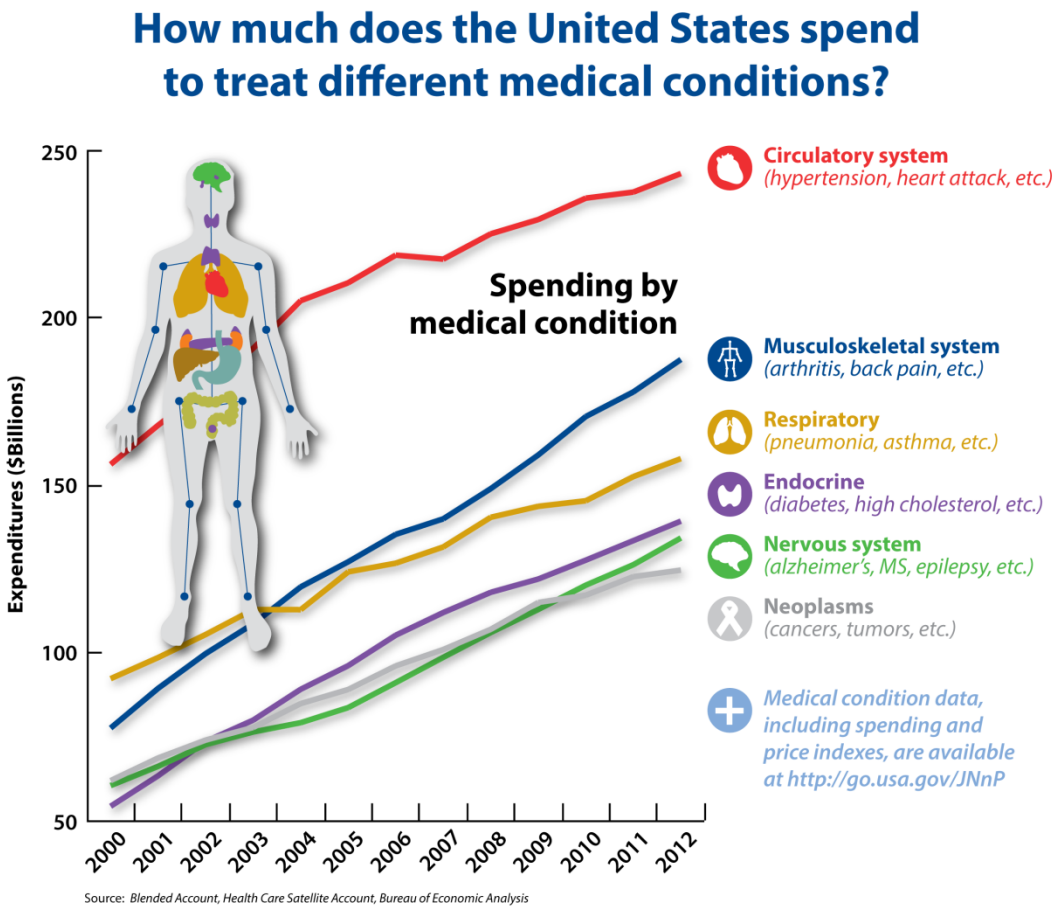


Where we are headed?

- Looking to big data to
  - **Extend**: provide more timely data, fill real time data gaps, expand geographical detail
  - **Enhance**: provide detailed interpolators, provide characteristic information for product quality, provide paradata for responsive survey design
  - **Verify**: confirm trends, validate findings from direct survey collection
  - **Supplement**: facilitate passive data collection

Recent Experience & Lessons Learned

Health Care Satellite Account



- Annual statistics for 2000-2012 that provide information on spending and price changes by disease category
- BEA combined billions of claims from both Medicare and private commercial insurance to determine the spending for over 250 diseases

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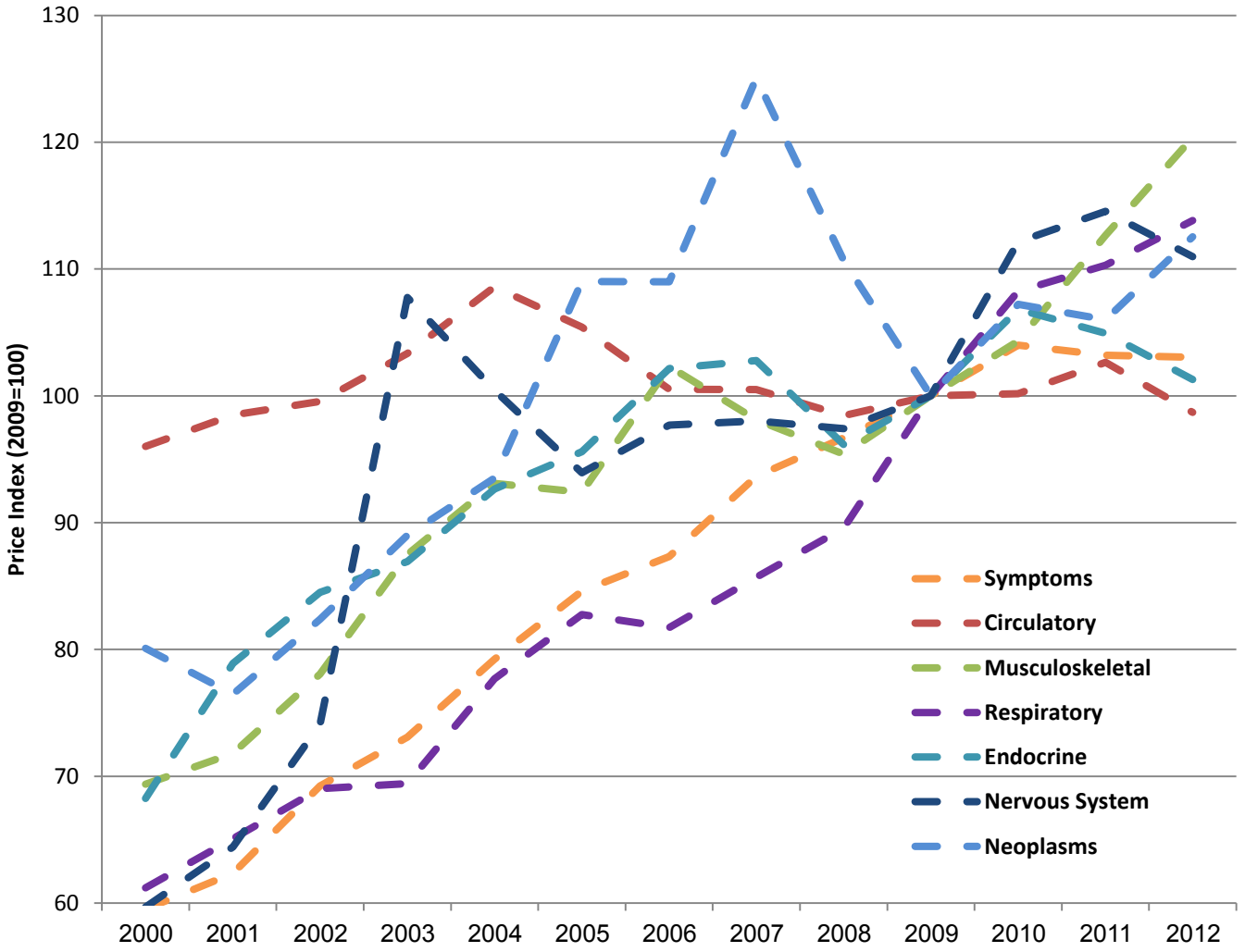
For more information, refer to http://bea.gov/national/health_care_satellite_account.htm

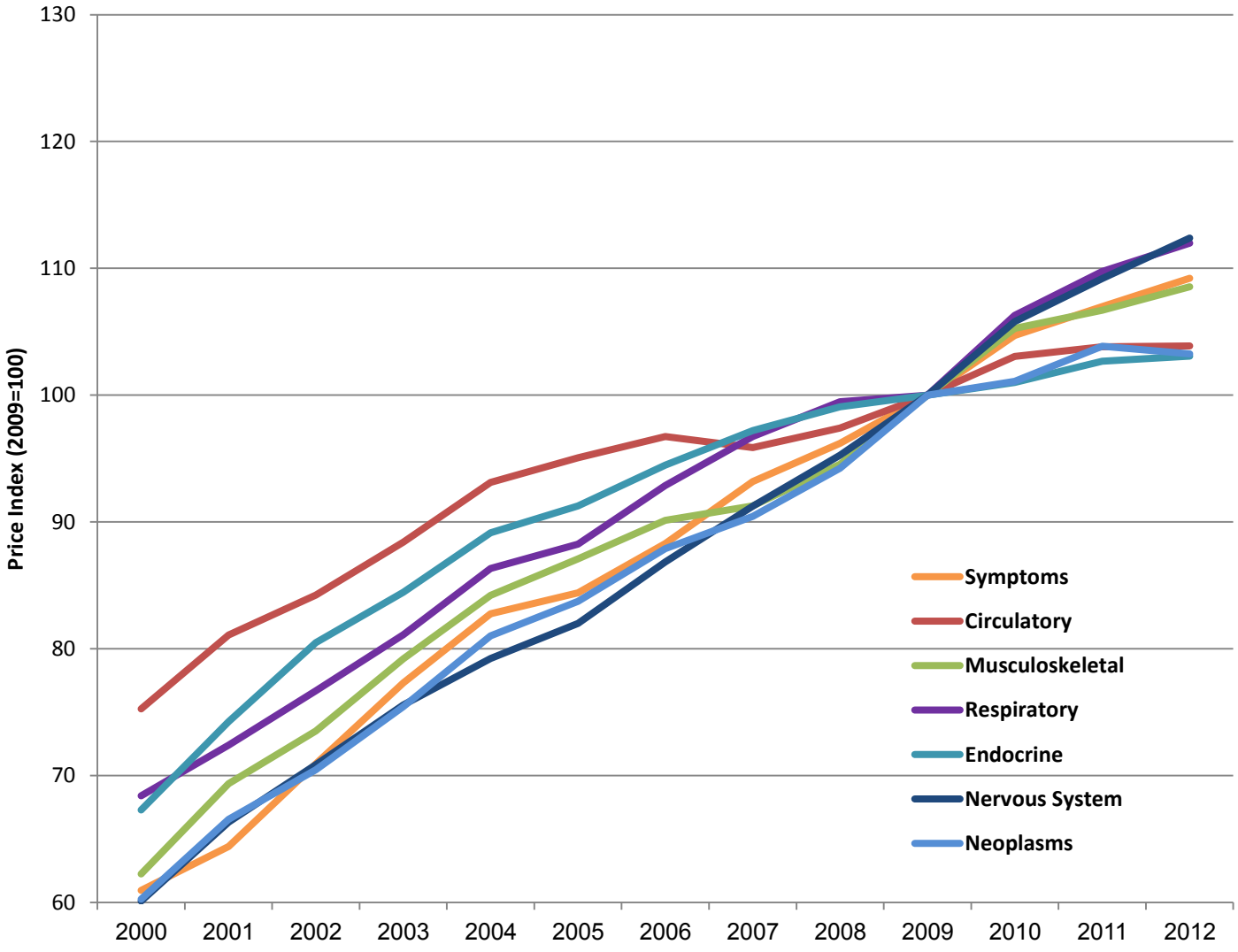
Health Care Satellite Account

- Two approaches:
  - "MEPS Account"
    - Using Medical Expenditure Panel Survey (MEPS)
    - Nationally representative sample with approximately 30,000 individuals
  - "Blended Account"
    - Includes MEPS data, private and public claims data
    - Commercially-insured patients from the MarketScan® Data from Truven Health
      - More than 2 million enrollees in each year
      - Convenience sample → application of population weights
    - Medicare patients from 5 percent random sample of enrollees
      - Approximately 2 million enrollees each year

Health Care Satellite Account: Survey Data Only



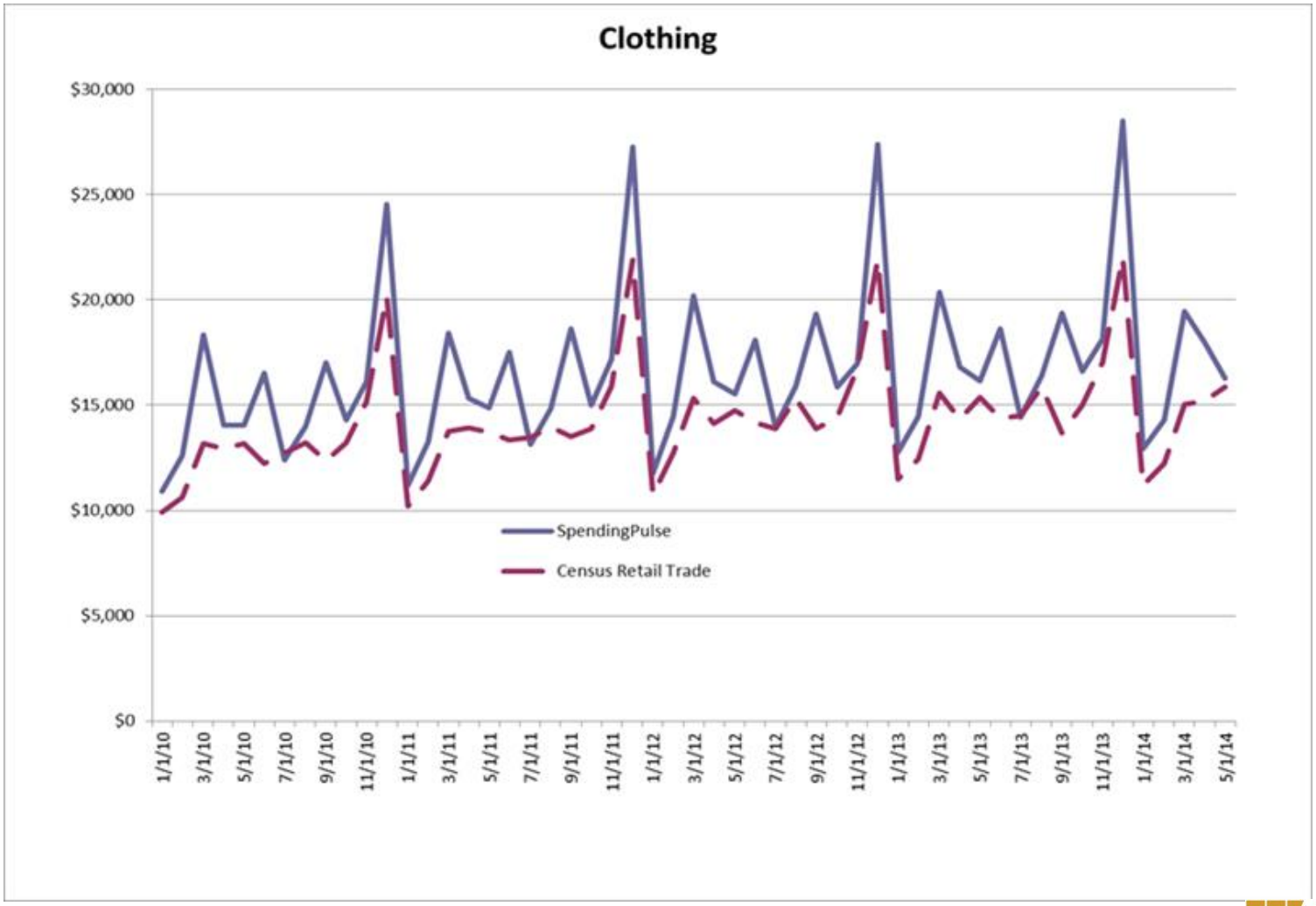
Health Care Satellite Account: Survey + Big Data



Electronic payment system data

- BEA is exploring use of credit card data to improve estimates of consumer spending and to develop estimates at the metro area and county levels
- Census Bureau initially focused on addressing data quality and mitigating the impact of declining survey response for its monthly retail sales survey
- Pilot projects: Mastercard, First Data, PayPal and Nielsen

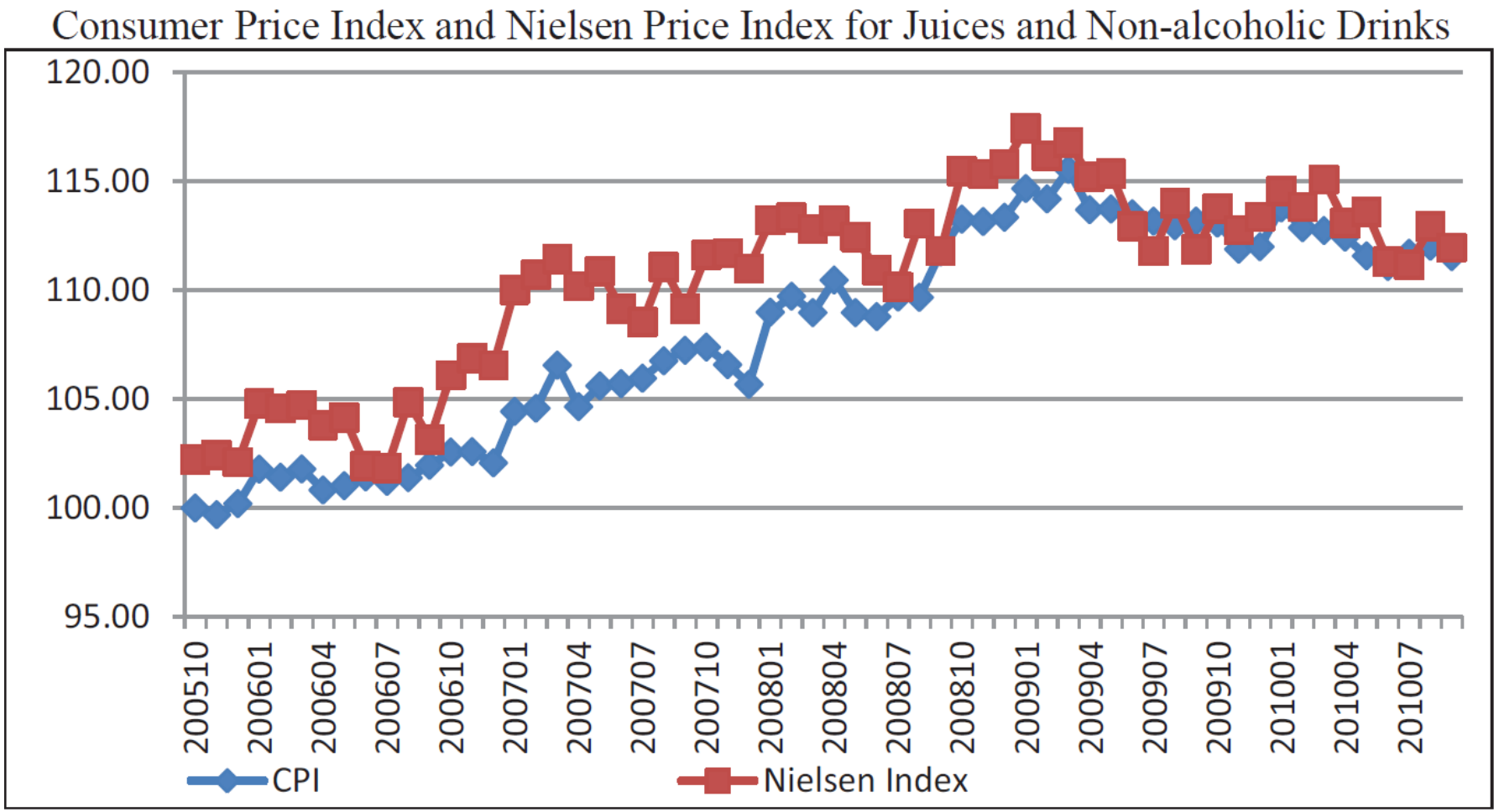
Credit Card Data for Consumer Spending



Retail Scanner Data

- Initial use of retail scanner data for BEA's estimates of consumer spending for electronic goods (TVs, audio equipment, cameras, etc.)
- BEA looking to expand the use of point-of-sale retail scanner data to estimate composition of consumer spending for type of product
- Census Bureau interested in long-run viability of producing high frequency retail statistics at detailed geographic levels
- Bureau of Labor Statistics testing web scraping and direct data feeds from retailers to measure consumer prices

Retail Scanner Data for Verification



Source: Bureau of Labor Statistics

Lessons Learned & the Future of Big Data

- All big data sources not created equal
- Use of big data requires incremental, blended approach
- Transparency issues with use in official statistics
- Need parameters to assess utility and quality of data sources (e.g. total error framework for surveys)
- Incentive structure and sustainability of big data sources
- Current and future cost considerations
- Legal, privacy and data confidentiality issues
- Public/private partnerships are key
- Need a framework with policies and procedures for using big data in official statistics