Exploring the Boundaries of GDP:

Cultivated Assets and Valuing 'Free' Media

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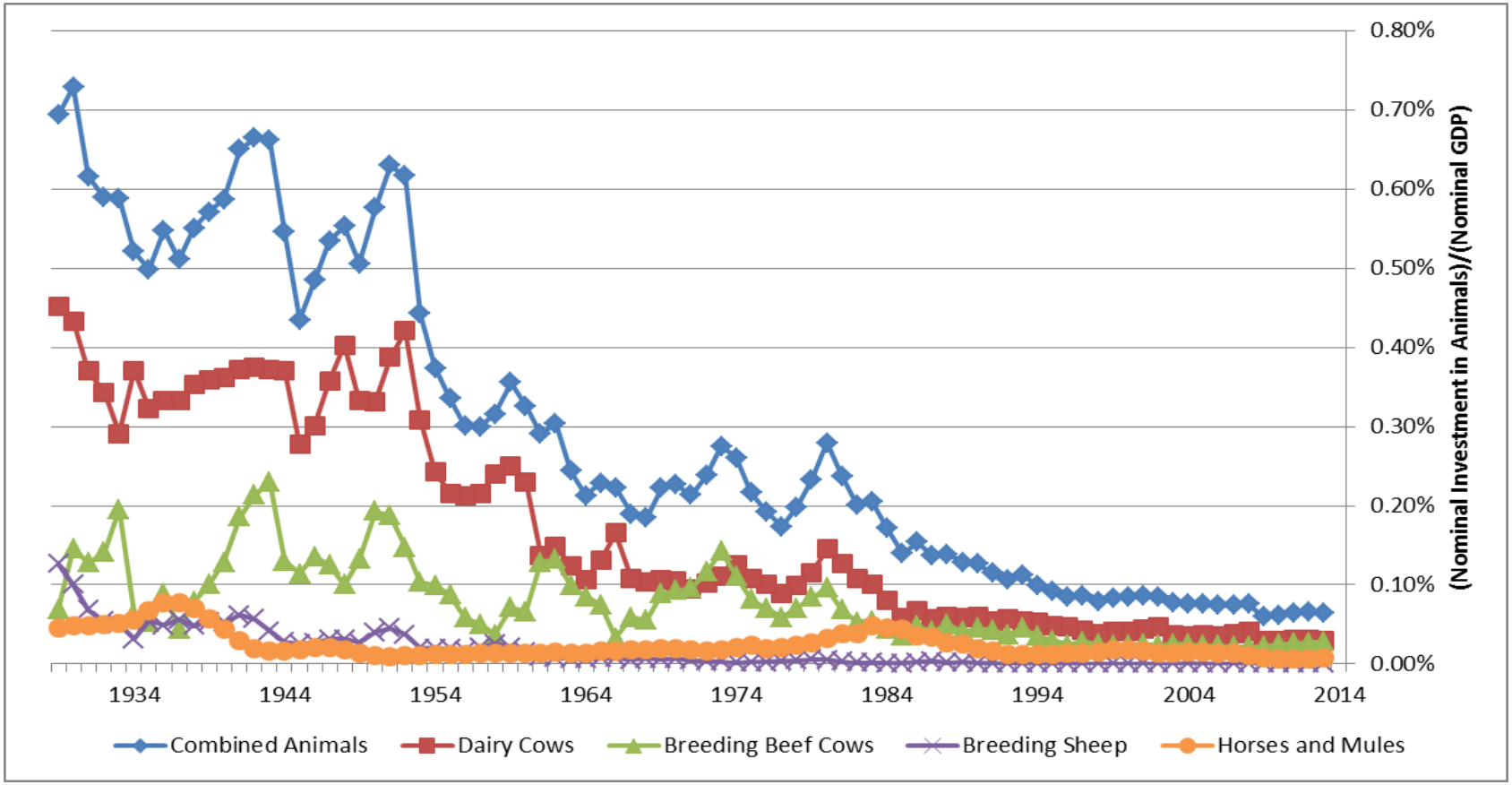
Outline of Talk

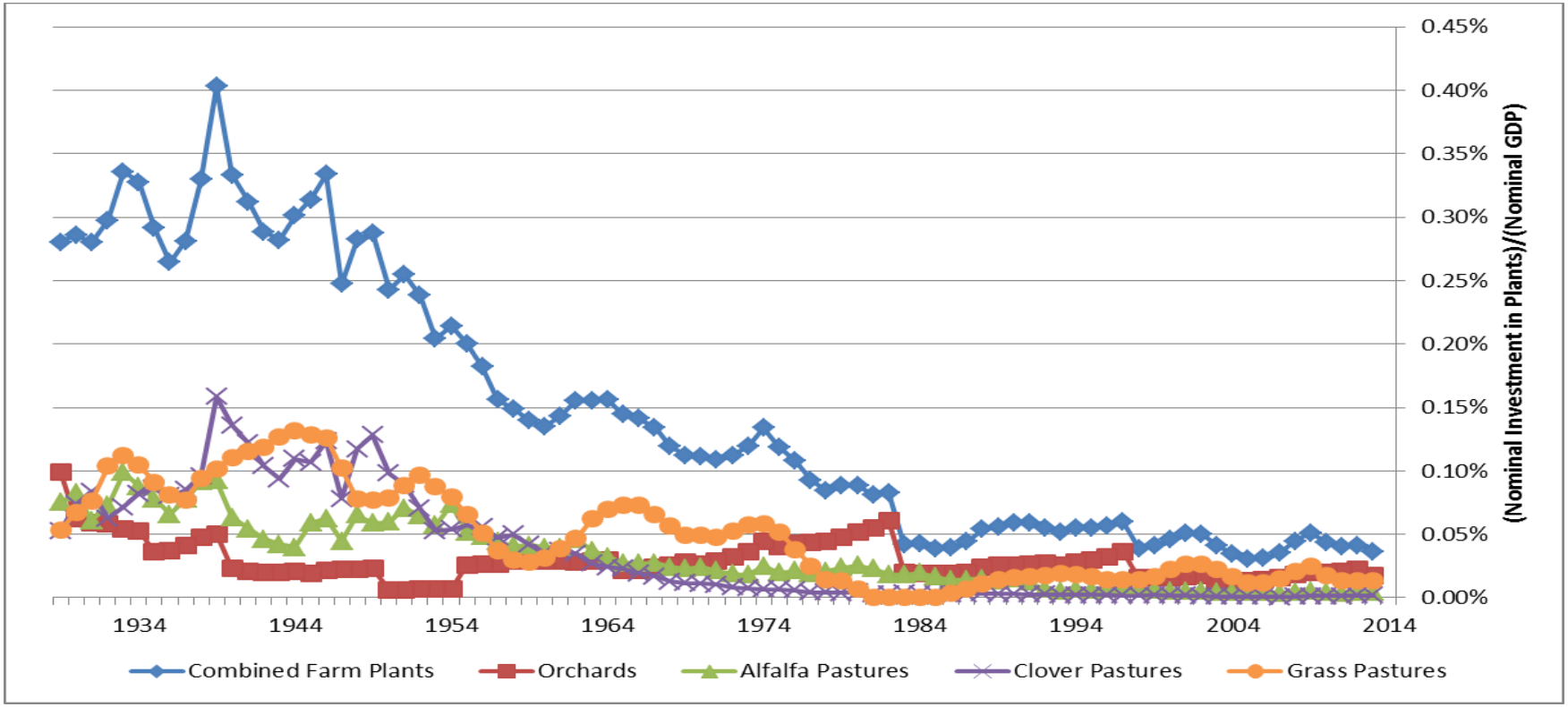
- I'll briefly discuss cultivated assets
  - Long-lived working animals
  - Long-lived farm plants
- Next, I'll discuss 'free' media like Facebook
  - Most 'free' media is not actually free, but supported by ads
  - SNA does not currently include ad-supported media in GDP – but its inclusion has been discussed for decades.
    - On the other hand, BEA does count subscription media, media produced by governments and media produced by non-profits in GDP.
  - I'm working with Leonard Nakamura to study 'free' media.
    - Our research studies all advertising-supported media, regardless of whether consumers pay zero out-of-pocket or a subsidized price.

Long-Lived Animal Investment By Category



- Capitalizing farm animals lowers average nominal GDP growth slightly.
  - BEA currently tracks farm animals as inventory, so the short-term volatility is already captured in the NIPA's. Capitalizing animals won't change short-term GDP growth.
- Animal prices track overall GDP prices, so inflation doesn't change much

Long-Lived Farm Plant Investment By Category

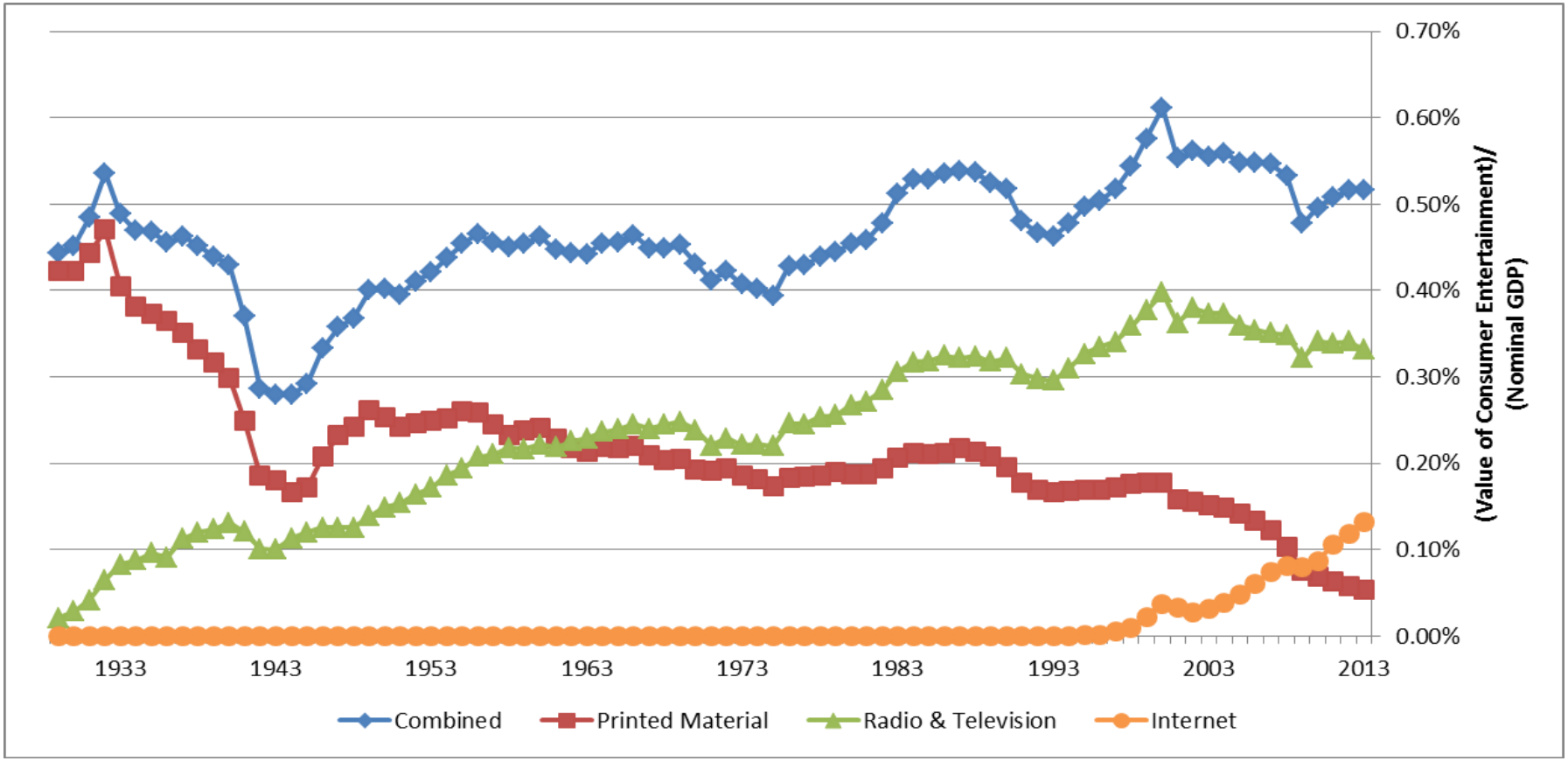


- The category 'pastures' only includes fields which are deliberately planted and cultivated by farmers. Natural prairie is tracked separately.
- Capitalizing farm plants lowers average nominal GDP growth slightly.
- Plant prices have risen faster than overall GDP prices.
  - Capitalizing farm plants will raise measured inflation rates slightly.

Overview of 'Free' Media

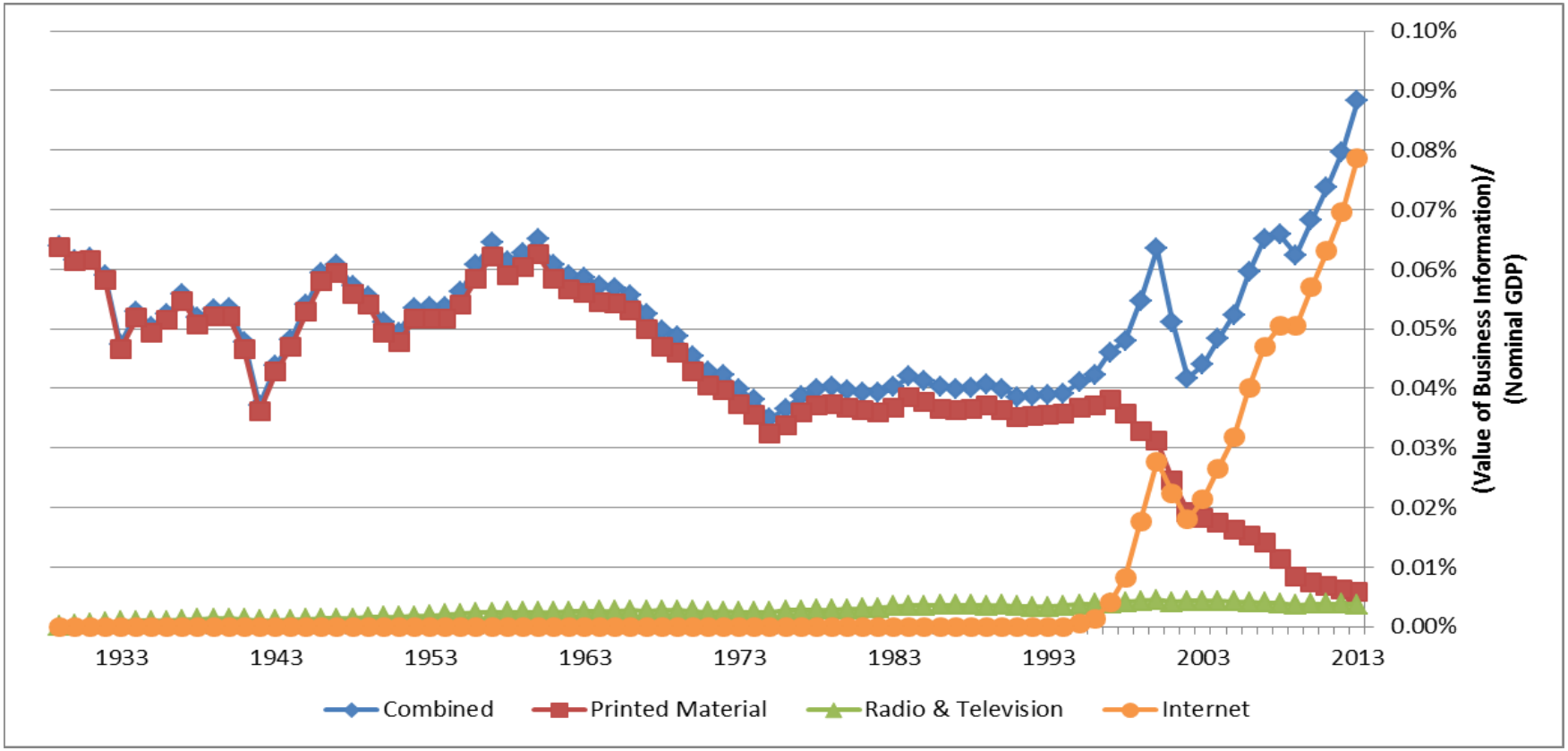
- How to evaluate 'free' media and its impact on personal consumption expenditures (PCE)?
  - What is the value of TV or Facebook or Google in GDP or PCE?
- Some researchers estimate that 'free' media in the US provided at least $2 trillion of consumer surplus (Brynjolfsson and Oh 2012)
  - Their estimate is based on time use data for TV and Internet.
  - Popular news sources have written articles echoing these large values (BusinessWeek, Ito 2013), (The Wall Street Journal, Aeppel 2015).
- In 2012, we estimate 'free' media added only $83 billion to GDP.
  - Our methodology is tied to payments to content providers
- Important for GDP to be tied closely to expenditures
  - Our experimental methodology is in the tradition of valuing products at cost even when the consumption is not purchased (e.g., government) or unpriced (owner occupied housing or financial intermediation services)
  - We calculate prices and real values by measuring input costs such as actor salaries, software costs, server costs and consumer media costs like TV sets.

Advertising-Supported Consumer Entertainment



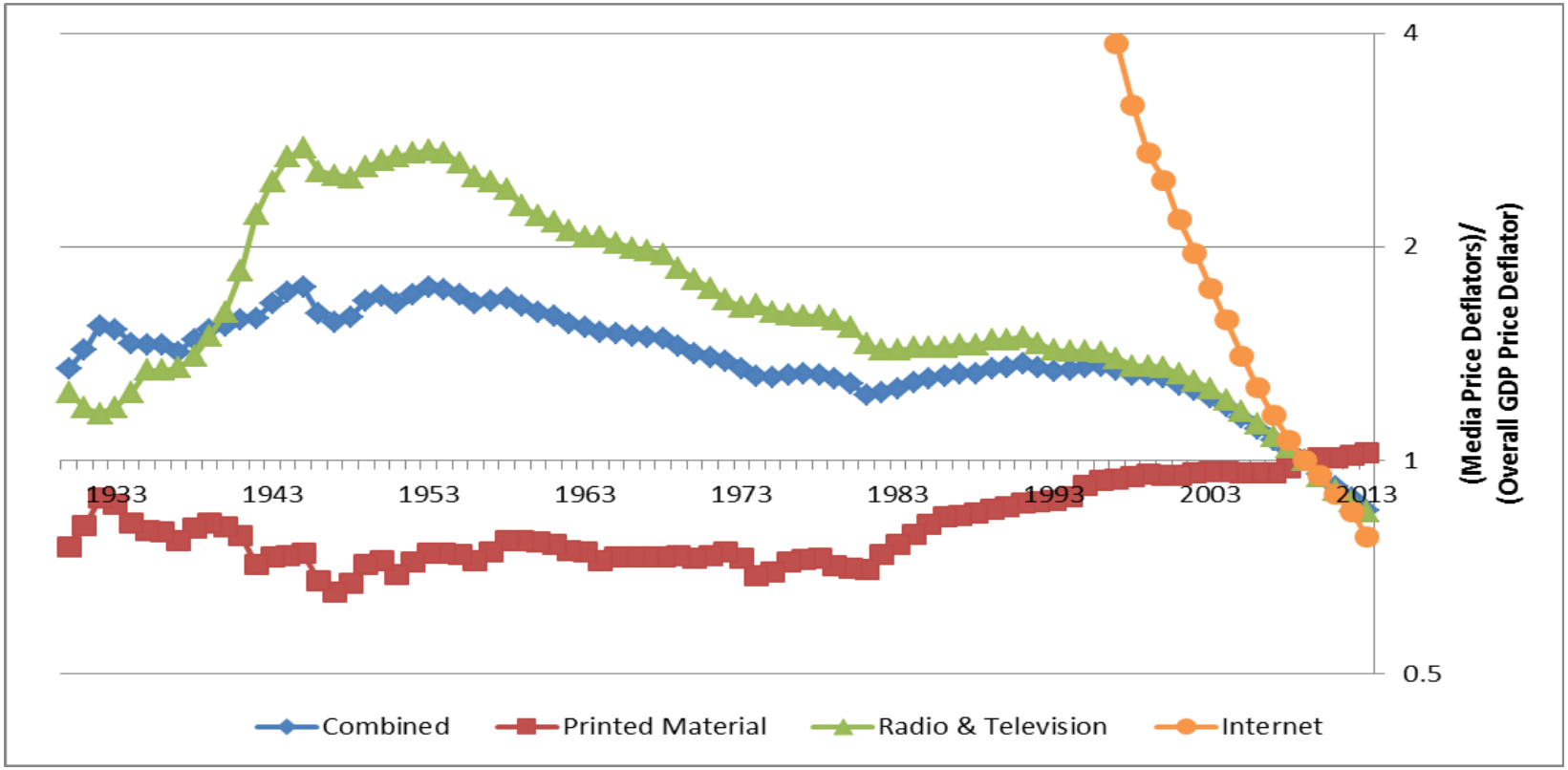
- The explosion in online media is balanced out by drop in print media.
- 'Free' consumer entertainment has hovered around 0.5% of nominal GDP – so the experimental methodology doesn't change growth much.

Advertising-Supported Media as an Intermediate Input



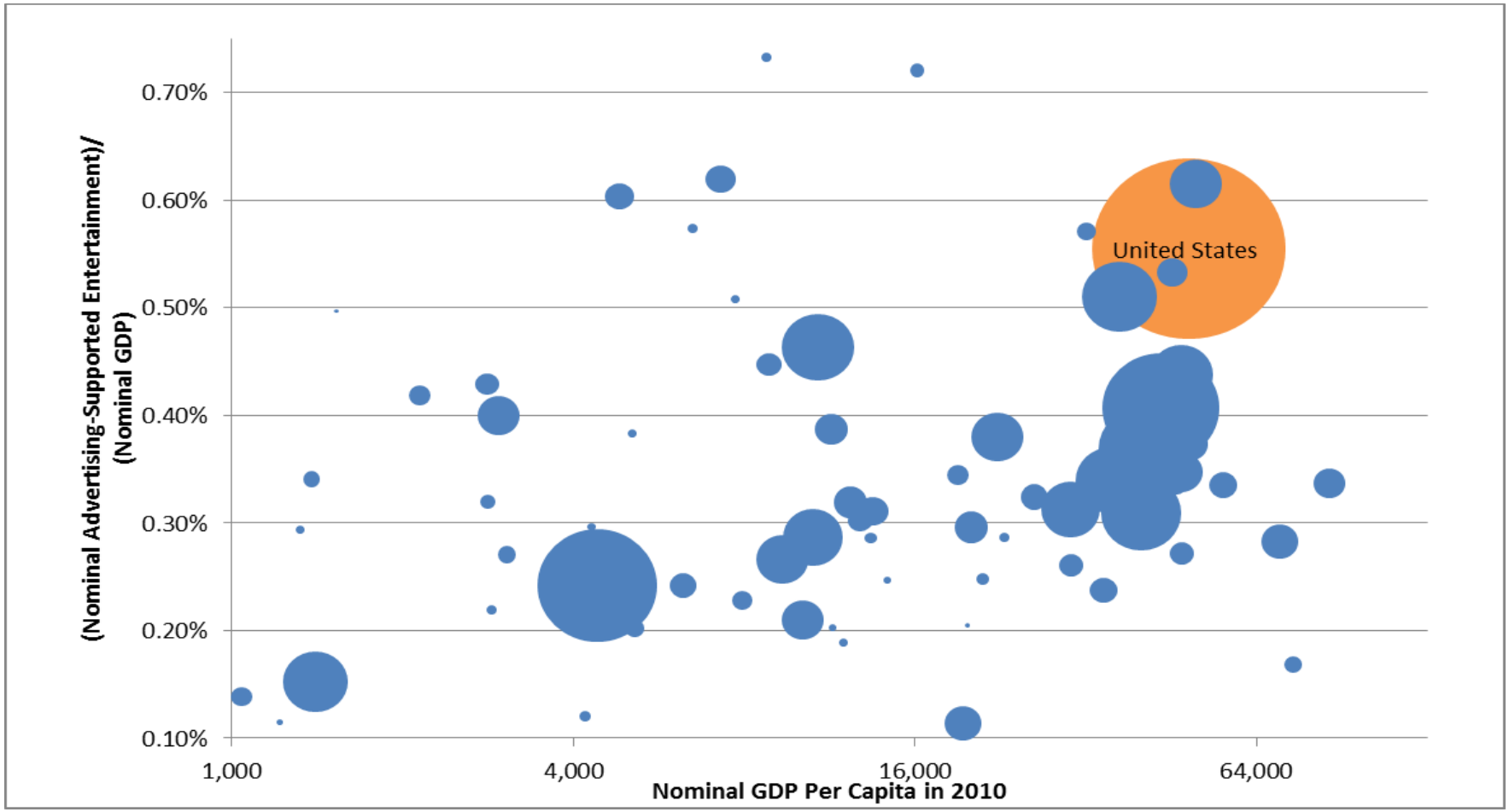
- Measured GDP only depends on final output, so 'free' media used by businesses has no direct effect on GDP.
  - 'Free' media will show up in the input-output tables and productivity statistics.
- BEA treats owner-occupied housing as a business, so we treat housing-related media as an intermediate input.

Prices for Advertising-Supported Media



- Since 2000, prices for 'free' entertainment have grown much slower than overall prices. Accordingly, the experimental methodology lowers inflation and raises real growth slightly.
- BLS's PPI for Internet publishers provides our price index after 2010.
  - Before 2010, we use BEA's prices for computer (5.3.4, line 11) and software (5.6.4, line 3)

Nominal Advertising-Supported Media Across Countries



- The United States has more 'free' media than most other countries. Accordingly, the experimental method raises relative US GDP.
- It's very difficult to compare quality-adjusted prices across countries.

Current SNA Treatment of 'Free' Media and Our Experimental Treatment

- In the SNA and the US NIPA, 'free' media is simply an intermediate cost of the firms whose products are advertised
  - A soap opera is a free byproduct of the sale of soap
  - Conceptually, this is similar to the treatment of pollution and other negative externalities. The only difference is that soap operas are positive.
- Our Experimental Treatment:
  - Measure the cost of the consumers' desired content (soap opera) that is subsidized by advertising (the sale of soap)
  - The content is consumption, valued at the cost of producing the soap opera
  - The advertiser and the consumer engage in a barter transaction in which the consumer agrees to buy the TV content (computer, radio, newspaper) and watch (listen to, read) the advertisement in exchange.
    - SNA counts other barter transactions in GDP (Section 6.102).
  - There is a balancing whereby the income paid to the consumer is exactly equal to the consumption of the advertising (as in any barter transaction)
    - Thus the consumption of the soap opera doesn't come out of nowhere.

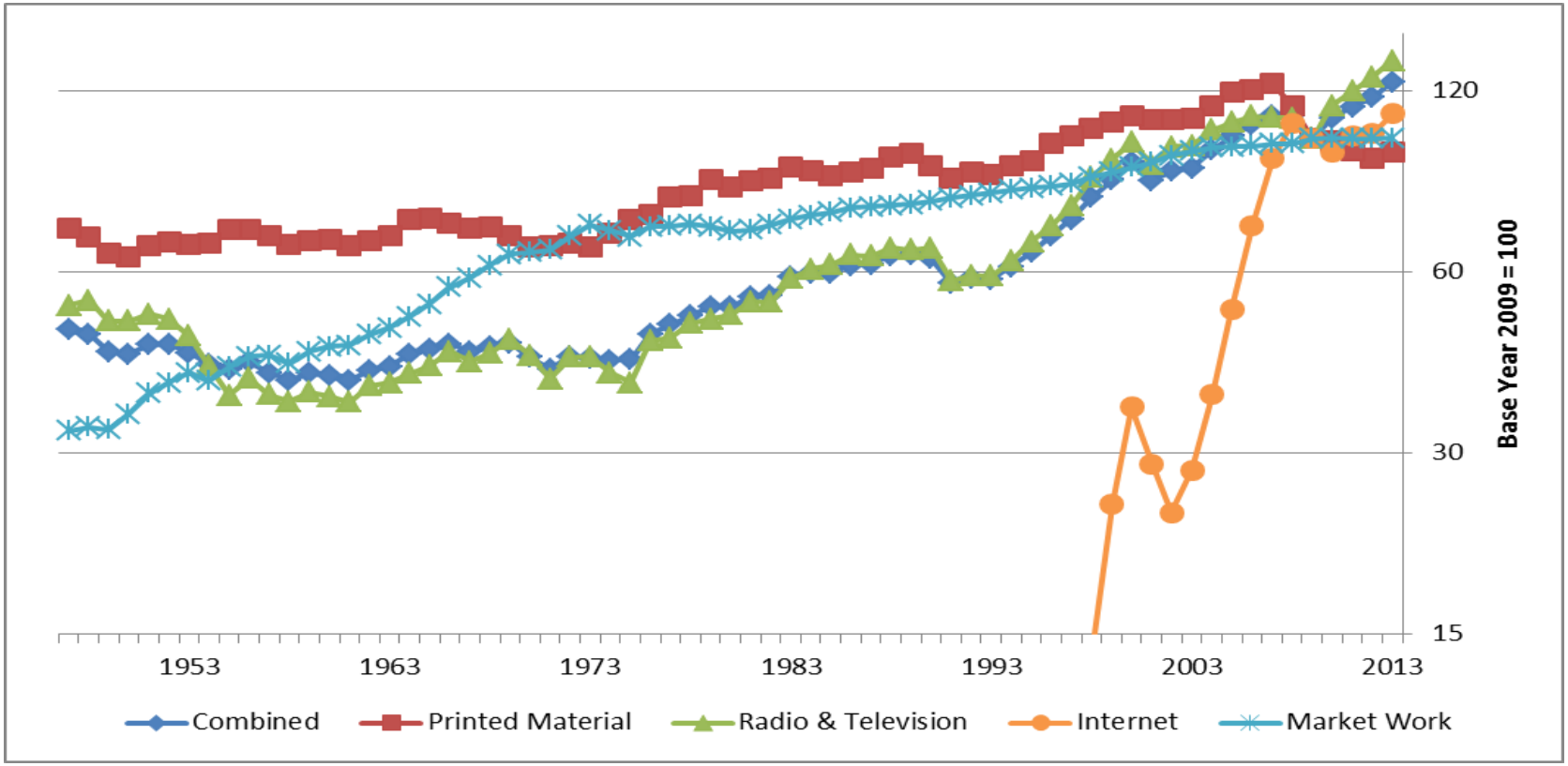
Historical Research on 'Free' Media

- Borden (1935) was an early exploration of the proportion of advertising devoted to subsidizing content provision
- Extensive discussion of measuring 'free' media in national accounts in the 1970s
  - Ruggles and Ruggles (1970), Okun (1971), Jaszi (1971), Eisner (1978). Kendrick (1979)
- Cremeans (1980) proposed a barter mechanism for measuring free media similar to the one we propose and estimated it
- Vanoli (2000) discussed the issue in a review of the history of national accounting
- Nakamura (2005) modeled the consumption gains from an expenditure model
- Soloveichik (2014) revived this approach for US GDP

‘Free’ Media and Consumer Welfare

- Real GDP only depends on nominal output and prices.
  - An increase in work hours can raise GDP but lower welfare.
  - On the other hand, workers unambiguously benefit from an increase in real wages.
- We treat ad viewership as a type of labor input:
  - ‘Hourly earnings’ = (Imputed Value of Media Content ‘Earned’)/(Time Spent Viewing Advertising)
  - Consumer welfare increases when real ‘hourly earnings’ rise.
- Market work pays much better than watching ads
  - TV ads are probably the most rewarding – yet we calculate that viewers earned only $0.55 per hour of ads in 2012.
    - Viewers enjoyed $0.16 of content per hour and 28% of air time was ads.
  - In comparison, employees averaged $31 per hour in 2012.

Real Ad-Supported Content Per Unit of Ad Viewership



- Real 'hourly earnings' growth per year from advertising viewership:
  - 0.62% from 1947 to 1995; 3.63% from 1995 to 2012
- Real earnings growth per year from market labor:
  - 1.96% from 1947 to 1995; 1.12% from 1995 to 2012

Measured Productivity with 'Free' Media

- Input-Output tables with the current method:
  - Media companies produce advertising viewership.
  - TFP decreases if users demand more content per ad.
- Input-Output tables with the experimental method:
  - Media companies produce content and then barter the content for advertising viewership.
  - Input costs rise if users demand more content per ad.
- Many companies use 'free' media. For example, a restaurant might use Waze for delivery directions.
  - Under the current method, improved directions and faster delivery is treated as a TFP increase for the restaurant.
  - Under the experimental method, improved directions are treated as better intermediate inputs.
- Leonard Nakamura and I are still working on this.

Conclusions for 'Free' Media

- Based on time use, previous researchers have argued that 'free' media accounts for a large and growing fraction of utility.
  - In 2012, they estimate that consumers enjoy $2 trillion of utility from 'free' TV and Internet (Brynjolfsson and Oh 2012)
- We develop an experimental methodology that uses payments to content providers to value advertising-supported media.
  - We study newspapers, magazines, radio, television and online media.
  - In 2012, we estimate 'free' media added only $83 billion to GDP.
- We find 'free' media has little impact on the aggregate NIPA's
  - 'Free' entertainment has hovered around 0.5% of nominal GDP, so nominal GDP growth is almost unchanged when we include 'free' media.
  - Measured inflation falls slightly and real GDP growth rises slightly.
  - We are still working to re-calculate productivity using the experimental methodology, but we believe aggregate TFP won't change much.