# Measuring the "Free" Digital Economy
within the GDP and Production Accounts

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- "Free" content is currently excluded from industry output, final output and GDP
  - We introduce an experimental methodology which includes "free" content in output, GDP and total factor productivity (TFP)

- "Free" content is:
  - Supported by advertising and marketing
  - Valued based on production cost
  - Divided into consumer and business use

Advertising-Supported Media: Impact on Real GDP
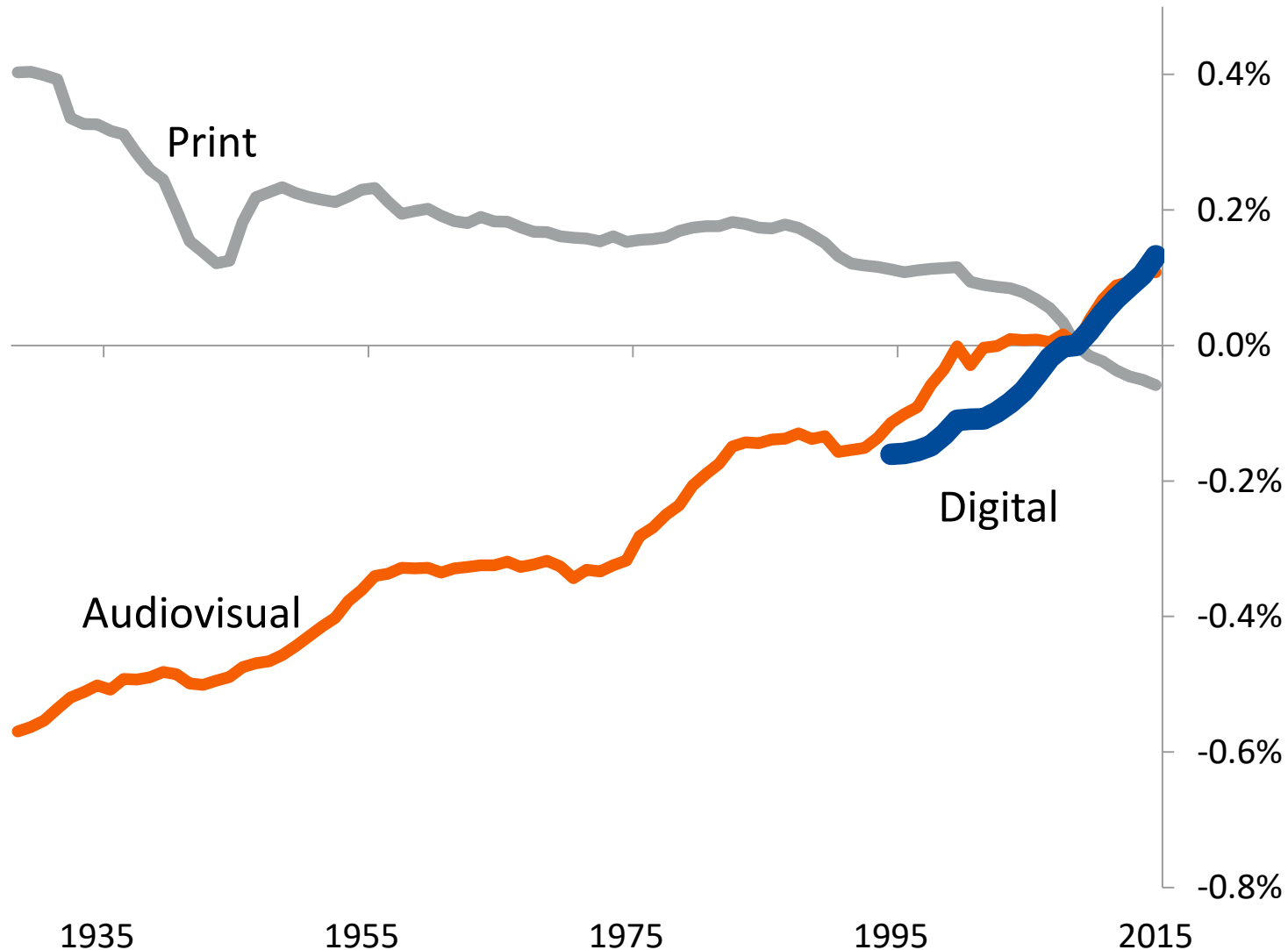
Advertising is a three-way transaction:

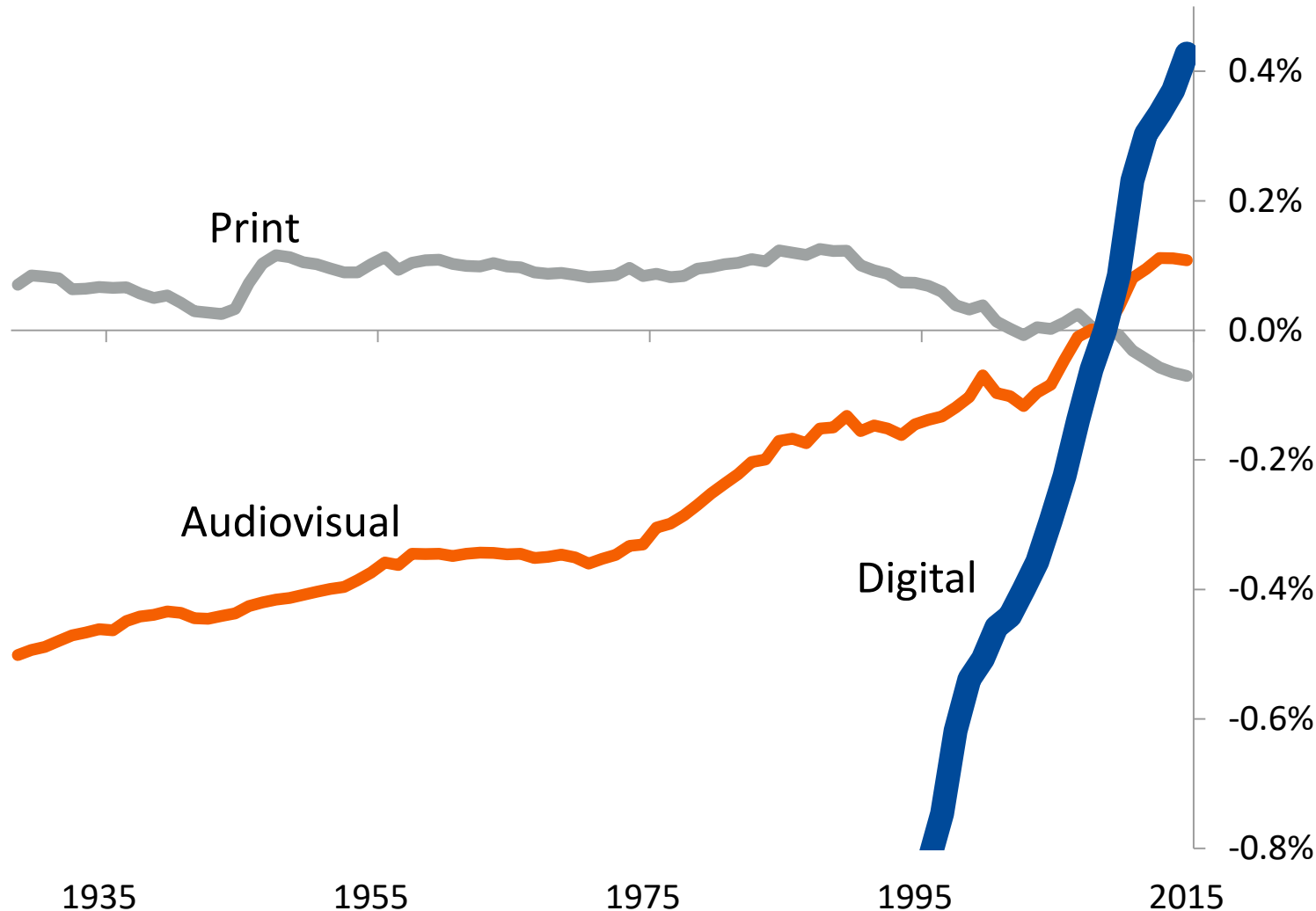Users barter viewership for media company content

Media companies resell the viewership

Resold viewership is used by every industry

Marketing-Supported Info: Impact on Real GDP

Marketing is a two-way transaction:

Users barter viewership for marketing content

Viewership is then used in-house by every industry

Preview of Talk

Empirical Results:	Digital	Print	Audiovisual
Nominal GDP Impact in 2012	$103 B	$29 B	$148 B

Real GDP growth impact **percentage points per year**	2005-2015	0.092	-0.021	0.029
	1995-2005	0.064	-0.011	0.018
	1929-1995	N/A	-0.004	0.012

TFP growth impact **percentage points per year**	2005-2014	0.074	-0.018	0.019
	1995-2005	0.024	0.016	0.032
	1947-1995	N/A	0.017	0.007

GDP Theory
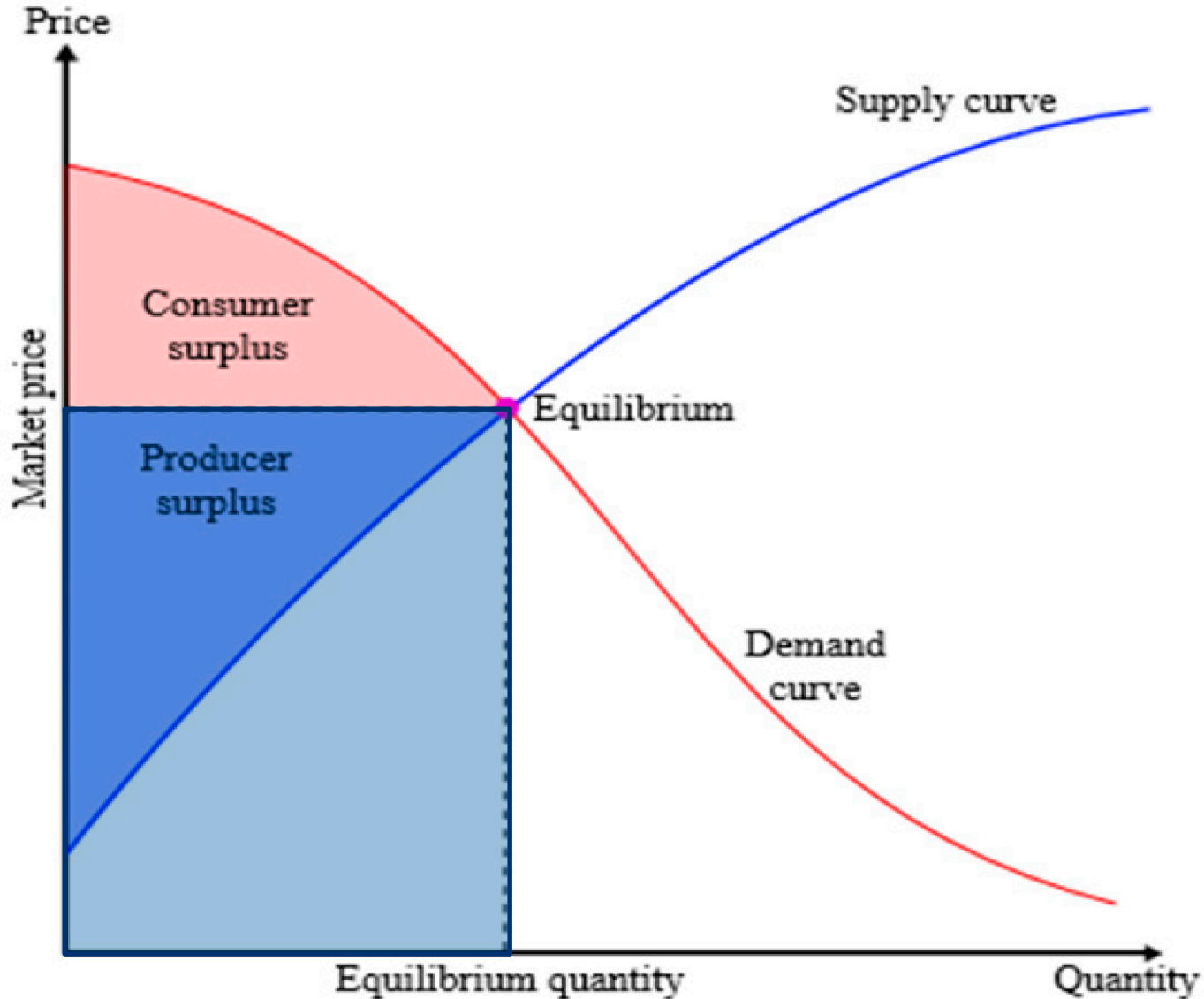
- Blue rectangle shows consumer spending
  - Under current methodology, "free" content is not included in GDP

- Red area, consumer surplus, is out of scope for GDP measurement
  - For some goods, consumer surplus outweighs GDP

"Free" Content is Not New

- "Free" broadcast television and radio has long been considered as a potential addition to GDP
  - Research started in 1935 and has continued since
  - Since 1995, the proliferation of "free" digital products has made the inclusion of "free" products more pressing

- Previous research looked at advertising-supported media. Our new paper also includes marketing-supported information

- GDP accounts don't track "free" content as industry output, industry input or personal consumption expenditures

- Measured GDP rises when "free" content is replaced by sold content

Experimental Treatment of "Free" Content

- Experimental GDP accounts track "free" content like sold content

- Value of viewership = value of "free" content
  - Content providers and users engage in barter: users watch advertising/marketing in return for media/information
  - We exclude spending on advertising/marketing which is bundled with "free" media/information
  - "Free" content is valued based on its production cost

- Experimental GDP is unchanged when "free" content is replaced by sold content

Empirical Data Work

- The Economic Census provides revenue data
  - Media companies which resell advertising viewership
  - Marketing support companies sell services like website hosting or logo design

- The Occupational Employment Survey (OES) provides data on in-house marketing production
  - Writers, web developers and other marketing professionals

- "Free" content is split between businesses and consumers
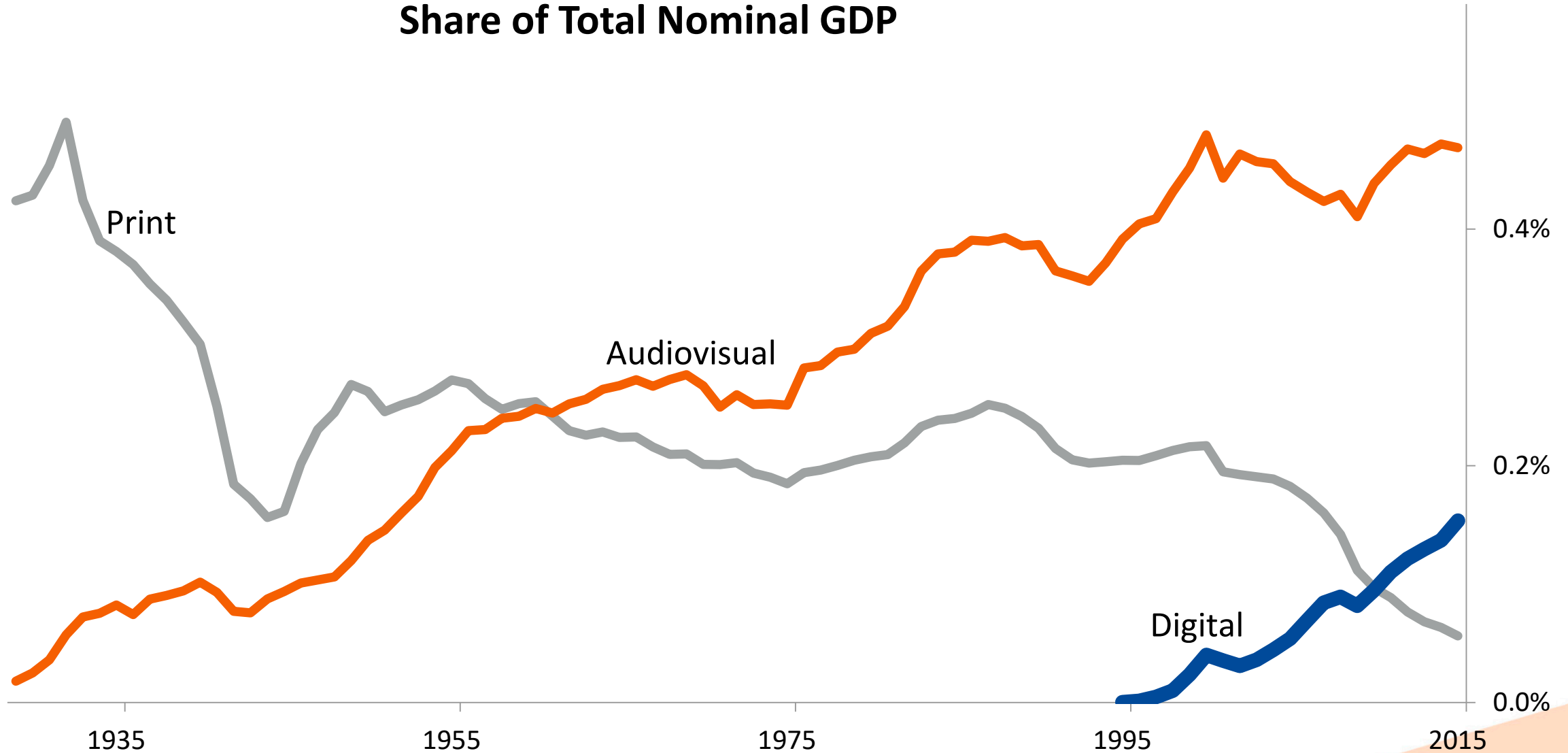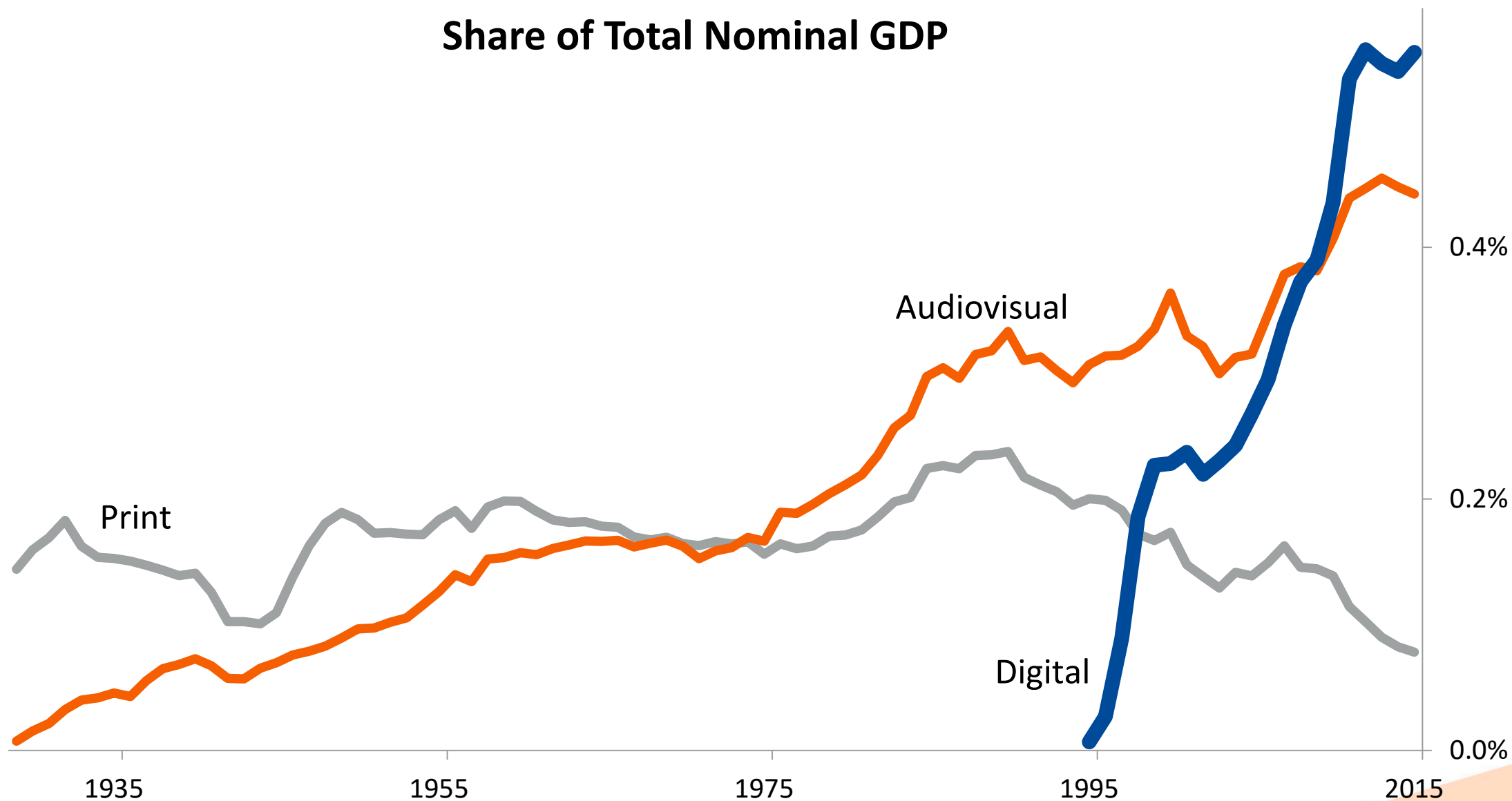
Nominal Value of "Free" Consumer Media

Share of Total Nominal GDP
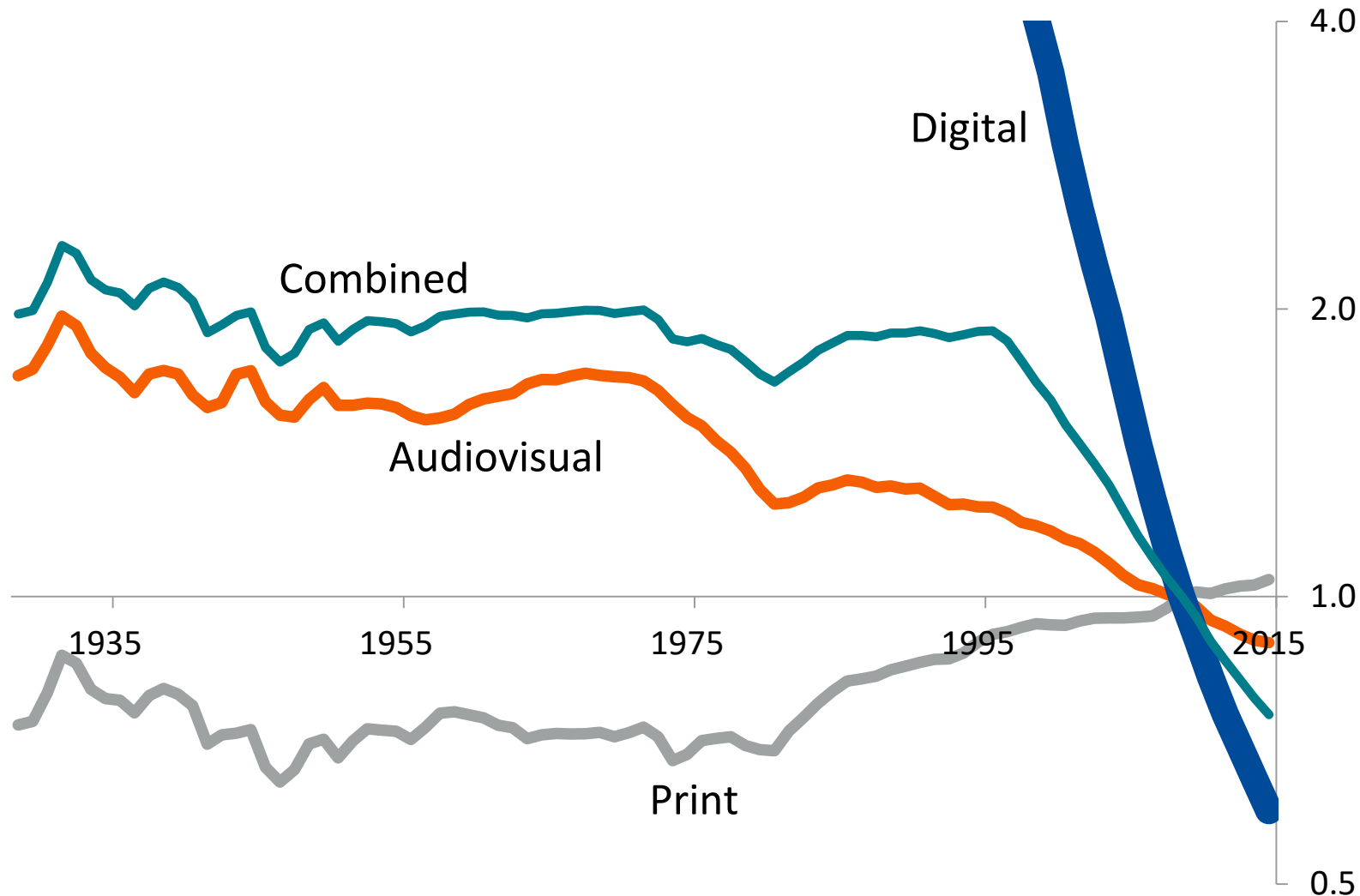
Nominal Value of "Free" Consumer Info

Share of Total Nominal GDP

Relative Prices for "Free" Content by Category

Ratio of "Free" Content Prices to Overall GDP Prices, 2009 Base Year

Digital

Combined

Audiovisual

Print

1935 1955 1975 1995 2015

4.0

2.0

1.0

0.5

"Free" content prices are hard to measure

– Our price indexes are based on input prices and output prices for paid content

As digital spending grows, its weight in the combined price index grows as well

Constructing Industry-Level Production Accounts

Current Methodology

	B	C	V
Business	0	0	----
Content	----	0	----
Viewership	----	----	----
Value-Added	800	200	----

Output by Type

	B	C	V
Primary	800	200	----
"Free" Content	----	----	----
Viewership	------	----	----

Experimental Methodology

	B	C	V
Business	0	0	----
Content	50	0	----
Viewership	100	100	----
Value-Added	800	200	150

Output by Type

	B	C	V
Primary	800	200	----
"Free" Content	100	100	----
Viewership	50	0	150

New output and input by industry: "free" content and viewership

Experimental TFP Due To "Free" Content

- Input prices needed to calculate total factor productivity (TFP)
  - (Viewership Input Price)/("Free" Content Output Price)

- Viewership prices calculated from quantity data:
  - Viewership Price$_t$ = (Advertising Spending$_t$ + Marketing Spending$_t$)/(Viewership Quantity$_t$)

- We calculate TFP for each of the 63 private sector industries tracked by BEA and BLS in their joint production accounts
  - Aggregate TFP growth rises by 0.04 percentage points per year (1947-2014)
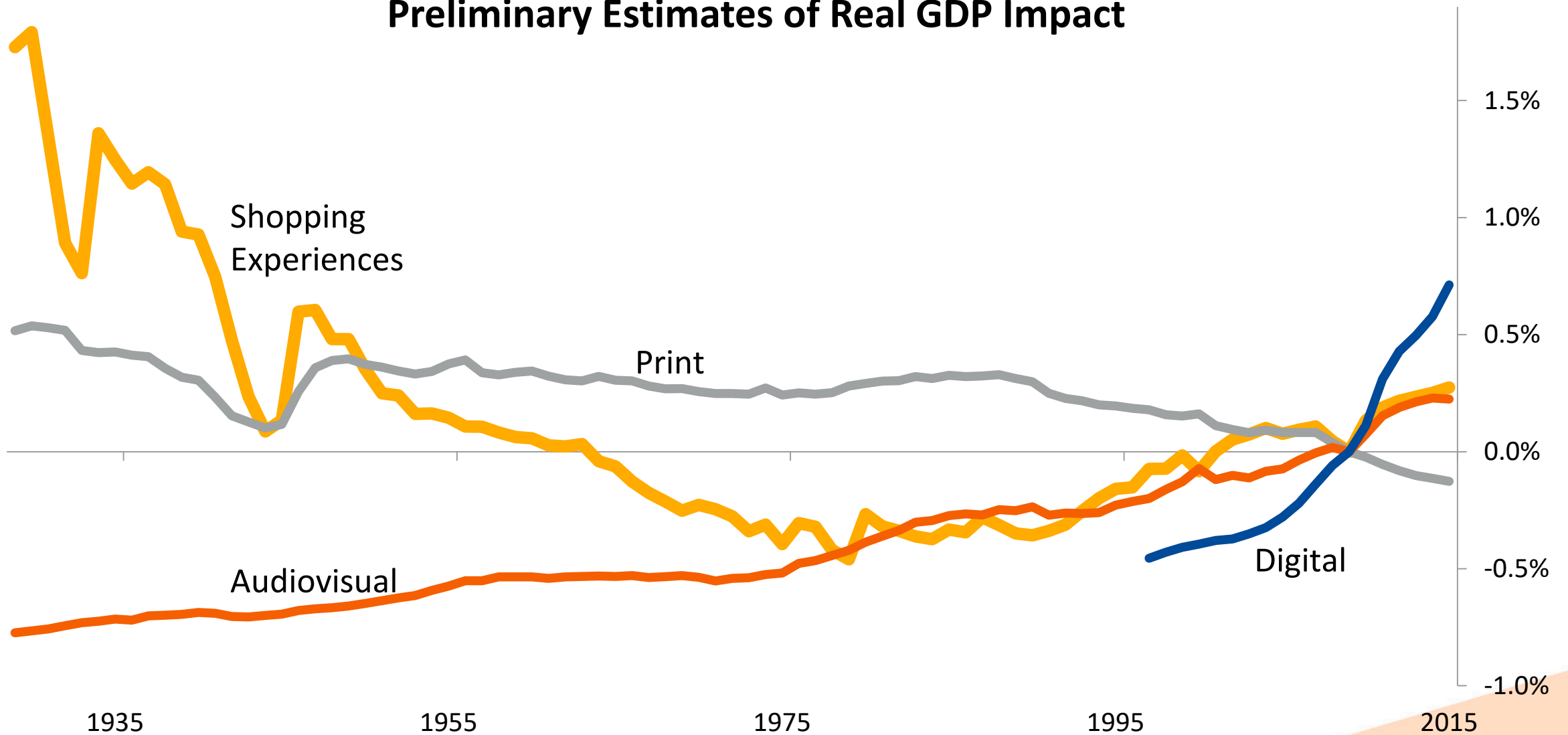 - Previously measured TFP growth was 0.64 over the same period

"Free" Content increases TFP growth

(Change in TFP Index)/(Overall TFP Index), 2009 Base Year

Print

Audiovisual

Digital

0.4%

0.2%

0.0%

-0.2%

-0.4%

-0.6%

-0.8%

1954

1974

1994

2014
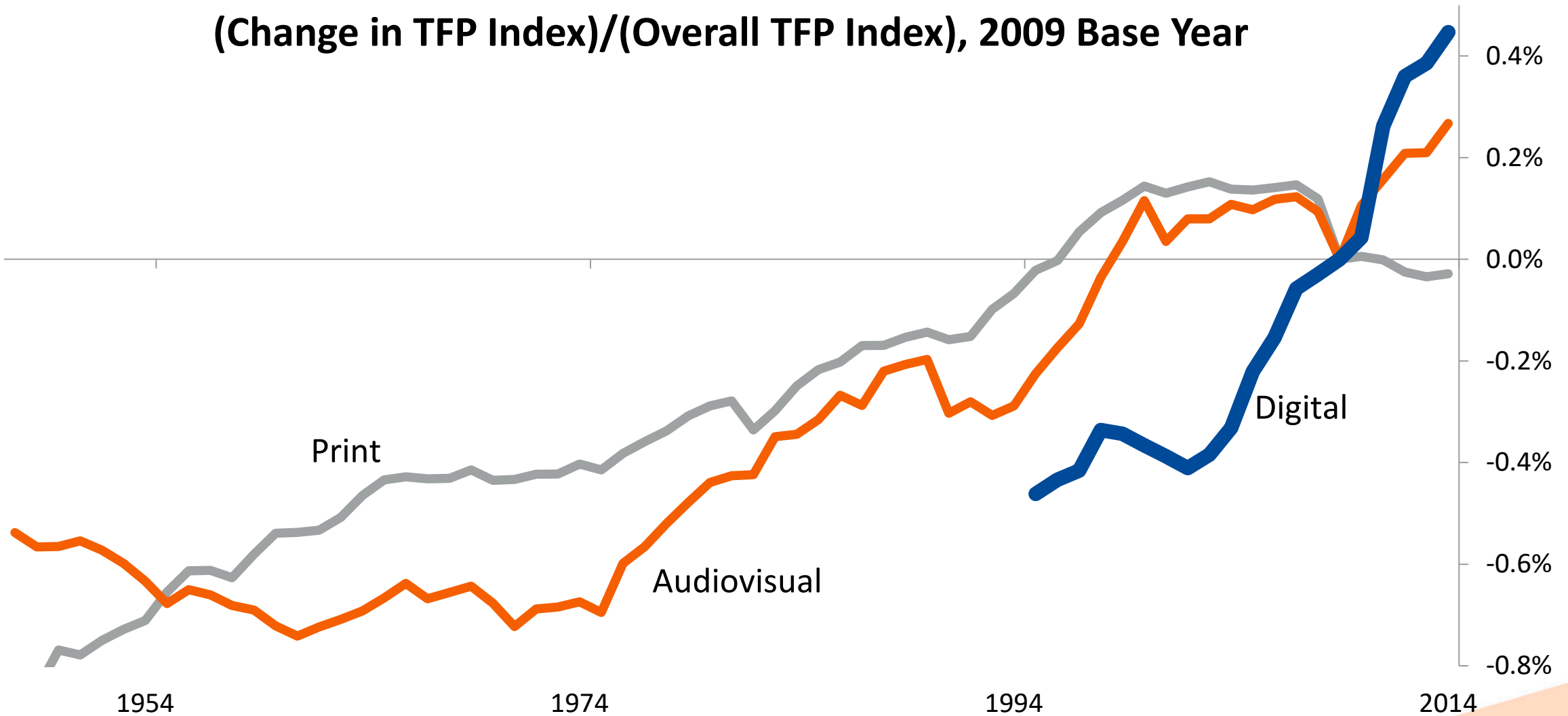
Future Work: "Free" Shopping Experiences

Preliminary Estimates of Real GDP Impact

Conclusion

"Free" Content Impact Percent points per year (ppy)	2005-2015	1995-2005	1929-1995
Nominal GDP growth	0.04	0.03	0.01
Real GDP growth	0.10	0.07	0.01
TFP growth	0.07	0.07	0.02

- These results ameliorate the recent slowdown in economic growth, but they do not reverse the slowdown entirely

- Like the rest of GDP, our production-based values are not comparable to consumer surplus values given elsewhere