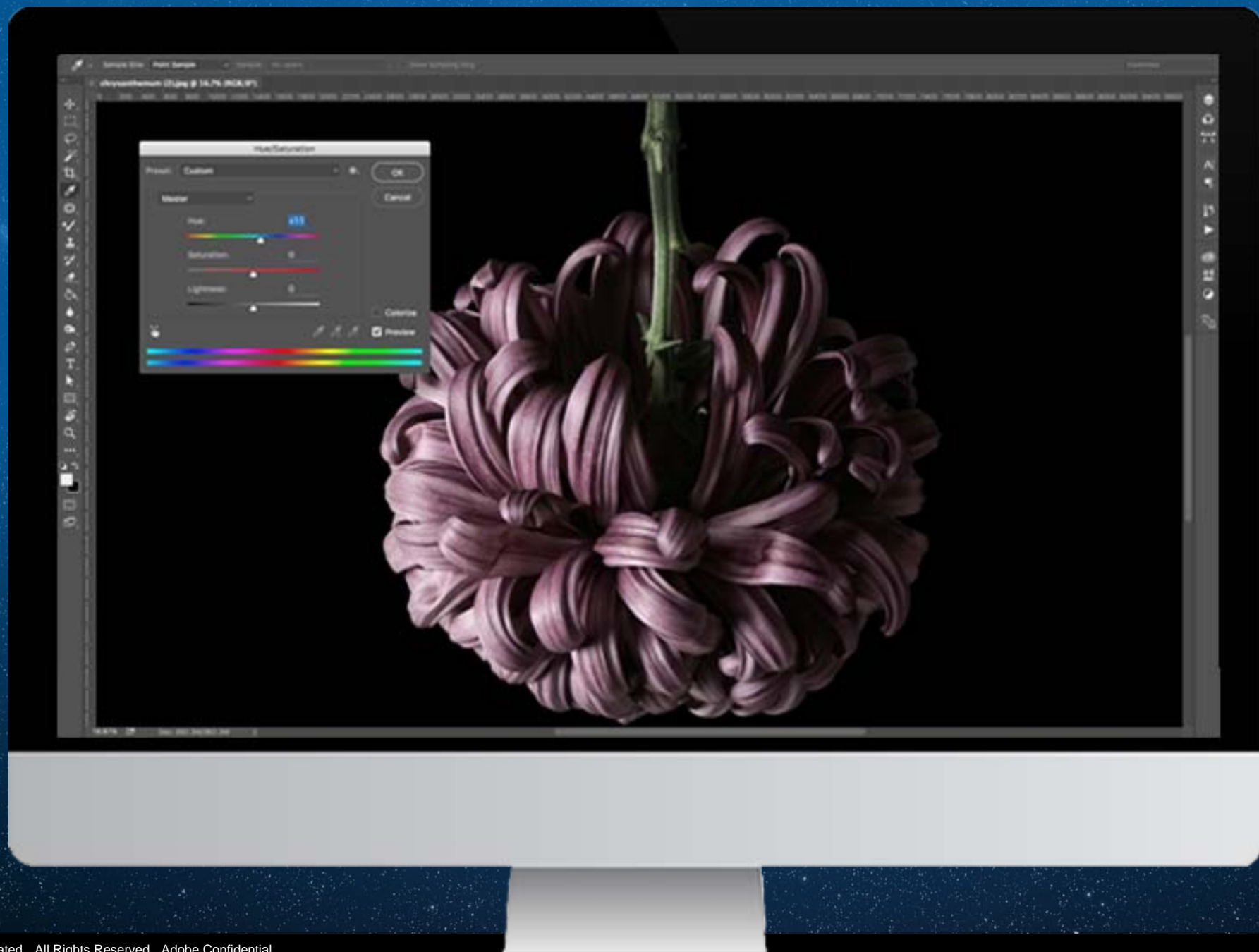
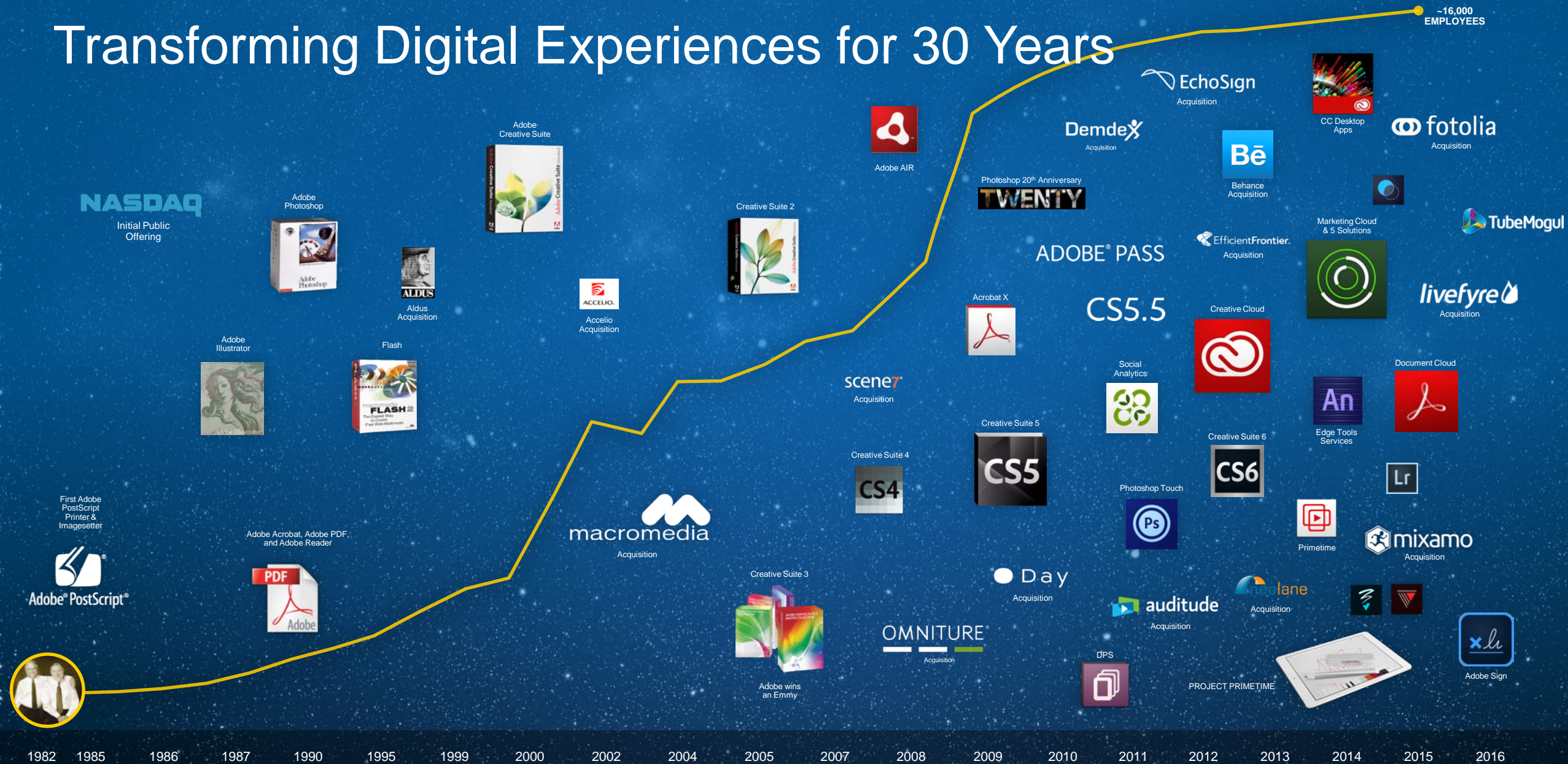


ADOBE DIGITAL INSIGHTS & DIGITAL ECONOMY PROJECT

LUIZ MAYKOT
DATA SCIENCE ANALYST



Transforming Digital Experiences for 30 Years



Adobe's Solutions

Adobe Creative Cloud

Adobe Document Cloud

Adobe Marketing Cloud

The background of the slide is a digital landscape. In the foreground, there's a dark, textured surface that looks like a cityscape or a digital terrain, with many small, glowing points of light. In the middle ground, a bright, glowing sun or light source is positioned on a horizon line, creating a lens flare effect. The sky above the horizon is a deep blue with many small, white, pixelated or star-like dots scattered throughout, suggesting a digital or space-themed environment.

CHANGING THE WORLD THROUGH DIGITAL EXPERIENCES

Adobe Marketing Cloud



ANALYTICS



EXPERIENCE MANAGER



CAMPAIGN



TARGET



SOCIAL



MEDIA OPTIMIZER



PRIMETIME



AUDIENCE MANAGER

Adobe Digital Insights Background

- Anonymous and aggregate web and app-based data collected by our clients
 - Real-time collection
 - Cloud-based, which makes data fairly standardized across clients
-
- 7.50 of every \$10 spent online with top 500 U.S. retailers go through Adobe Marketing Cloud **
-
- Adobe Marketing Cloud powers:
 - 20 of the top 30 U.S. employers
 - 9 of 10 largest U.S. hotel groups
 - 7 of 10 largest U.S. airlines
-
- Extensive data in many countries

Economist Advisors



Austan Goolsbee, University of Chicago

- Robert P. Gwinn Professor of Economics at The University of Chicago's Booth School of Business
- Formerly served as President Obama's Chairman of the Council of Economic Advisers
- The youngest member of the cabinet of President Obama



Pete Klenow, Stanford University

- Professor, Department of Economics, Stanford University
- Currently Visiting Scholar, Federal Reserve Bank of San Francisco
- Member of editorial boards for Econometrica, American Economic Review, Quarterly Journal of Economics and others

Conversations with Government Agencies

- Bureau of Labor Statistics, United States
- Federal Reserve, United States
- Census Bureau, United States
- Office for National Statistics, United Kingdom
- Central Bank of Canada, Canada
- Others



Digital Price
Index
(DPI)



Job Seeking
Index
(JSI)

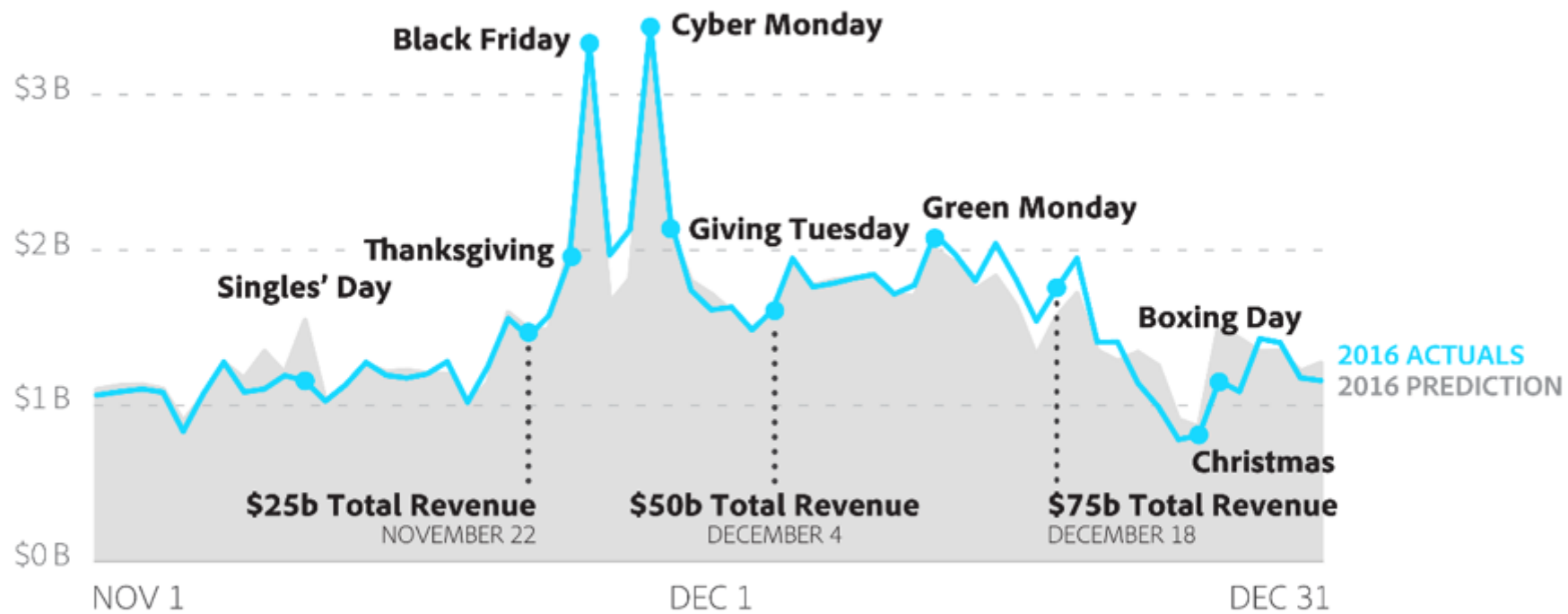


Digital Housing
Index
(DHI)



Digital Price Index Methodology (DPI)

Online Consumer Spend



ONLINE SALES FOR 2016 (US, BILLIONS)
SOURCE: ADOBE MARKETING CLOUD

Methodology – U.S.

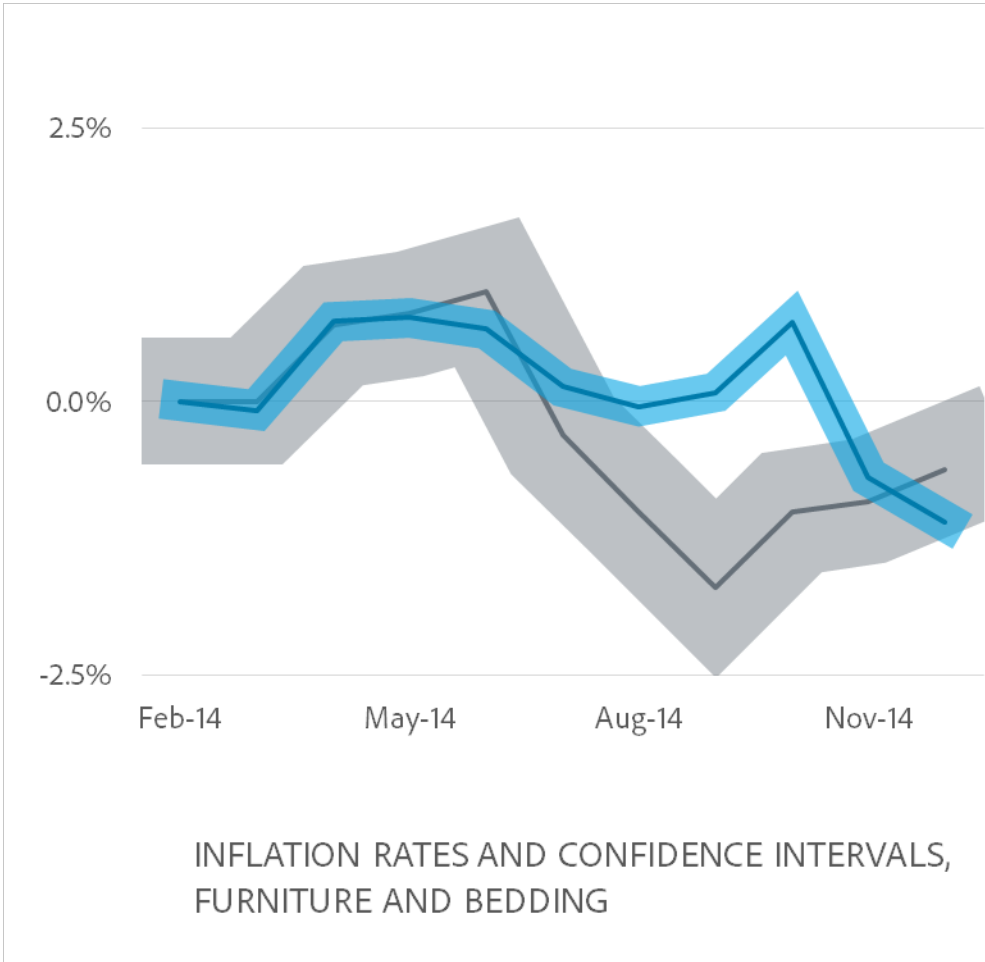
Based on analysis of aggregated and anonymous data

- Fisher Ideal Price Index
- Based on analysis of 15 billion website visits and 2.2 million products sold online

	BLS: Consumer Price Index	Adobe: Digital Price Index
Quantities Sold	No	Yes
Products/quantities updated	Every 2 years	Daily
Number of Products	83 thousand (all categories)	2.2 million (currently covered categories)
Data Collection Frequency	Bi-Monthly	Daily
Data Availability	Monthly	Daily
Offline Prices	Yes	No
Long history	Yes	No
All categories of spending	Yes	No
Index Type	Laspeyeres	Fisher Ideal

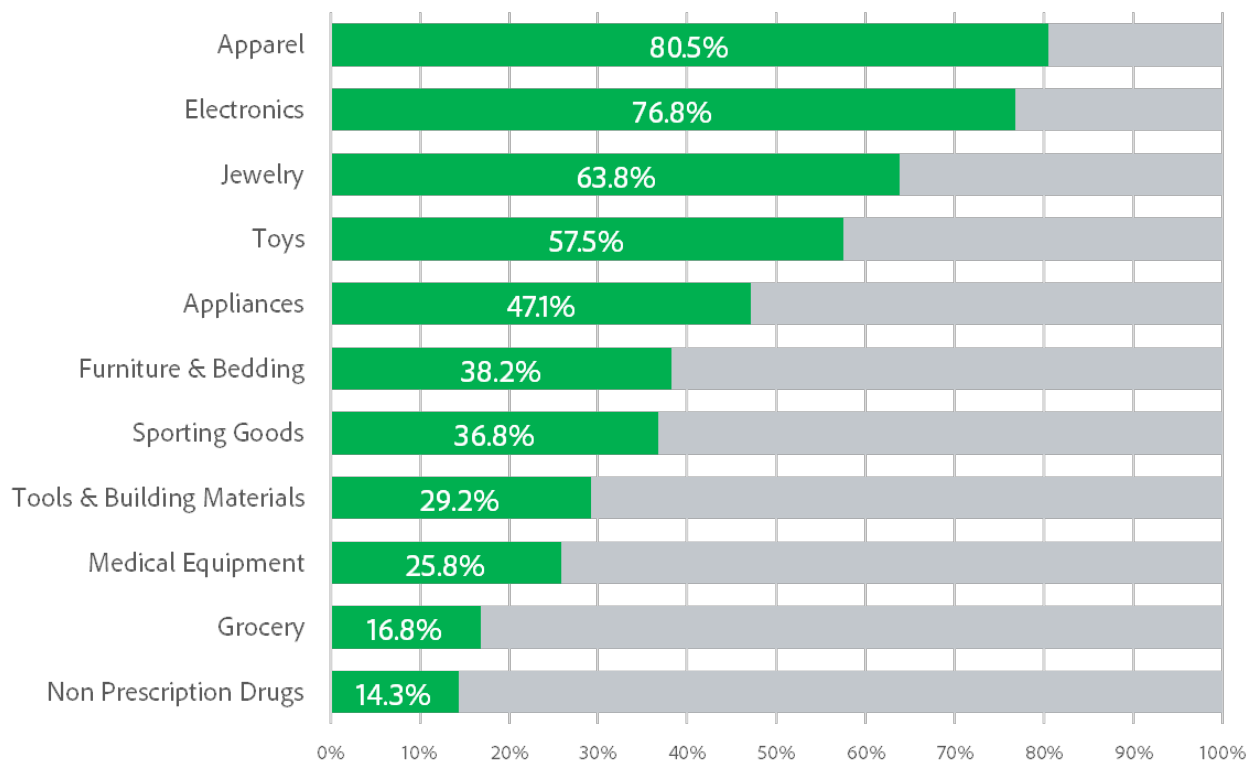
** Latest IR Top 500 Report 2015

Big data in DPI decreases uncertainty



	DPI	CPI
Appliances	0.15%	0.46%
Airfare	0.08%	0.51%
Computers	0.28%	0.49%
Furniture and bedding	0.07%	0.31%
Grocery	0.10%	0.12%
Hotels: domestic	0.04%	2.30%
Medical equipment and supplies	0.20%	0.39%
Nonprescription Drugs	0.18%	0.47%
Sporting Goods	0.12%	0.31%
Televisions	0.24%	0.60%
Toys	0.25%	0.59%

Measuring rapidly shifting consumer preferences



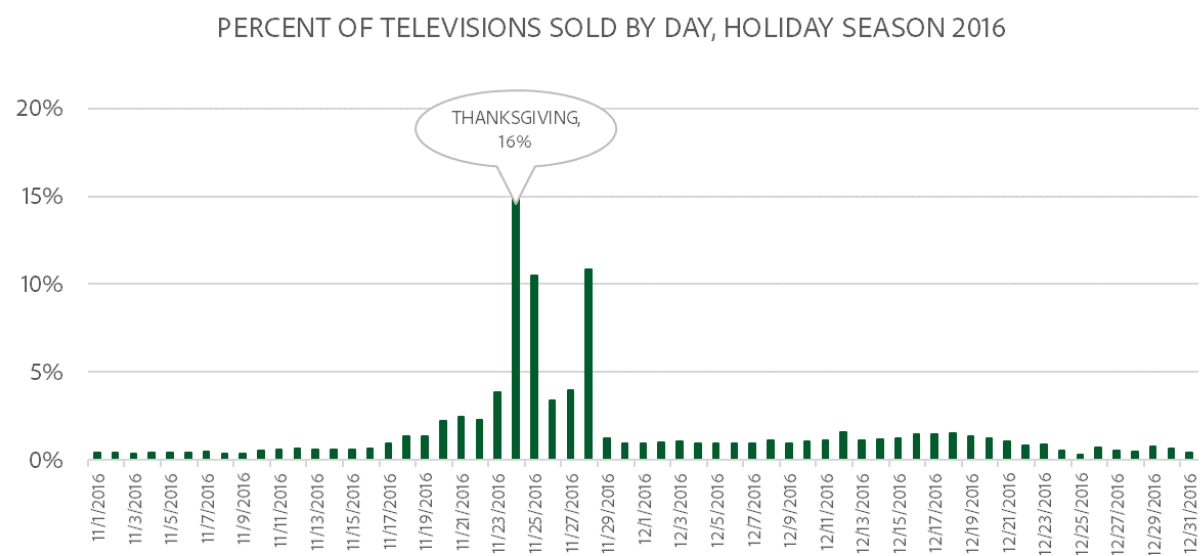
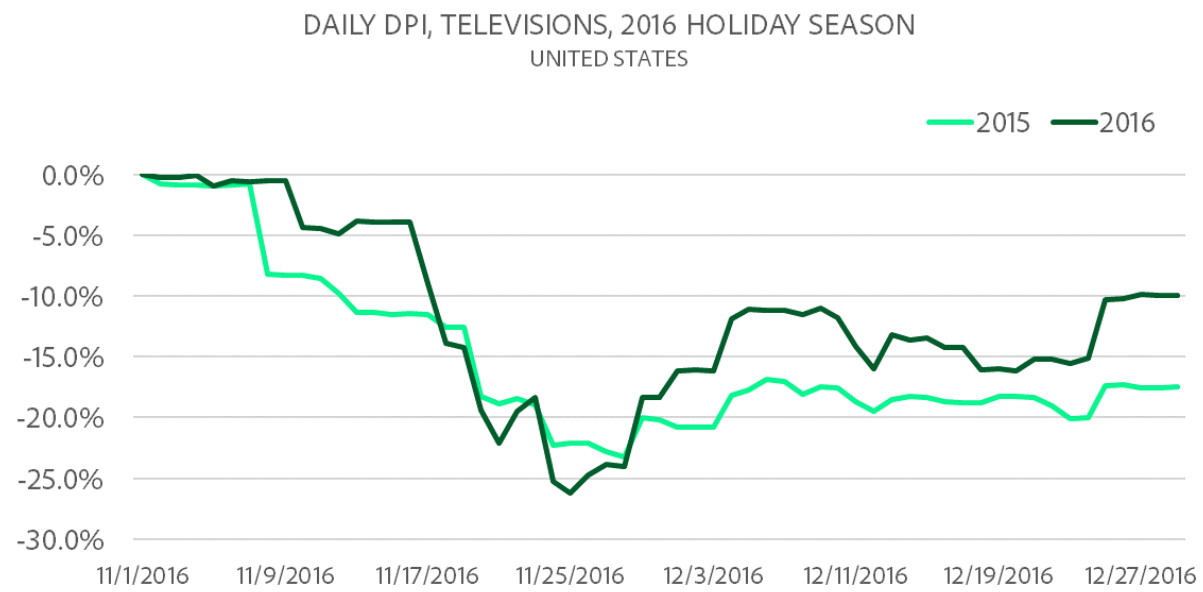
PERCENT OF SPEND ON NEW PRODUCTS, INTRODUCED IN THE LAST YEAR
SOURCE: ADOBE ANALYTICS

- Electronics see an average of 77% of online spend on new* products**
- 17% of monthly online spend for groceries on new products

* Products that have been available for 1 year or less

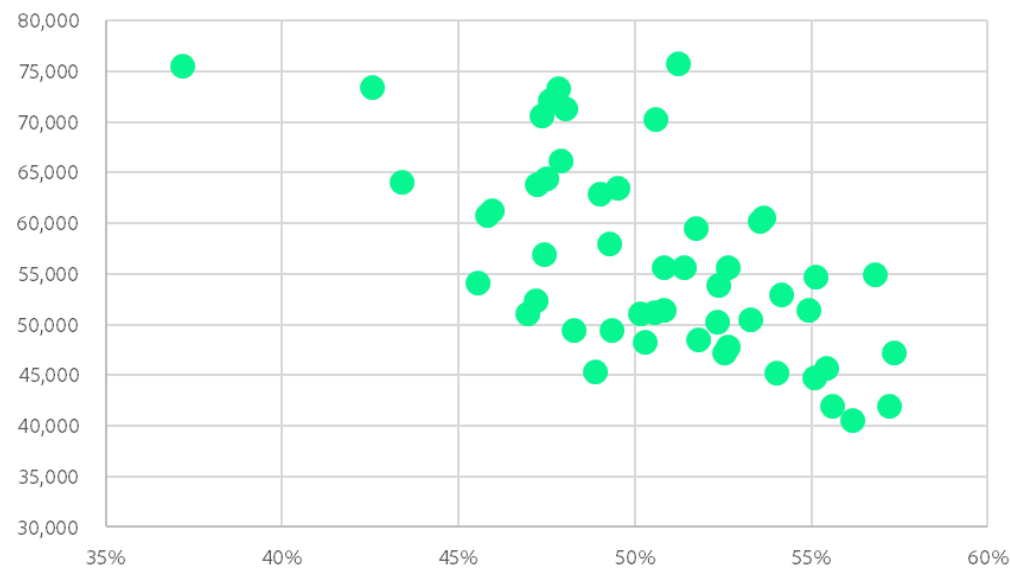
** A product is defined as an item for purchase which has a unique identifier (such as

The Importance of detail: Black Friday discount comparisons

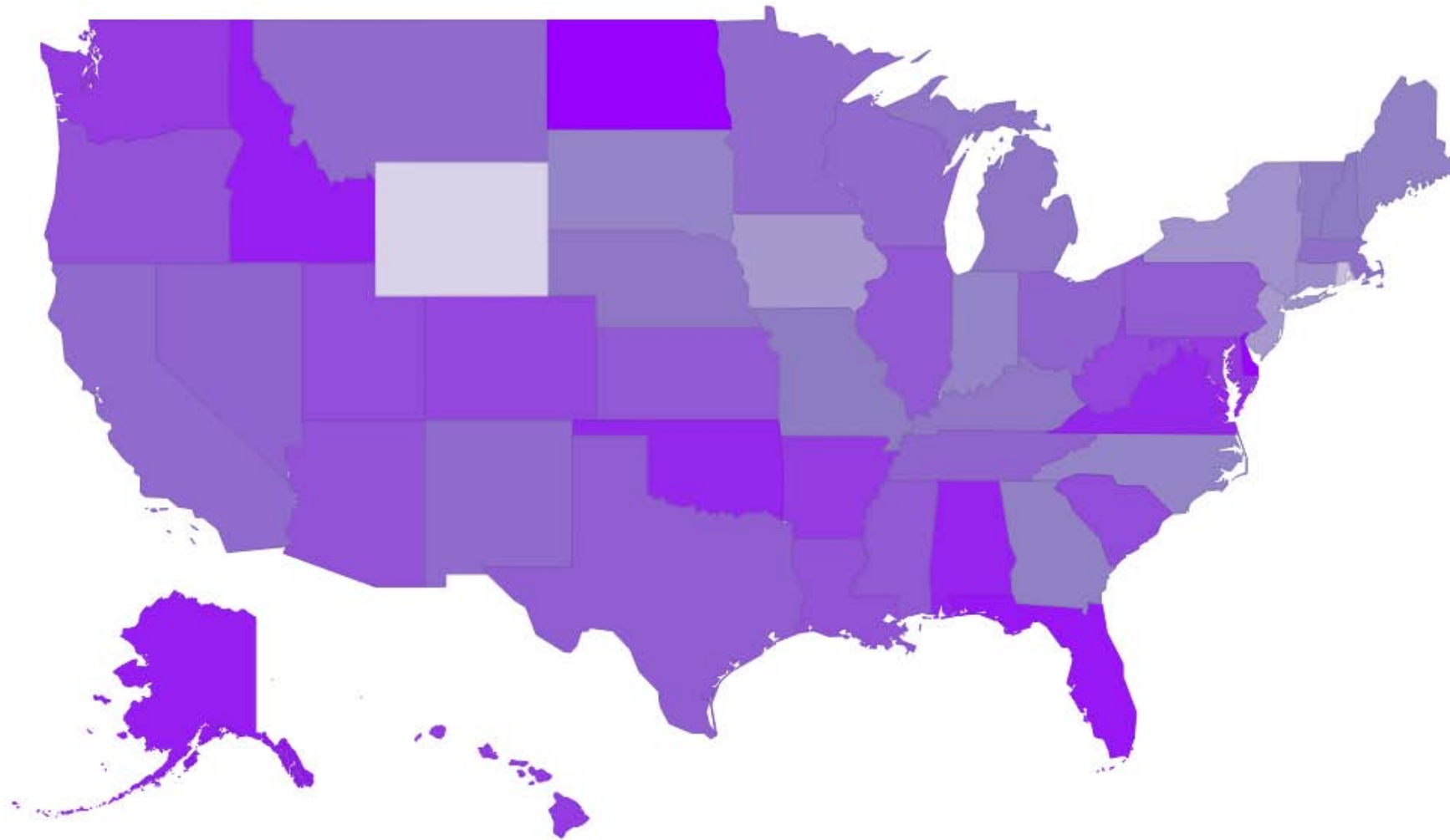


Black Friday most important in low-income states

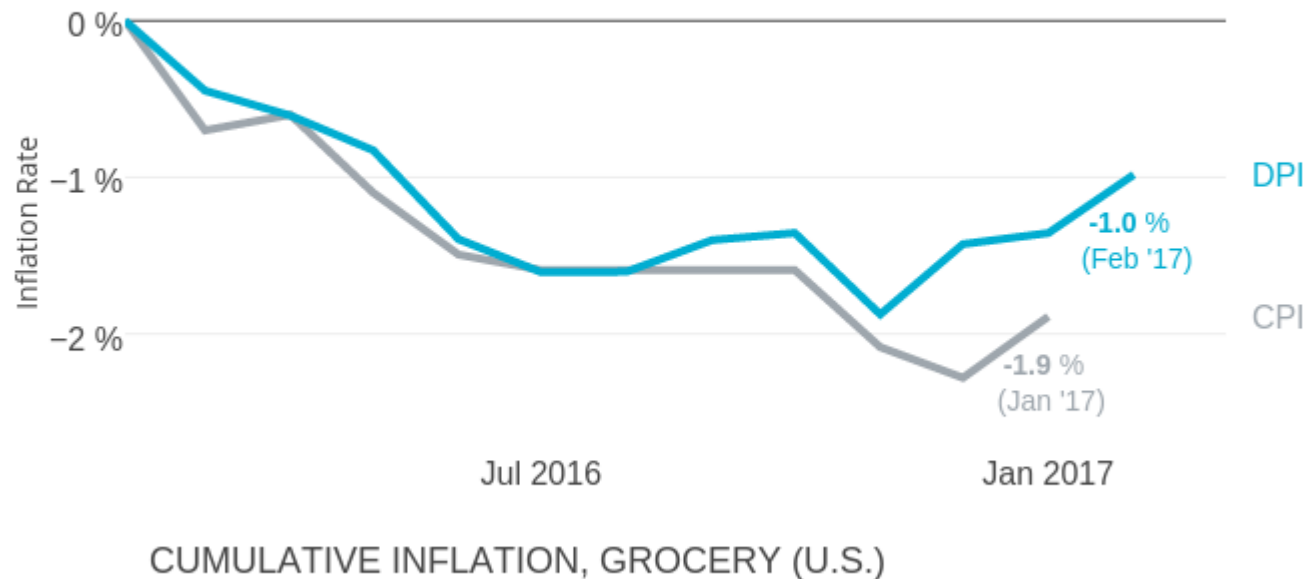
2015 state median income (Y) vs. Percent of Televisions bought on Black Friday week



Geographic data



Groceries – U.S.

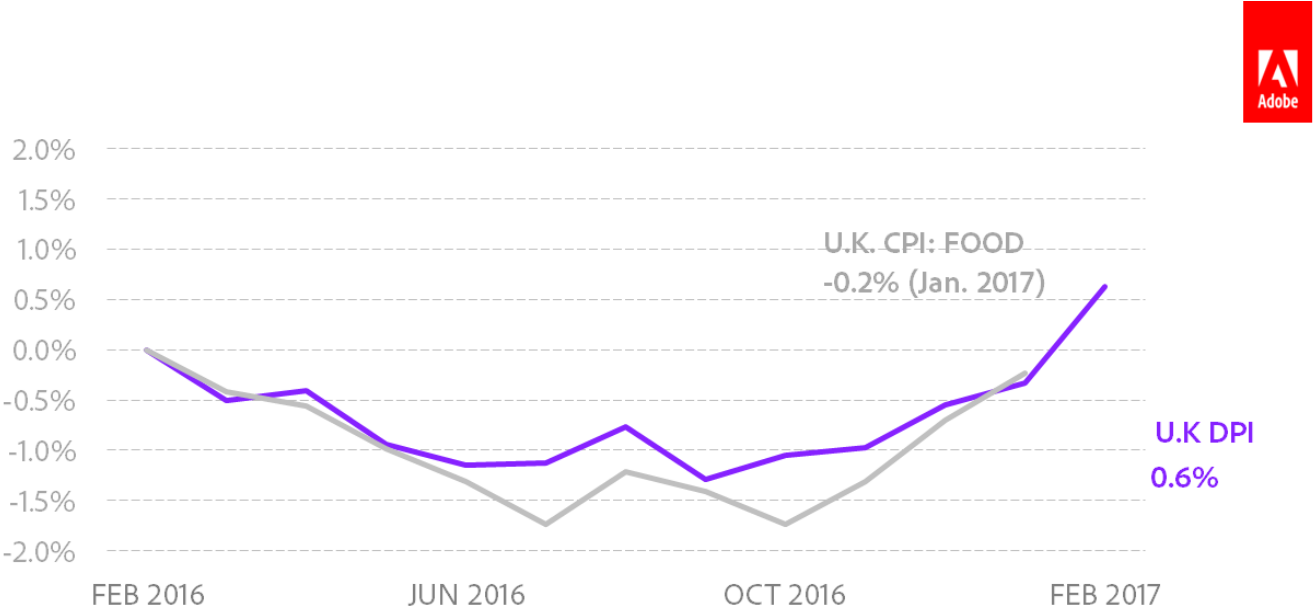


- Adobe DPI shows cumulative deflation of -1.0% YoY (February 2016 to February 2017)
 - *Main YoY deflation for eggs (-22.7%), beverages (-3.2%) and cheese (-2.2%)*
- For February 2017, prices increased 0.4% vs January 2017 MoM
 - *Main price increases for dairy products including ice cream (inflation 1.3% MoM) and cheese (1.0% MoM). Meats and poultry products also saw a 0.6% MoM increase*

METHODOLOGY:

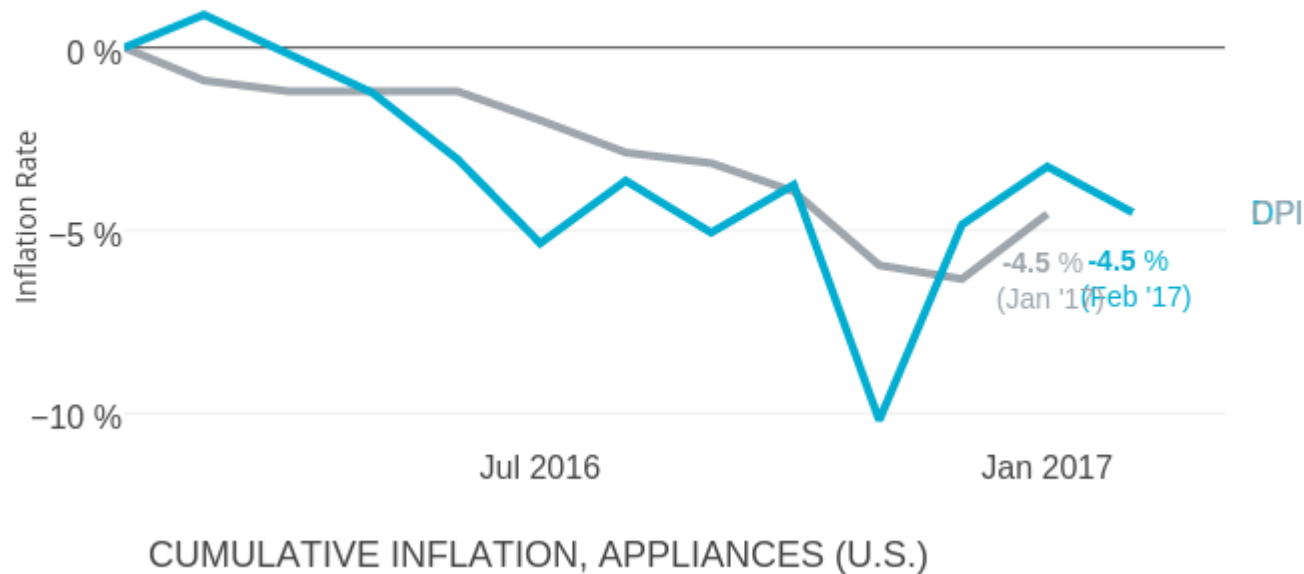
- *Our dataset covers an estimated 30-40% of all online grocery purchases. It contains transactions for ~195k products*
- *The mix of grocery products bought online is not the same as offline – the top category for online shopping is drinks (nonalcoholic), while for offline shopping it is meat*

Grocery - U.K



CUMULATIVE INFLATION, GROCERIES 2/16-2/17 (U.K.)
SOURCE: ADOBE ANALYTICS

Appliances



Adobe DPI shows cumulative deflation of -4.5% YoY (February 2016 to February 2017)

- *Main YoY price decreases for Appliances priced between \$200 and \$400*

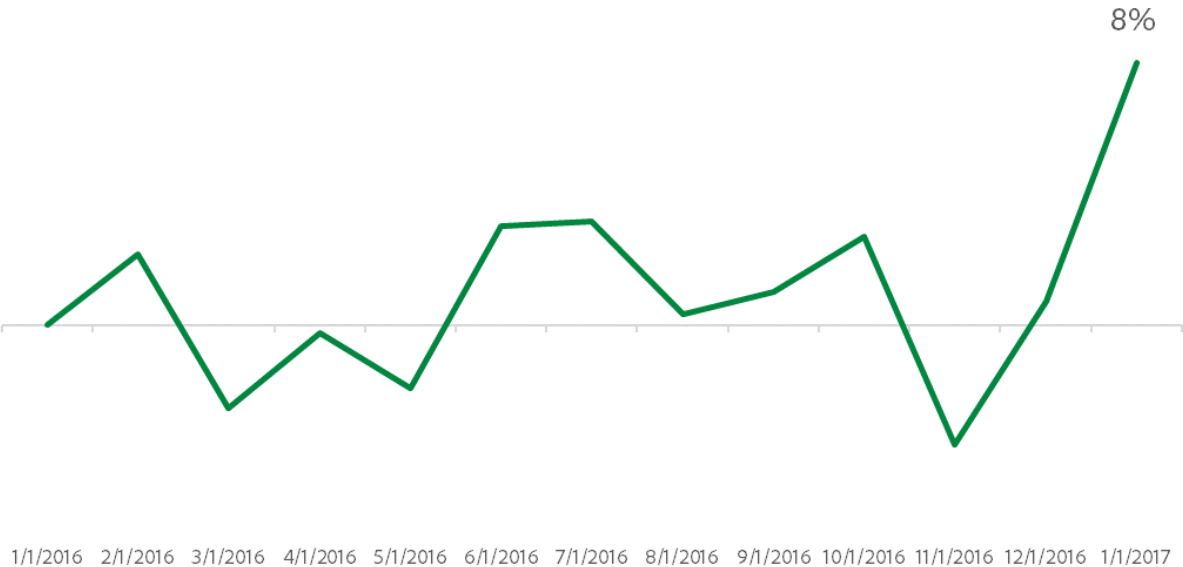
For February 2017, prices decreased -1.3% vs January 2017 MoM

METHODOLOGY:

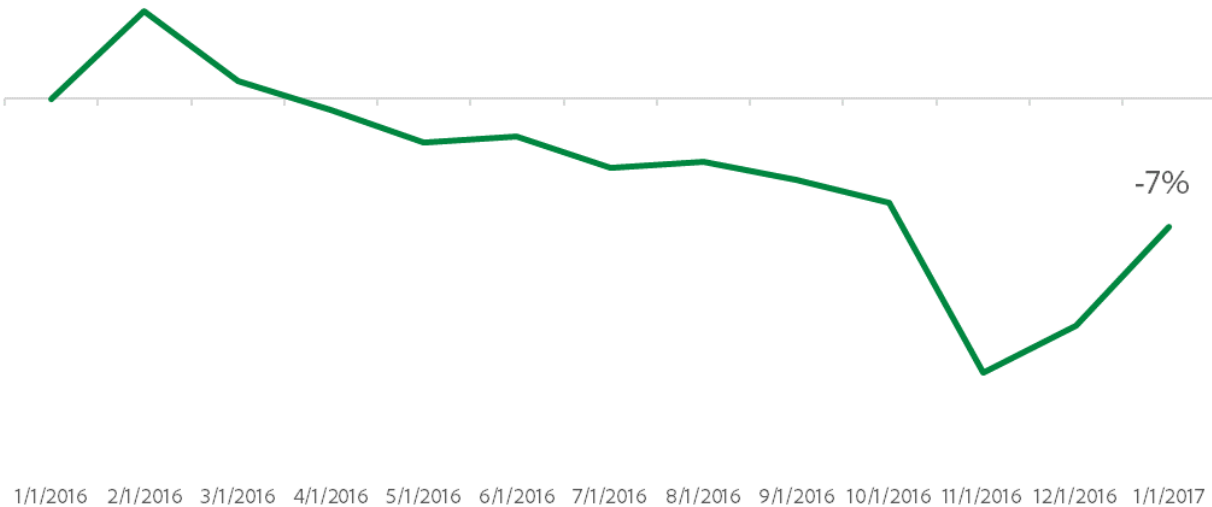
- *The data used contains transactions for ~110 K products*
- *Products include large appliances such as fridges, ovens, washers, dryers as well as smaller appliances such as vacuums, mixers, blenders etc*

Appliances – Brazil (draft, do not quote)

Appliances, Brazil



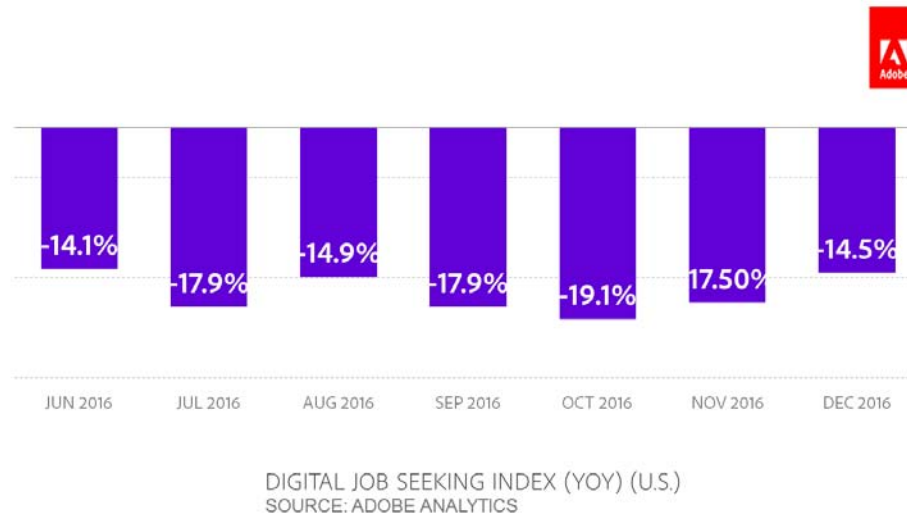
Electronics, Brazil





Job Seeking Index (JSI)

Online job seeking continues YoY declines



US online job seeking is down 14.5% YoY in December

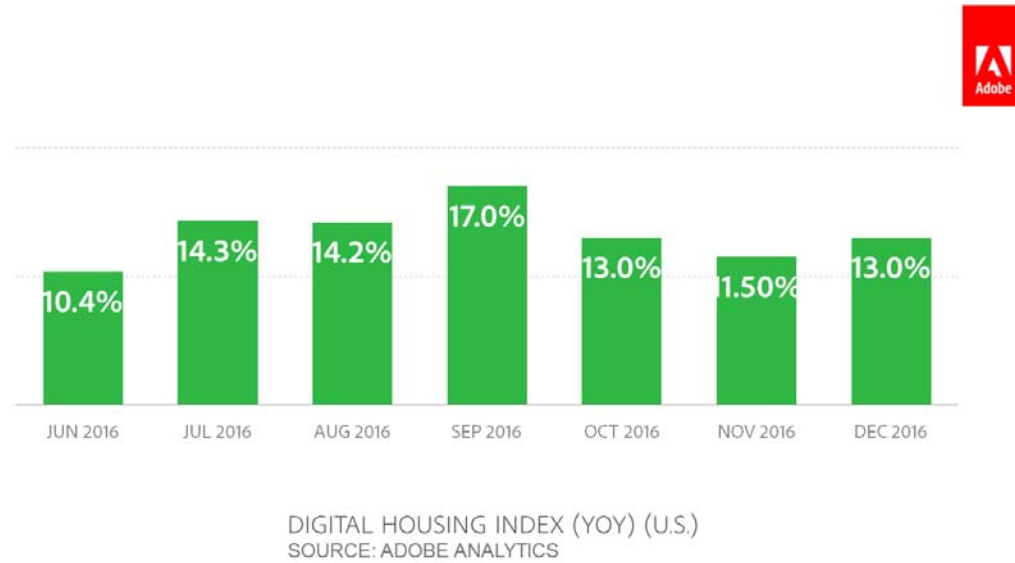
METHODOLOGY:

- Based on analysis of aggregated and anonymous data from more than 1 billion visits to U.S. employment-search websites and top employer career pages
- Adobe Marketing Cloud powers 20 of the top 30 U.S. employers**



Digital Housing Index (DHI)

Online housing search grows YoY



Online search for purchases and rentals is up 13% YoY in December.

METHODOLOGY:

- Based on analysis of aggregated and anonymous data from more than 2 billion visits to U.S. housing search websites



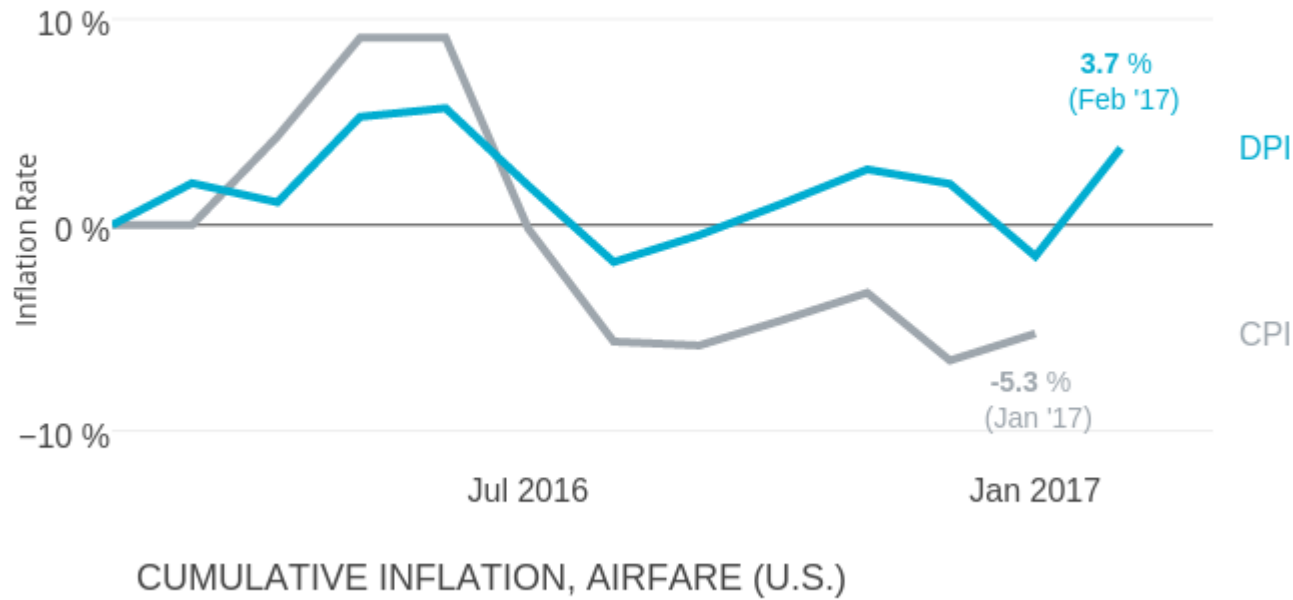
Adobe

Digital Price Index: Fisher Ideal Price Index

- The Fisher Ideal Price Index uses quantities purchased on the current period (month) and a previous period (previous month) to determine actual consumer's preferences. Instead of assuming that consumers preferences for what goods to buy are constant over a certain number of years, it is able to account for the fact that they are constantly changing what they buy.

$$\text{Fisher } \pi_t = \sqrt{\frac{\sum_{i=1}^n P_{it} U_{it-1}}{\sum_{i=1}^n P_{it-1} U_{it-1}}} * \sqrt{\frac{\sum_{i=1}^n P_{it} U_{it}}{\sum_{i=1}^n P_{it-1} U_{it}}}$$

Airfare

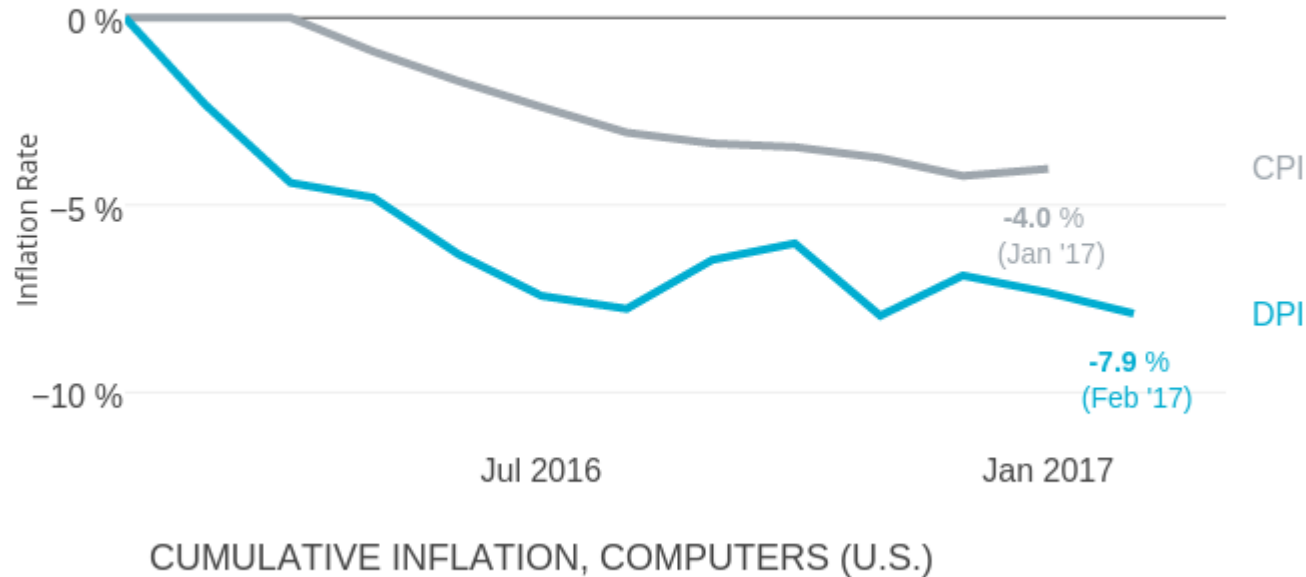


- Adobe DPI shows cumulative inflation of 3.7% YoY (February 2016 to February 2017)
- For February 2017, prices increased 5.3% vs January 2017 MoM

METHODOLOGY:

- The data used contains transactions for ~370 K flight routes
- Includes associated fees, where applicable

Electronics: computers

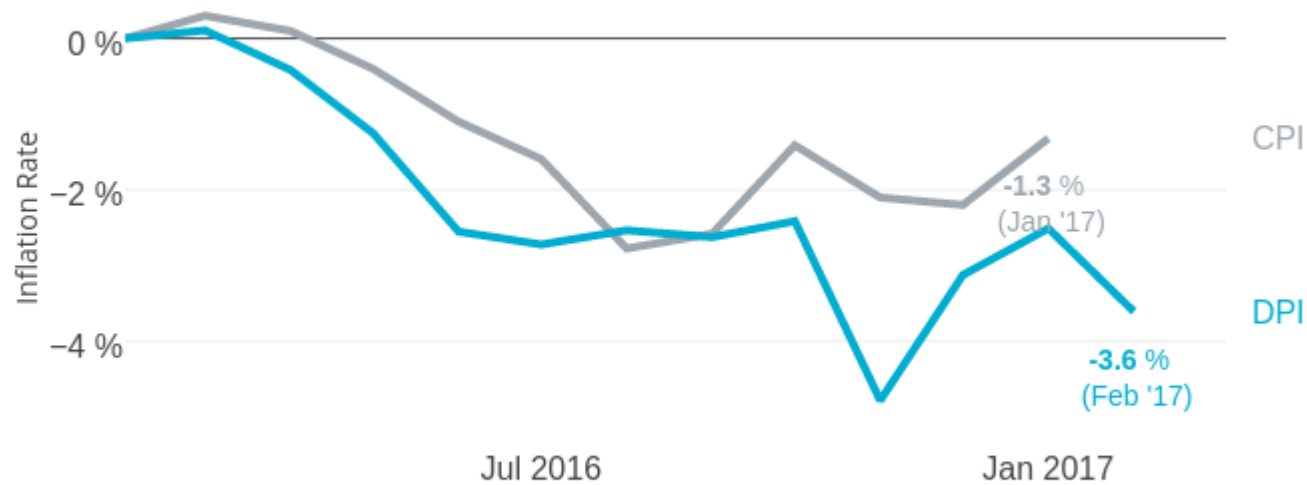


- Adobe DPI shows cumulative deflation of -7.9% YoY (February 2016 to February 2017)
 - Main YoY price decreases for Computers priced between \$700 and \$1200
 - Main YoY price increases for Computers priced between \$0 and \$300
- For February 2017, prices decreased -0.6% vs January 2017 MoM

METHODOLOGY:

- The data used contains transactions for ~63 K products
- Products span across dozens of different categories such as televisions, laptops, Blu-ray players, desktops, tablets, wearables, headphones, video games, printers etc..

Furniture and Bedding



CUMULATIVE INFLATION, FURNITURE AND BEDDING (U.S.)

METHODOLOGY:

- The data used contains transactions for ~173 K products
- Products include interior and exterior furniture, mattresses and other bedding products

- Adobe DPI shows cumulative deflation of -3.6% YoY (February 2016 to February 2017)
 - Main YoY price decreases for Furniture and bedding priced between \$100 and \$150
- For February 2017, prices decreased -1.1% vs January 2017 MoM

Inflation rates by price ranges

