

Health Care Satellite Account

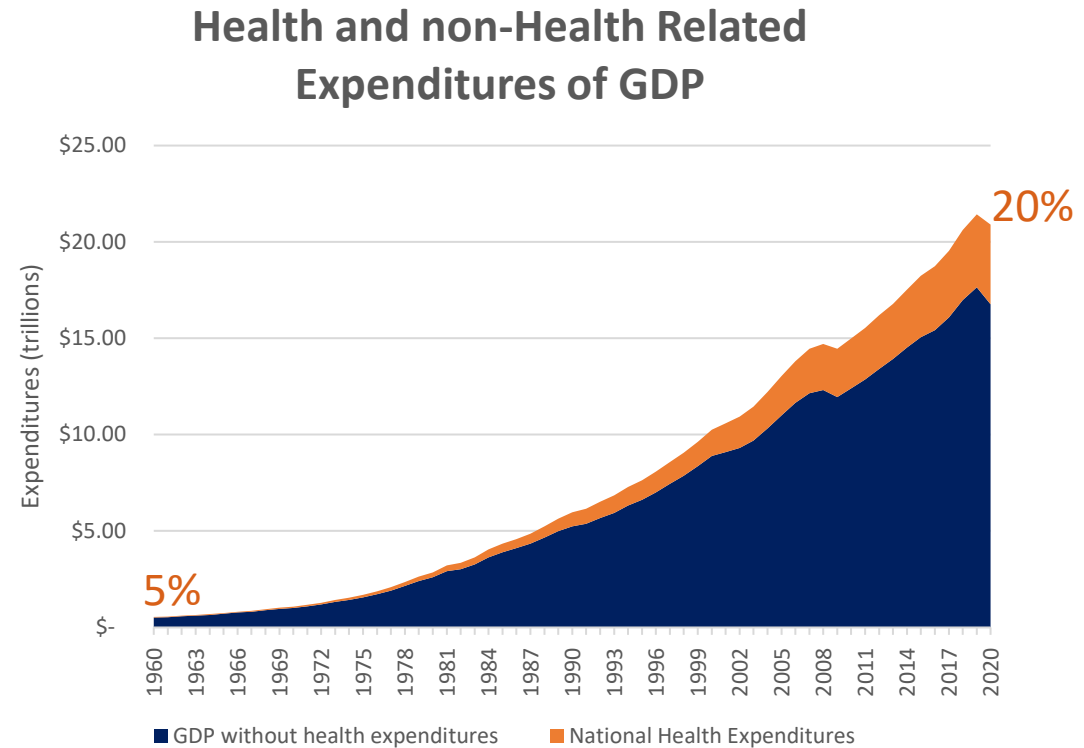
Abe Dunn, Assistant Chief Economist

November 18th, 2022

The views expressed in this presentation are those of the author and do not necessarily represent the U.S. Bureau of Economic Analysis or the U.S. Department of Commerce.



- Motivation for BEA's Health Care Satellite Account (HCSA)
- Background on the HCSA
- Research in quality-adjustment



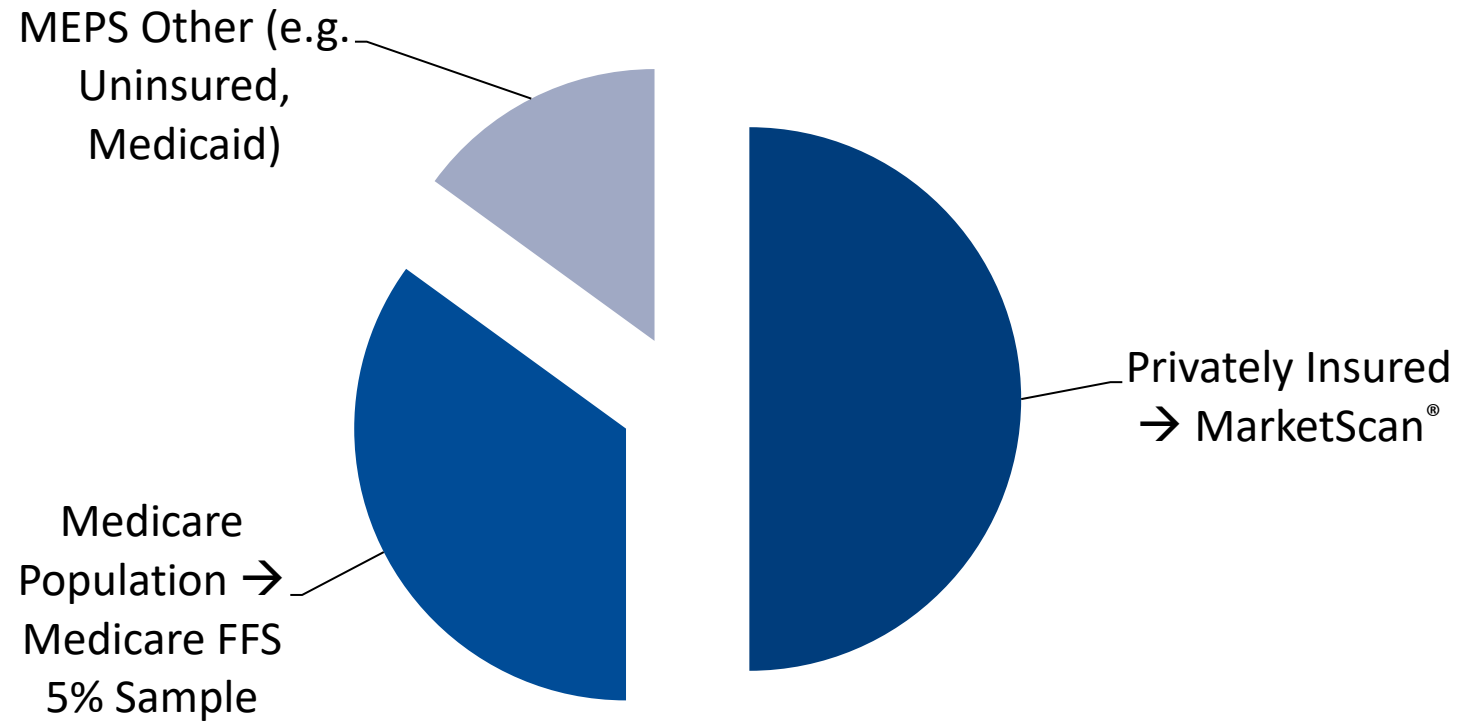
- HCSA's goal: improve understanding of health care spending in the United States
- Redefine output and spending into more meaningful units
 - Output is the treatment of a condition (e.g., diabetes) not individual goods and services (e.g., prescription drug or doctor's office visit)
- Example
 - Output = number of patients treated for diabetes
 - Expenditures = spending on the treatment of diabetes
 - Price = average spending per treated patient for diabetes

HCSA provides 2 versions (currently covering 2000-2019)

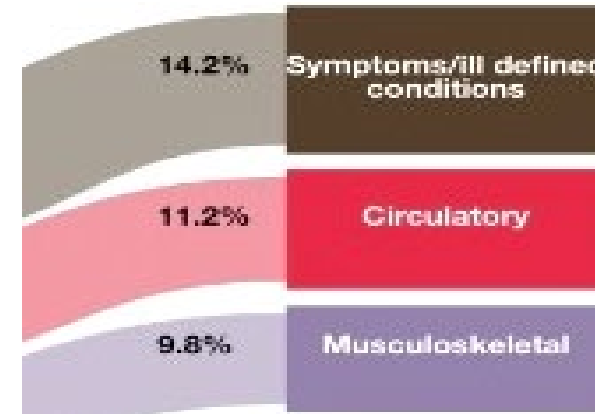
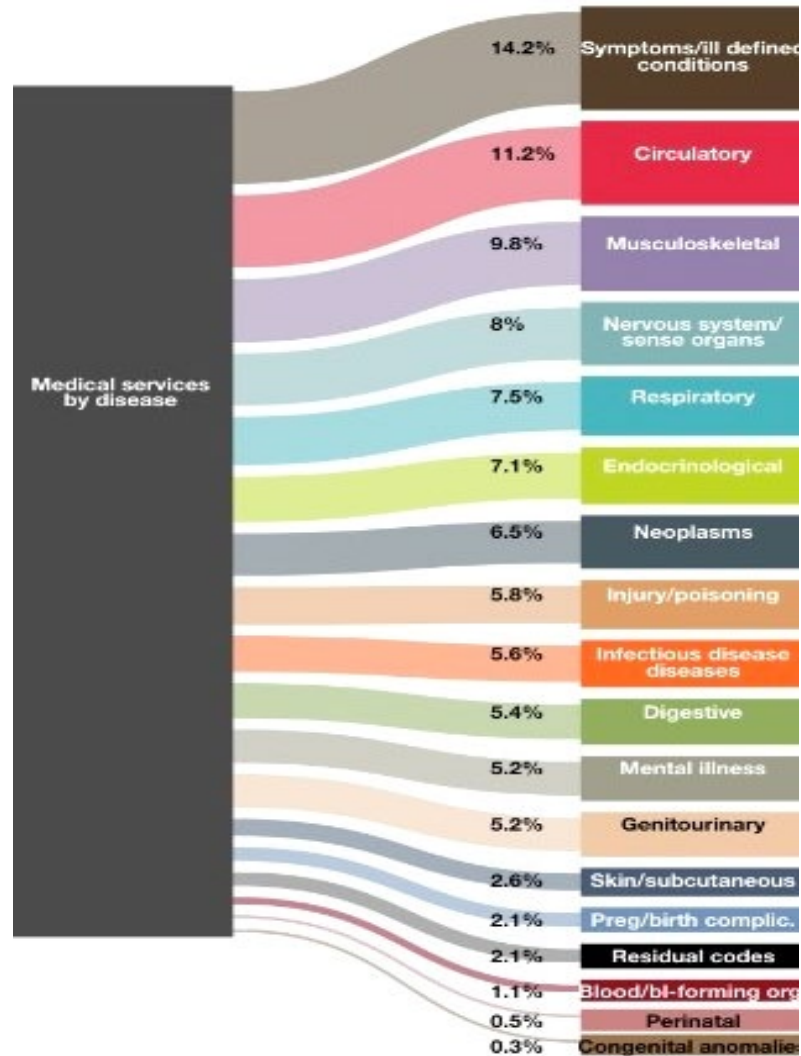
1. “MEPS Account” – using Medical Expenditure Panel Survey (MEPS)
 - Publicly available survey with around 30 thousand individuals annually

2. “Blended Account” – MEPS, MarketScan[®] claims data, and Medicare claims data
 - Incorporates millions of enrollees and billions of claims for Medicare population and private insurer claims

Use population weights from MEPS to fold in data from different sources

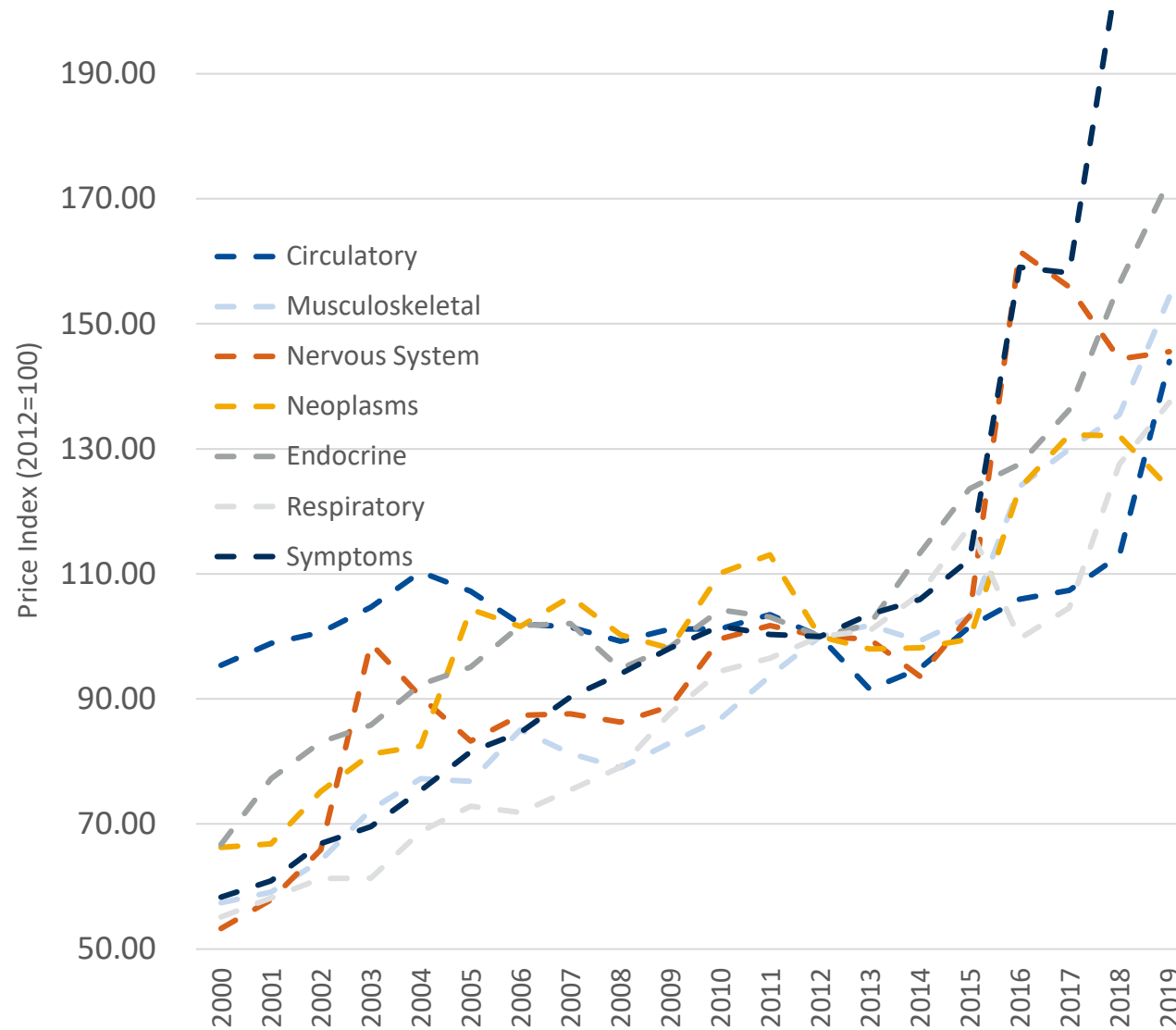


Health Care Satellite Account, Blended

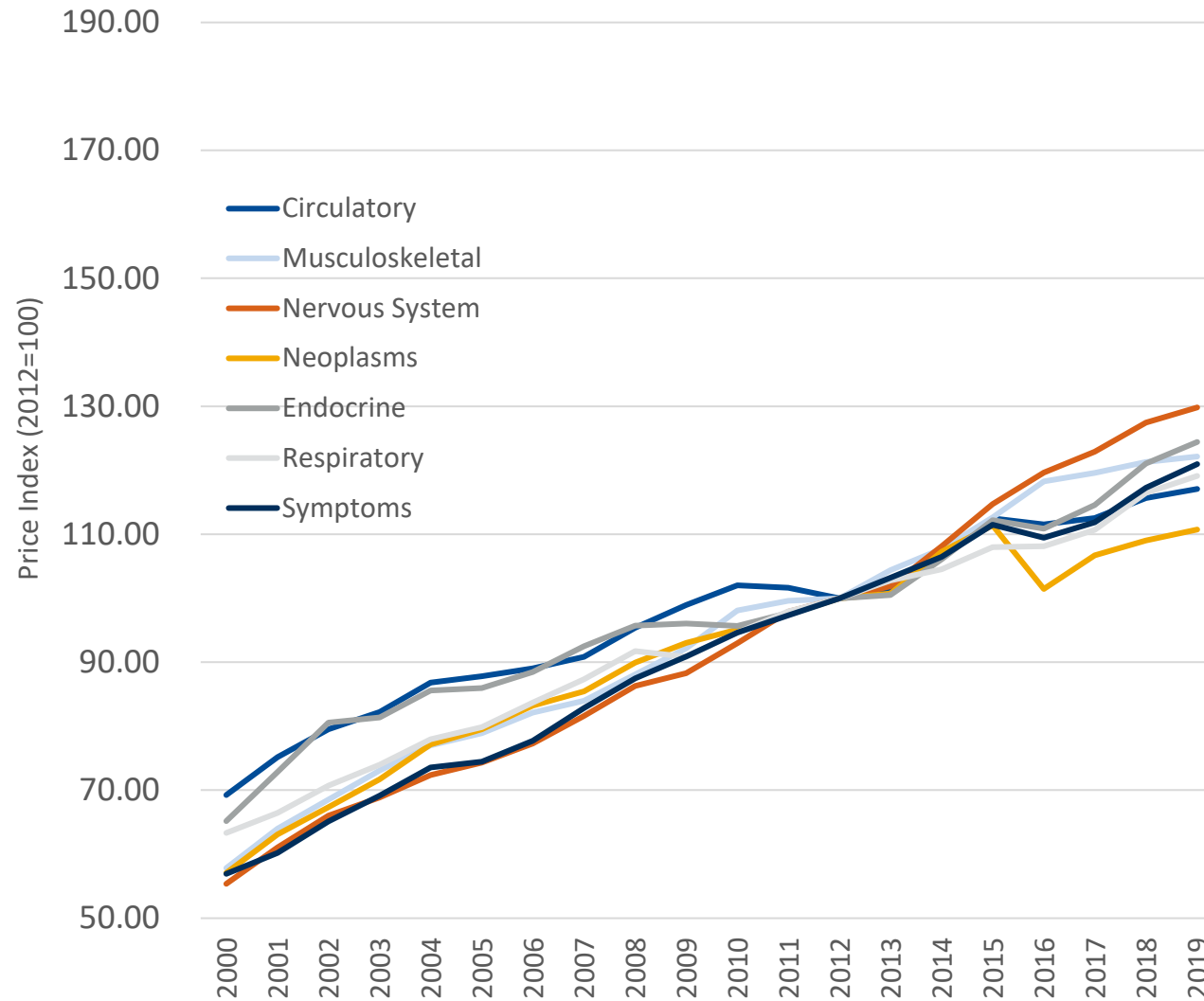


Satellite account currently includes 18 broad diseases

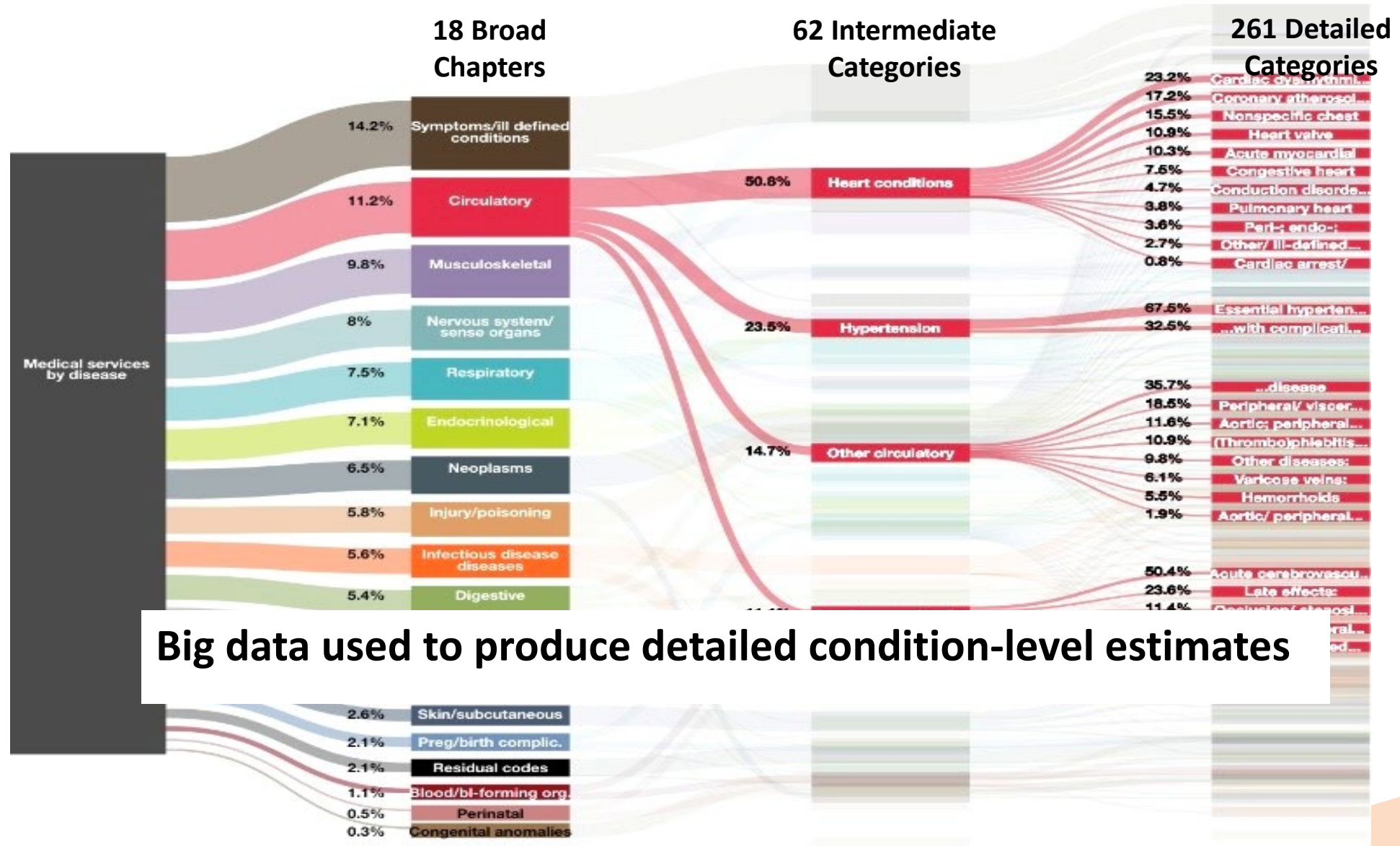
Volatile trends in disease-based price indexes using the MEPS account index



Less volatile disease-based price indexes using the Blended account index



Health Care Satellite Account, Blended

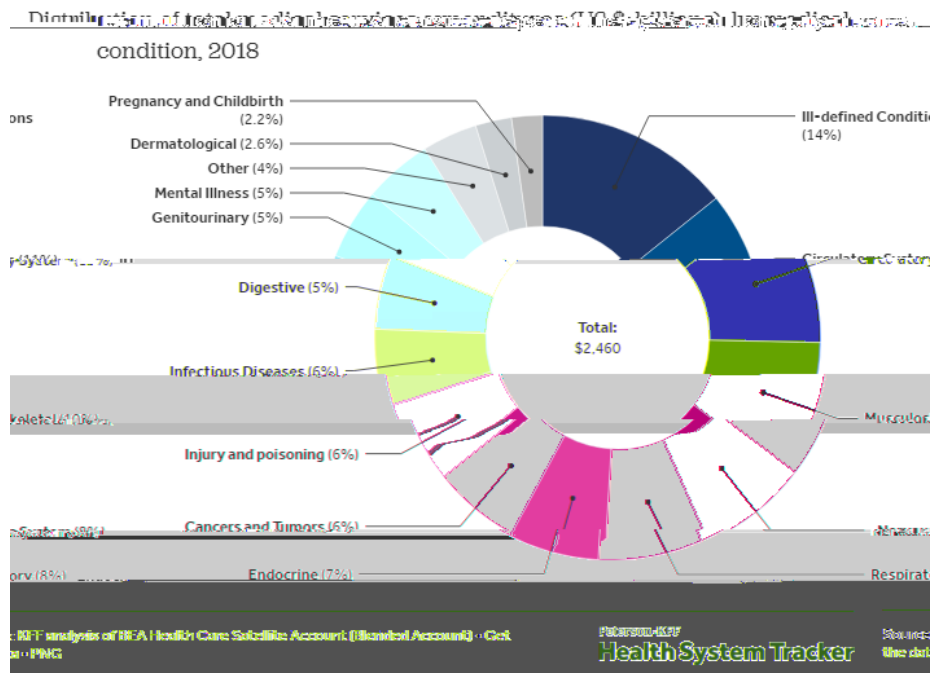


Big data used to produce detailed condition-level estimates

THE WALL STREET JOURNAL

The Diseases We Spend Our Health Dollars On

But there is good news for those who want to understand more. The [Bureau of Economic Analysis](#) (BEA) has made a real contribution to making health spending more comprehensible by analyzing health spending and price growth by common diseases and diagnoses such as cancer, heart disease, diabetes, and even the common cold.

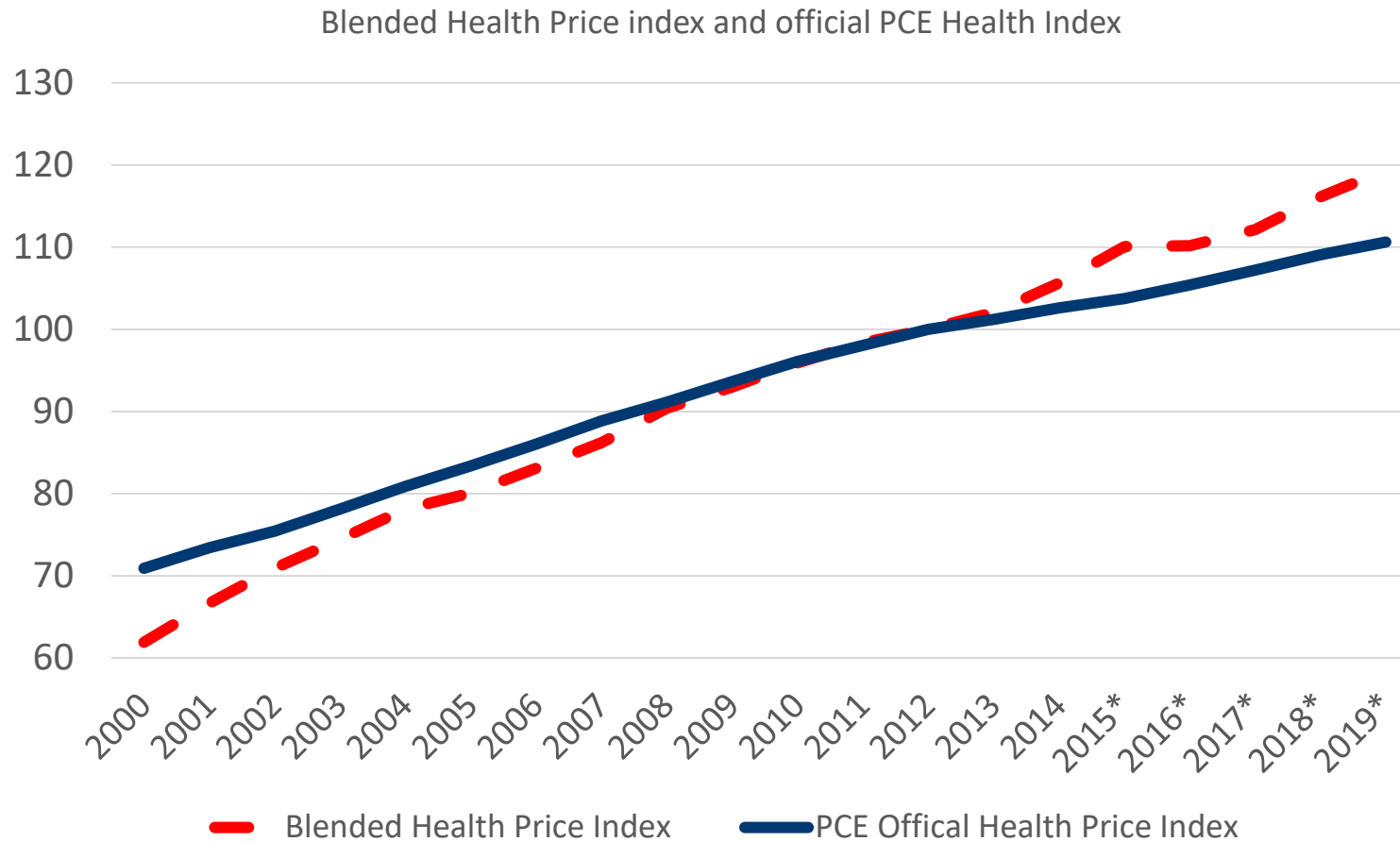


HealthAffairs

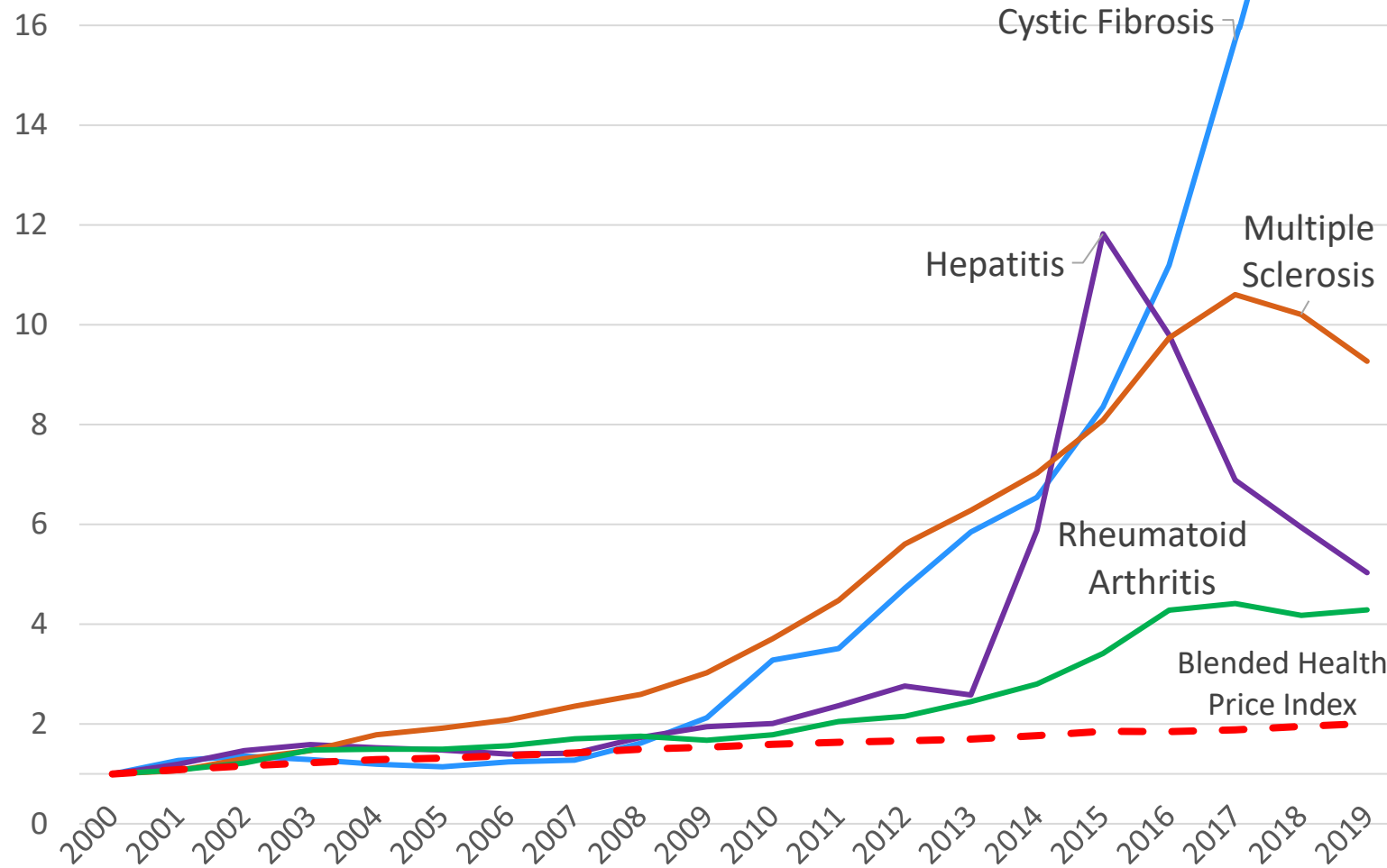
At Last: The Data To Routinely Discuss Health Spending By Medical Condition

- Between 2000 and 2019:
 - Health care spending grew from 13% to 18% of GDP
 - Life-expectancy has increased by 2 years from 2000-2019
 - Innovation is a key driver of spending growth in health care – Chernew and Newhouse (2011)
- Nearly half of the bias in the Personal Consumption Expenditure (PCE) deflator is due to unmeasured quality changes in the health sector
 - Lebow and Rudd (2003); Groshen, Moyer, Aizcorbe, Bradley and Friedman (2017)

Disease-based index grows faster than the official PCE health price index



Disease-based price indexes for select high price growth conditions



Estimates from the HCSA Blended detailed data.

Recent related literature (past 7 years)

- **Cutler, David, Kaushik Ghosh, Cassandra Messer, Trivellore Raghunathan, Allison Rosen and Susan Stewart. (2022): “A Satellite Account for Health in the United States,” American Economic Review.**
- Lucarelli, Claudio, Sean Nicholson, and Nicholas Tilipman. (2022): "Price Indices and the Value of Innovation with Heterogenous Patients." Journal of Health Economics 84
- Matsumoto, Brett. “Producing Quality Adjusted Hospital Price Indexes.” No. 543. Bureau of Labor Statistics, 2021.
- Eggleston, Karen, Brian K. Chen, Chih-Hung Chen, Ying Isabel Chen, Talitha Feenstra, Toshiaki Iizuka, Janet Tinkei Lam, Gabriel M. Leung, Jui-fen Rachel Lu, Beatriz Rodriguez-Sanchez, Jeroen N. Struijs, Jianchao Quan, and Joseph P. Newhouse. (2019): “Are Quality-Adjusted Medical Prices Declining for Chronic Disease? Evidence from Diabetes Care in Four Health Systems”, NBER Working Paper No. 25971.
- Hult, Kristopher J., Sonia Jaffe, and Tomas J. Philipson. (2018): “How Does Technological Change Affect Quality-Adjusted Prices in Health Care? Systematic Evidence from Thousands of Innovations,” American Journal of Health Economics, 4(4), 433-453.
- Jones, Charles I. and Peter J. Klenow. (2016): “Beyond GDP? Welfare across Countries and Time,” American Economic Review 2016, 106(9): 2426–2457.
- **Sheiner, Louise, & Malinovskaya, A. (2016). “Measuring productivity in healthcare: an analysis of the literature.” Hutchins center on fiscal and monetary policy at Brookings.**
- Romley, John A., Dana P. Goldman, and Neeraj Sood. "US hospitals experienced substantial productivity growth during 2002–11." Health Affairs 34.3 (2015): 511-518.

Medical Literature – Cost-effectiveness Studies

- Dunn, Abe, Anne Hall, and Seidu Dauda. "Are Medical Care Prices Still Declining? A Re-Examination Based on Cost-Effectiveness Studies." *Econometrica* 90.2 (2022): 859-886.
- Dunn, Abe, Lasanthi Fernando, and Eli Liebman. "How Much Are Medical Innovations Worth? An Analysis Based on Millions of Patients and Thousands of Cost-Effectiveness Studies." In progress

Acute Health Events

- Dauda, Seidu, Abe Dunn, and Anne Hall. "A systematic examination of quality-adjusted price index alternatives for medical care using claims data." *Journal of Health Economics* 85 (2022): 102662.
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Population Health

- Weaver, Marcia R., et al. "Health Care Spending Effectiveness: Estimates Suggest That Spending Improved US Health From 1996 To 2016: Study examines health care spending effectiveness, the ratio of an increase in spending per case of illness or injury to an increase in disability-adjusted life-years averted per case." *Health Affairs* 41.7 (2022): 994-1004.

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Cost-effectiveness studies and quality adjustment (Dunn, Hall and Dauda (2022)): Sovaldi example for Hepatitis C



- S_{New} – \$105,488 – Sovaldi
- S_{Old} – \$81,211 – Interferon
- H_{New} – 9.40 QALYs – Sovaldi
- H_{Old} – 8.28 QALYs – Interferon
- $\$VSLY$ – \$50,000

$$\begin{aligned}\Delta\text{Net benefit} &= \$VSLY \cdot \text{Health Improvement} - \text{Spending Increase} \\ &= \$VSLY \cdot (H_{\text{New}} - H_{\text{Old}}) - (S_{\text{New}} - S_{\text{Old}}) \\ &= \$50,000 \cdot (9.40 - 8.28) - (\$105,488 - \$81,211) \\ &= \$31,723\end{aligned}$$

Utility-based price index (based on Cutler et al. (1998))

$$\begin{aligned} \text{Laspyeres Index} &= \frac{S_{\text{Old}} - \Delta \text{Net Benefit}}{S_{\text{Old}}} = \\ &= \frac{S_{\text{New}}}{S_{\text{Old}}} - \frac{\$VSLY \cdot (H_{\text{New}} - H_{\text{Old}})}{S_{\text{Old}}} \end{aligned}$$

Unadjusted price change Quality-adjustment

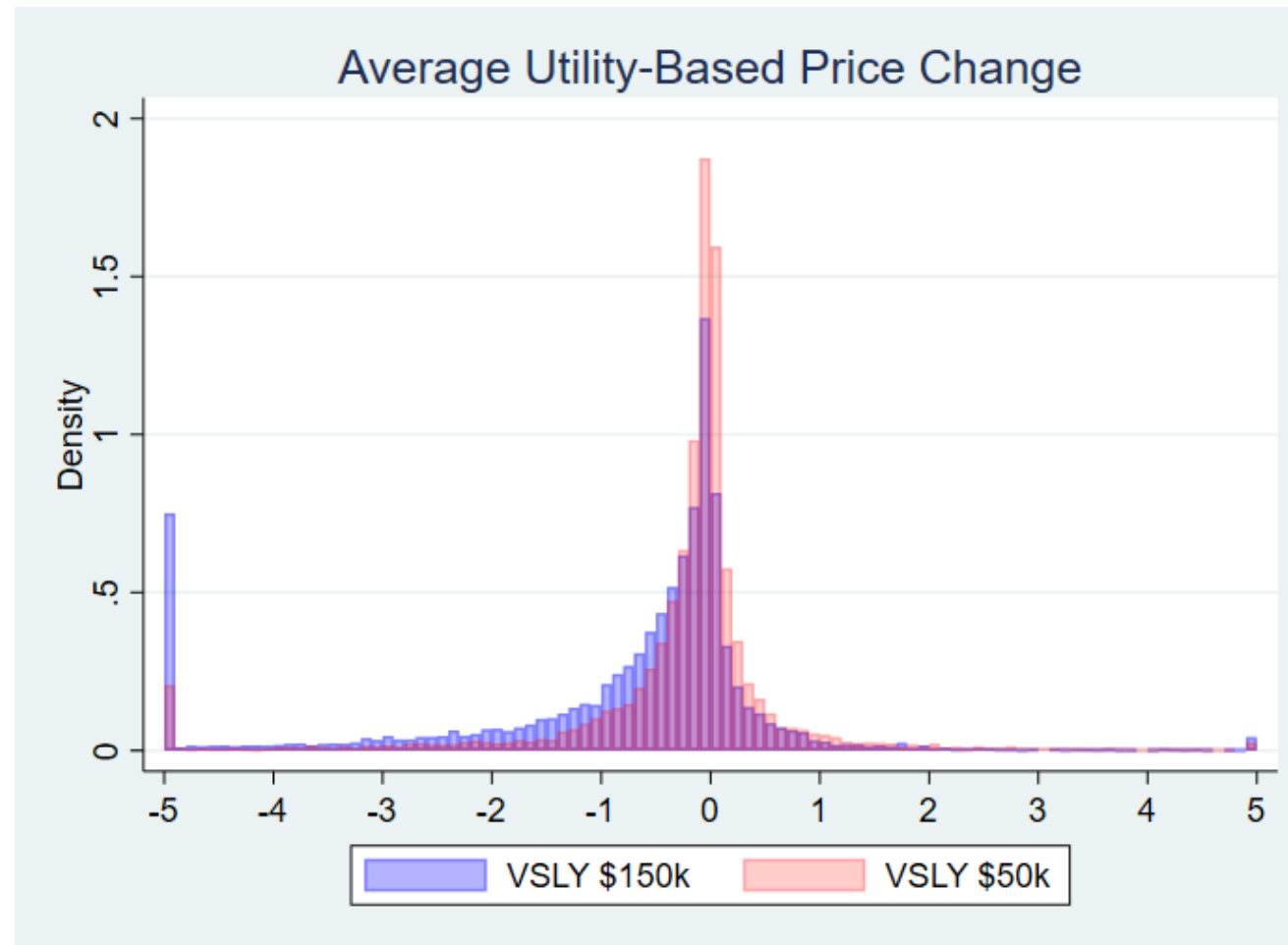
Utility-based price index: Sovaldi example

$$\text{Laspeyres Index} = \frac{\$105,488 - \$50,000 \cdot (9.40 - 8.28)}{\$81,211} = 0.61$$

→39 percent price decline

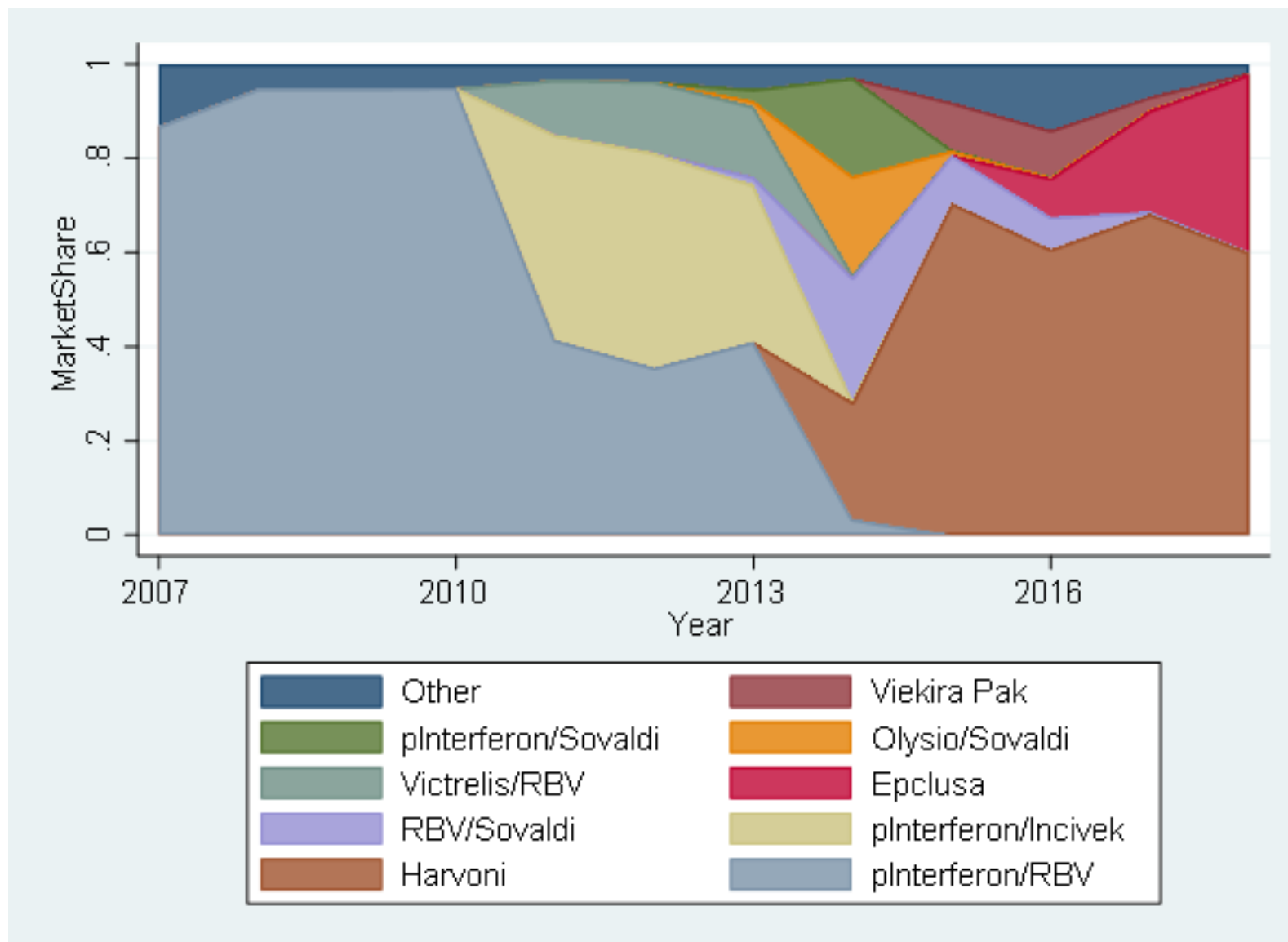
(Setting VSLY to \$100,000 → Price decline is 109 percent)

Quality-adjusted price implied by thousands of cost-effectiveness study – Dunn, Hall, and Dauda (2022)

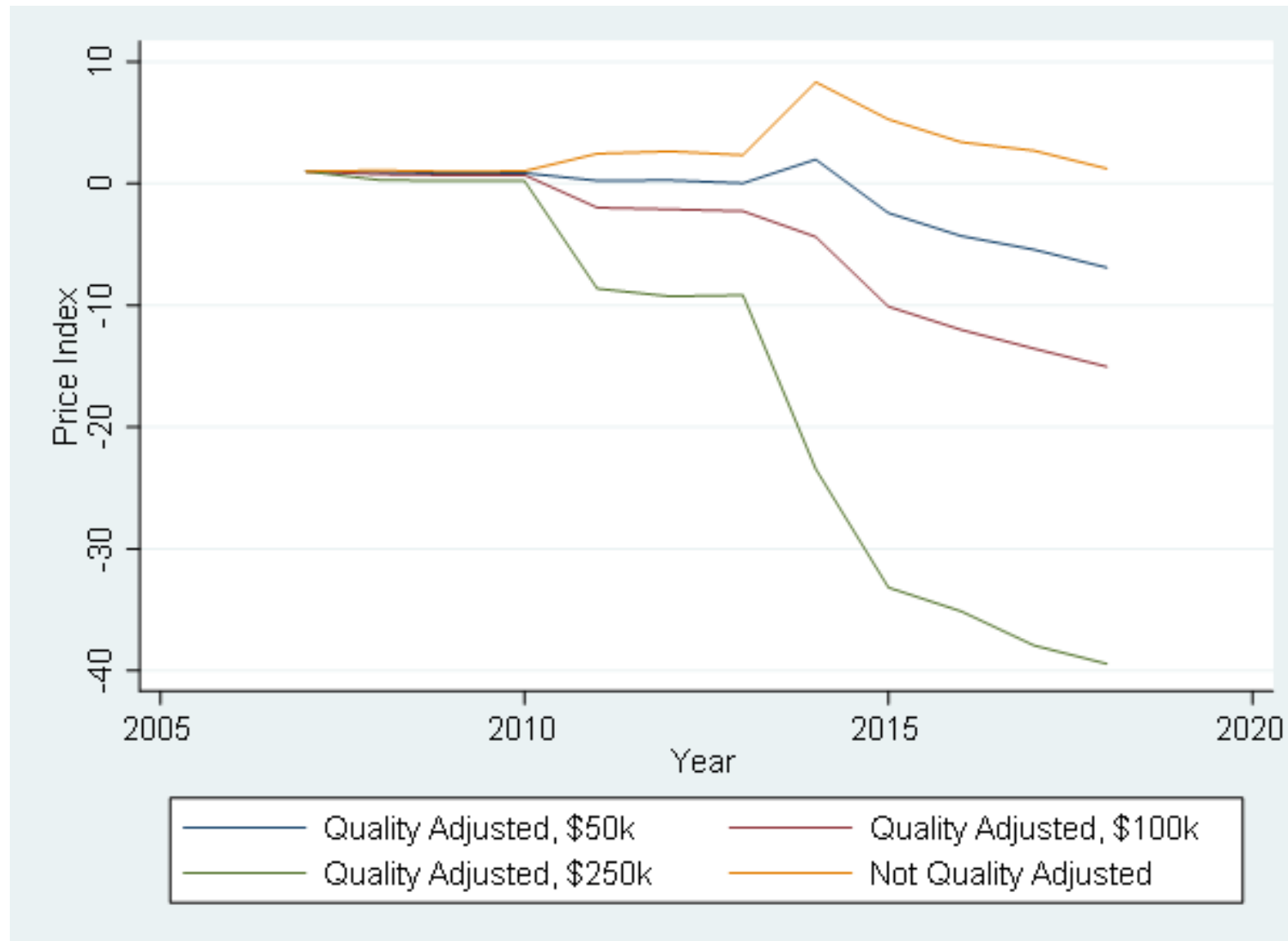


Innovation implies a typical **price decline of around 18 percent. (VSLY \$100k)**

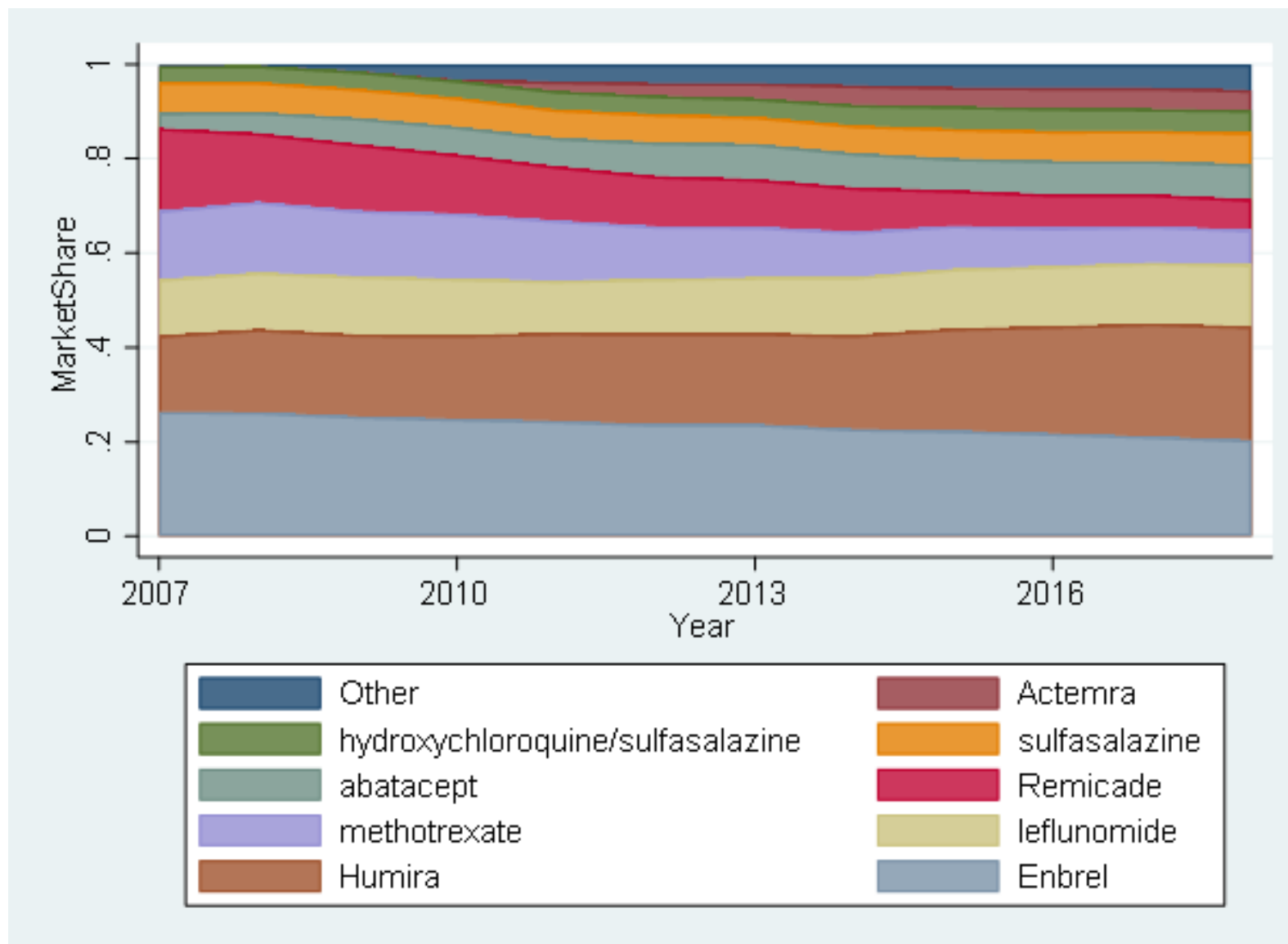
Hepatitis C: Market shares 2007-2018 – Dunn, Liebman, and Fernando (2022) (preliminary)



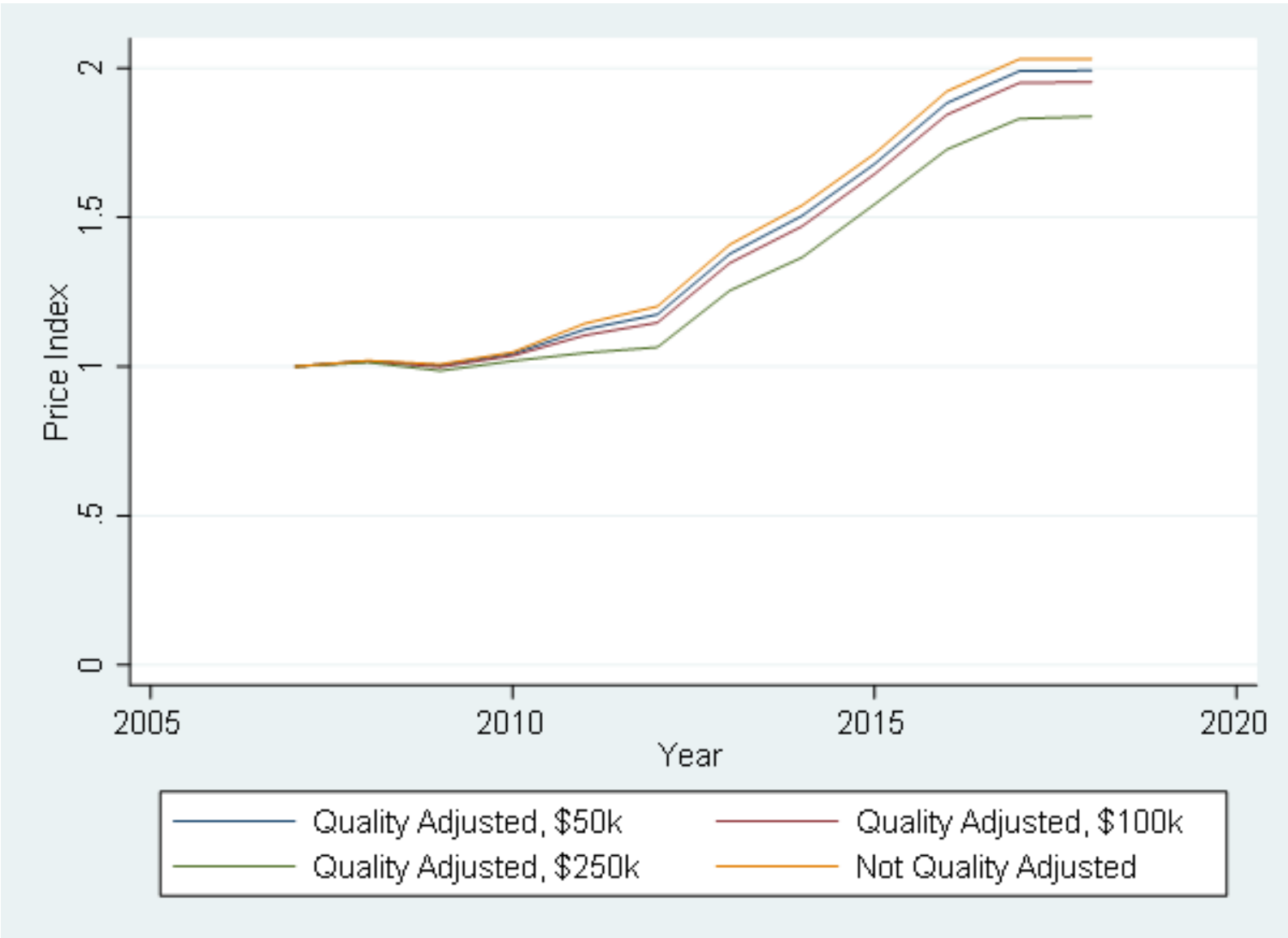
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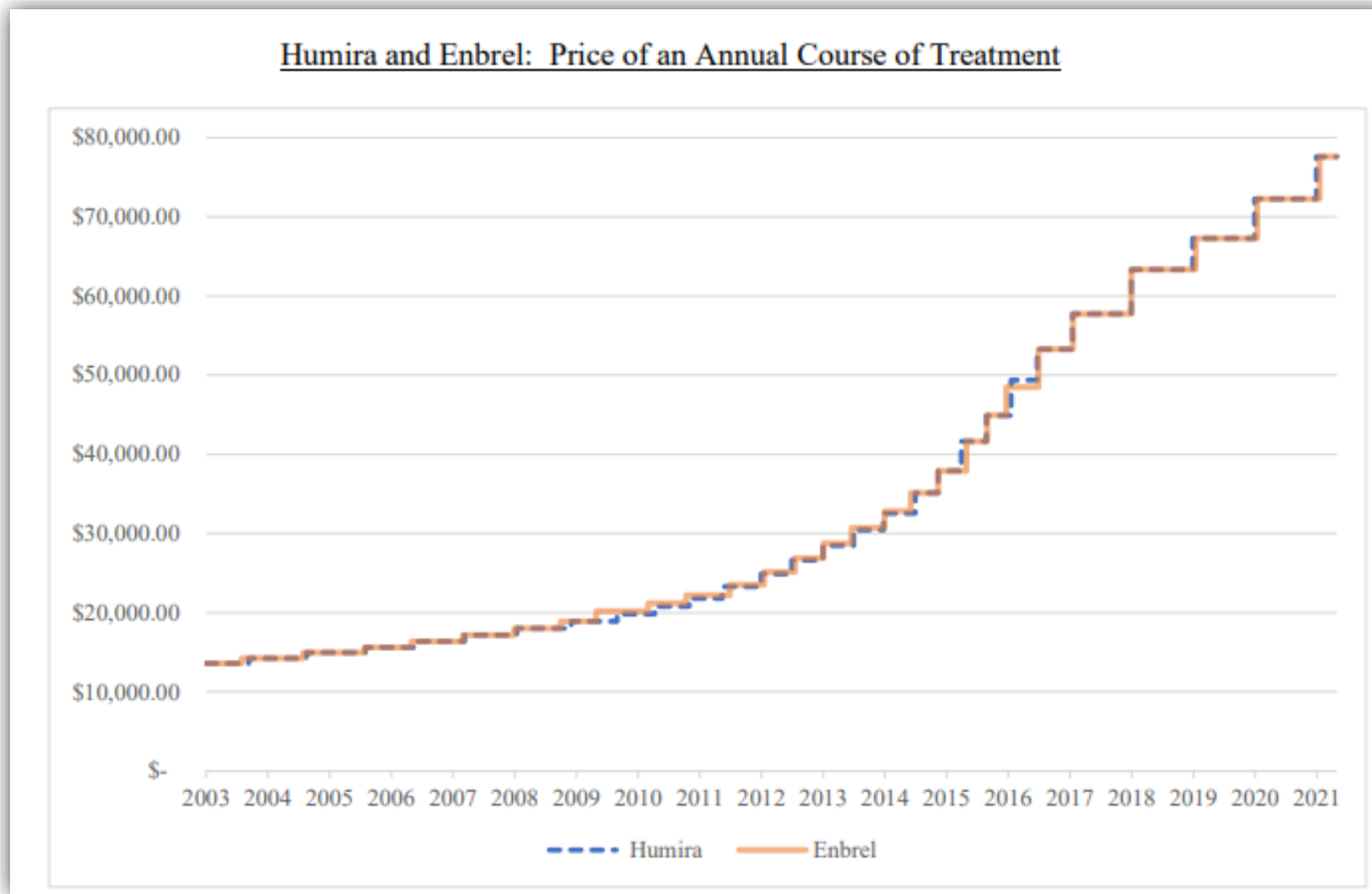
Rheumatoid Arthritis: Market shares 2007-2018 – Dunn, Liebman and Fernando (2022) (preliminary)



Rheumatoid Arthritis: Quality-adjusted price indexes– Dunn, Liebman and Fernando (2022) (preliminary)



Rheumatoid Arthritis: Drug Pricing Investigation, Staff Report, House Committee on Oversight and Reform



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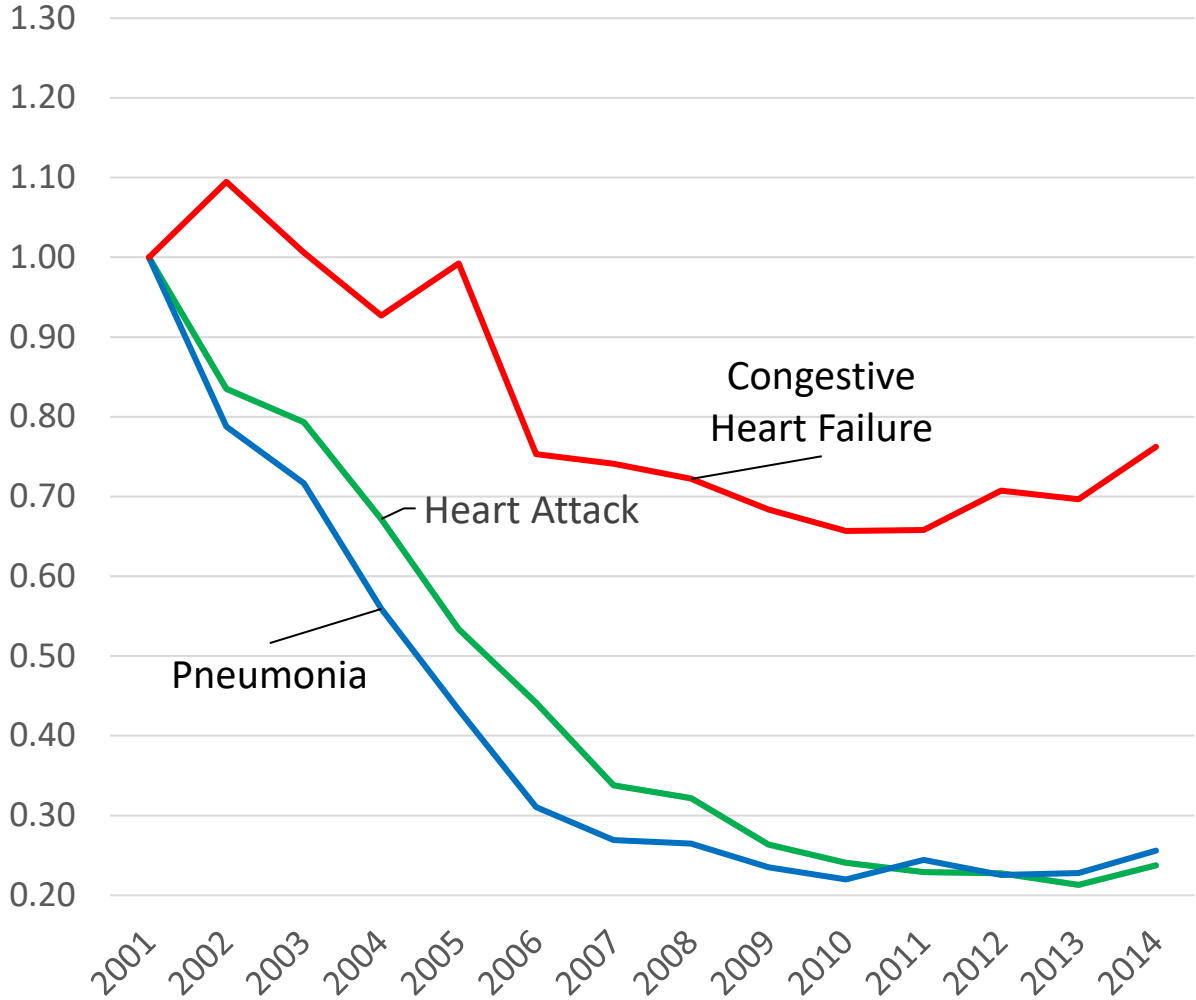
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Quality-adjusted price index measured for acute conditions – Dauda, Dunn, Hall (2022)



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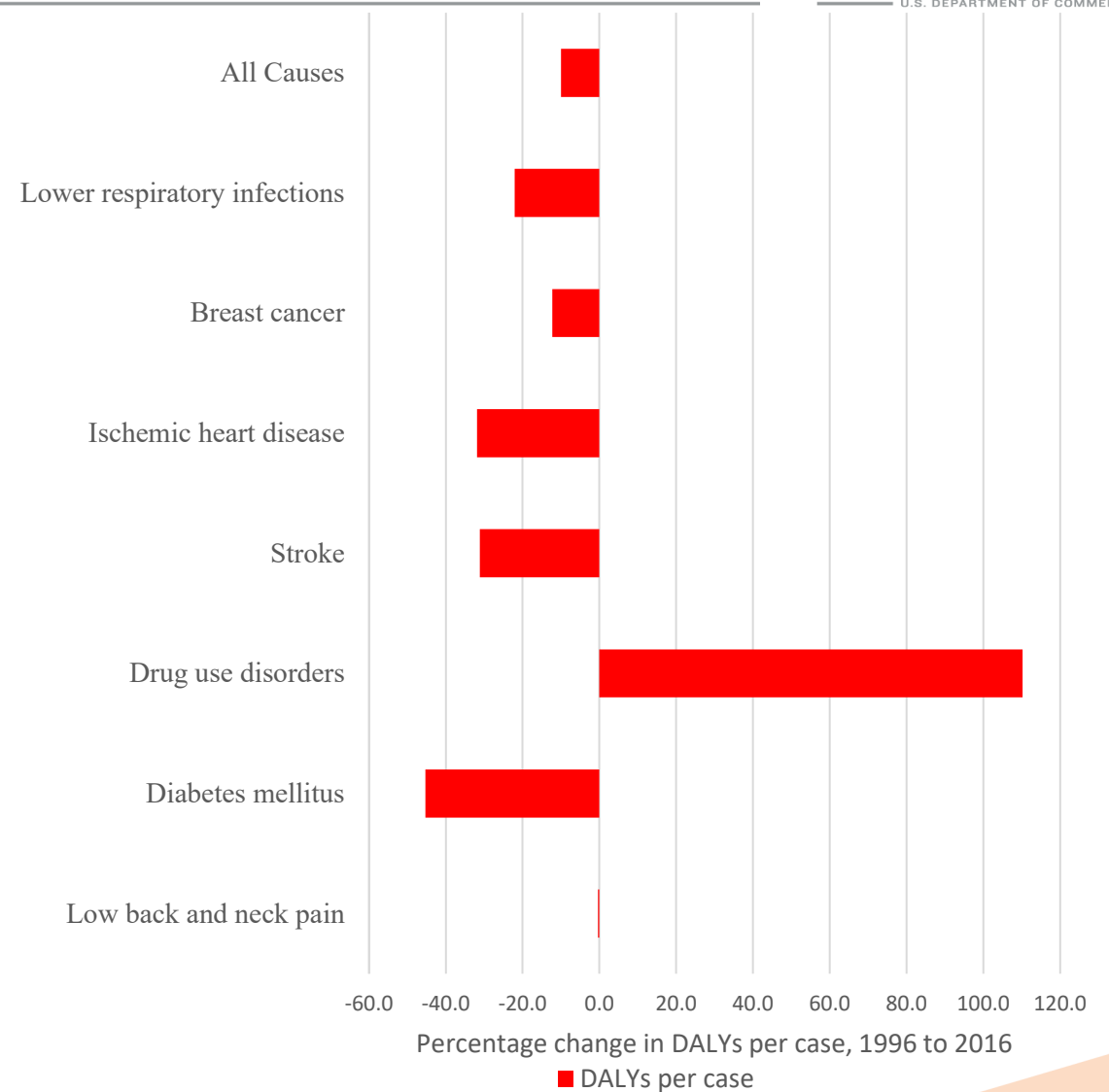
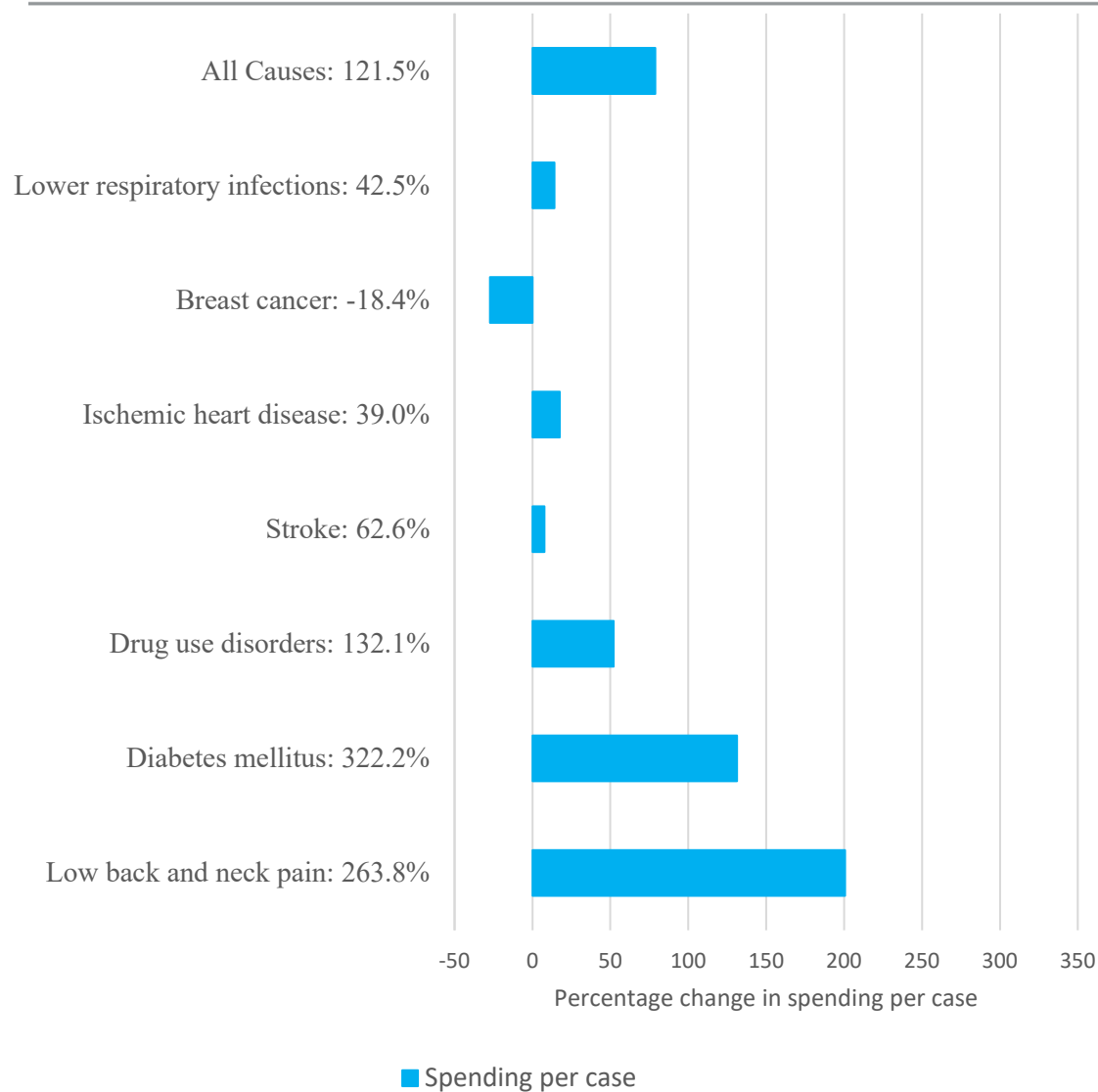
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Spending improved U.S. health 1996-2016 – Weaver et al. (2022) → quality-adjustment has substantial effect on inflation in the health care sector



- The HCSA provides a unique look at health care spending that is relevant for the IRA
- Measuring changes in treatment quality is key to understanding inflation in the health sector
 - Example of Rheumatoid Arthritis and Hepatitis C
- There has been substantial progress toward incorporating quality adjustment into price estimates for the health care sector
- Several methods and assumptions to consider when constructing quality-adjusted prices