BROOKINGS

Hutchins Center on Fiscal & Monetary Policy at BROOKINGS

Summary of Healthcare Productivity Symposium

Tuesday, May 3, 2016

Summary of the Hutchins Center Symposium on Health Care Productivity

May 3, 2016

The Hutchins Center on Fiscal and Monetary Policy recently hosted a conference on health care productivity growth. Two main questions were addressed: First, how productive has the health care sector been historically, particularly once changes in the quality of care are taken into account? And, second, what are the prospects for improvements in productivity growth in the future? (See attached agenda)

Why it matters: The question of health sector productivity has long been an issue of interest to academics, but recent changes to Medicare payments under the Affordable Care Act (ACA) mean that it now has important policy significance as well.

Prior to the ACA's payment reforms, hospital and non-physician payments were supposed to be adjusted annually by the change in input costs—if wages and other input costs rose by 5%, payments to these providers would rise by 5%. But under the new payment system, the annual increase in provider payment rates is equal to input cost growth *less* the 10-year average of economy-wide multifactor productivity (MFP) growth. If health productivity growth is equal to economy-wide productivity growth, Medicare payments will increase sufficiently to provide the same services over time. If, however, health productivity growth is lower than that of the general economy, Medicare payment updates under the ACA will be too small to allow providers to offer the same level of services over time.

What is the controversy? Historically, measured health sector productivity growth has been *well below* that of economy-wide productivity growth. Some see this as a permanent deficiency reflecting technological impediments to productivity growth in health care. For example, in a 2015 memo, the Centers for Medicare and Medicaid Services' Office of the Actuary suggested that:

> Based on the historical evidence of health sector productivity gains, the labor-intensive nature of health care services, and presumed limits on the extent of current excess costs and waste that could be removed from the system, actual health provider productivity is very unlikely to achieve improvement equal to the economy as a whole over sustained periods[1].

Others disagree. A growing literature suggests that health productivity may not be nearly so low as traditional measures suggest, and that at least some of the gap can be explained by the mismeasurement of productivity in the health sector. These researchers argue that, once changes in the quality of care are taken into account, health care productivity might be close to or even exceed economy-wide productivity growth. If this is the case, then, even with the ACA provider payment cuts, Medicare providers will be able to provide a constant or even growing quality of service.

Furthermore, many analysts believe that, regardless of what health care productivity has been in the past, there is great potential for healthcare productivity to increase in the future, particularly given the payment

[1] Department of Health and Human Services. Center for Medicare & Medicaid Services. Office of the Actuary. 2015. *Projected Medicare Expenditures under an Illustrative Scenario with Alternative Payment Updates to Medicare Providers*, by John D. Shatto and Kent Clemens. https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/ReportsTrustFunds/Downloads/2015TRAlternativeScenario.pdf

reforms enacted as part of the ACA. To the extent that health care productivity can be increased, the ACA provider payment cuts need not lead to any reduction in quality or slowdown in the rate of technological progress.

The Hutchins Center convened a panel of experts to discuss these issues. This panel included academics and researchers and analysts from the Center for Medicaid and Medicare Services, the Department of Labor, the Congressional Budget Office, and many others. (See attached attendance list).

The first session of the conference looked backward at what health care productivity has been in the past. Stephen Heffler from the Office of the Actuary at the Centers for Medicare and Medicaid Services (CMS) presented the CMS analysis of hospital sector productivity, which uses a traditional methodology that does not adjust for changes in quality. Jon Romley of the Leonard D. Schaeffer Center for Health Policy and Economics presented some recent work done with colleagues that examines what health care productivity growth has been when adjusted for changes in quality. Louise Sheiner of the Hutchins Center explored the different methodologies that have been used to incorporate health care quality.

The second session of the day focused on the question of what health care productivity could be with improved incentives and market structure. That is, rather than assuming that the health care sector has been operating with maximum efficiency given existing technology, is it possible that there is scope for significant productivity improvements even without changes in technology? Mark Miller of the Medicare Payment Advisory Commission (Medpac) discussed Medpac's view of the issues surrounding health care productivity and the sustainability of the ACA provider payment cuts. Mike Chernew of Harvard Medical School provided an overview of the recent evidence surrounding efficiencies from new payment systems. Carol Propper of the Imperial College – London reviewed the effect of market reforms in the U. K. health care sector on health care productivity there.

Summary of presentations (see attached slides)

Stephen Heffler of Office of the Actuary, Centers for Medicare & Medicaid Services (CMS), argued that the measure of productivity should align with the concept for which it will be used. He noted that, although much of the current debate on productivity growth in health has focused on measuring outcomes, outcomes do not affect the payment or inputs used, so a resource-based approach is needed. He said that even if outcomes improve over time, that does not answer the question of whether we can continue with the level of Medicare payments legislated by the ACA. He added that for the purpose of updating Medicare payments, his measured of resource-based productivity is consistent with the current Diagnosis Related Groups payment system, which classifies patients by clinical condition and is used to pay for procedures and services necessary to treat the condition. Finally, Heffler warned that since the resource-based hospital MFP growth has been lower than economy-wide MFP growth, there may be long-range implications for profitability and/or quality of care.

Heffler explained that CMS uses two methods to estimate hospital multi-factor productivity (MFP) in following a resource-based approach. One of them uses deflated revenue as output and deflated expenses as capital, labor, and intermediate purchase inputs. The other method is more closely aligned with the BLS approach and uses deflated revenue for output, but measures capital and labor inputs directly, using labor hours and capital stock quantity indexes. The findings, however, are similar for these two methods: during 1990-2013, hospital MFP averaged 0.1% per year according to first method and 0.6% per year according to the second method,

with greater divergence between the two methods in later years (Slide 8). During the same time period, BLS-computed private non-farm business MFP averaged slightly higher, about 1% annually.

John Romley of the Leonard D. Schaeffer Center for Health Policy and Economics, University of Southern California, suggested that quality of care is a critical element of health system performance because it is the outcomes that people care about. He reviewed his recent work in which he and co-authors measured productivity in hospitals for heart attack, heart failure, and pneumonia, adjusting for changes in quality and patient severity and focusing on Medicare fee-for-service beneficiaries. First, they measured the "naïve" productivity growth for these three conditions during 2002-2011, with hospital output defined as the number of stays and productivity growth as the change in real resources used per stay. This productivity growth was found to be negative, up to -1% per year, for each of the three conditions. Second, they made an adjustment for patient severity of illness. Increased health resources per stay associated with sicker patients should not be viewed as a reduction in productivity. Making this adjustment, measured productivity growth improved for two of the three conditions. Third, they incorporated a measure of health care quality by redefining the unit of output from number of stays to number of successful stays. Successful stays were defined as those in which the patient survived for 30-days and did not have an unplanned readmission. Successful stays increased sharply as a fraction of all stays over time for all three conditions. With this incorporation of quality changes, U.S. hospitals actually achieved significant increases in productivity over 2002-2011, ranging from 0.6 to 1.9% annually for the three conditions.

Romley concluded by noting that ACA's payment adjustments for economy-wide productivity may not threaten provider viability. During a brief Q&A session following his presentation, conference participants noted that 30-day survival without unplanned readmission might be an imperfect measure of hospital outcomes. They also raised the issue of including drugs into the analysis of outcomes and asked whether this single-payer, single-condition perspective might be an oversimplification given that hospitals are multi-product firms that interact with multiple payers.

Louise Sheiner of the Hutchins Center on Monetary and Fiscal Policy at the Brookings Institution reviewed the different methodologies that have been used to quality-adjust health care. In particular, she contrasted three methods: the "redefine the good" method, which redefines output as successful output, the approach used by Romley and colleagues; the "cost" method, which subtracts the cost of quality improvements from measured prices, so that increases in costs associated with improved outcomes will be viewed as greater health care output, rather than higher health care prices; and the "cost of living" approach, which places a monetary value on quality improvements like improved life expectancy. She noted that, because the value of increased life expectancy has typically been much greater than the cost of achieving it, this latter method shows the greatest increases in quality and the greatest improvements in productivity among the three. She also noted that the "cost" method was most directly related to the question of the sustainability of the ACA payments: could health care providers have maintained the same level of health care services at lower resource cost if they had not also improved quality?

Mark Miller of the Medicare Payment Advisory Commission (Medpac) argued that the focus should be on the fiscal pressures facing providers rather than measuring productivity correctly. He noted that the reasoning

behind the ACA policy—beyond simply a way of cutting spending—was that, unlike other sectors of the economy, hospitals, post-acute providers, and physicians in fee-for-service Medicare are not subject to the types of market forces that would lead to productivity improvements. That is, you might need to impose some type of fiscal pressure in order to drive some productivity improvements. He also noted that, even given the payment cuts in the ACA, the Medicare Part A trust fund is schedule to be exhausted in 2030, so that the idea that we will need to spend even more money on Medicare doesn't seem feasible.

Miller's view of the effects of fiscal pressure on hospitals is reinforced by work done by researchers at Medpac. He explained that Medpac divides hospitals according to their degree of fiscal pressure from non-Medicare payers, where fiscal pressure is defined by the difference between payments and costs for all non-Medicare patients. Fiscally pressured hospitals are those with non-Medicare margins less than 1 percent; non-pressured hospitals are those with margins greater than 5 percent. Miller noted that, fiscally-pressured hospitals tend to have much higher Medicare margins than hospitals under low pressure: 4 to 6 percent for fiscally-pressured hospitals, versus negative margins for hospitals under low pressure. Medpac's interpretation of this finding is that hospitals under fiscal pressure manage (by necessity) to control costs better than hospitals not under fiscal pressure. Miller also noted that Medpac has investigated whether these high-pressure hospitals tend to have higher quality—measured using metrics like mortality and readmissions rates —and found no correlation between quality and fiscal pressure. He noted that some hospitals manage to have the highest quality with the lowest cost.

Miller also noted that hospitals these days are doing very well. All-payer margins (margins from all payers, including private, Medicaid, and Medicare) are at historic highs, and hospitals have been pouring money into capital expenditures. So, from an overall hospital solvency perspective, it seems like there is no threat in the near or medium term from the ACA payments cuts.

Miller also addressed the question of access for Medicare beneficiaries. One worry that is often expressed about the ACA payment cuts is that hospitals will not want to serve Medicare beneficiaries, particularly because the payment rates from private payers are at least 50 percent higher than Medicare rates. Miller noted that (1) occupancy rates for hospitals only average about 60 percent, and (2) Medpac analyses shows that, even if Medicare margins are low or even negative on average, Medicare payments remain about 10 percent above the marginal costs of providing services to a beneficiary, so providers do not lose money by treating Medicare patients. Thus, he concluded that, at least for the foreseeable future, access should not be a problem.

Michael Chernew of the Harvard Medical School provided an overview of the research on the effects on productivity of new population-based payment models—that is, models that pay providers to take care of a person over a particular time period. Focusing on reforms implemented by the ACA, Chernew pointed to research demonstrating substantial room for savings. A 2015 study by Chernew and coauthors published in the New England Journal of Medicine found that, among the 32 organizations entering the Pioneer accountable care organization (ACO) program in 2012—a program that provides incentives to organizations to reduce spending by allowing them to share any savings with Medicare beyond a predetermined benchmark—spending on acute inpatient, total outpatient, and poste-acute care fell, resulting in aggregate savings of 1.2%. A large share of these savings came from reduced spending on low-value care, particularly among organizations that had previously provided the greatest amount of low-value care. Importantly, these

spending reductions were not associated with declines in quality, and even led to improved quality in some cases. Another study by Chernew and coauthors, this time focusing on participants in the Medicare Shared Savings Program (MSSP)—a successor to the Pioneer ACO program—found aggregate savings of 1.4% for organizations entering the program in 2012, but much smaller results for 2013 entrants. Again, the authors found that these savings were not associated with a decline in quality of care, suggesting improved productivity. Not all of the savings are captured by Medicare. As Chernew pointed out, "shared savings" mean just that—some of the savings accrue to the providers and not to Medicare.

Chernew also pointed to innovations in payment systems that could lead to productivity gains. In a study of Alternative Quality Contract (AQC) organizations—a payment arrangement that makes fixed payments for the care of a patient over a pre-determined time horizon and connects payments to specific quality goals—Chernew and coauthors found that organizations utilizing this payment structure experienced lower spending growth, with roughly half of the savings stemming from reduced prices. Another payment structure, episode based payments, which reimburse providers a fixed amount based on expected costs for a given episode of care, demonstrates some mixed evidence of savings, but faces numerous implementation challenges.

Drawing attention to the current state of healthcare spending United States, Chernew noted that, "There is just flat out waste…There is stuff that people do that doesn't help you, it may in fact hurt you, there is just flat out waste in the system…People are doing things they shouldn't be doing and they are not doing it that well and historically we have not had a system that rewarded you for getting rid of that waste." Chernew also noted that even the most efficient providers still perform a lot of low value services and that, while Medpac can point to efficient hospitals, that this "efficiency" should be viewed as relative.

Chernew concluded that these innovative payment models have the potential to significantly reduce wasteful spending by rewarding healthcare providers by cutting down on unnecessary spending while also improving overall quality of care. He did warn, however, that the idea that the 30 percent waste in the system will be pulled out overnight is not likely, and that progress is likely to be slow and incremental.

Carol Propper of the Imperial College – London reviewed the effect of market reforms in the U. K. health care sector on health care productivity. She noted that health care spending in the U.K. as a percentage of GDP has been significantly lower than that in the U.S. and has been growing more slowly over time, yet many estimates of productivity growth in the sector are low. She asked whether competition could be one way to address the challenge of low productivity growth. The U.K. could be a good case study because it has been a pioneer in the use of market-oriented reforms in the formerly centralized and heavily regulated sector.

Propper reviewed evidence from a number of studies she has authored with colleagues examining reforms to Britain's National Health Service. Since the 1990s, the U.K. has undergone several market-oriented structural reforms. These reforms were intended to increase "choice and competition" in the health care system. Some of the elements of the reform included greater autonomy for well-performing hospitals, greater freedom for patients to choose their health care provider, and a shift to a fixed pricing schedule for hospitals. These reforms provide a useful test of the effects of increased competition on health care productivity under a fixed pricing schedule.

Propper and coauthors found that these reforms did, in fact, impact behavior and market structure, suggesting that there is scope for improving performance in the health sector. Post-reform, better hospitals—

measured both in terms of mortality following heart attacks and wait times—attracted more patients, meaning that the average quality of care increased. In addition to this shift in market share to the better hospitals, individual hospitals also improved the quality of their care in response to increased competition. For example, hospital mortality rates from both heart attacks and all causes appeared to decrease following the reforms, without any concomitant increase in spending. Propper also reported on research that examines the effects of hospital consolidation in the U.K. Evidence suggests that, as in the US, hospital mergers (which, by definition, decrease competition) do not appear to improve productivity, raise quality, or lower costs. Propper concludes that the U.K.'s pro-market reforms appear to have had an overall positive impact. Although the mechanisms through which these structural reforms produced productivity gains is not entirely clear, Propper pointed to evidence suggesting that increased competition leads to better hospital management, which may be partially responsible.

Summary of the General Discussion: Few of those present believed that health care is well characterized by the "Baumol Model", a model whereby industries that cannot achieve increases in productivity inevitably experience higher prices over time. And most attendees believed that there was a tremendous amount of waste in the system that could be captured. Although most agreed that waste exists in all health care systems, the general belief was that waste is greatest in the United States.

Mike Chernew made the point that thinking about Medicare as a fee-for-service system is a function of the old way of paying for things. He noted that studies that focus on the quality of hospital care or even the cost and quality of treating episodes of illness can miss much of the productivity growth that might result from having people not go to the hospital or not receive a particular service or drug. For example, if an Accountable Care Organization can figure out how to keep people healthy, that will be a great productivity improvement in the health sector, even though it would not show up as hospital or physician productivity growth.

Others noted that, while there is hope that the ACA payment reforms will bring improvements in productivity that, right now, these programs are in their infancy and that we really do still need to look to the past to at least acknowledge the risk that the ACA provider cuts will be insufficient to ensure quality and access for Medicare beneficiaries. But still others said that, even given that, we need to look at the past correctly, and that the focus on fee-for-service inpatient is perhaps misplaced given the tremendous growth we have already seen in ACOs, Medicare Advantage, outpatient services, hospital quality payments, etc.

Furthermore, when thinking ahead for 50 to 75 years, some argued that the tremendous diversity of payment programs that are now being tried by the Center for Medicare and Medicaid Innovation (CMMI) suggests that, even if we don't know the mechanisms by which Medicare spending will slow over time, it is reasonable to assume that we will figure it out. That, if it looks as if the system is going to collapse because hospitals can't survive, we could move to some other system that would capture savings from other parts in the system. In other words, even if the ACA payment cuts are not sustainable in a fee-for-service system, the alternative should not assume that aggregate spending needs to increase faster than currently projected, but, rather, that some alternative payment mechanisms will have to be used.

Other issues discussed included a discussion of the heterogeneity across hospitals, such that, while most hospitals might do fine under the provider cuts, others who are already efficient and who don't have market power vis-à-vis their private payers might have greater difficulty.

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Healthcare Productivity Symposium

Tuesday, May 3, 2016

8 am – 1 pm
Saul/Zilkha Room, Brookings

Breakfast and check-in	8:00 – 8:30 am
Session 1: What do we know about what healthcare productivity has been?	
Louise Sheiner, Brookings: "Approaches to measuring productivity in the context of the ACA Provider Cuts"	8:30 – 8:55
Stephen Heffler, CMS: "Estimating resource-based hospital multifactor productivity growth"	8:55 – 9:20
John A. Romley, Schaeffer Center for Health Policy & Economics, University of Southern California: "Quality-adjusted health care productivity growth"	9:20 – 9:45
Mark Miller, MedPAC: "View from MedPAC"	9:45 – 10:10
Coffee Break	10:10 – 10:20
Roundtable discussion led by **Ernst Berndt**, MIT	10:20 – 11:00
Session 2: What are the prospects for improved productivity in the future?	
Michael Chernew, Harvard Medical School: "Experience with global payments"	11:00 – 11:25
Carol Propper, Imperial College London: "Competition: A means of improving healthcare productivity in the UK?"	11:25 – 11:50
Break	11:50 – 12:15
Roundtable discussion led by **Martin Gaynor**, Carnegie Mellon and working lunch	12:15 – 1:00
Adjourn	1:00 pm

See reverse for participant list →

Participants

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Urban Institute

Estimating Resource-Based Hospital Multifactor Productivity Growth

Stephen Heffler
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Office of the Actuary, CMS

Brookings Symposium on Health Care Productivity
May 3, 2016

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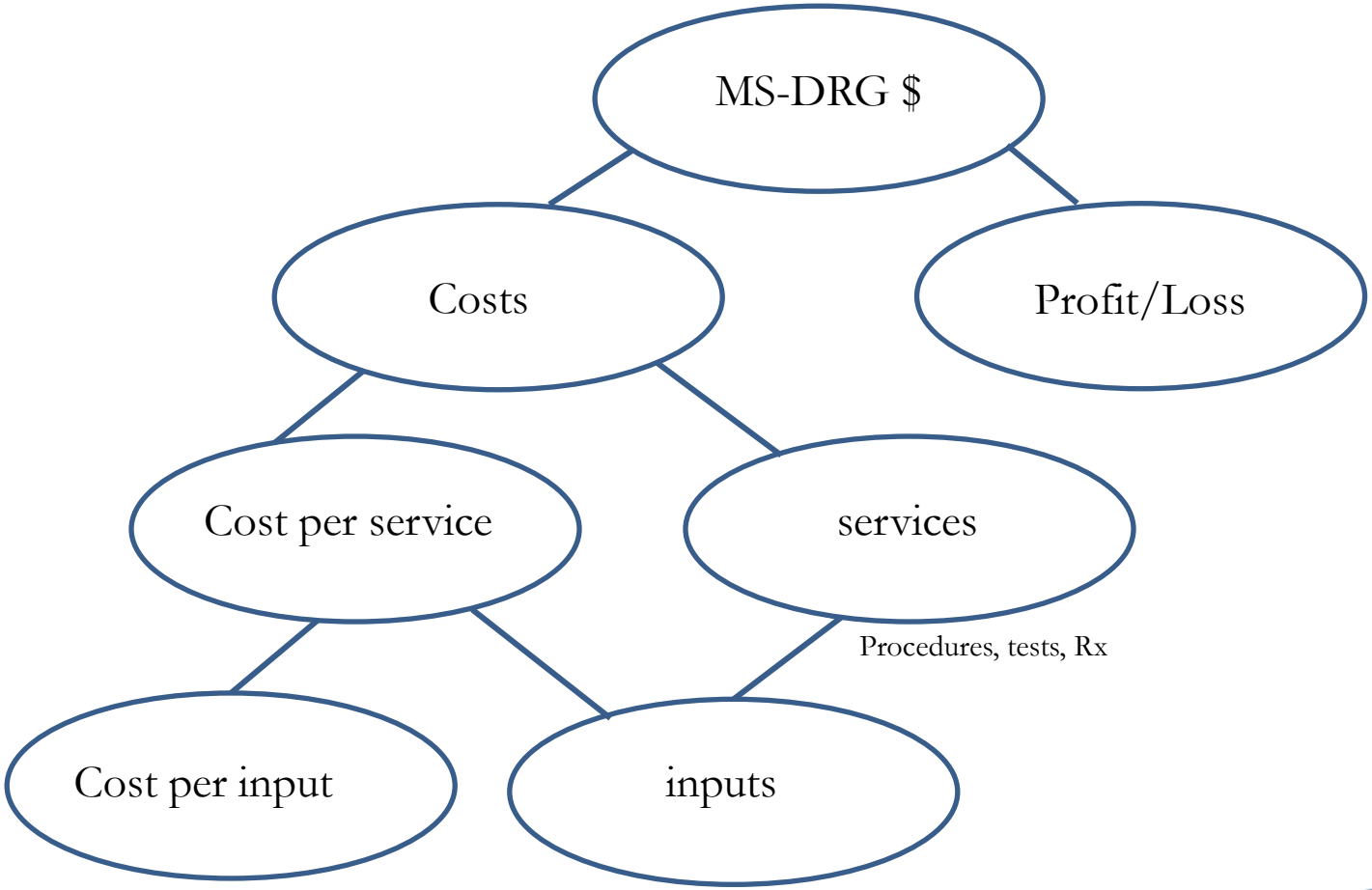
Outline

- Background
  - Medicare Inpatient Hospital Payment Updates
  - BLS Multifactor Productivity (MFP)
- OACT Resource-Based Hospital Multifactor Productivity
  - Methods and Findings
  - Comparisons to Other Estimates
- Conclusions

What is in the MS-DRG Rate?

Medicare Severity Diagnosis-Related Groups (MS-DRGs) classify patients by clinical condition, including primary diagnosis and comorbidities, and are used to pay for procedures and services necessary to treat the condition.



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Medicare Inpatient Hospital Payment Update

$$MS\text{–}DRG\$_t \times (Market\ Basket - Productivity\ Adjustment) = MS\text{–}DRG\$_{t+1}$$

Δ in price of constant mix of hospital inputs

Δ in 10-yr. moving average of economy-wide MFP

The key issue is how the productivity adjustment compares to the Δ in the mix and quantity of hospital inputs used to produce a DRG (output).

- If hospital productivity => economy-wide productivity, profits would remain stable or improve (all else equal).
- If hospital productivity < economy-wide productivity, profits would fall (all else equal).

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How does BLS measure Major Sector MFP?

	Major Data Sources	Method/Concept
Output	Real Gross Domestic Product (BEA)	Fisher-Ideal indexes
Labor Inputs	BLS Current Employment Statistics for production workers; BLS Current Population Survey for nonproduction and supervisory workers	Tornqvist aggregation of the hours at work by all persons, classified by education, work experience, and gender with weights determined by their shares of labor compensation
Capital Inputs	BLS measures of capital stocks for equipment and structures are prepared using BEA real gross investment data and BLS age/efficiency schedules	In accordance with a service flow concept for physical capital assets—equipment, structures, inventories, and land.

How does BLS measure Service Industry MFP?

	BLS Service Industry Method/Concept
Output	Deflated revenue
Labor Inputs	Hours at work by all persons, classified by education, work experience, and gender
Capital Inputs	Real Capital stocks by detailed asset type by industry derived using BEA real gross investment data and BLS age/efficiency schedules
Intermediate Purchase Inputs	BEA "KLEMS" tables (Energy, Materials, and Purchased Services)

How does OACT measure Hospital MFP?

	BLS Service Industry Method/Concept	OACT Hospital – Method 1	OACT Hospital – Method 2
Output	Deflated revenue	Deflated revenue (AHA revenue deflated by PPI)	Deflated revenue (AHA revenue deflated by PPI)
Labor Inputs	Hours at work by all persons, classified by education, work experience, and gender	Deflated expenses (AHA labor compensation deflated by ECIs)	Labor hours (BLS CES Private and CPS Government)*
Capital Inputs	Real Capital stocks by detailed asset type by industry derived using BEA real gross investment data and BLS age/efficiency schedules	Deflated expenses (Rent and depreciation expenses deflated by capital input price index)	Quantity indexes (BEA chain-type indexes for net capital stock)**
Intermediate Purchase Inputs	BEA "KLEMS" tables (Energy, Materials, and Purchased Services)	Deflated expenses (residual, input price indexes)	Deflated expenses (residual, input price indexes)

*Not adjusted for labor composition
**Based on BEA data for "age/efficiency"

https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/ReportsTrustFunds/Downloads/ProductivityMemo2016.pdf

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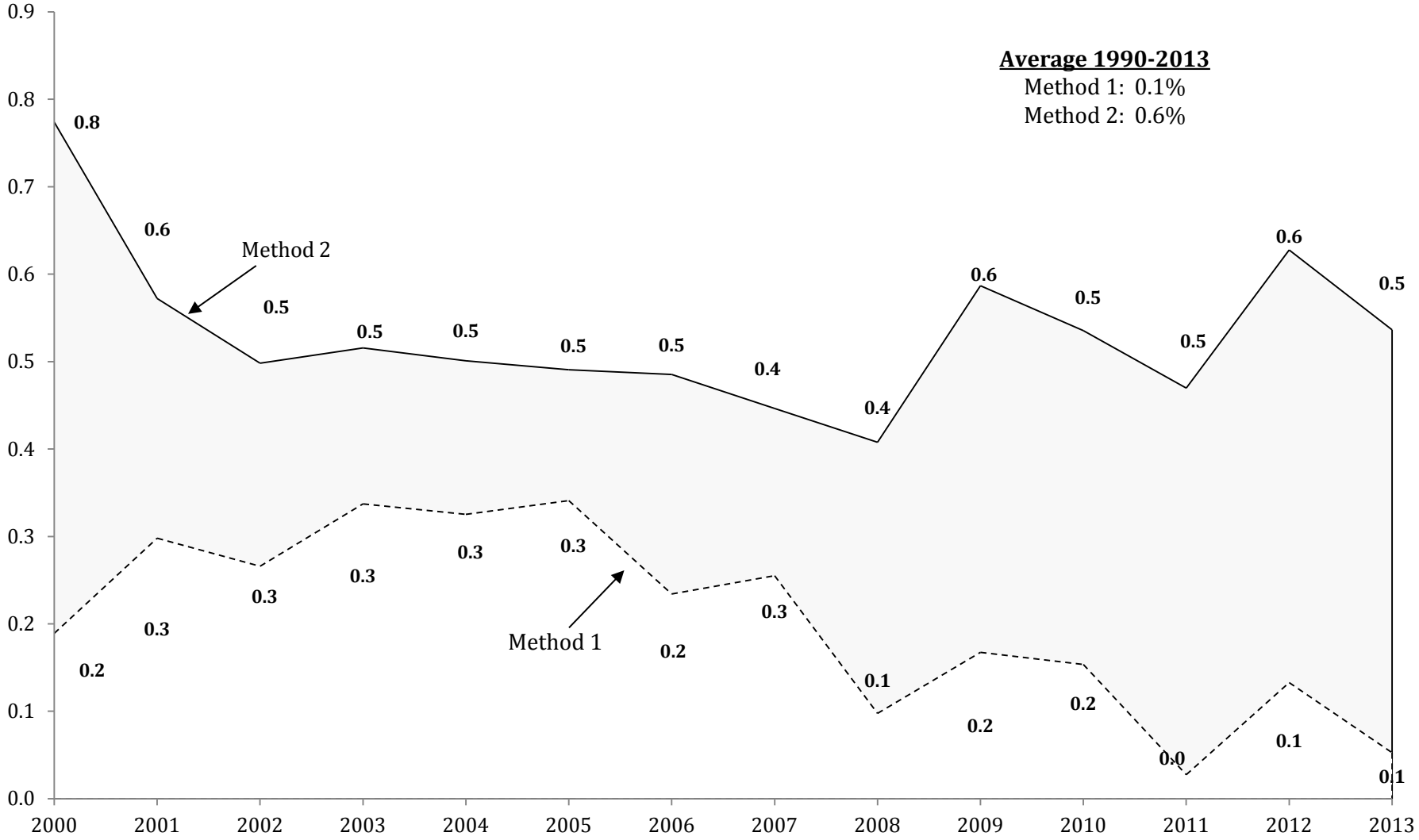
Hospital MFP

10 year moving average growth rate



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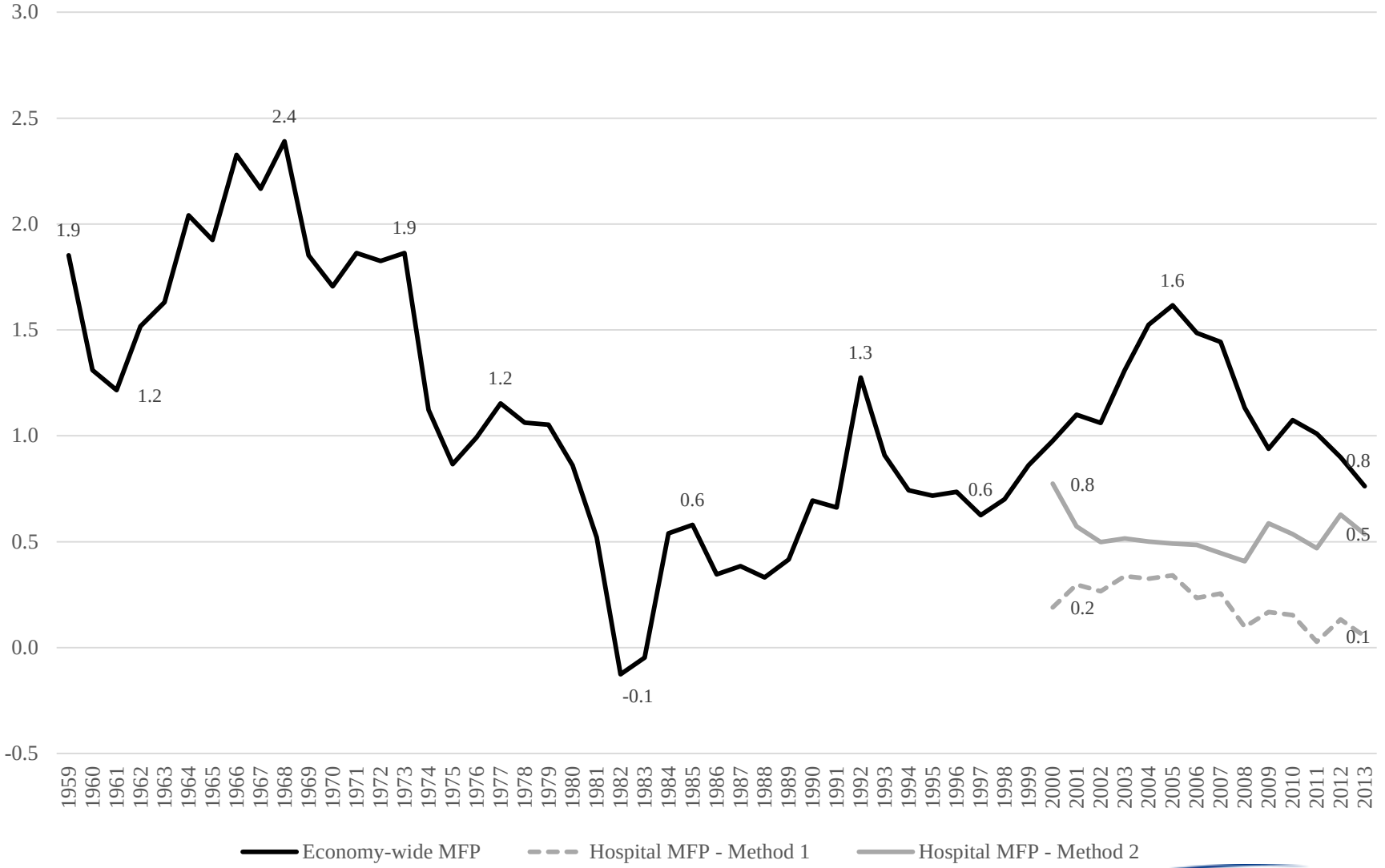
Hospital MFP and BLS Private Nonfarm Business MFP

10 year moving average growth rate



* Reflects Economy-wide MFP at the time of the OACT analysis (BLS historical estimates published in June 23, 2015).

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Comparison of Hospital Productivity Estimates

Private Community Hospital Labor Productivity (Chansky, Garner, Raichoudhary – BLS)[1]

- "Output" based on weighted inpatient service and outpatient service indices using a Tornqvist aggregation of inpatient discharges (or outpatient visits) for each DRG category (or disease category)

	1993-2012	
	MFP	**Labor Productivity**
Hospital		
OACT – Method 1	0.3	0.8
OACT – Method 2	0.6	1.6
Chansky, et. al.	—	0.5
Economy-wide*	1.0	2.2

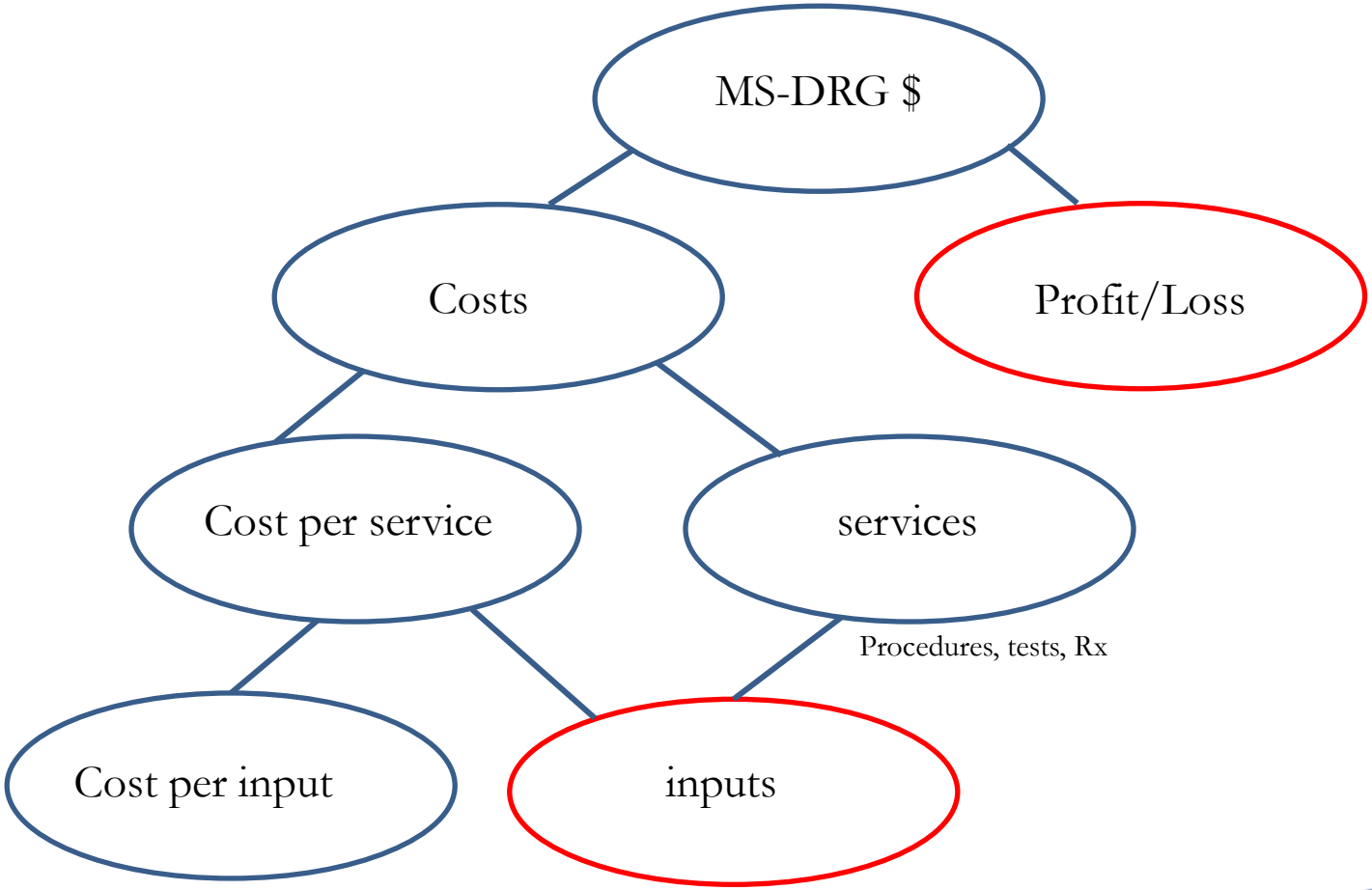
* Reflects Economy-wide MFP at the time of the OACT analysis (BLS historical estimates published in June 23, 2015).

Approximated Hospital MFP (1998-2013):

- Hospital MFP (0.3%) = Input Price (3.0%) – Output price (2.9%) + Actual Change in Hospital Total Facility Margins from Medicare Cost Reports (0.2%)

1/ http://www.bls.gov/opub/mlr/2015/article/new-measure-of-labor-productivity-for-private-community-hospitals-1993-2012.htm

Long-Run Implications for Hospitals



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Conclusions

- The measure of productivity should align with the concept for which it will be used; for updating Medicare payments, resource-based productivity is consistent with the current DRG payment system.
- Over 1990-2013, the average growth of OACT's resource-based hospital MFP using two methods was between 0.1% and 0.6% per year.
- OACT's estimates are similar to alternative estimates of hospital labor productivity and hospital MFP.
- Resource-based hospital MFP growth has been lower than economy-wide MFP growth, which suggests long-range implications for profitability and/or quality of care.

Quality and Productivity in Health Care

John A. Romley

May 3, 2016

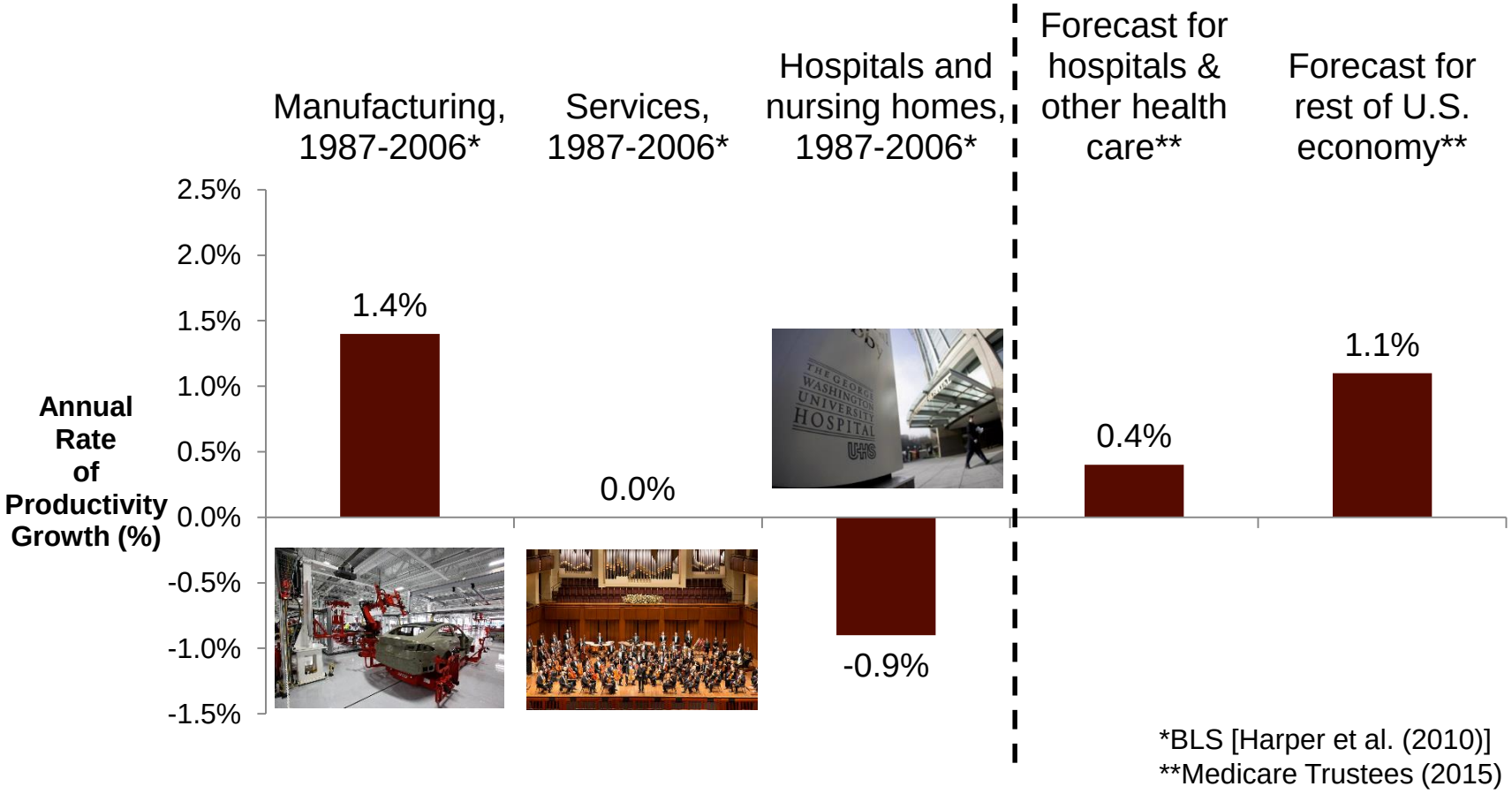
Overview

- **Some perspective**
- **Quality and productivity in hospitals**
- **New directions**
- **Conclusions and implications**

Overview

- **Some perspective**
- **Quality and productivity in hospitals**
- **New directions**
- **Conclusions and implications**

Conventional wisdom holds that a "cost disease" limits productivity improvement in health care



*BLS [Harper et al. (2010)]
**Medicare Trustees (2015)

Yet productivity measurement is particularly challenging in health care

- **Health care is not cement concrete, or even automobiles**
- **In this context, productivity can be readily confounded, by unmeasured aspects of**
  - **Product quality, i.e., quality of care**

Quality is relevant to productivity measurement

- **Quality of care is a critical element of system performance**
  - **Ultimately, quality means better health, i.e., good outcomes**
- **Health care providers produce quality, as well as quantity**
  - **Quality and quantity may be substitutes, or complements**
- **Question: What if quality were improving (or deteriorating) over time, but was ignored?**

Quality is not a new challenge in the policy domain

- **Boskin Commission addressed bias in CPI**
  - **Found upward bias due to improvements in product quality**
- **Cutler et al. analyzed heart-attack care**
  - **Adjusting for better outcomes, price of treatment *decreased***

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ARE MEDICAL PRICES DECLINING?
EVIDENCE FROM HEART ATTACK TREATMENTS*

DAVID M. CUTLER
MARK MCCLELLAN
JOSEPH P. NEWHOUSE
DAHLIA REMLER

We address long-standing problems in measuring medical inflation by estimating two types of price indices. The first, a Service Price Index, prices specific medical services, as does the current CPI. The second, a Cost of Living Index, measures a quality-adjusted cost of treating a health problem. We apply these indices to heart attack treatment between 1983 and 1994. More frequent reweighting and accounting for price discounts lowers the measured price change for heart attacks by three percentage points annually. Accounting for quality change lowers it further; we estimate that the real Cost of Living Index fell about 1 percent annually.

I. INTRODUCTION

The difficulties of deriving accurate price indices for service industries are well-known [Griliches 1992]. In this paper we address the issue of appropriate price indices for medical care. We focus on medical care because it is a large and growing part of the

BLS has incorporated quality of care into hospital PPI

Yet productivity measurement is particularly challenging in health care

- **Health care is not cement concrete, or even automobiles**
- **In this context, productivity can be readily confounded by unmeasured aspects of**
  - **Quality of care**
  - **Patient severity**

Against this backdrop, existing evidence on hospital productivity growth has limitations

Item	*BLS*	*Health literature**
Output measure	Revenues	Revenues, stays
Sensitive to quantity?	Yes	Yes
Sensitivity to quality?	Limited	Limited-to-none
Sensitive to severity?	Across DRGs, but not within	Across DRGs, but not within

*Ashby et al. (2000), Cylus & Dickinsheets (2007)

Overview

- **Some perspective**
- **Quality and productivity in hospitals**
- **New directions**
- **Conclusions and implications**

Romley, Goldman and Sood (2015) revisited the issue of productivity growth in hospitals

WEB FIRST

By John A. Romley, Dana P. Goldman, and Neeraj Sood

US Hospitals Experienced Substantial Productivity Growth During 2002–11

DOI: 10.1377/hlthaff.2014.0587
HEALTH AFFAIRS 34,
NO. 3 (2015): –

ABSTRACT **The need for better value in US health care is widely recognized. Existing evidence suggests that improvement in the productivity of American hospitals—that is, the output that hospitals produce from inputs such as labor and capital—has lagged behind that of other industries. However, previous studies have not adequately addressed quality of care or severity of patient illness. Our study, by contrast, adjusts for trends in the severity of patients' conditions and health outcomes. We studied productivity growth among US hospitals in treating Medicare patients with heart attack, heart failure, and pneumonia during 2002–11. We found that the rates of annual productivity growth were 0.78 percent for heart attack, 0.62 percent for heart failure, and 1.90 percent for pneumonia. However, unadjusted productivity growth appears to have been negative. These findings suggest that productivity growth in US health care could be better than is sometimes believed, and may help alleviate concerns about Medicare payment policy under the Affordable Care Act.**

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Health spending in the United States has grown less rapidly in recent years, compared to its long-term trend.[1] However, the sustainability of the US health care system continues to be a serious concern.[2] Against this backdrop, the Institute of Medicine

in American manufacturing grew by 1.37 percent per year from 1987 through 2006.[4]

Some observers have noted that service industries such as health care may suffer from what has sometimes been called a "cost disease"—in which a heavy reliance on labor limits opportunities for cost efficiencies stemming from tech-

We studied hospital productivity for heart attack (HA), heart failure (HF) and pneumonia (PN)

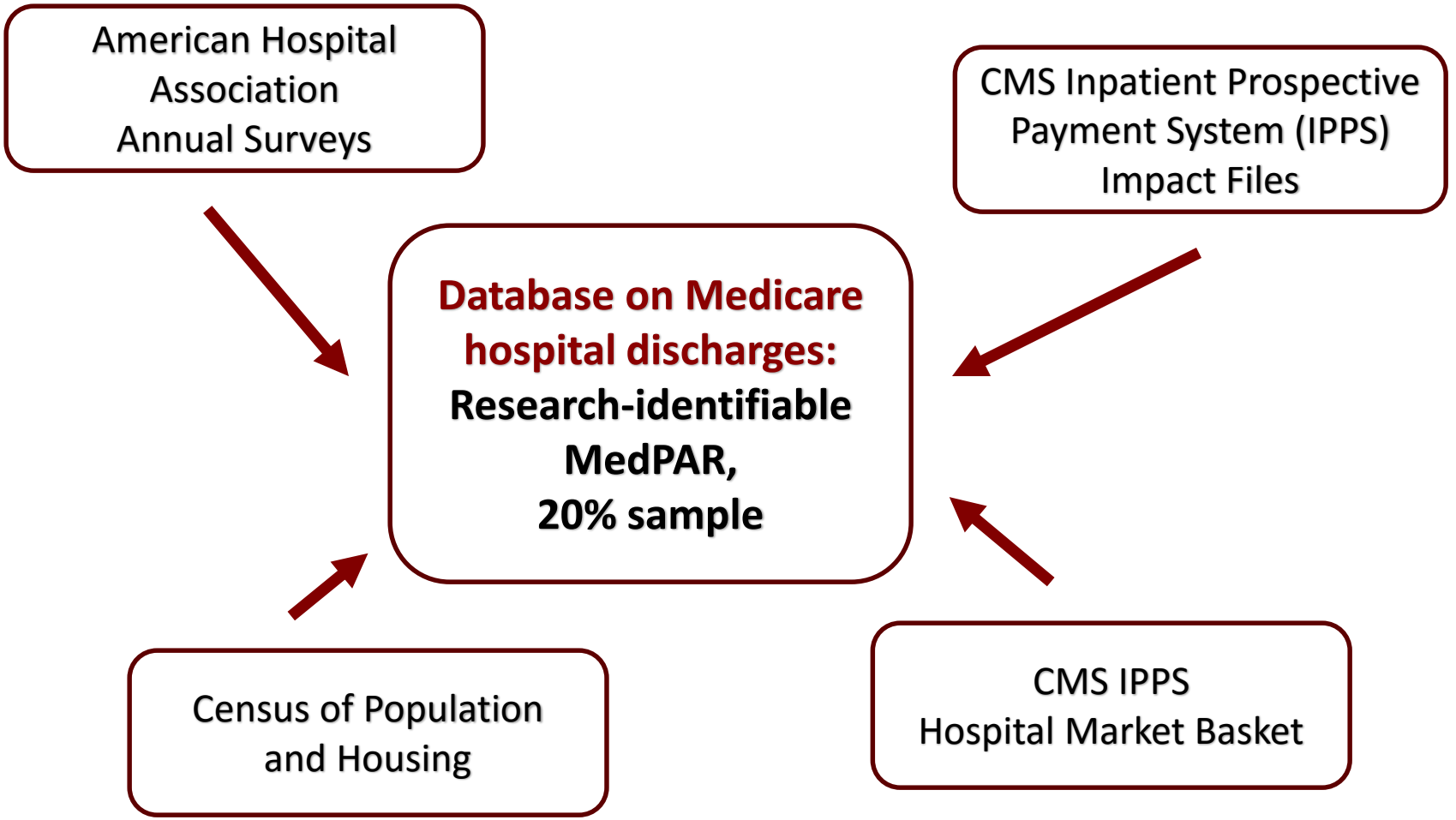
- **These are leading causes of death in the U.S…**

  …and common admitting diagnoses to the hospital

- **CMS has been paying very close attention**
  - **Publicly reports, and now pays according to, hospital performance on these conditions**

- **Measures of patient severity / health risk have been developed specifically for these conditions**
  - **Included in AHRQ Inpatient Quality Indicators (IQIs)**

Among elderly fee-for-service Medicare beneficiaries over 2002-2011



Hospital productivity and inputs

- **We measured productivity using the ratio of a hospital's output to its inputs**
  - **Unit of analysis was the hospital-year**
- **Production inputs were measured with a dollar-denominated index**
  - **Specifically, total facility costs for all patients with condition**
  - **Charges converted to costs with cost-to-charge ratio, then adjusted for area wages and hospital cost inflation**

How we identified patient cohorts

AHRQ Quality Indicators Web Site: http://www.qualityindicators.ahrq.gov

AHRQ QUALITY INDICATORS
Inpatient Quality Indicators
Technical Specifications

IQI #15 Acute Myocardial Infarction (AMI) Mortality Rate

Provider-Level Indicator

Mortality Indicator for Inpatient Medical Conditions

Numerator

Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator.

Denominator

All discharges, age 18 years and older, with a principal diagnosis code of AMI.

ICD-9-CM AMI diagnosis codes:

41001	AMI ANTEROLATERAL, INIT	41051	AMI LATERAL NEC, INITIAL
41011	AMI ANTERIOR WALL, INIT	41061	TRUE POST INFARCT, INIT
41021	AMI INFEROLATERAL, INIT	41071	SUBENDO INFARCT, INITIAL
41031	AMI INFEROPOST, INITIAL	41081	AMI NEC, INITIAL
41041	AMI INFERIOR WALL, INIT	41091	AMI NOS, INITIAL

Exclude cases:

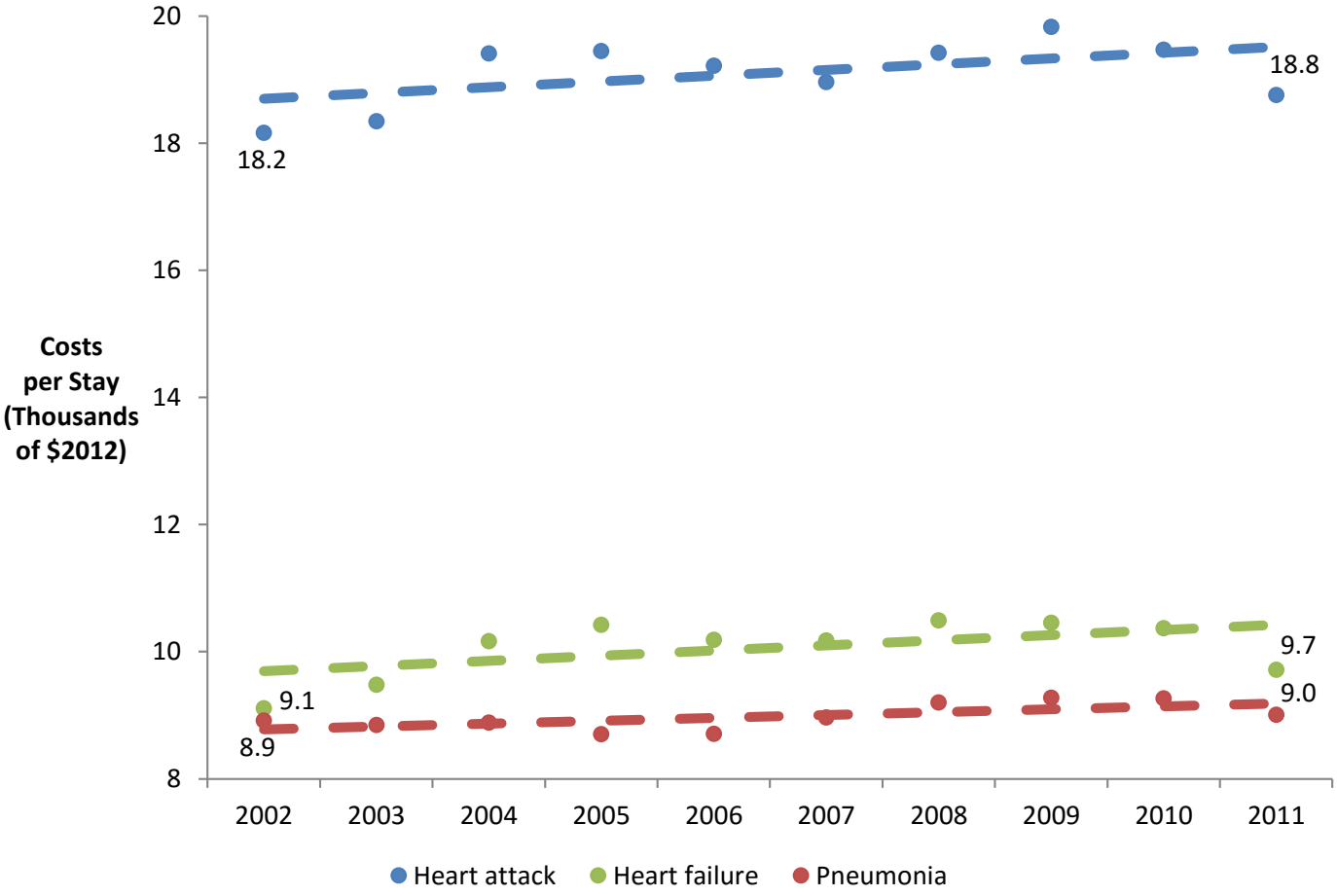
- missing discharge disposition (DISP=missing), gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing) or principal diagnosis (DX1 =missing)
- transferring to another short-term hospital (DISP=2)
- MDC 14 (pregnancy, childbirth, and puerperium)

Some summary statistics

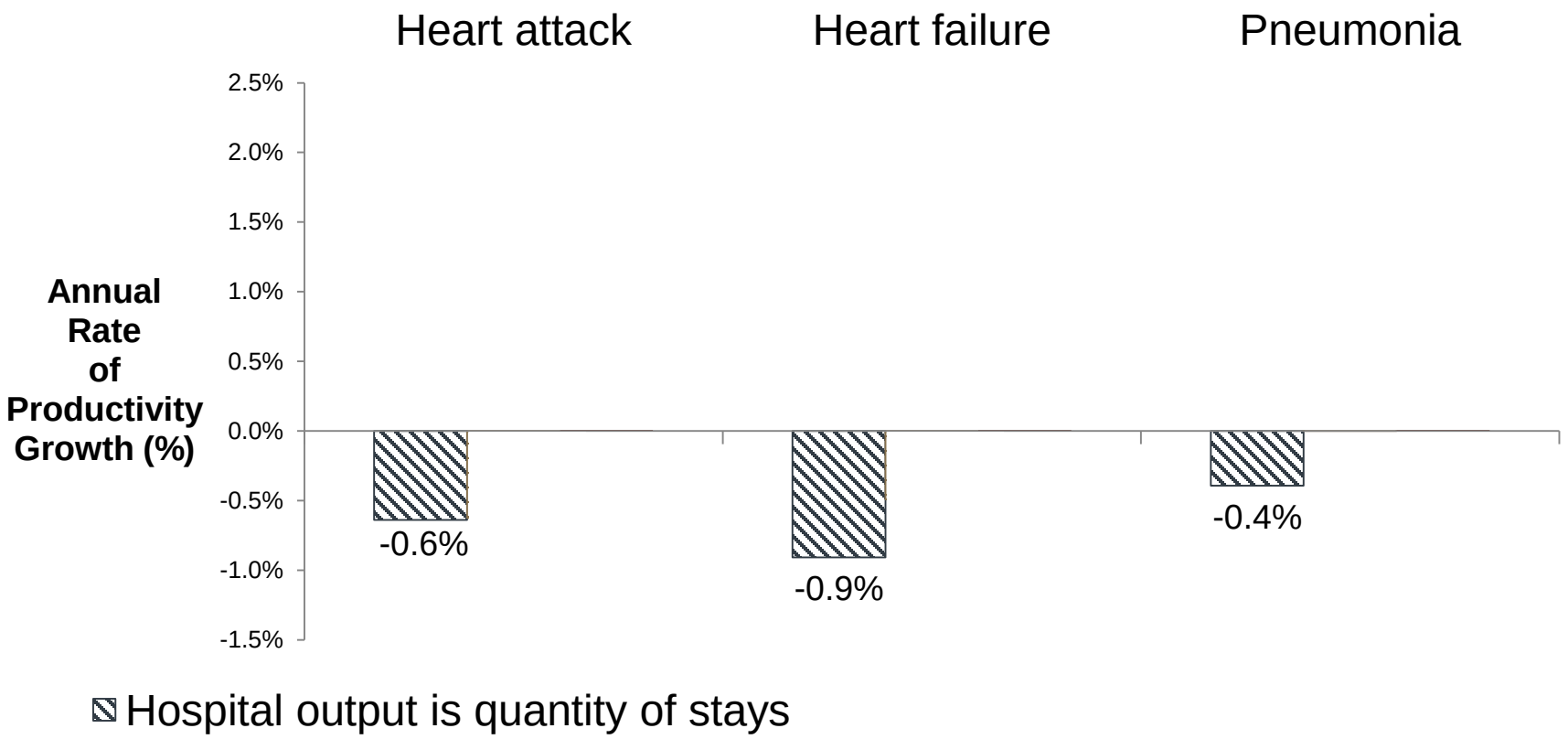
	Heart attack	*Heart failure*	*Pneumonia*
Patient stays, n	403,253	906,918	764,623
Hospitals, n	3,315	3,621	3,675
Year of admission	2006.0	2006.4	2005.9
Adjusted cost per stay (2012 dollars)	$18,762	$10,017	$8,942
30-day survival with no unplanned readmissions	78.7%	71.8%	77.4%
Teaching hospital	4.4%	3.4%	2.5%

Notes: Statistics are means unless otherwise indicated; all statistics calculated at the patient stay level.

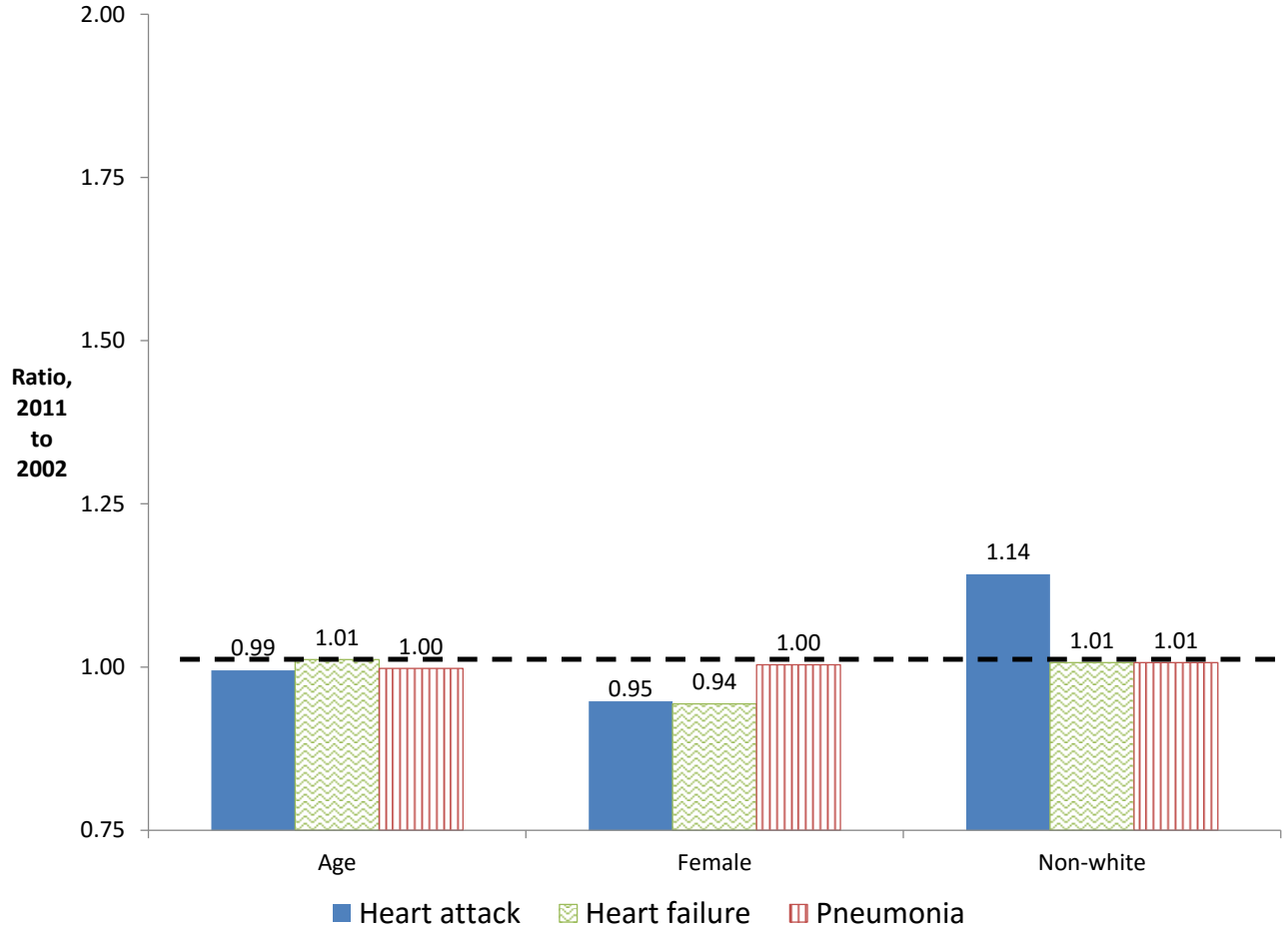
For costs per stay, the trend lines do not point to productivity growth



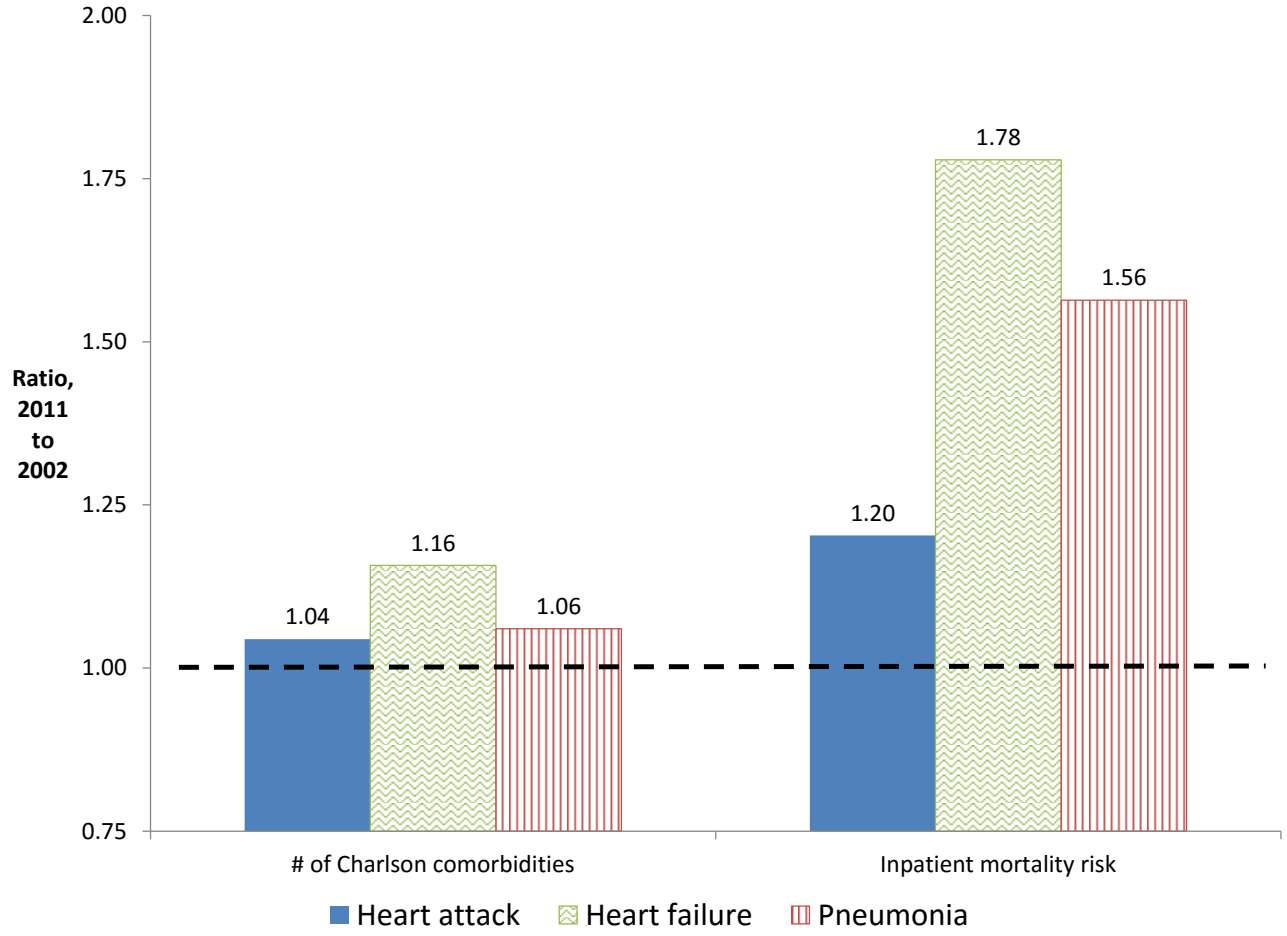
In regression analysis, “naïve” productivity growth was negative over 2002-2011 for all conditions



But patient demographics were changing between 2002 and 2011



In addition, patient severity was increasing



Clinical experts for AHRQ developed model of inpatient mortality risk in administrative data sets

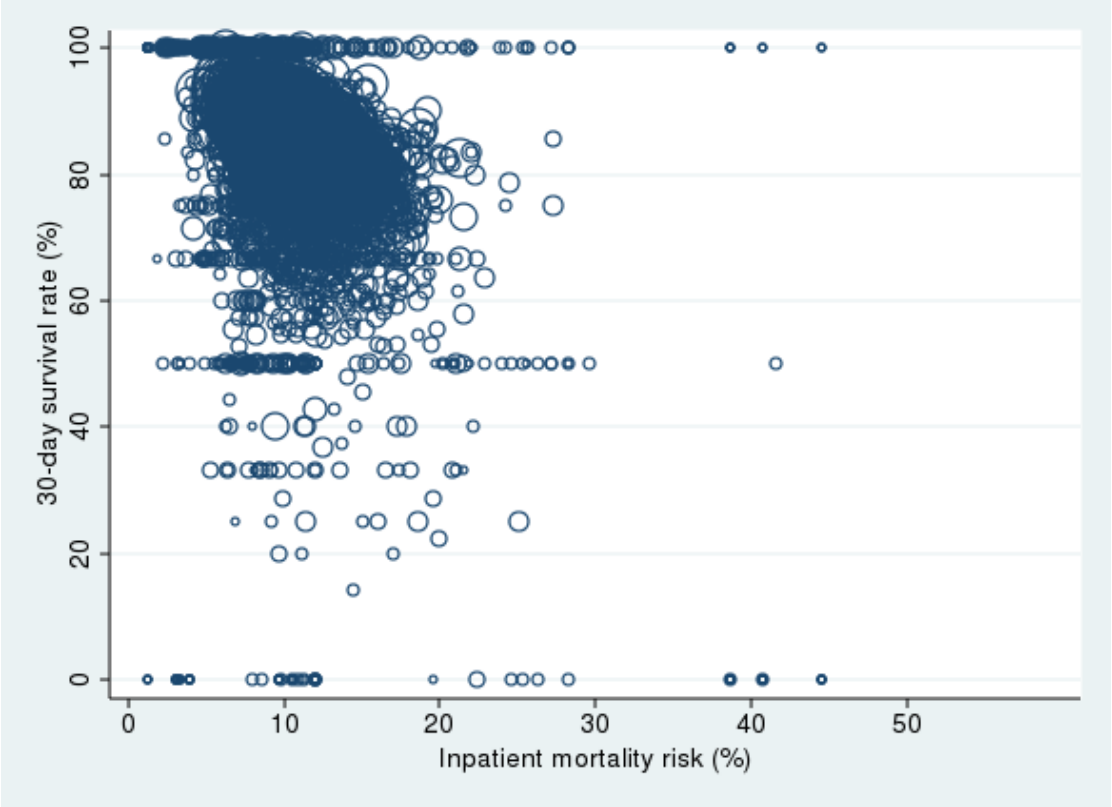
APR-DRGs from 3M play important role

IQI

Table 7. Risk Adjustment Coefficients for IQI #15— AMI Mortality

Parameter	Label	DF	Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Intercept		1	-5.5309	0.1025	2912.8843	<.0001
Age	18 to 39	1	-0.5723	0.1438	15.8301	<.0001
Age	40 to 44	1	-0.7079	0.1302	29.5492	<.0001
Age	45 to 49	1	-0.2508	0.0847	8.777	0.0031
Age	50 to 54	1	-0.23	0.0716	10.3304	0.0013
Age	55 to 59	1	-0.1458	0.0644	5.1317	0.0235
Age	65 to 69	1	0.1264	0.0462	7.4857	0.0062
Age	80 to 84	1	0.123	0.0506	5.9012	0.0151
Age	85+	1	0.1959	0.0487	16.1528	<.0001
APR-DRG	'1611' to '1612'	1	1.1742	0.3682	10.1694	0.0014
APR-DRG	'1613' to '1614'	1	2.87	0.1589	326.1709	<.0001
APR-DRG	'1621' to '1622'	1	2.3699	0.253	87.7313	<.0001
APR-DRG	'1623'	1	3.9284	0.1762	497.1341	<.0001
APR-DRG	'1624'	1	4.6219	0.1993	537.5819	<.0001
APR-DRG	'1651' to '1652'	1	1.0558	0.1471	51.5343	<.0001
APR-DRG	'1653'	1	2.6729	0.1227	474.6562	<.0001
APR-DRG	'1654'	1	3.8062	0.1407	731.6044	<.0001
APR-DRG	'1731' to '1734'	1	3.8338	0.1753	478.5413	<.0001
APR-DRG	'1742'	1	1.4064	0.1109	160.7569	<.0001
APR-DRG	'1743'	1	3.035	0.1096	766.6736	<.0001
APR-DRG	'1744'	1	4.4992	0.1026	1922.9611	<.0001
APR-DRG	'1901'	1	1.4033	0.1255	125.084	<.0001
APR-DRG	'1902'	1	2.3416	0.1028	519.1431	<.0001
APR-DRG	'1903'	1	3.3619	0.0984	1167.0483	<.0001
APR-DRG	'1904'	1	4.9943	0.0982	2585.3541	<.0001
MDC	5	1	3.5402	0.1069	1096.7232	<.0001
TRNSFER		1	-0.2032	0.0352	33.3572	<.0001
c-statistic	0.84					

AHRQ inpatient mortality risk is well correlated with 30-day survival

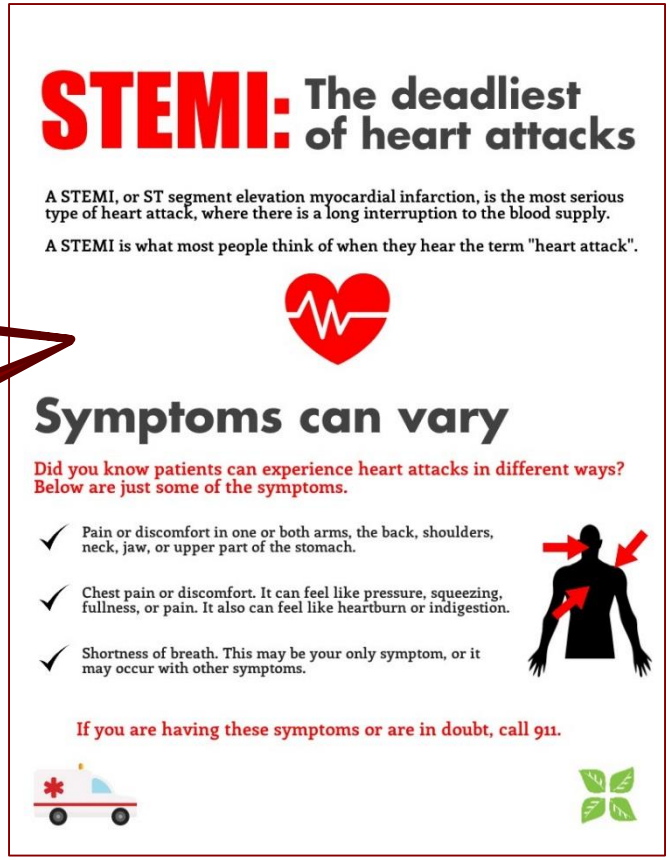


Heart attack

For heart attack, we adjusted for the location within the heart

Location (ICD-9-CM code)
Anterolateral (410.0x)
Other Anterior Wall (410.1x)
Inferolateral Wall (410.2x)
Inferoposterior Wall (410.3x)
Other Inferior Wall (410.4x)
Other Lateral Wall (410.5x)
True Posterior Wall (410.6x)
Sub-Endocardial (410.7x)
Other Specified Sites (410.8x)
Unspecified site (410.9x)

STEMI share increased 25.2% between 2002 and 2011

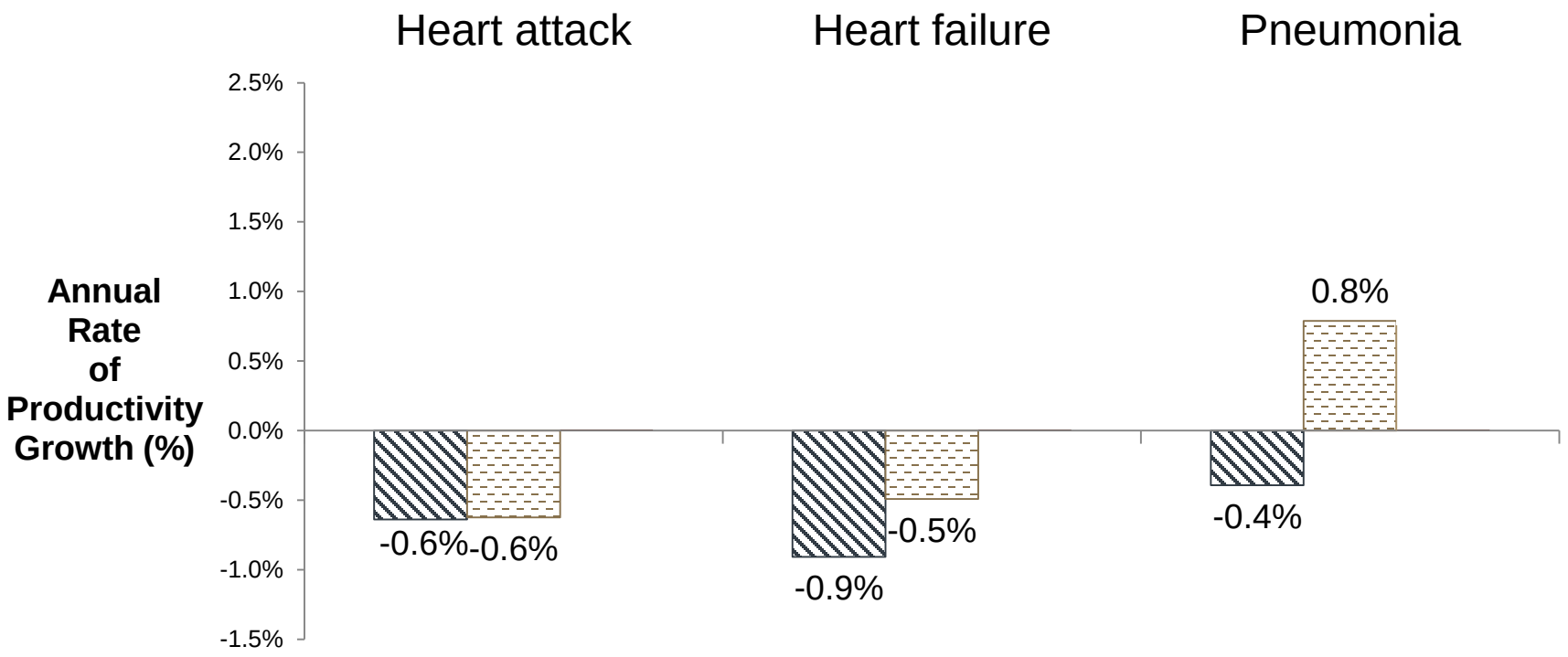


Finally, following Fisher et al. (2003), we adjusted for contextual factors in patient zip codes

	Heart attack	*Heart failure*	*Pneumonia*
Patient zip code characteristics			
Median household income ($000)	41.9	41.3	41.7
Social Security income ($000)	11.3	11.2	11.3
Poor	12.3%	13.1%	12.7%
Employed	58.3%	57.9%	58.3%
Less than high school education	20.3%	21.2%	20.8%
Urban	71.3%	74.5%	71.7%
Hispanic	8.6%	9.5%	9.2%
Single	42.0%	43.1%	42.2%
Elderly in an institution	4.6%	4.6%	4.8%
Non-institutionalized elderly with physical disability	29.5%	30.0%	30.0%
Sensory disability among elderly	12.3%	13.1%	12.7%
Mental disability	11.0%	11.4%	11.4%
Self-care disability	9.8%	10.1%	10.0%
Difficulty going-outside-the-home disability	20.6%	21.3%	20.9%

Notes: Statistics are means unless otherwise indicated; all statistics calculated at the patient stay level.

With adjustment for patient severity, measured growth improves for HF and PN



Should we be worried about our patient severity measures?

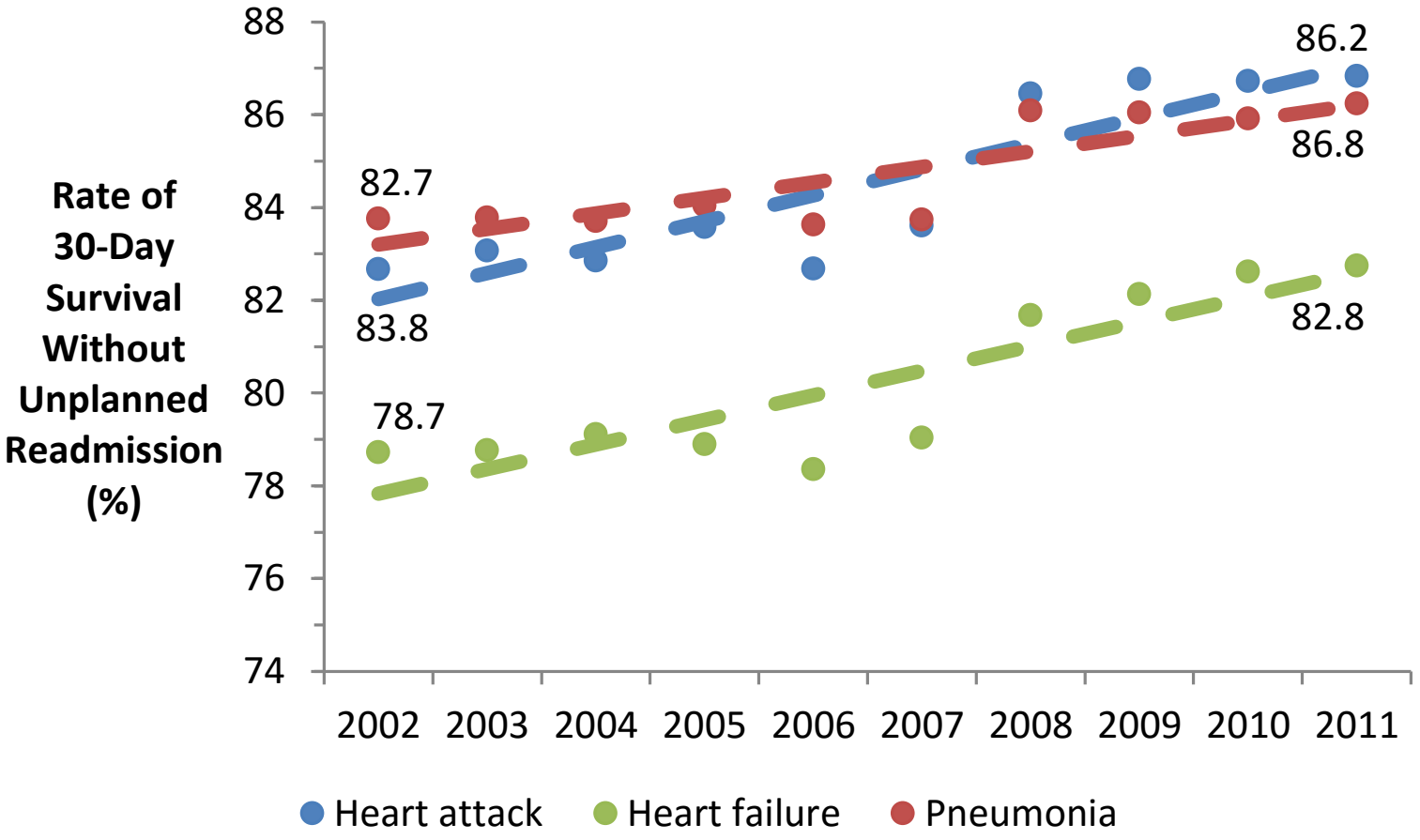
- There is reason to be believe comorbidity has grown
- But, MS-DRG adoption created incentives for "documentation and coding" response by hospitals
- Severity measurement merits careful investigation

Identifying high-quality stays: Survival without an unplanned readmission

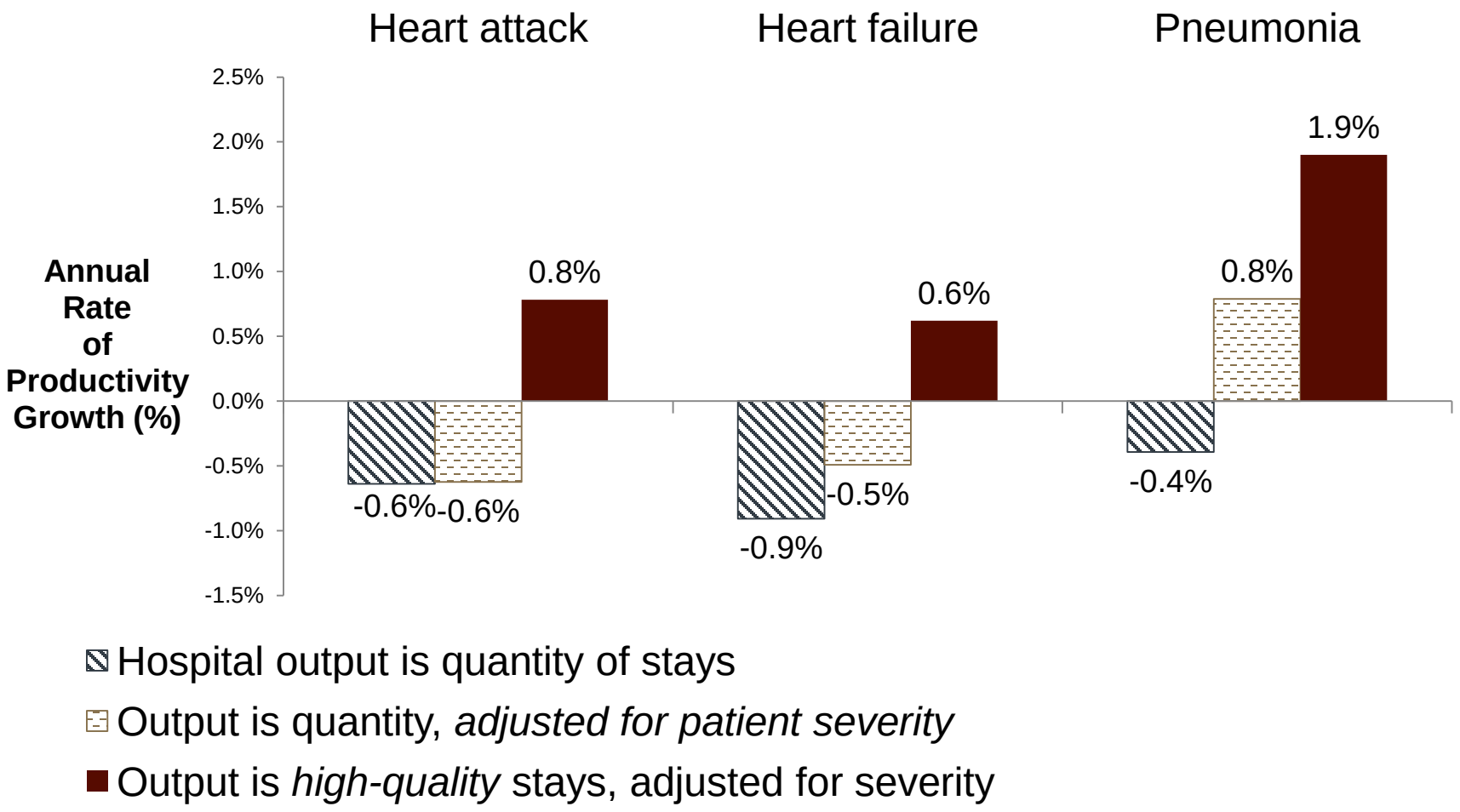
- **MedPAC identifies efficient hospitals based on these patient outcomes**

- **We measured unplanned readmission rate following CMS methodology**

The quality of hospital stays increased



Accounting for quality, U.S. hospitals actually performed well over 2002-2011



Overview

- **Some perspective**
- **Quality and productivity in hospitals**
- **New directions**
- **Conclusions and implications**

Unpublished results − Slide removed

In addition, we have begun to explore post-acute care

- **Nursing homes seem like strong candidates for a cost disease**
- **Ultimately, we want to understand productivity not only by site of care, but also for episodes of care**
- **As of today, we have examined outcomes for Medicare beneficiaries admitted to a SNF**
  - **After hospitalization for hip / knee replacement or stroke**
  - **Over 2007-2012**

Unpublished results − Slide removed

We are also exploring hospital-physician integration

- **On one hand, clinical integration could improve quality while lowering costs**
  - **On the other hand, *financial* integration could incentivize low-value care with fee-for-service**

- **We follow Baker, Bundorf and Kessler (2014) in characterizing hospital-physician relationships**
  - **Ranging from unintegrated to contractually integrated (e.g., IPA) to fully integrated, based on survey data**
  - **Their study found private insurers paid high prices for inpatient care in counties with high share of fully integrated**

Unpublished results − Slide removed

Overview

- Some perspective
- Quality and productivity in hospitals
- New directions
- Conclusions and implications

The ACA Provider Cuts and Productivity Growth in Health Care

Louise Sheiner
Hutchins Center on Fiscal and Monetary Policy
Symposium on Health Care Productivity

May 3, 2016

Productivity Adjustments in the ACA

- ACA lowered statutory updates from:
  - Changes in input cost

    to
  - Changes in input cost *less* economy-wide multi-factor productivity growth (MFP)
- Affects all Part A providers and most non-physician Part B providers

Implications for sustainability

- If productivity growth in the health sector < economy-wide MFP, relative health prices will rise faster than Medicare updates
- Medicare payments will fall below cost of maintaining constant bundle of services
- Either Medicare beneficiaries will have less access or more cost shifting, putting pressure on politicians to undo cuts
- Trustees have been issuing "illustrative alternative " in case ACA cuts not sustainable

BUT,

- If productivity growth actually >= economy-wide MFP, ACA updates sufficient to finance constant or even growing quality of care
- And ACA payment reforms might boost productivity.

Other concerns about sustainability

- Even if health sector as productive as rest of economy, ACA cuts might bring Medicare payment levels < private sector levels
  - Private sector might be willing to pay for continuously increasing quality
  - Could mean access problems
- But most analysts expect private sector health spending to slow over time as well, so not clear
- Also, some evidence that private sector follows Medicare

Measured Productivity Growth in Health Care

- Multifactor productivity defined as a residual: Increase in output that is unexplained by increases in inputs
- Often measured on a service basis (hospitals, physicians, nursing homes…)
- Almost always found to be below economy-wide productivity; often found to be close to 0 or even negative

Is Health-Sector Productivity Growth Really So Low?

- Many people believe the health sector subject to Baumol Cost Disease.
  - Classic example: string quartet: no productivity increases.
  - If economy-wide productivity>health care productivity, then wages will increase faster than productivity in health sector, and relative prices will rise

- Is this correct? Are rising health prices inevitable over the long run?

- Or are there measurement problems in productivity growth?

Mismeasurement of Health Care Productivity: Not Defining the Good Properly

- Service-based fixed good approach misses productivity-improving shifts in the location/type of treatment
  - e.g., shift from inpatient treatment to lower-cost treatment in a physician's office, shift from talk therapy to drugs, shift from invasive to laparoscopic surgery
- Much effort now being put into disease-based approach: Treatment for a disease is the good being purchased:
  - Aggregate spending across all service providers on a disease-by-disease basis
  - "Price" is total cost of treatment
- Effect on prices unclear: substitution effect (substituting lower priced settings) lowers prices, but any intensity of treatment viewed as price increase

Mismeasurement of Health Care Productivity: No Quality Adjustments

- If outcomes improving over time, this should be viewed as an increase in the quality of the good
- Quality-adjusted prices will not increase as quickly as unadjusted prices, => the real quantity of quality-adjusted output will increase faster than unadjusted output
- Quality-adjusted MFP will be higher than unadjusted
- Can either quality adjust the price, and calculate a quality-adjusted quantity, or calculate a quality-adjusted quantity directly

Two Broad Issues in Quality Adjustment

- What is quality?
- How should quality be incorporated into prices?

What is Quality?

- From consumer welfare perspective, quality should be whatever is valued by consumers

- What researchers have used:
  - ex post mortality rates
  - expected mortality rates, based on treatment choice
  - quality-adjusted years of life expectancy,
  - expected remission rates from depression,
  - adherence to guidelines
  - scores on Hospital Compare

Incorporating Quality into Prices and Productivity

- Three Different Approaches Have Been Used

1. The Cost of Living Approach
2. The Redefine the Good Approach
3. The Cost Approach

Cost of Living Approach

- Measures the relative cost of obtaining the same level of utility at different points of time
- Asks: How much income would you be willing to forego to get the benefit of new and improved health care
- Background paper shows that this approach is equivalent to one in which quality-adjusted price is equal to the actual price less the *utility value* (in monetary terms) of the quality improvement.
- Nominal price increases from $10 to $12 but value increases from $10 to $14, equivalent to $2 reduction in price, to $8.

Redefine the Good Approach

- What we want to buy is successful treatment
- Rather than counting number of treatments as quantity, count number of *successful* treatments
  - If in year 1, surgery successful 50% of the time and in year 2 surgery successful 75% of the time, that is like 50% increase in quantity (holding # procedures fixed)
- Productivity from this perspective is the increase in successful treatments that is not explained by increases in inputs
- Approach used by Romley et al (2015)

The Cost Approach

- Quality-adjusted price = Nominal price less the cost of quality improvements
  - E.g., In year 1, treatment cost $100.
  - In year 2, treatment cost $160, but $50 of that represents an additional input used to improve quality.
  - Quality-adjusted year 2 price: $110.
  - Real quantity in year 2: $160/$110 = 1.45
  - No quality adjustment:? Year 2 price = $160; Year 2 Quantity = 1.
- Background paper shows: *if* % change in quality = % change in cost, this approach equivalent to a "redefine the good" approach
  - Won't always be the case: e.g. aspirin for heart attacks, low cost, big benefit
- Approach used by BLS in Quality-Adjusted PPIs

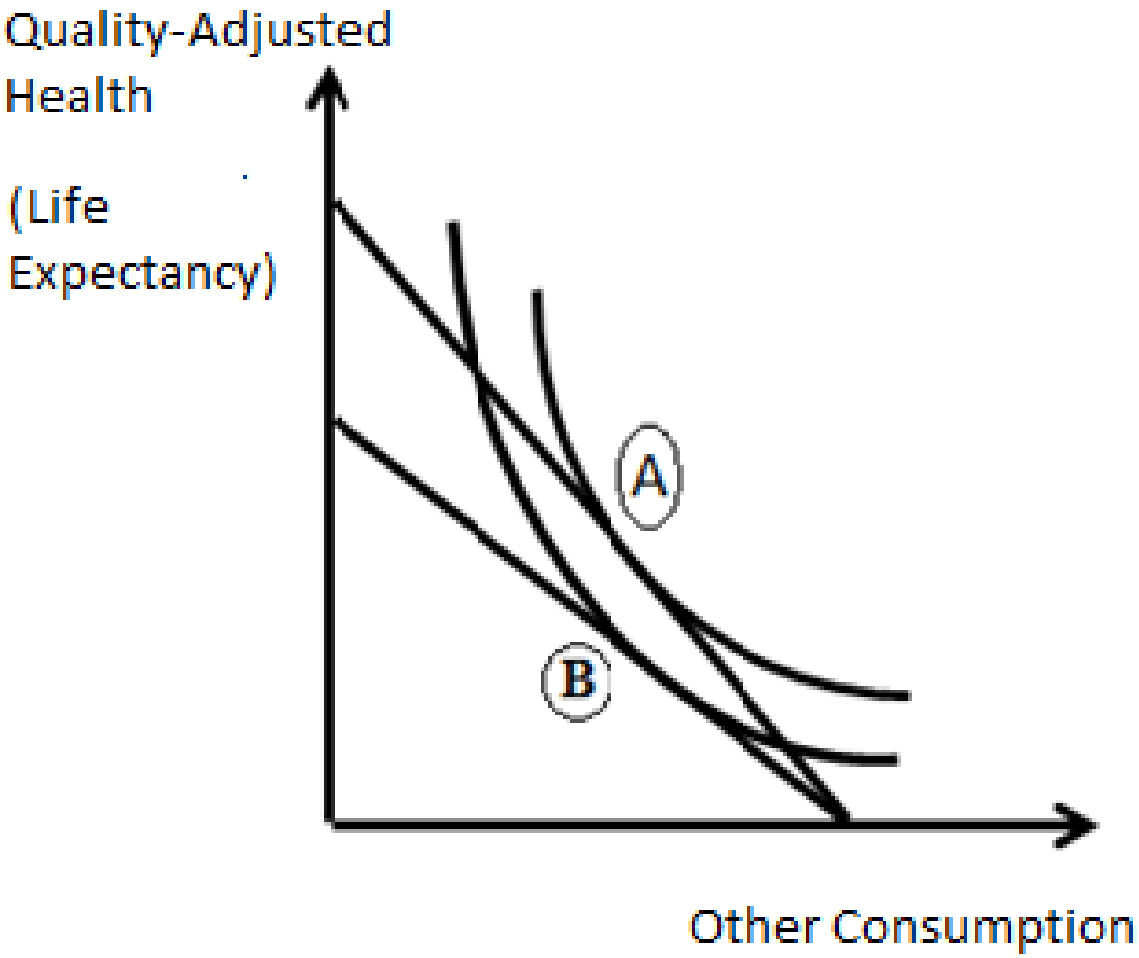
Comparing Approaches

- Cost of Living Approach can yield much larger price declines than Redefine the Good/Cost Approach

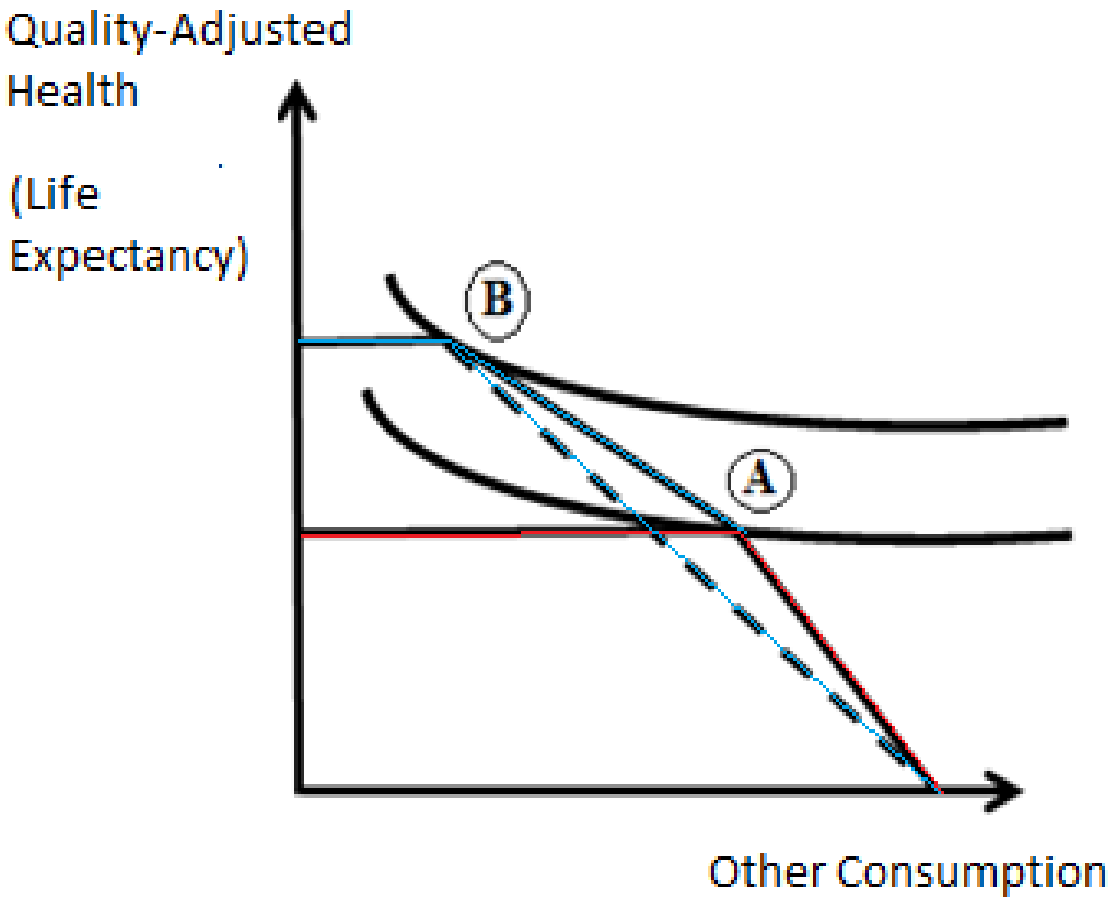
- Redefine the Good Approach asks: what is happening to the cost of an incremental unit of quality over time?
  - If cost increasing, then productivity decreasing

- But, cost of living approach would say: so long as value of incremental quality is worth it, we are better off, and costs are decreasing

If at an interior solution (price of improvement = value of improvement) then higher cost of quality-adjusted health makes us worse off: no difference in approaches



But if at a kink in production function--can't pay more to get more life expectancy--then even more years of life at marginally higher cost can make us better off



- Price increases using Redefine the Good
- Price decreases using Cost of Living Approach

ACA Sustainability?

- Are updates sufficient to cover costs of constant quality health care?
- Cost approach best suited to answering this question. Redefine the Good approach similar.
- What about prospects for improved productivity in the future?
  - ACA contains a multitude of payment reforms that are aimed at raising quality and rewarding cost effectiveness.
  - If successful, these reforms will raise productivity.
  - If productivity already > economic-wide MFP in past, these reforms will allow continued increases in quality even with ACA cuts.
  - If successful, makes ACA cuts less likely to impinge on quality and more politically sustainable.

Payment Reform and Sustainability

- But will these reforms increase productivity per unit of service?
  - Will they lower costs of an angioplasty? Or quantities of angioplasties?
- Probably some combination of both.
  - Tighter payments could encourage providers to find more cost effective modes of care.
  - Reductions in hospital acquired infections, for example, could lower costs per treatment.
  - But goal is to eliminate waste as well – reduce readmissions, for example. This won't enable lower payment per admission.

- Two ways to think about this:
  - These efficiencies can be captured by ACOs, which cover patient lives over a period of time. (Fewer admissions, greater cost savings). So, greater incentive to move toward global payment model.
  - These efficiencies free up resources for Medicare, allowing an "alternative" payment system that boosts payment per admission, if necessary.

Conclusions

- Traditional measures most likely understate health care productivity growth.
- Exactly how much is an empirical and methodological matter.
- From the perspective of the sustainability of the ACA cuts, a Cost approach seems best suited: What could providers have produced if spending hadn't increased?
- But sustainability also requires an analysis of how private payments will evolve over time.
- The ACA's payment reforms—if successful—could boost productivity and lead to increasing quality over time for Medicare beneficiaries despite the provider cuts, easing the political pressure (if any) to undo them.

Global Payment and Productivity in Health Care

Michael Chernew

Productivity

- Ideal outcome: Health
- Ideal input: real resources
  - Spending is a proxy
    - Price declines increase productivity
- Productivity: Health per $

➔How much can we lower spending with same health

Could also improve health with same spending or some combination of health and/ or spending improvement

A Lot of Room for Savings

Variation in differences in spending between ACOs and non-ACO providers in local service areas

Patient characteristics included in model	ACO-level variation in spending differences versus local non-ACO providers, standard deviation	Expected distribution of spending differences among ACOs (percentile)			
		10th	25th	75th	90th
Demographic	$453	–$601	–$326	$286	$561
Demographic and HCC	371	–496	–270	230	456
Demographic and CAHPS health measures	364	–487	–266	226	447
Demographic, HCC, and CAHPS health measures	335	–449	–246	206	409

Source: Rose, Zaslavsky, McWilliams. 2016. "Variation in Accountable Care Organization Spending and Sensitivity to Risk Adjustment: Implications for Benchmarking." *Health Affairs* 35(3):440-448

Pioneer ACOs Reduce Spending

Spending category	Quarterly mean, $	Differential change from 2009-11 to 2012 for ACO group vs. control, $	Savings, %
Total	2,456	-29.2*	-1.2
Acute inpatient	911	-13.5*	-1.5
Total outpatient	793	-6.9	-0.9
Office	405	7.3	+1.8
Hospital outpt dept	388	-14.2*	-3.7
Poste-acute (SNF/IRF)	271	-8.7*	-3.2

*P<0.05

Source: McWilliams, J. Michael, et al. "Performance Differences in Year 1 of Pioneer Accountable Care Organizations." New England Journal of Medicine (2015).

Greater savings from low value care

- Differential reduction of 0.8 low-value services per 100 beneficiaries for ACOs (vs. control)
  - 1.9% differential reduction in low-value service quantity
  - 4.5% differential reduction in spending on low-value services
- Greater reductions for ACOs providing more low-value care

Source: Schwartz et al. “Change in Low-Value Services in Year 1 of the Medicare Pioneer Accountable Care Organization Program." *JAMA Internal Medicine* 2015.

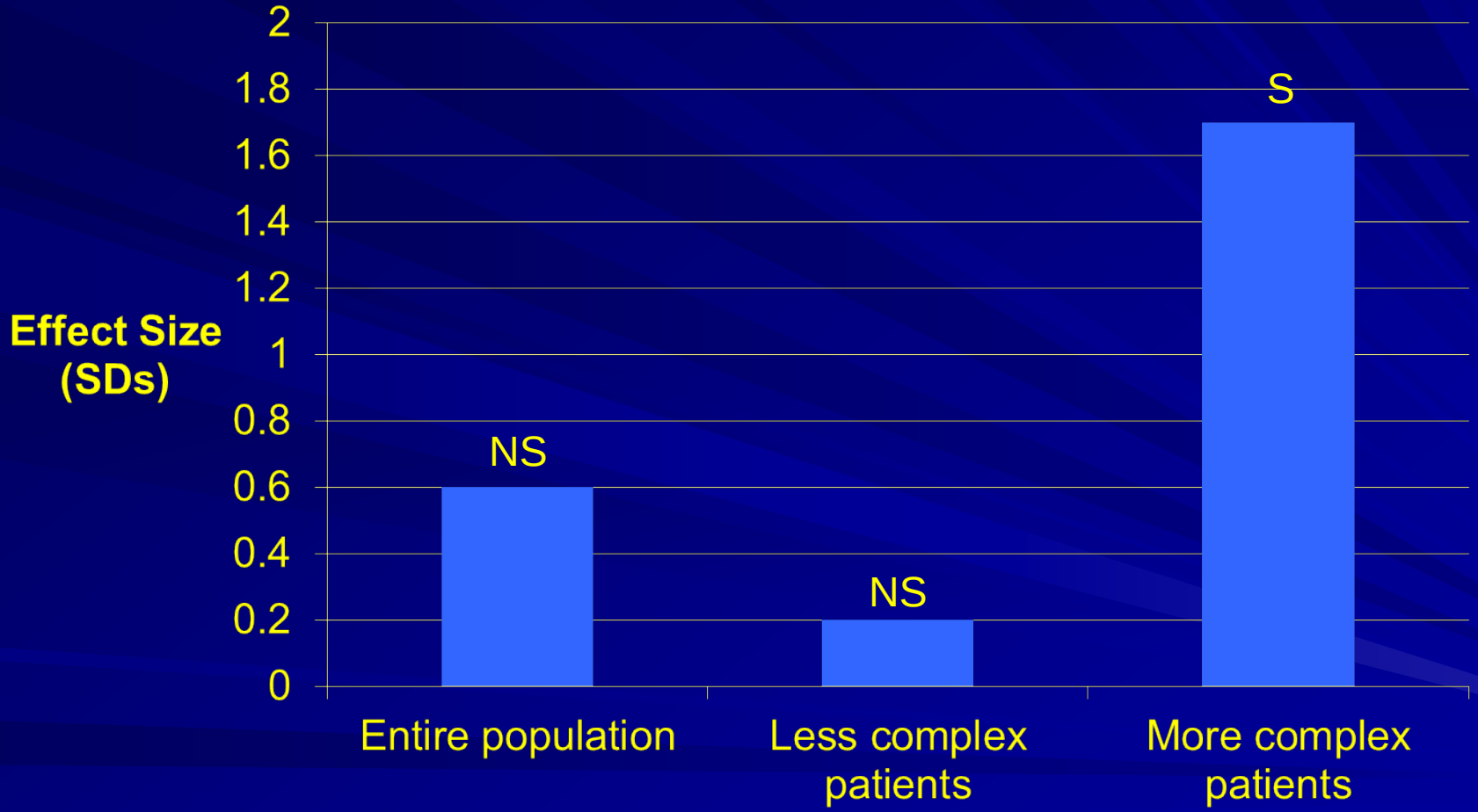
Pioneer ACOs have Null or Positive Impact on Quality

Quality Measure	Annual mean	Differential change for ACO group vs. control
30-day readmissions, no.	0.26	0.00
Hospitalizations for ACSCs, no.	0.06	0.00
CHF	0.02	0.00
COPD	0.01	0.00
CVD and DM	0.02	0.00
Mammography, %	55.2	0.0
Preventive services for DM, %		
A1c testing	73.1	0.5*
LDL testing	77.4	0.5*
Eye exams	55.2	0.8*
Received all 3	38.5	0.8*

*P<0.05

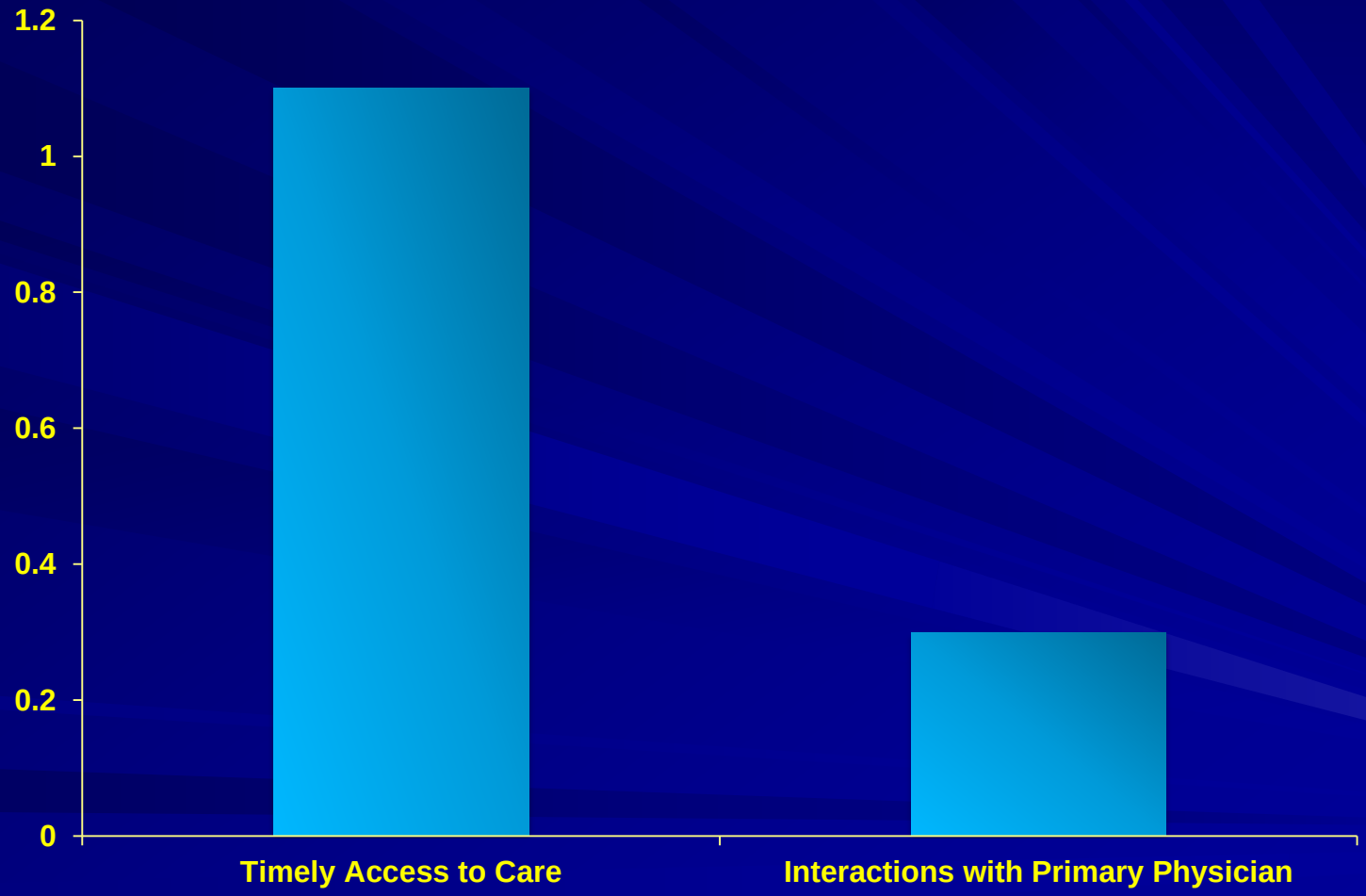
Source: McWilliams, J. Michael, et al. "Performance Differences in Year 1 of Pioneer Accountable Care Organizations." New England Journal of Medicine (2015).

ACO Improve Patient Experiences (Pioneer and MSSP)



Source: McWilliams, J. Michael, et al. "Changes in Patients' Experiences in Medicare Accountable Care Organizations." New England Journal of Medicine 371.18 (2014): 1715-1724.

ACOs Improve Access (Pioneer and MSSP)



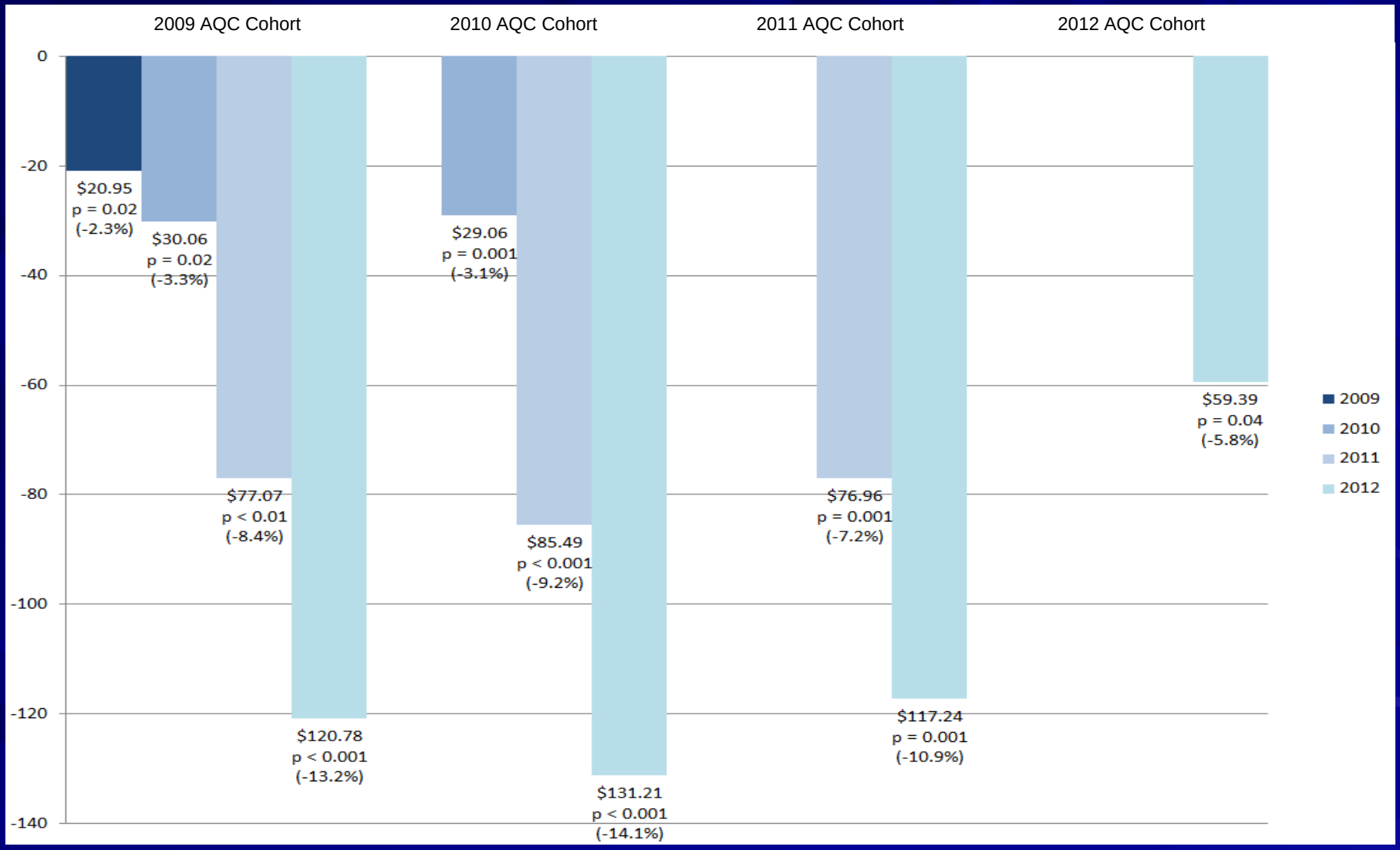
Source: McWilliams, J. Michael, et al. "Changes in Patients' Experiences in Medicare Accountable Care Organizations." New England Journal of Medicine 371.18 (2014): 1715-1724.

MSSP ACO Results

- Lower spending
  - In 2013, $144 per beneficiary differential change in mean total annual Medicare spending in 2012 cohort vs control
    - 1.4% estimated savings
  - Only $3 per beneficiary differential change in 2013 cohort vs. control
- No change in quality
  - No differential change in use of low value services

McWilliams, Hatfield, Chernew, Landon, and Schwartz. 2016. “Early Performance of Accountable Care Organizations in Medicare.” *NEJM*

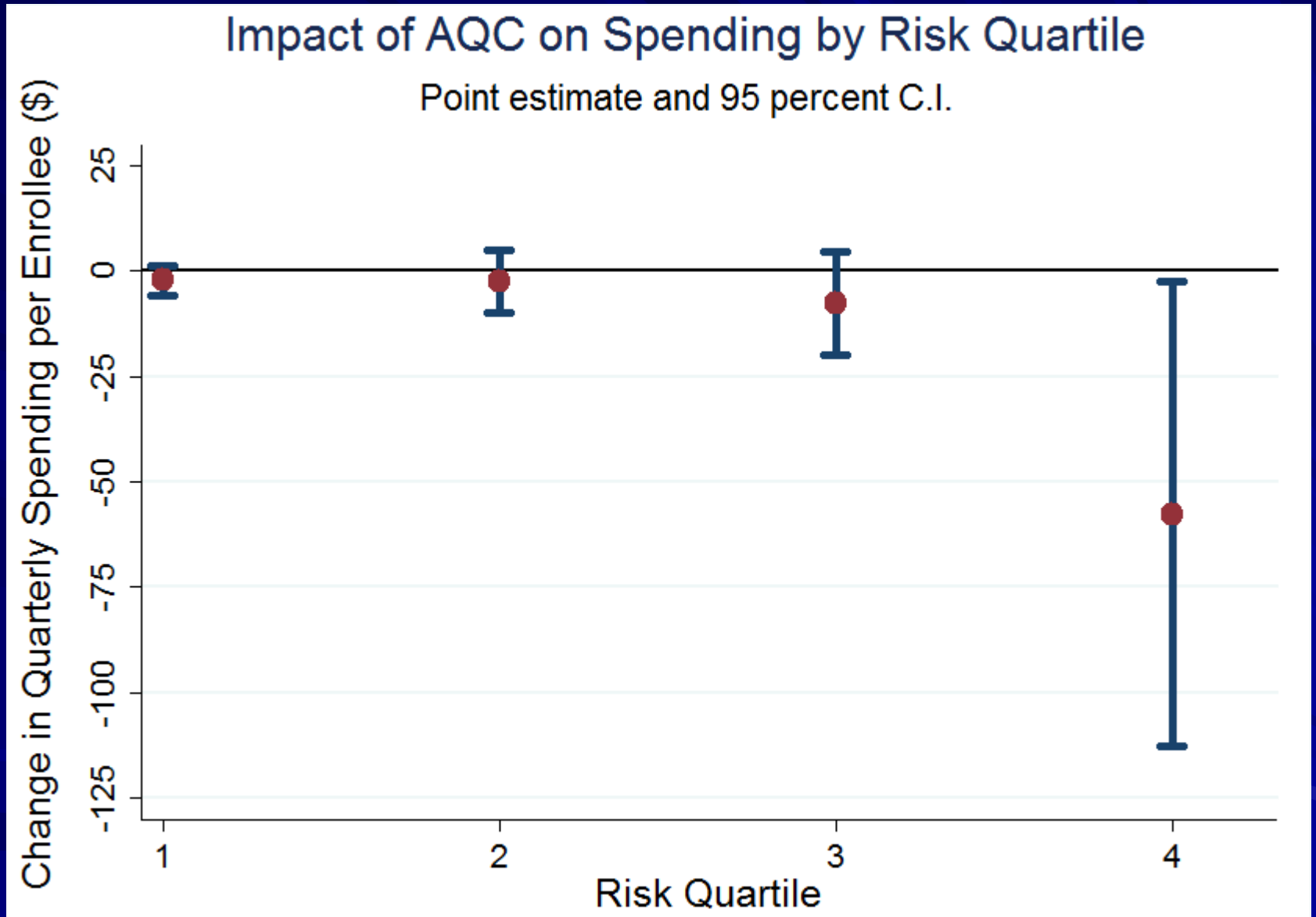
Alternative Quality Contract Reduced Spending



Source: Song, Zirui, et al. "Changes in health care spending and quality 4 years into global payment." New England Journal of Medicine 371.18 (2014): 1704-1714.

Result Decomposition

- About half savings due to price (referrals)
- Utilization effects on
  - Stenting
  - Advanced imaging
  - Equivocal results for orthopedic services
  - Few impacts on prescription drugs


Impact of AQC on Spending by Risk Quartile
Point estimate and 95 percent C.I.
Change in Quarterly Spending per Enrollee ($)
25
0
-25
-50
-75
-100
-125
1
2
3
4
Risk Quartile

Episode Payment

- Many implementation challenges (Hussey et al, 2011)
- No consistent quality impact BPCI[1, 2]
- Some, but mixed, evidence of savings
  - Some lower spending in episodes with post-acute care[2]
  - For episodes w/ cardiovascular procedures and joint replacement, hospitals saw episode costs decrease by an average $300 (Medicare Acute Care Episodes 2009)
  - For CABG episodes, found **5%** decrease in costs within Geisenger integrated delivery system (Casale et al, 2007)
  - Some evaluations show no savings

[1] Econometrica, Inc. "Evaluation and Monitoring of the Bundled Payments for Care Improvement Model 1 Initiative." July 2015.
[2] Lewin Group. "CMS Bundled Payments for Care Improvement Initiative Models 2-4: Year 1 Evaluation & Monitoring Annual Report." February 2015.

End

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Competition: A means of improving healthcare productivity in the UK?

Carol Propper
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May 2016
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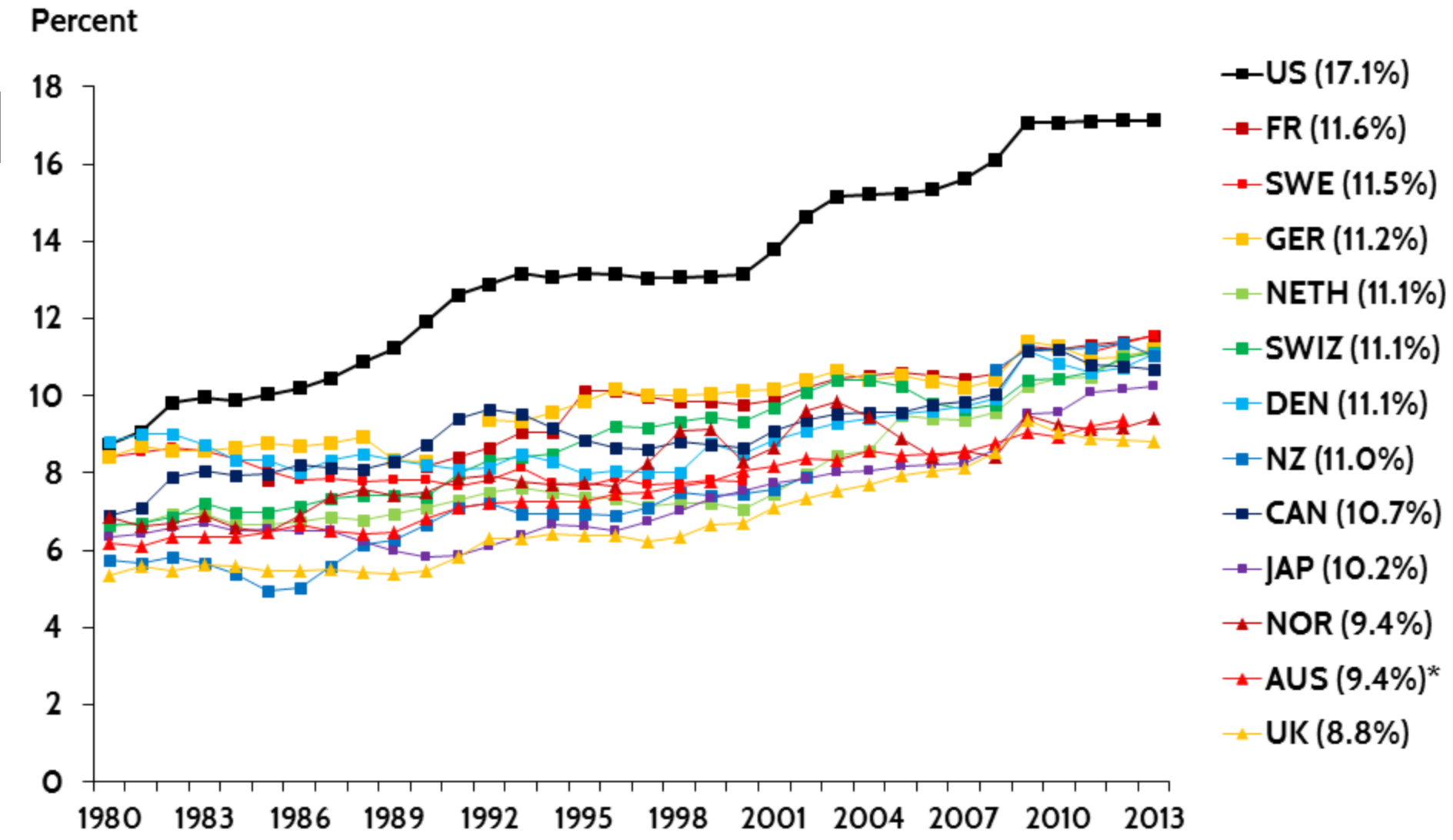
The background: the productivity challenge

- UK healthcare sector characterised by growth in expenditure over time long period
- Tends to outstrip GDP growth (as in other countries)
- Many estimates of productivity growth in sector are low

Exhibit 1. Health Care Spending as a Percentage of GDP, 1980–2013



* 2012.

Notes: GDP refers to gross domestic product. Dutch and Swiss data are for current spending only, and exclude spending on capital formation of health care providers.

Source: OECD Health Data 2015.

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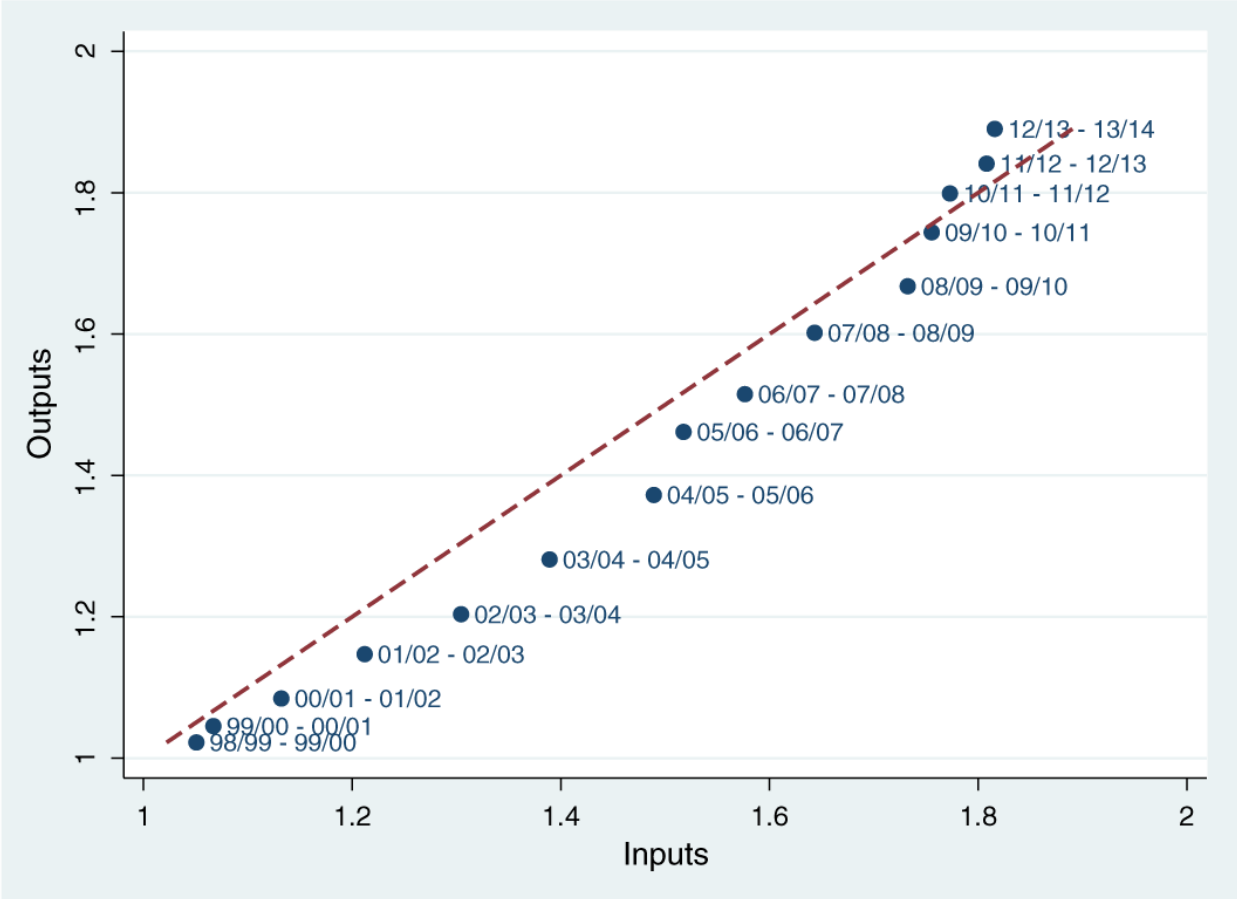
NHS Productivity 1998-2013



Health Economics
hec.3338, 4 APR 2016 DOI: 10.1002/hec.3338
http://onlinelibrary.wiley.com/doi/10.1002/hec.3338/full#hec3338-fig-0008

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Greater competition in the healthcare sector

- Is competition one way to address this challenge?
  - UK (England) has been a pioneer in use of pro-market reforms in formerly heavily centralised and regulated systems
  - Several other European and OECD countries have also had major pro-market reforms in healthcare
- Lessons from the UK experience

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Outline

- Brief overview of reforms
- Evaluation of impact on choice and outcomes
- Reflections and lessons for future

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UK reforms

- Two waves of pro-market reforms
  - Part of pro-market reforms in general economy under Thatcher administration in 1990s
  - Labour administration mid-2000s which continued until around 2012 under Coalition administration

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The Blair pro-choice reforms

- Blair regime started with ‘co-operation’ and targets; mid-2000s shifted to policy of ‘choice and competition’
- Key elements of the reform
  - Focus on secondary care
  - Freedom for patients to choose hospital of care
  - Shift from selective contracting to DRG type pricing (for around 70% of hospital activity)
  - Greater autonomy for well performing hospitals (retain some surpluses; greater freedom over investment decisions)

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What happened?

- Did the reforms change behavior and market structure?
- Did this have any effect on outcomes, processes, productivity, equity?

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Behaviour and market structure: choice

- Patient knowledge of choice
  - Around 50% of patients recalled being offered choice within two years of the reform but also a view from some GPs that their patients did not want (or need) choice
- Increasing evidence that patients can choose on the basis of quality (as well as distance)
  - From choice of GPs; elective hip replacement surgery; heart surgery (CABG)
  - Better hospitals attracted more patients post-reform (CABG surgery; hip replacements)

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Better hospitals attracted more patients (Gaynor et al)

	Quality (AMI mortality rate 2003)					
	Bottom quartile			Top quartile		
	2003	2007	% change (2003-07)	2003	2007	% change (2003-07)
Number of elective admissions	33,985	38,274	12.6%	41,398	45,132	9.0%
Average distance travelled by patients	11.4	11.7	2.4%	10.0	10.1	1.1%
Share of patients bypassing nearest hospital	0.37	0.39	5.4%	0.45	0.43	-4.4%
Number of hospitals	33	33		32	32	

Source: Gaynor et al Free to Choose

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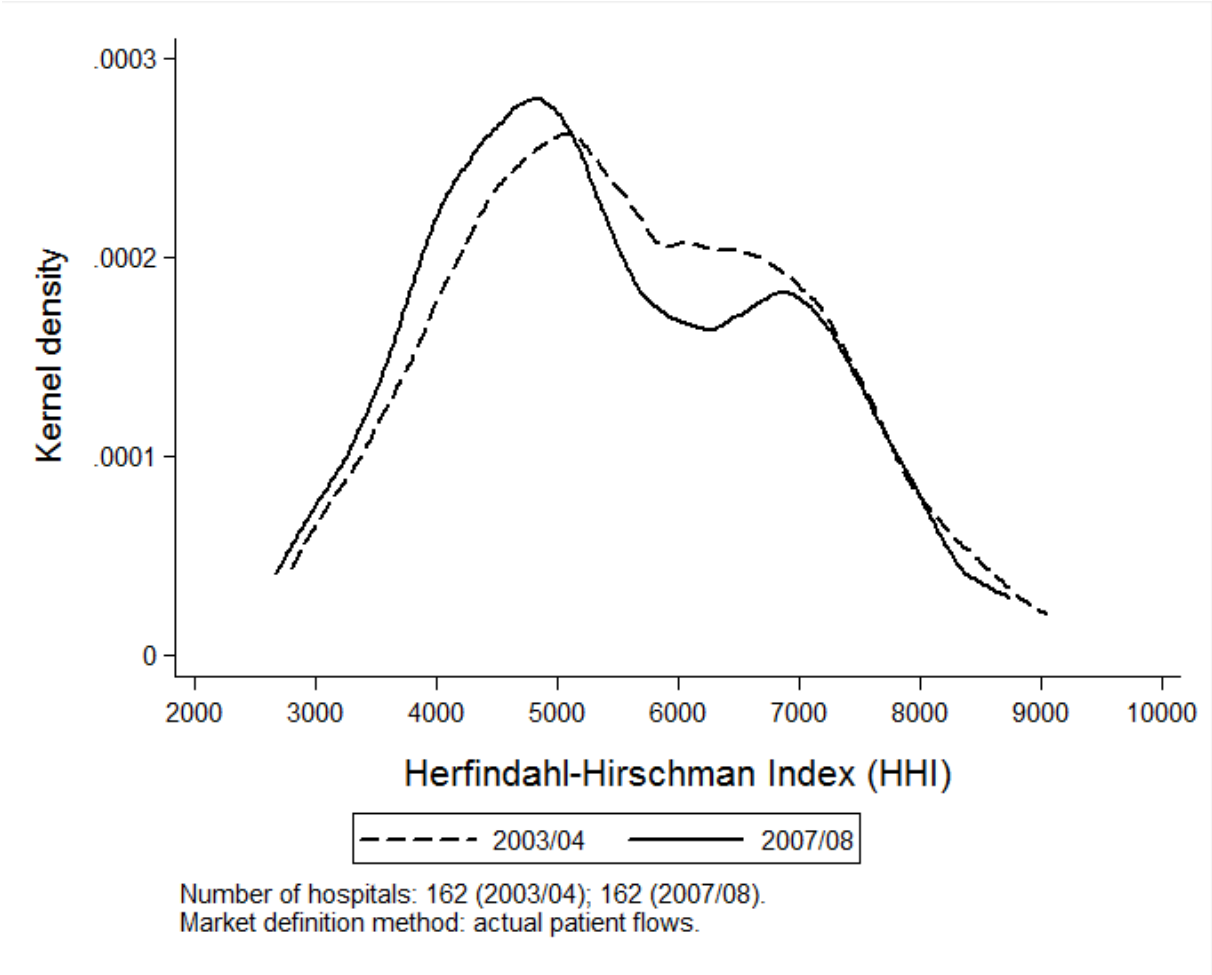
Change in market structure (actual provider HHI)



Number of hospitals: 162 (2003/04); 162 (2007/08).
Market definition method: actual patient flows.

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The impact on quality and process

Quality (most evidence)

(1) D-i-d studies

- Mortality rates - fell and fell by more in less concentrated markets (AMI - 2 studies, change pre-dated policy, 1 study; heart surgery - hospitals with higher quality elasticity has higher falls in mortality)
- Other measures of patient gain – no clear effect and/or positive effects

(2) Structural studies

- Mortality fell, patient utility rose by around 8% (CABG); hospital elasticity with respect to quality increased (hip replacement)

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The impact on quality and process

Productivity

- Less evidence
- Length of stay fell in less concentrated markets post-reform
- No evidence of greater spending

Access/inequality

- No impact on waiting times
- No differential effects by income (deprivation) of local area

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How did the reforms bring gains?

- Relatively little study of the mechanisms by which competition might bring benefits
- One approach has been to study the relationship between competition and management

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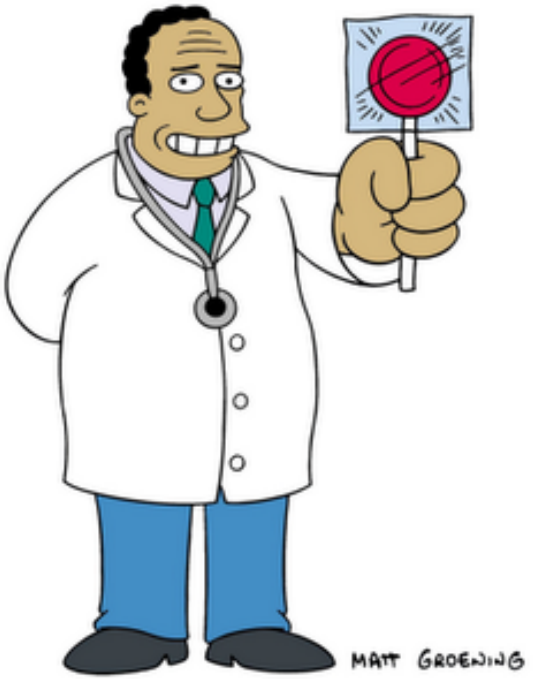
Competition and Management in Public Hospitals



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Motivation

- Management has been shown to result in greater firm productivity
- Economies which are competitive have better management
- Is this the case in hospitals?

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- Bloom et al (2015) use well-tried measure of management quality and examine relationship with competition
- Find that better management in England is
  - Associated with a range of better outcomes (quality, financial performance, waiting times, staff satisfaction and regulator ratings)
  - Management is better in hospitals facing more local competition

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MY (co-author's) FAVOURITE QUOTE:

Don't get sick in Britain

Interviewer : "Do staff sometimes end up doing the wrong sort of work for their skills?

NHS Manager: "You mean like doctors doing nurses jobs, and nurses doing porter jobs? Yeah, all the time. Last week, we had to get the healthier patients to push around the beds for the sicker patients"

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Evidence from UK Hospital consolidation

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Evidence from UK Hospital consolidation

- US evidence: consolidations raise prices, mixed impact on quality, reduce costs only slightly (Vogt 2009)
- Is this the same for a public system?
  - 1997 onwards UK experienced a wave of hospital reconfigurations
    - Over half of acute hospitals were involved in a reconfiguration with another trust
    - Median number of hospitals in a market fell from 7 to 5
- What was the impact on hospital production?

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- Gaynor et al (2012) find that consolidations resulted in:
  - Lower growth in admissions and staff numbers but no increase in productivity
  - No reduction in deficits
  - No improvement in quality
- Summary – mergers costly to bring about with few visible gains other than reduction in capacity

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What do we know from the UK experiment?

- Impact of reforms appears positive
  - Patients and hospitals appear to have responded
  - Better hospitals attract more patients
  - Quality rose without an increase in expenditure
  - Some of this might be due to increased managerial effort
  - Merger policy appears to have opposite effect
- But ……

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Lessons and emerging Issues

- Design issues in maintaining competition
  - Need to ensure mergers (networks) do not remove all competition and that market regulation does not become command and control by another name
- Large political push back
  - Impact on overall expenditure is small; competition between public hospitals is seen as privatisation; choice is seen as a luxury in tough financial times
  - Similar responses in other European countries where equity concerns limits amount of competition that is possible so effects are small

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