THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, DC

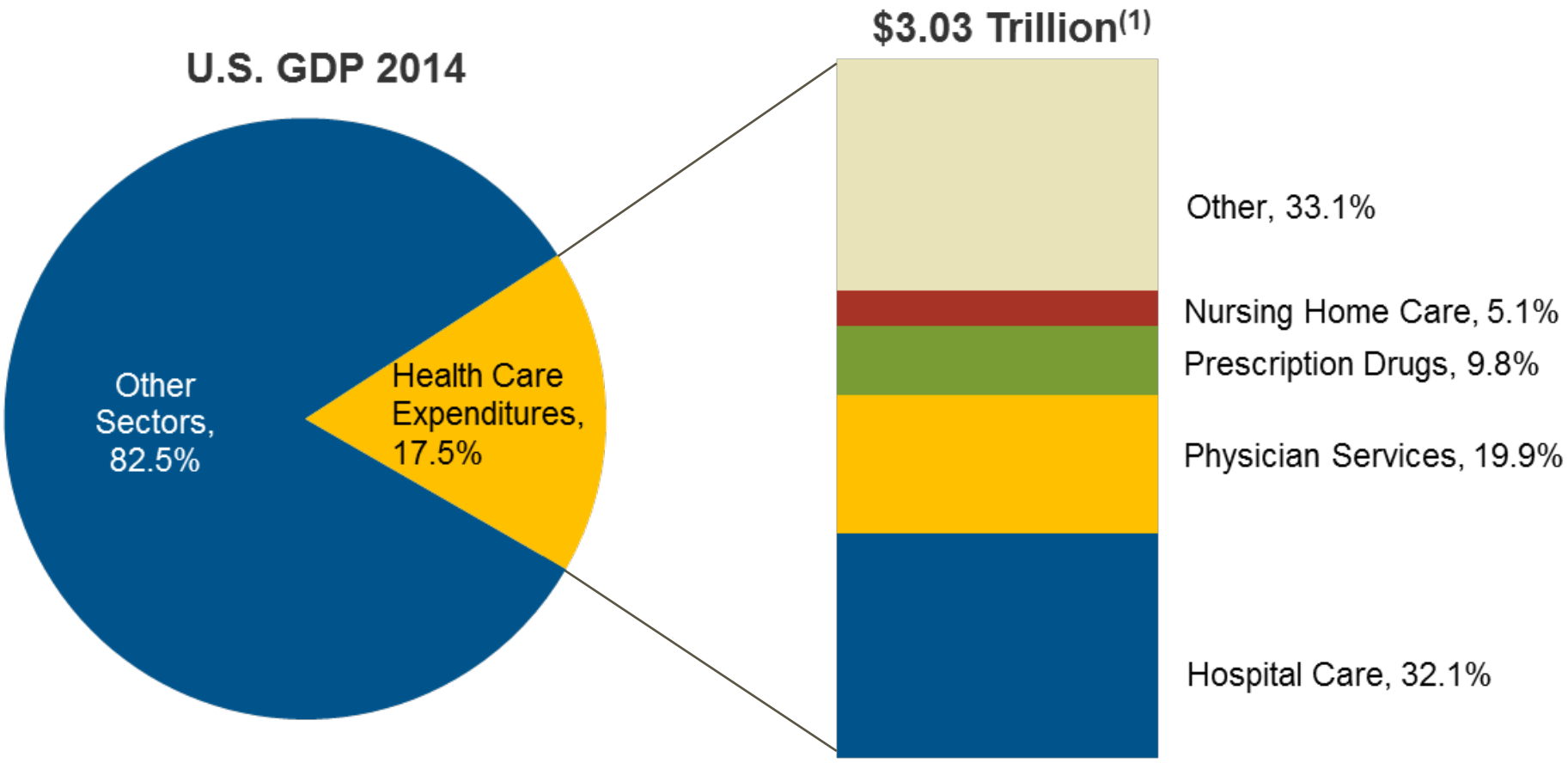
Hospital Pricing and Public Payments

Michael Darden, Ian McCarthy, and Eric Barrette

March 1st, 2018

Outline

Health Care and Hospitals



Outline

The Washington Post

Health & Science

Maryland hospitals push for insurers to pay Medicare and Medicaid cost shift

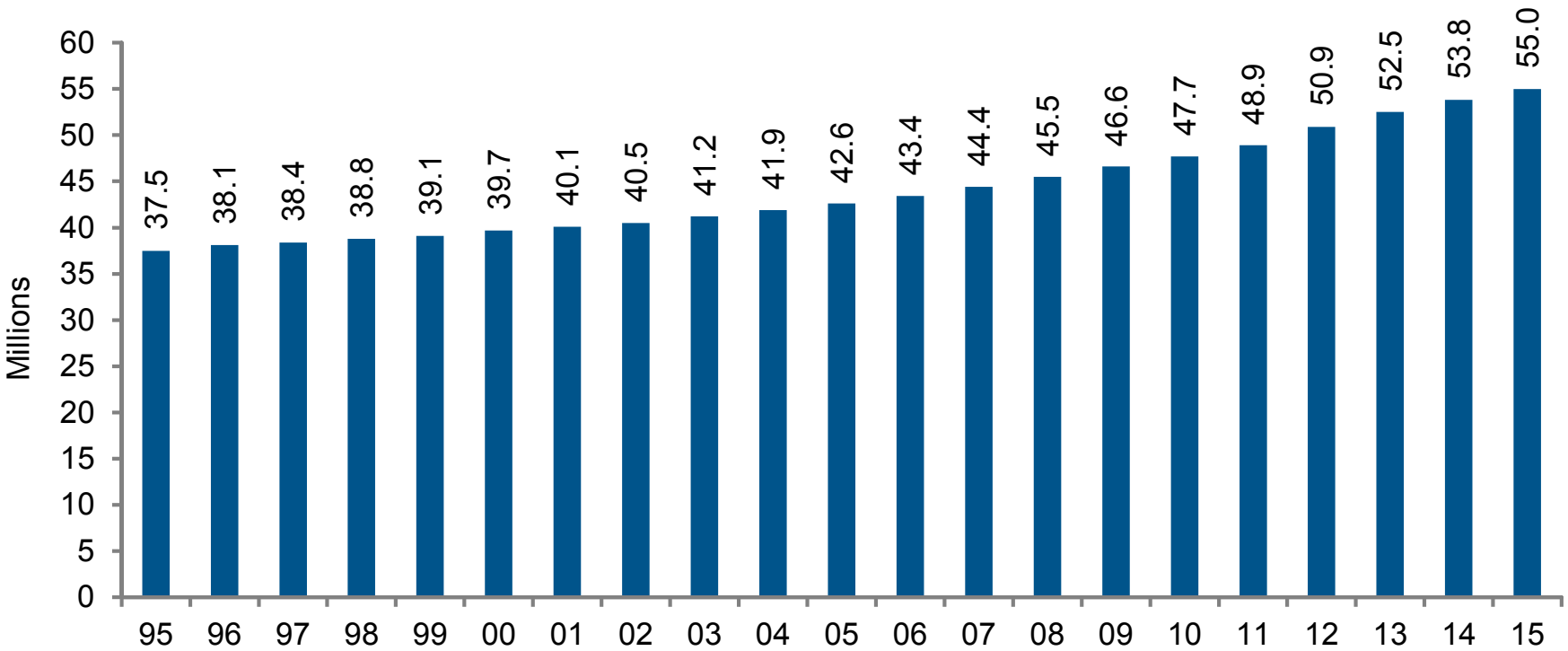
By Jay Hancock August 19, 2012

Maryland hospitals and regulators are discussing raising hospital prices for private insurers and businesses by hundreds of millions of dollars a year to make up for suggested cuts from Medicare and Medicaid.

Cont.

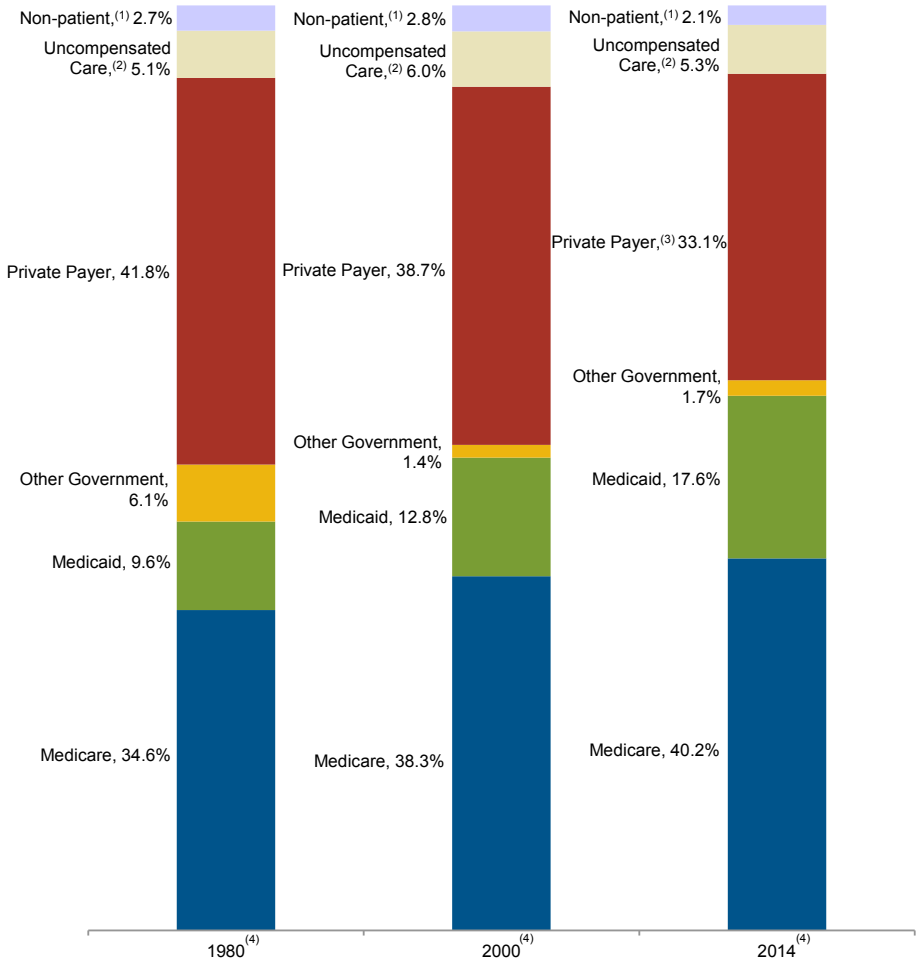
- “Cost shifts have been a fact of hospital financial survival for decades.... The data show ... how private payment is a mirror image of public payment over time and that the cost shift occurs. Hospitals must make up for shortfalls through a combination of approaches and cost-shifting is among them.” - -Rich Umbdenstock, Former President and CEO of American Hospital Association

Medicare Enrollees



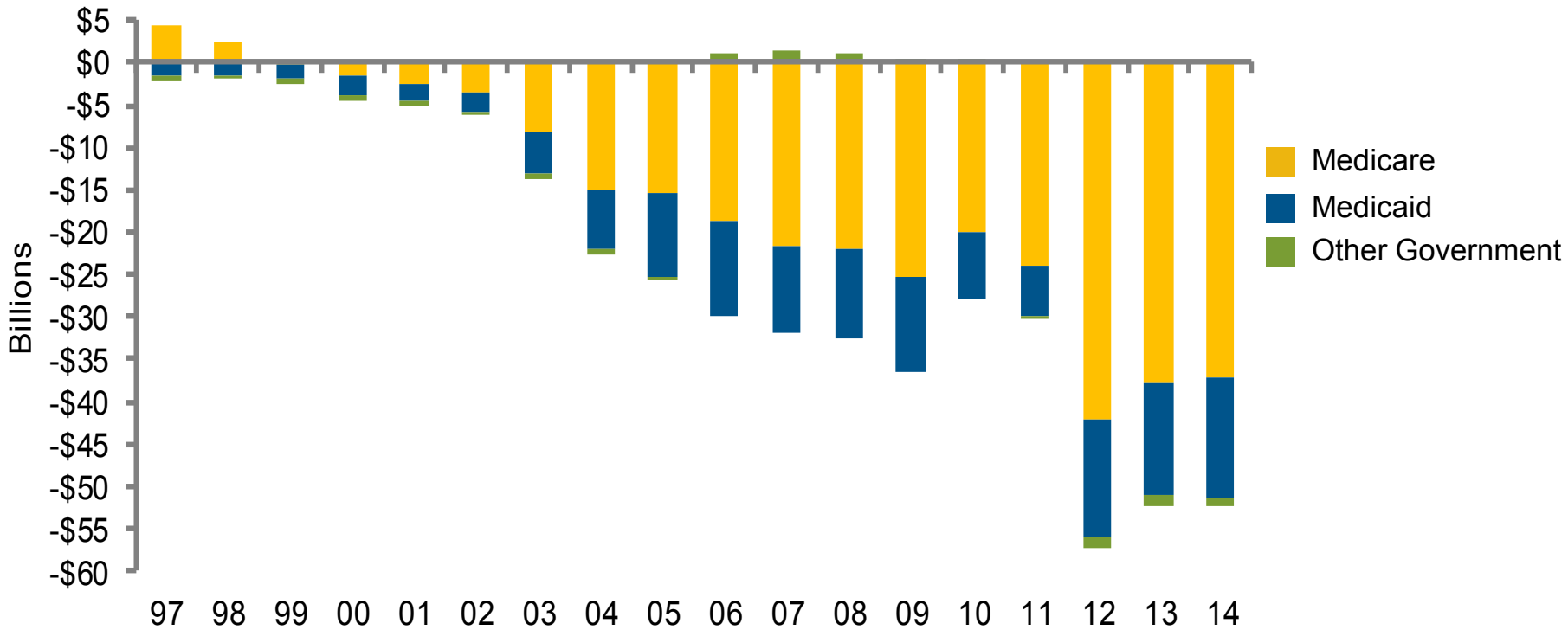
Source: AHA Trendwatch Chartbook 2016. Data from CMS.

Hospital Cost by Payer Type



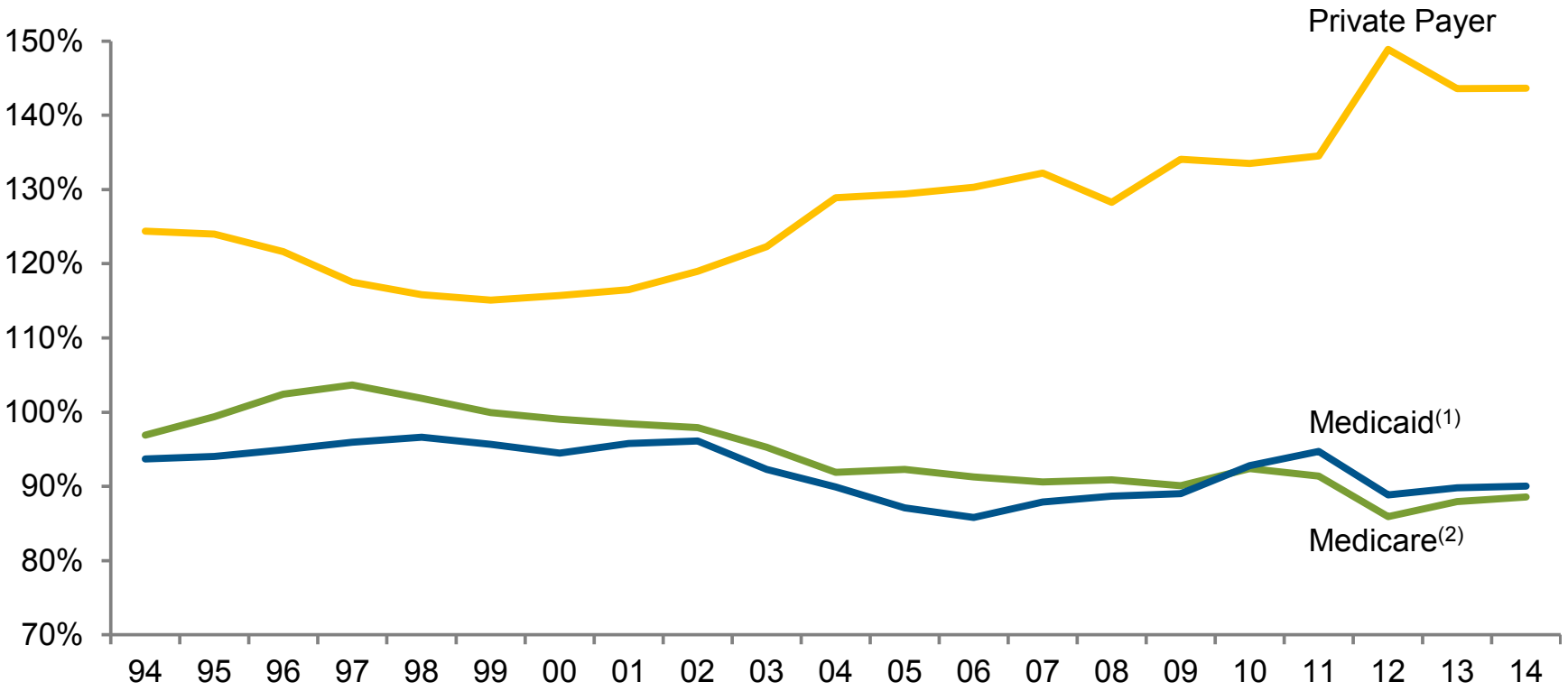
Source: AHA Trendwatch Chartbook 2016.

Payment Shortfall Relative to Costs



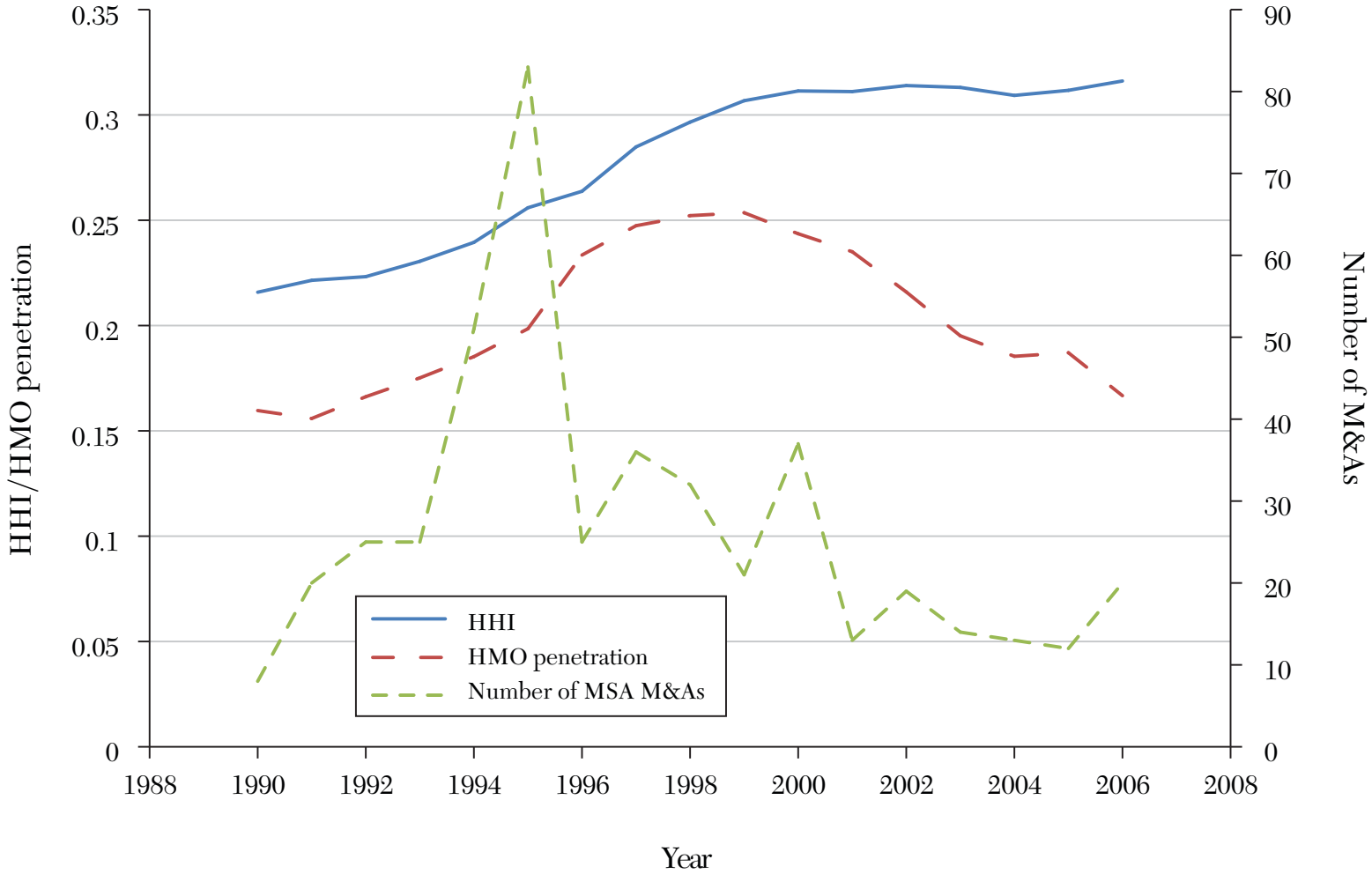
Source: AHA Trendwatch Chartbook 2016.

Payment-to-Cost Ratios



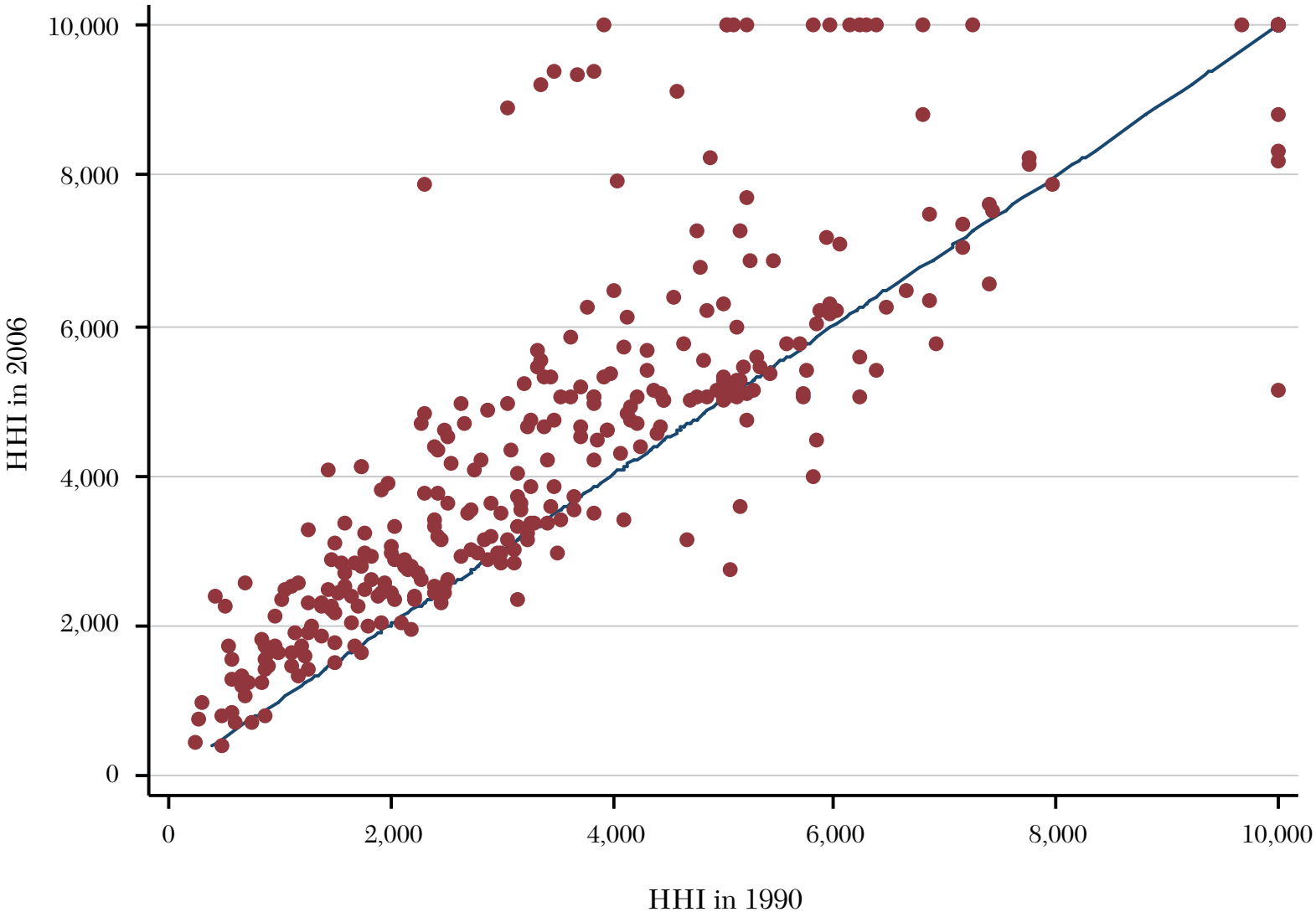
Source: AHA Trendwatch Chartbook 2016.

Hospital Concentration



Source: Gaynor, Ho, and Town (2015)

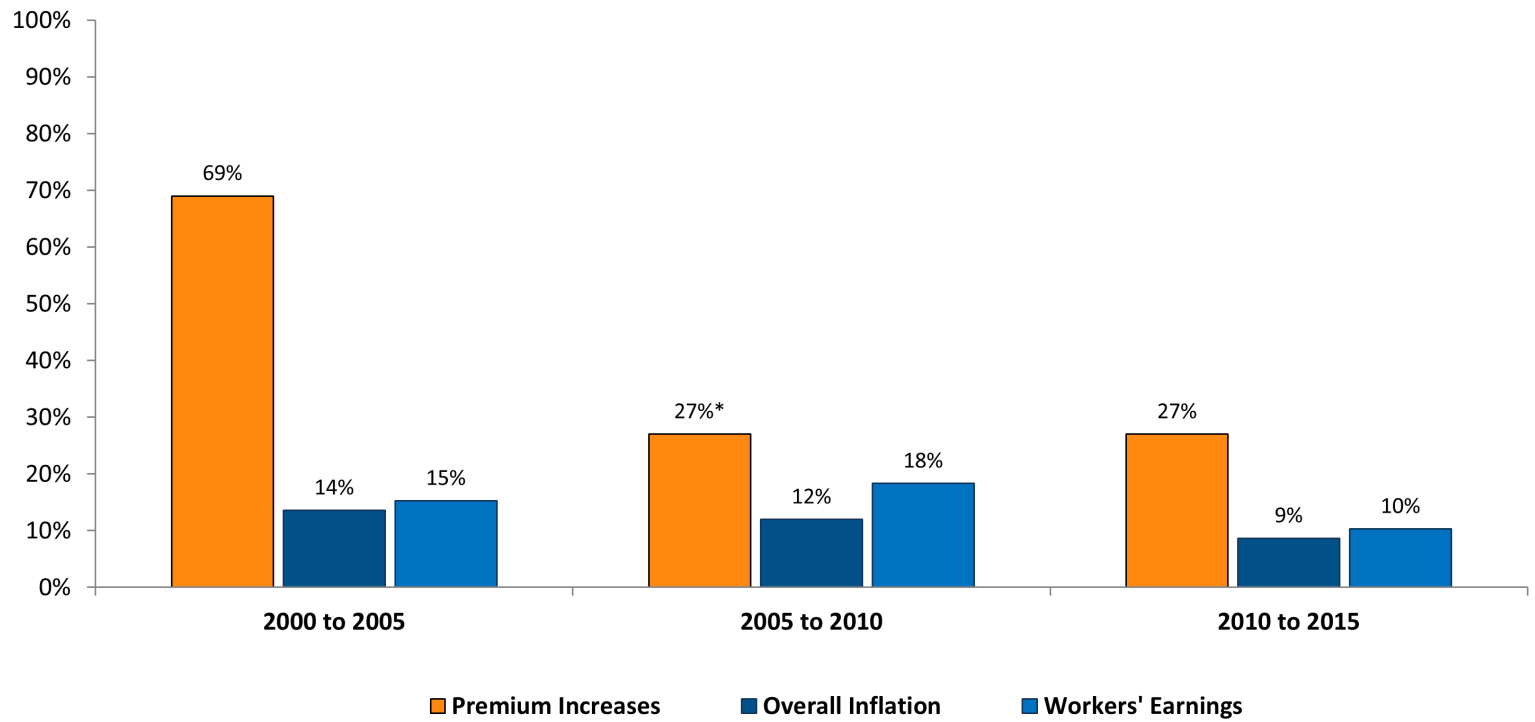
Hospital Concentration



Source: Gaynor, Ho, and Town (2015)

Premiums are Rising

Average Premium Increases for Covered Workers with Family Coverage, 2000-2015



Source: Kaiser Family Foundation

Policy Argument: Uncompensated Care

"You and I are both paying 900 bucks on average - our families - in higher premiums because of uncompensated care." - Barack Obama

Evidence of Cost-Shifting: “Sharing the Pain”

- Gowrisankaran and Town (1997)
- Clement (1998)
- Cutler (1998)
- Zwanziger and Bamezai (2000, 2006)

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Insurance industry funded study by PWC found *massive* cost-shifting! PWC (2010)

Outline

Firms Shouldn't Do This!

"Economists usually presume that a profit-maximizing firm has previously fully exploited all opportunities to reduce costs or raise revenues, so absent a fundamental rethinking of the firm's strategy, it would have to absorb the loss." -Dranove *et al.* 2017

Cost-shifiting occurs rarley if at all!

- “In fact, as a whole, the evidence does not support the notion that cost-shifting is both large and pervasive. Instead, it reveals that cost-shifting can occur but may not always do so.When it has occurred, it has generally been measured at a rate far below dollar-for-dollar” - Austin Frakt

Simple Economics: Hay 1983

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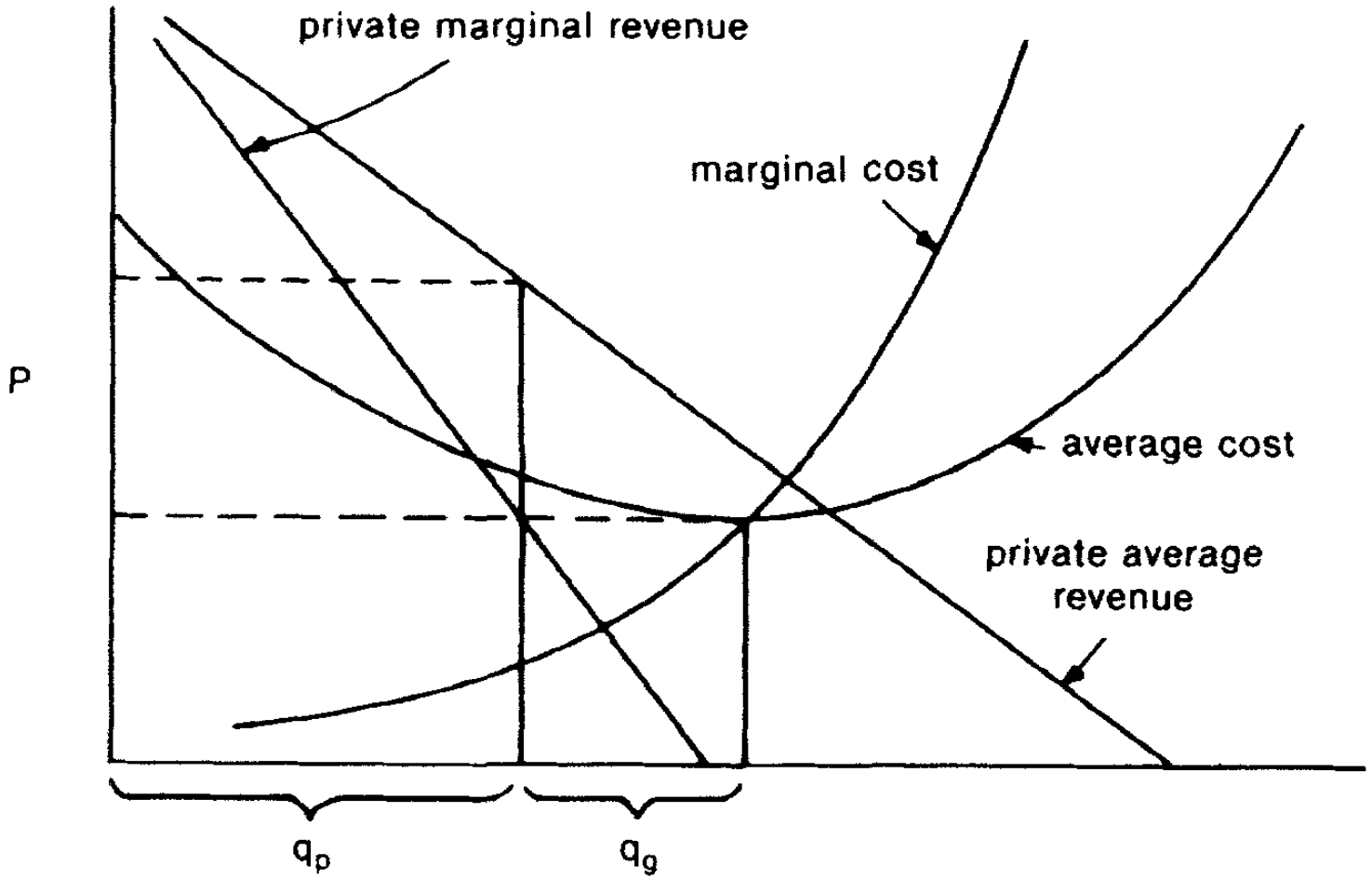

Source: Hay (1983)

Sizable Literature Against Cost-Shifting

- Evidence Against Cost-Shifting:
  - Zero effect: Wu (2010), Dranove (2017)
  - Lower prices: Showalter (1997), Stensland et al. (2010), White (2013)
- Alternative Responses to Public Reimbursement Reductions
  - Lower Profits: Garthwaite (2011)
  - Upcoding: Dafny (2005)
  - Cutting Costs: Robinson (2011)
  - Heterogeneous Responses: Tai-Seale (1998)

Why identifying cost-shifiting is difficult?

Three main reasons:

1. Complexity of the environment
2. Data Limitations –
   - Data on payments from *private insurance* companies to hospitals are typically unobserved.
   - Charge and cost-based measures of prices → measurement error!
3. Heterogenous Responses:
   - “When you’ve learned how one hospital operates, you’ve learned how one hospital operates.”

Outline

The Questions We Answer

1. **Do hospitals respond to public reimbursement cuts by bargaining for higher prices from private insurers? Do hospitals cost-shift?**

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1. **Do hospitals respond to public reimbursement cuts by bargaining for higher prices from private insurers? Do hospitals cost-shift?**
2. **What characteristics of hospitals are associated with cost-shifting?**
3. **Can we rationalize cost-shifting behavior in the modern health care environment for both non-profit and for-profit hospitals?**

Features of Our Analysis

- 50% of all inpatient prospective payment hospitals between 2010 and 2015.
- Health Care Cost Institute (HCCI) claims data:
  - Aetna, UnitedHealthcare, and Humana.
  - Policies that cover 28% of Americans under 65 with employer-provided health insurance.

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- Health Care Cost Institute (HCCI) claims data:
  - Aetna, UnitedHealthcare, and Humana.
  - Policies that cover 28% of Americans under 65 with employer-provided health insurance.
- Plausibly exogenous variation:
  1. Hospital Readmissions Reduction Program. (HRRP)
  2. Hospital Value Based Purchasing. (HVBP)
- Within-hospital price variation.

Findings

- Increase in average payments of 1.5% for hospitals facing a net reimbursement reduction . Equivalent to:
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- Significant heterogeneity by payer mix.
  - Hospitals with larger shares of private patients cost-shift more
- 2.5% reduction in Medicare Discharges

Challenges for our Analysis:

- If firms are able to raise prices, why haven’t they already?
- How can firms with "lower quality" be expected to raise price?
- Selection into HRRP and VBP penalties.
- Financial Crisis of 2008 and Full ACA implementation in 2014.

Outline

Motivation of HRRP: Pay for performance

Prospective Payment System creates incentives for hospitals to discharge patients quickly.

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Prospective Payment System creates incentives for hospitals to discharge patients quickly.

- 1.8 million hospitalizations occurring within 30 days of discharge from a prior admission.
- Total cost $=$ \$24bn
- 19.6% and 28.2% of all Medicare patients were readmitted within 30 and 60 days, respectively.

Hospital Readmissions Reduction Program

Years penalties applied	FY 2013	FY2014	FY2015
Diagnoses at initial hospitalization	Heart Attack Heart Failure Pneumonia	Heart Attack Heart Failure Pneumonia	Heart Attack Heart Failure Pneumonia Hip and Knee COPD
Maximum rate of penalty	1%	2%	3%
Average Hospital Payment adjustment all hospitals	-0.27%	-0.25%	-0.49%
Average hospital penalty adjustment penalized hospitals	-0.42%	-0.38%	-0.63%
Percent of hospitals penalized	64%	66%	78%
Percent of hospitals at at max penalty	8%	0.6%	1.2%
CMS estimate of total penalties	$290m	$227m	$428m

Penalties: Percentage reduction in base payments on all Medicare inpatient admissions

HRRP - Cont.

$$\text{Excess Readmission Ratio} = \frac{\text{risk-adjusted readmissions}}{\text{risk-adjusted expected readmissions}}$$

- Risk adjustment method adjusted for patient characteristics,
- Aggregate Payments from Medicare Due to Excess Readmissions.

$$= \sum_i (\text{base DRG payments}_i * (ERR_i - 1))$$

Evidence from HRRP

Has HRRP reduced 30-day readmissions? Improved health outcomes?

- Mellor *et al.* (2016): HRRP associated with declines in AMI readmission, not due to delay, intensity, or patient mix.
- Gupta *et al.* (2018, JAMA Cardiology): 5% point *increase* in heart failure mortality, despite a reduction in readmissions.
- Gupta (2017): 5% reduction in overall readmissions and 3% reduction in all-cause mortality. Mostly driven by quality improvement.

HVBP Motivation

- Tie 85% of fee-for-service Medicare payments to quality or value.
- The HVBP program scores hospitals:
  - Comparison to other hospitals
  - Comparison to their own previous performance
- Budget neutral:
  - The Hospital VBP Program is funded by reducing participating hospitals' base FY 2017 operating Medicare severity diagnosis-related group (MS-DRG) payments by 2%.

Value Based Purchasing Program

Measures → Points → Total Performance Score → % Bonus → $

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- Quality domains:
  - Clinical Process of Care:
  - Patient Experience of Care
  - Efficiency and Cost Reduction
  - Spending
- Points relative to national mean and median. Also within hospital improvement.
- 2013 through 2017, hospitals are docked 1, 1.25, 1.5, 1.75, and 2 percent, respectively.

HVBP Timeline

Fiscal year	2013	2014	2015	2016	2017
CMS withholds	1%	1.25%	1.5%	1.75%	2%
Average hospital bonus	0.23%	0.24%	0.44%	0.66%	0.71%
Average hospital penalty	0.21%	0.26%	0.30%	0.48%	0.48%
Top hospital bonus	0.83%	0.88%	2.09%	3.02%	4.0%
Top hospital penalty	0.90%	1.14%	1.24%	1.75%	1.83%

Source: Managed Care analysis of CMS data

HVBP Cont.

Potential responses:

- Vertical and Horizontal Integration.
- Improve domain specific (overall) quality
- Different hospitals have vastly different incentives to make improvements in spending or in different quality domains.

Norton *et al.* (2016): Hospitals improved quality of care as a result of HVBP, but only for services with the highest marginal incentives to improve quality of care.

Unique Opportunity

The HRRP/VBP generates unique variation in public reimbursements in a very complicated market environment.

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Outline

Health Care Cost Institute Data

Unique data opportunity:

- All claims from 3 national commercial insurers from all 50 states and DC.
  - Aetna, UnitedHealthcare, and Humana.
  - Policies that cover 28% of Americans under 65 with employer-provided health insurance.
  - Every claim for acute care admissions
- Prices are risk-adjusted by patient and service mix:
  - Regress inpatient episode payment divided by DRG weight on gender, age, and dummies for hospital in each year.

Because medical services are typically bundled, researchers have focused on the average price for the hospital.

Charges vs. Costs vs. Payments

- **Charges**: The initial, individual list prices a hospital sets for different services. “Chargemaster.”
- **Costs**: Expenses incurred by a hospital in providing patient care, both direct and indirect.
- **Payments**: The amount a hospital actually receives for providing patient care.

Table: Per Discharge Correlation Matrix

	Cost	Charge	Payment
Cost	1.000		
Charge	0.382	1.000	
Payment	0.274	0.435	1.000

Data Used

We use data from the following sources:

- Health Care Cost Institute.
- Hospital Compare.
- American Community Survey
- American Hospital Association (AHA) annual surveys
- Healthcare Cost Report Information System (HCRIS)

Environment

1,386 inpatient prospective payment system hospitals from 2010 to 2015:

- Smaller hospitals and those without sufficient history (such that HRRP and HVBP don’t apply) were dropped.
- We focus on acute care admissions.
- Drop all transfer admissions and those in which the patient traveled more than 180 miles.
- Claims with incomplete data - likely evidence of procedural errors - are dropped
- Claims with a payment ratio below the 5th percentile and above the 95th percentile were excluded.

Dependent Variables

Table: Characterization of Research Sample over Time

Fiscal Year	Sample Size	Payment $ Mean (St. Dev.)	Percent Penalized
2010	1,386	10,408.18 (9,501.88)	0.00
2011	1,386	10,517.91 (4,624.22)	0.00
2012	1,386	10,262.14 (4,488.17)	0.32
2013	1,386	10,235.52 (6,682.76)	0.74
2014	1,386	10,453.04 (4,672.43)	0.76
2015	1,386	10,984.82 (5,854.48)	0.79
Total	8,316	10,470.89 (6,272.67)	0.43

Variables by Penalty

Table: Hospital Characteristics by Penalties

Variable	Never Penalized	Ever Penalized	p-value
Log(Payment)	9.434	9.310	0.000
System Membership	0.768	0.784	0.352
Non-profit	0.790	0.692	0.000
Log(Case Mix Index)	0.437	0.447	0.090

Outline

Basic Framework

Hospital Fixed Effects Estimator:

$$y_{hct} = \alpha_h + x'_{ht}\beta + Z'_{ct}\gamma + \delta 1[Penalty] + \theta_t + \epsilon_{hct}, \quad (1)$$

- y_{hct} = outcome in hospital y in county c in year t.
- α_h = hospital fixed effect.
- x_{ht} = time-varying hospital characteristics.
- Z_{ct} = time-varying county characteristics.
- θ_t = year fixed effect.
- ϵ_{hct} = i.i.d. across hospitals and time error component.

$1[Penalty]$ penalty variable is zero in years 2010 and 2011 for all hospitals.

Outline

Fixed Effects Regression Results

Table: Baseline Results

	Log Mean Payment	Log Medicaid Discharges	Log Medicare Discharges	Log Private Discharges
Net Penalty	0.015***	-0.044**	-0.025***	-0.002
	(0.005)	(0.021)	(0.006)	(0.010)

Notes: $n = 8,316$.

All regressions include hospital and year fixed effects and other hospital level controls include bed count and labor force. Market power variables are constructed as the overall county market share tercile. Large market is a binary variable for a hospital in the top half of the market size distribution. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

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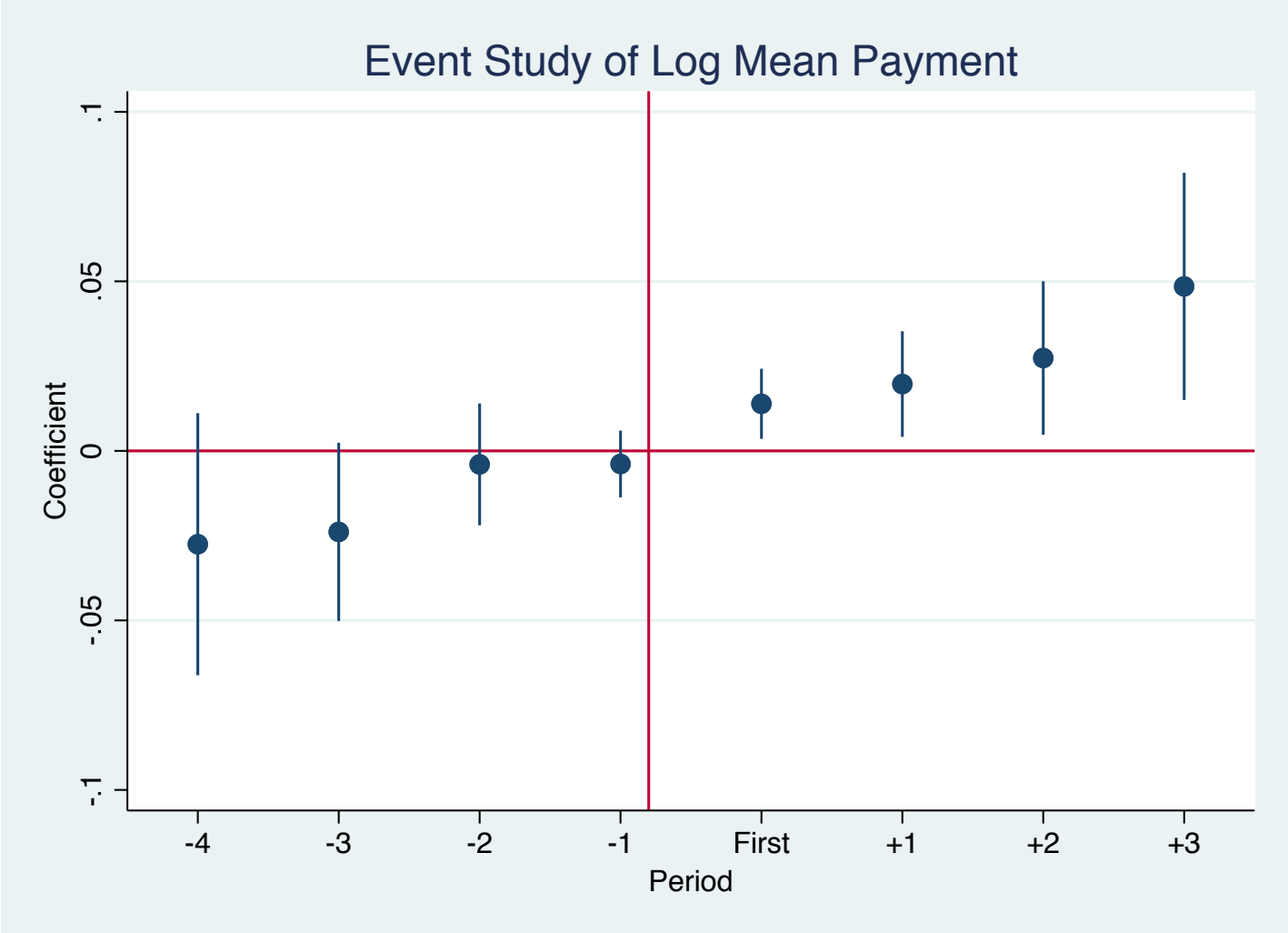
Event Study


Event Study of Log Mean Payment
Coefficient
.1
.05
0
-.05
-.1
-4
-3
-2
-1
First
+1
+2
+3
Period

Fixed Effects Regression Results: Intensive Margin

Table: Baseline Results

	Log Mean Payment	Log Mean Charge	Log Medicaid Discharges	Log Medicare Discharges	Log Private Discharges
Large Bonus	-0.006	0.017	0.023	0.027**	0.043***
	(0.008)	(0.012)	(0.034)	(0.012)	(0.016)
Low Penalty	0.011*	0.014	-0.023	-0.014	0.008
	(0.006)	(0.010)	(0.029)	(0.01 0)	(0.015)
Large Penalty	0.013*	0.017	-0.046	-0.008	0.036**
	(0.007)	(0.012)	(0.03 0)	(0.010)	(0.015)

Notes: $n = 8,316$.

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Fixed Effects Regression Results: Intensive Margin 2

Table: Baseline Results

	Log Mean Payment	Log Mean Charge	Log Medicaid Discharges	Log Medicare Discharges	Log Private Discharges
Penalty ($10k)	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Penalty ($1m)	0.008	0.016	-0.050	0.003	0.023
	(0.009)	(0.020)	(0.031)	(0.011)	-(0.015)
Penalty ($10m)	0.076	0.158	-0.500	0.029	0.226
	(0.095)	(0.202)	(0.307)	(0.111)	(0.146)

Notes: $n = 8,316$.

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Robustness Check 1

Table: Penalty Specific Trends Results

	Log Mean Payment	Log Mean Charge	Medicaid Discharges	Medicare Discharges	Private Discharges
Net Penalty	0.010**	0.018**	-0.037	-0.024***	-0.008
	(0.005)	(0.008)	(0.023)	(0.006)	(0.011)
p-value	0.473	0.034	0.282	0.003	0.182

Notes: Further controls include those in our baseline specification for mean payments. The p-value in the first row of results is in reference to the null hypothesis that trends in the outcome of interest are the same between ever-penalized and never-penalized hospitals conditional on the model covariates. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Robustness Check 2

Table: Hospital, Year, and County Fixed Effects

	Log Mean Payment	Log Mean Charge	Medicaid Discharges	Medicare Discharges	Private Discharges
Net Penalty	0.016***	0.008	-0.047**	-0.024***	0.000
	(0.005)	(0.008)	(0.022)	(0.007)	(0.010)

Notes: Further controls include those in our baseline specification for mean payments. The p-value in the first row of results is in reference to the null hypothesis that trends in the outcome of interest are the same between ever-penalized and never-penalized hospitals conditional on the model covariates. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Robustness Check 3

Table: Controlling for Medicaid Expansion States

	Log Mean Payment	Log Mean Charge	Medicaid Discharges	Medicare Discharges	Private Discharges
Net Penalty	0.015***	0.008	-0.042**	-0.025***	-0.002
	(0.005)	(0.008)	(0.021)	(0.006)	(0.010)

Notes: Further controls include those in our baseline specification for mean payments. The p-value in the first row of results is in reference to the null hypothesis that trends in the outcome of interest are the same between ever-penalized and never-penalized hospitals conditional on the model covariates. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Robustness Check 4

Table: Controlling for Overall HCAHPS Hospital Rating

	Log Mean Payment	Log Mean Charge	Medicaid Discharges	Medicare Discharges	Private Discharges
Net Penalty	0.015***	0.007	-0.044**	-0.024***	-0.001
	(0.005)	(0.008)	(0.021)	(0.006)	(0.010)

Notes: Further controls include those in our baseline specification for mean payments. The p-value in the first row of results is in reference to the null hypothesis that trends in the outcome of interest are the same between ever-penalized and never-penalized hospitals conditional on the model covariates. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Robustness Check 5

Table: Dropping Fiscal 2012

	Log Mean Payment	Log Mean Charge	Medicaid Discharges	Medicare Discharges	Private Discharges
Net Penalty	0.013**	0.009	-0.045*	-0.024***	-0.003
	(0.005)	(0.009)	(0.023)	(0.007)	(0.011)

Notes: Further controls include those in our baseline specification for mean payments. The p-value in the first row of results is in reference to the null hypothesis that trends in the outcome of interest are the same between ever-penalized and never-penalized hospitals conditional on the model covariates. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Robustness Check 6

Table: "Controlling" for Vertical Integration

	Log Mean Payment	Log Mean Charge	Medicaid Discharges	Medicare Discharges	Private Discharges
Net Penalty	0.010**	0.006	-0.066***	-0.019***	0.000
	(0.005)	(0.009)	(0.022)	(0.006)	(0.011)

Notes: Further controls include those in our baseline specification for mean payments. The p-value in the first row of results is in reference to the null hypothesis that trends in the outcome of interest are the same between ever-penalized and never-penalized hospitals conditional on the model covariates. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Robustness Check 7

Table: "Controlling" for Case Mix

	Log Mean Payment	Log Mean Charge	Medicaid Discharges	Medicare Discharges	Private Discharges
Net Penalty	0.015***	0.003	-0.043**	-0.024***	-0.002
	(0.005)	(0.008)	(0.021)	(0.006)	(0.010)

Notes: Further controls include those in our baseline specification for mean payments. The p-value in the first row of results is in reference to the null hypothesis that trends in the outcome of interest are the same between ever-penalized and never-penalized hospitals conditional on the model covariates. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

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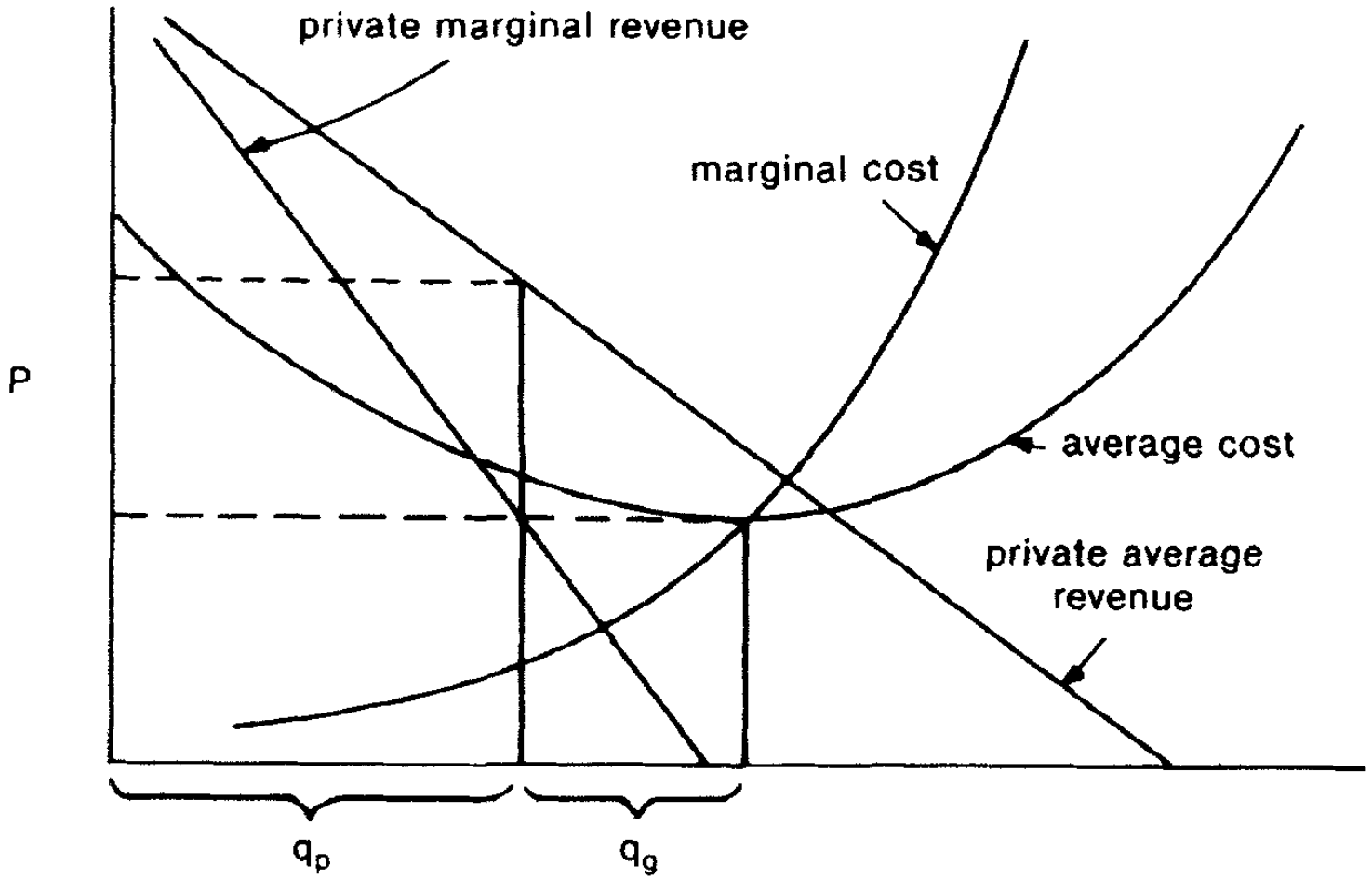
Simple Economics: Hay 1983



Source: Hay (1983)

Challenges for Standard Models

Private prices are not directly set by hospitals.

- Hospital/private insurer bargaining.
- Procedure specific discounts in return for guaranteed referrals.
- *Relative* market power: $U^{\tau}V^{1-\tau}$?
- Hospital Objective Function?

The effect of insurer competition on patient welfare is ambiguous:

- Insurer market power increases premiums
- Insurer market power increases τ, the relative bargaining power, which may imply lower hospital prices.

Utility Maximizing Hospital

$$U\left(\pi_j = \sum_{i=1}^{N_j} \pi_{i,j}^h + \pi_{g,j}^h, \sum_{i=1}^{N_j} D_{i,j}^h, D_{g,j}^h\right),$$

- $i =$ Insurer
- $j =$ Hospital
- $\pi_j =$ Total hopsital j profit
- $\pi_{i,j} =$ Hospital j from private insurer i
- $\pi_{g,j} =$ Hospital j from the public payer.
- $D_{i,j} =$ Hospital j demand from insurer i.
- $D_{i,j} =$ Hospital j demand from the public sector.

$$\pi_{i,j}^h = D_{i,j}^h(p_{i,j} - c_i),$$

- $p_{i,j} =$ negotiated payment between insurer i and hospital j

Assumptions

Assumptions:

- Patients are "unaware or unable to determine their [financial] liability prior to choosing their provider."
- Average cost = Marginal Cost = constant.
- Public payment is administratively set at p_g
- Profits for insurer i are:

$$\pi_i^M = D_i(\theta_i - \eta_i) - \sum_{j=1}^{N_i} D_{i,j}^h p_{i,j}, \tag{2}$$

- D_i = number of enrollees for insurer i
- θ_i = insurer $i's$ premiums
- η_i = insurer i' costs per-enrollee (other than inpatient hospital care),
- $D_{i,j}^h p_{i,j}$ = payments to hospitals for care provided to the insurer's enrollees.

Negotiated Price

The negotiated price between hospital j and insurer i is such that:

$$p_{ij} = \arg\max_{p_{ij}} \left(\Delta U_j\right)^{b_j} \times \left(\Delta \pi_i^M\right)^{1-b_j},$$

- $\Delta U_j =$ change in hospital j's utility from reaching an agreement with insurer i
- $\Delta \pi_i^M =$ the change in insurer $i's$ profits from an agreement with hospital j.
- $b_j =$ bargaining weight of hospital j (expressed as the weight to which the hospital's payoffs are given in the overall net value.)

Take Aways

1. Hospital objective function matters.
2. Utility curvature in profits allows for cost-shifting.
3. A utility maximizing hospital may cost shift depending on:
   - Relative market power
   - Market competition limits cost-shifting.
4. Financial shocks leave less room for nonprofits to pursue non-pecuniary goals.

Outline

For-profit vs. Non-Profit Hospitals

- Non-profits constitute 2/3 of hospital beds (David, 2009)
- Non-profits are charged with providing “community benefits” as a precondition for federal tax exemption:
- Leading theories of nonprofit hospitals:
  - For-profits in disguise. Mixed evidence, nonprofits:
    - Upcode less (Silverman and Skinner, 2003; Dafny, 2005
    - Lower marginal cost but larger markups (Gaynor and Vogt, 2003)
  - Output maximizers
  - Social welfare maximizers
  - Perquisite maximizers
- Chang and Jacobson (2010)

Fixed Effects Regression Results: Nonprofit Only

Table: Non-profit Results

	Log Mean Payment	Log Mean Charge	Medicaid Discharges	Medicare Discharges	Private Discharges
			Non-profit Hospitals		
Net Penalty	0.016***	0.007	-0.043*	-0.026***	-0.007
	(0.005)	(0.009)	(0.024)	(0.007)	(0.012)
			Non-Profit Hospitals with Penalty Specific Trends		
Net Penalty	0.013**	0.015	-0.037	-0.021***	-0.012
	(0.005)	(0.009)	(0.026)	(0.007)	(0.013)
p-value	0.731	0.181	0.281	0.001	0.597

Notes: $n = 6,625$.

Notes: All regressions include hospital and year fixed effects. Further controls include those in our baseline specification for mean payments. The p-values are in reference to the null hypothesis that trends in the outcome of interest are the same between ever-penalized and never-penalized hospitals conditional on the model covariates. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Fixed Effects Regression Results: Nonprofit Only

Table: For-profit Results

	Log Mean Payment	Log Mean Charge	Medicaid Discharges	Medicare Discharges	Private Discharges
			For-profit Hospitals		
Net Penalty	0.020	0.021	-0.018	-0.007	0.028
	(0.014)	(0.021)	(0.050)	(0.017)	(0.019)
			For-Profit Hospitals with Penalty Specific Trends		
Net Penalty	0.011	0.040*	0.001	-0.025	0.011
	(0.014)	(0.023)	(0.049)	(0.016)	(0.019)
p-value	0.259	0.032	0.857	0.019	0.003

Notes: All regressions include hospital and year fixed effects. Further controls include those in our baseline specification for mean payments. The p-values are in reference to the null hypothesis that trends in the outcome of interest are the same between ever-penalized and never-penalized hospitals conditional on the model covariates. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Triple Difference by Payer Mix

Table: Payer Mix Results

	Log Mean Payment	Log Mean Charge
Net Penalty	0.039***	0.042***
	(0.010)	(0.012)
* Public Share 2	-0.020*	-0.013
	(0.012)	(0.014)
* Public Share 3	-0.032**	-0.043***
	(0.013)	(0.015)
* Public Share 4	-0.044***	-0.070***
	(0.013)	(0.016)
Public Share 2	0.006	0.047***
	(0.010)	(0.013)
Public Share 3	0.016	0.086***
	(0.011)	(0.016)
Public Share 4	0.023*	0.155***
	(0.012)	(0.018)

Notes: All regressions include hospital and year fixed effects. Further controls include those in our baseline specification for mean payments. The share of a hospital's patients insured by the public sector is broked into quartiles and interacted with penalty variables. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. We restrict the sample to include at least 25 admissions per hospital per year. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Payments vs. Charges: Hospital FE

Cutler, McClellan, and Newhouse (2000).

Table: Baseline Results

	Log Mean Payment	Log Mean Charge	Log Medicaid Discharges	Log Medicare Discharges	Log Private Discharges
Net Penalty	0.015***	0.008	-0.044**	-0.025***	-0.002
	(0.005)	(0.008)	(0.021)	(0.006)	(0.010)

Table: Year Fixed Effects Only

	Log Mean Payment	Log Mean Charge	Medicaid Discharges	Medicare Discharges	Private Discharges
Net Penalty	-0.061***	-0.053***	0.222***	0.097***	0.070***
	(0.015)	(0.018)	(0.044)	(0.025)	(0.022)

Notes: Further controls include those in our baseline specification for mean payments. The p-value in the first row of results is in reference to the null hypothesis that trends in the outcome of interest are the same between ever-penalized and never-penalized hospitals conditional on the model covariates. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Changes in Quality

Table: Profit Index

	Profit Index	Average DRG Weight	Average LOS
Net Penalty	0.002	0.004	0.015
	(0.001)	(0.004)	(0.012)

Notes: $n = 8,316$.

All regressions include hospital and year fixed effects and other hospital level controls include bed count and labor force. Market power variables are constructed as the overall county market share tercile. Large market is a binary variable for a hospital in the top half of the market size distribution. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Condition Specific Payment Effects

Table: Payments for Condition Specific Admissions

	Nervous System	Respiratory System	Circulatory System	Musculoskeletal System	Labor and Delivery	Neonatal
Net Penalty	0.022***	0.000	0.022***	0.004	-0.001	0.015
	(0.010)	(0.011)	(0.008)	(0.007)	(0.005)	(0.010)
n	1,410	1,770	2,754	3,084	5,232	3,198
Mean	13,878.62	11,984.62	13,222.00	13,088.46	11,507.31	9,038.22

Notes: All regressions include hospital and year fixed effects. The dependent variable is the log of average payments for each condition. Further controls include those in our baseline specification for mean payments. The dependent variable in each column is the log of the payment for the associated acute care admission. In cases in which independent variables are missing, we recode them and control for missing variable indicators to ensure a balanced panel. Standard errors are clustered at the hospital level. We restrict the sample to include at least 25 admissions per hospital per year. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

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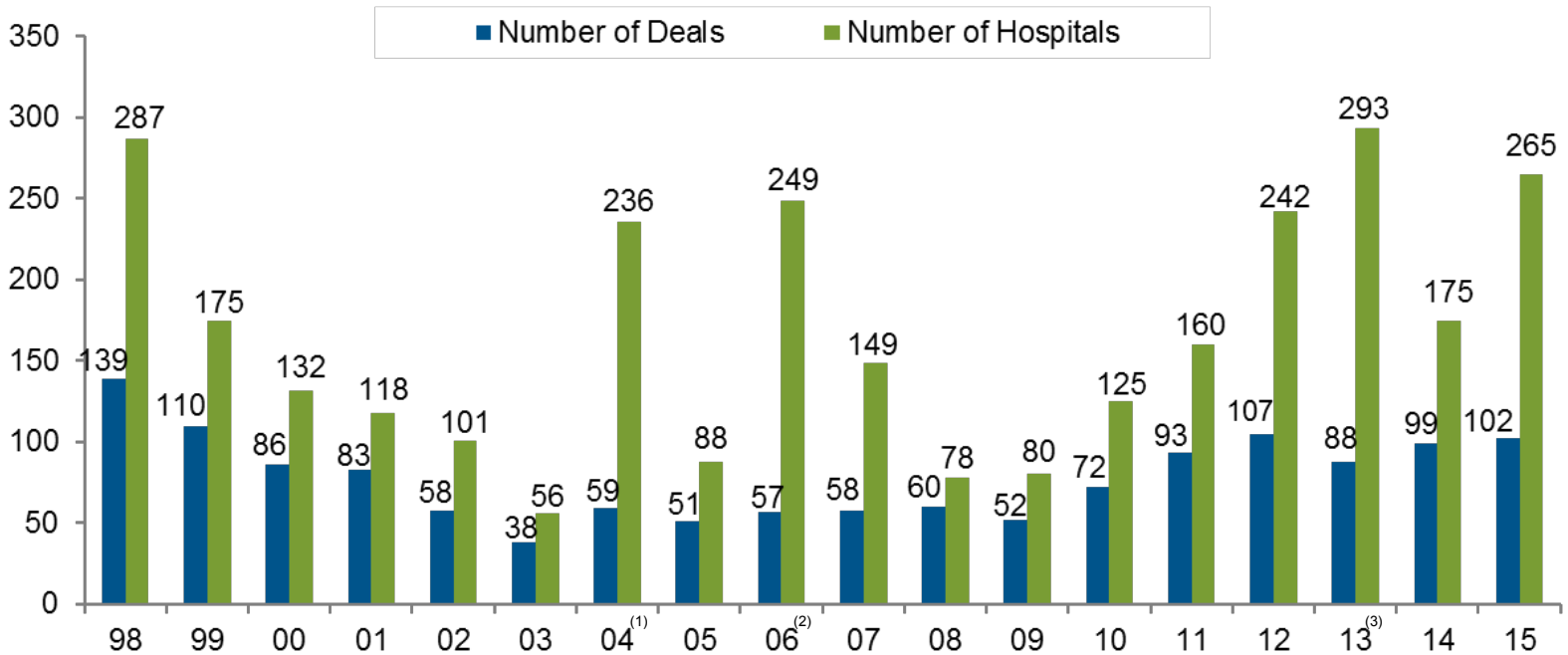
Outline

Larger Trends

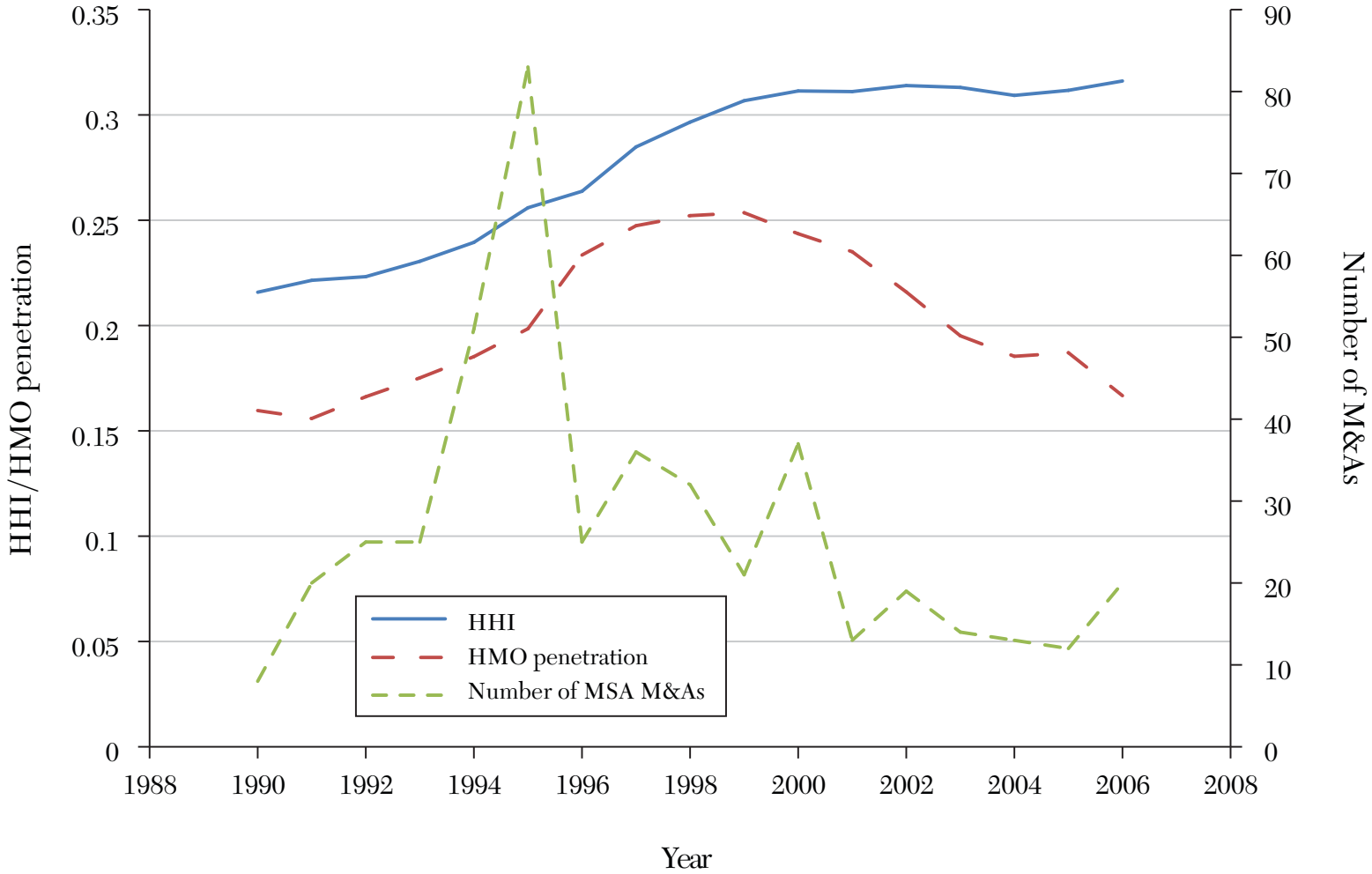
- Health Consumption Expenditures at Hospitals remain approximately 1/3 of total National Health Expenditures.
- Starting this year (FY 2017), HRRP has added coronary artery bypass graft (CABG) surgery: $130,000 per procedure, wide variance, continued care.

Hospital Concentration



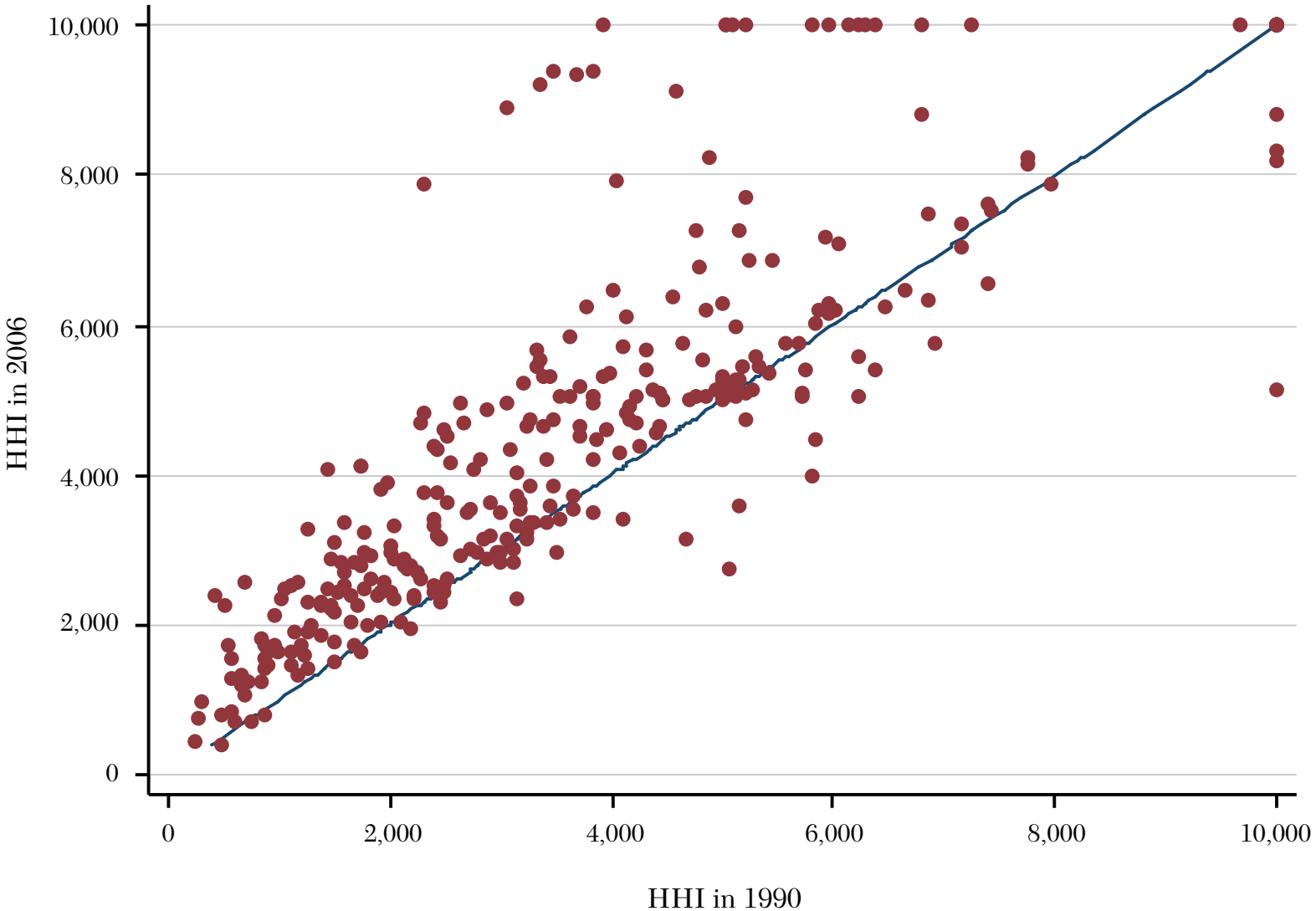
Source: AHA Trendwatch Chartbook 2016.

Hospital Concentration



Source: Gaynor, Ho, and Town (2015)

Hospital Concentration



Source: Gaynor, Ho, and Town (2015)

Conclusion

- We leverage unique data and plausibly exogenous variation in public reimbursement to study cost-shifting in hospitals.
- Evidence suggests that non-profit hospitals may increase prices following reimbursement cuts.
- $0.50 to the dollar. Concentrated in
  - Hospitals with large private patient shares
  - Non-Profits (Statistically)

Thank You!

- Comments to: darden@gwu.edu
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