Information and Quality when Motivation is Intrinsic: Evidence from Surgeon Report Cards

By: Jonathan Kolstad

Presentation: Paul George

Date: 10/24/2022

Motivation

"He doesn't care about the money. He just doesn't want to be seen as the laziest one there."

Research question

- What role does intrinsic motivation play in surgeon performance, in addition to extrinsic motivation?

Contribution

- Most other research focus is on extrinsic motivation (e.g. reimbursement, profit-maximizing model)
- Other areas for quality improvement measures in healthcare

Preview of findings

- Extrinsic: Surgeons facing stronger profit incentives following the release of quality report cards show greater improvements in performance, though effect is low.

- Intrinsic: Intrinsic motivation is responsible for more of the improvements in performance observed following the release of report cards.

Paul's biases / thoughts

- I agree with the non-profit maximizing model, so I was/am biased to agree with his hypothesis, that intrinsic motivation will be important

- As for the assumptions/quality of this paper…

Background

- Pennsylvania began collecting data on patient outcomes in 1990

- The first widely available report card was released in May 1998 and included data from 1994-1995
  - Source of variation – introduction of report cards
  - Presumably report on every surgeon?

Data

- Primary data source is Physician Health Care Cost Containment Council (PHC4)
 - Contain observations from 89,406 CABG surgeries in Pennsylvania

$$RAMR_{\{s,h\}} = \frac{OMR_{\{s,h\}}}{EMR_{\{s,h\}}} \, OMR_{PA}$$

  - RAMR (risk-adjusted performance) is the main measure of a surgeon's performance
  - OMR (observed mortality rate), EMR (expected mortality rate)
  - Unit of analysis is individual surgeon

Table 1: Descriptive Statistics by Year

Year	Observations	Surgeons	Hospitals	Mean RAMR*	Mean OMR*
1994-95	18,351	201	43	3.42	3.23
2000	19,594	182	55	2.38	2.20
2002	15,999	187	62	2.02	1.82
2003	15,157	183	63	2.00	1.85

*Surgeon weighted average
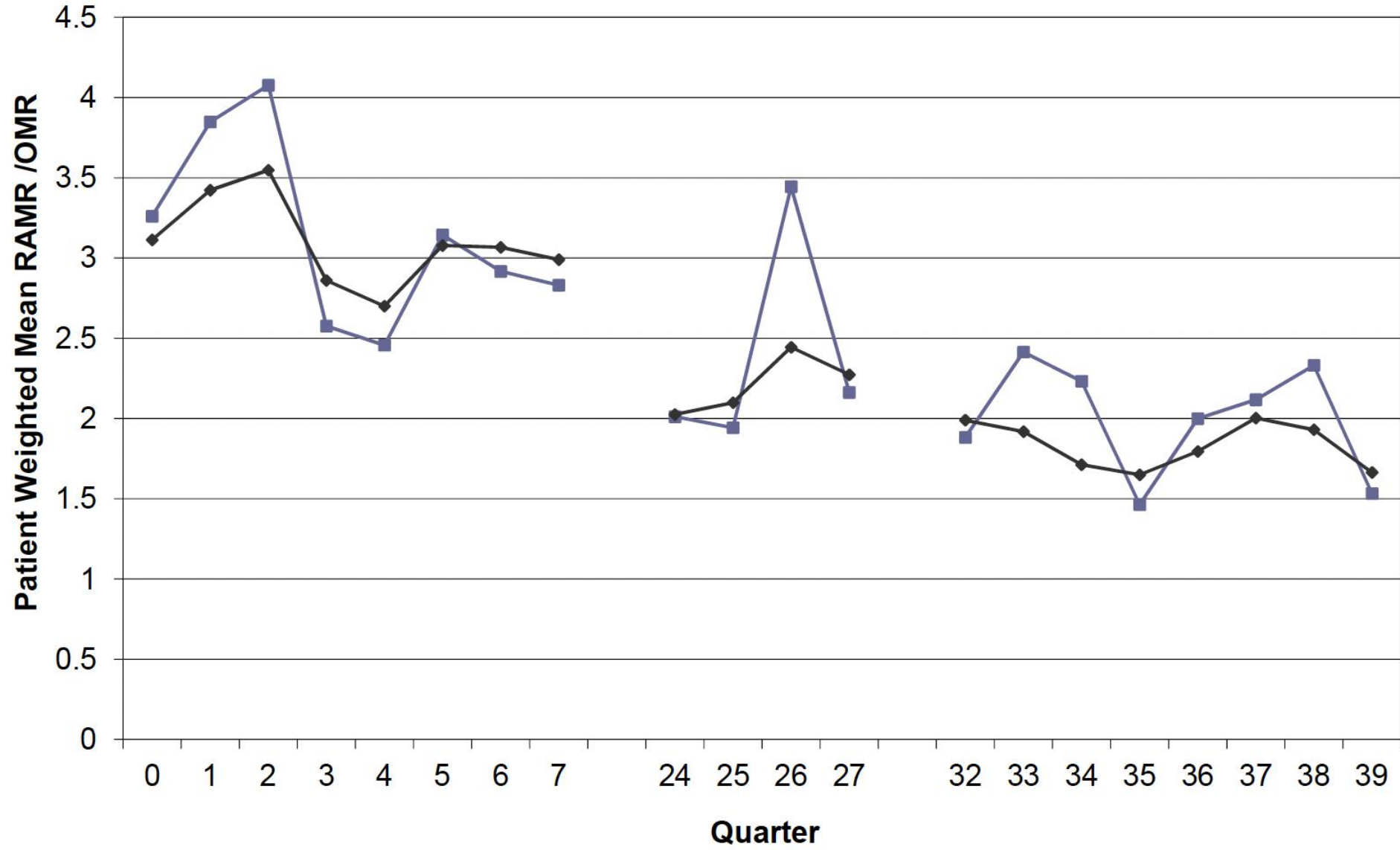
Utility function

$$U_i = \Pi_i(\theta_i, \theta_{-i}, \Omega) + \Gamma_i(\theta_i, \theta_{-i}, \Omega)$$

$$\theta_i = quality\ level$$
$$\Omega_i = market\ information$$
$$\Gamma = intrinsic\ value$$

'utility needs not be set at zero if surgeons gain some level of static intrinsic utility – the 'warm glow' from being a cardiac surgeon'

- Model intuition
  - Without report cards, surgeons have little information on their own relative performance
  - Surgeon with little information on own performance is unable to observe quality and improvements; this lack of information dilutes intrinsic incentive
  - Hypothesis: more information → more intrinsic motivation

- Measure of new information
  - $f(RAMR_{pre} - OMR_{pre})$
  - Larger the above function in absolute value, the more information is provided (key assumption of paper)

Figure 4: Frequency of New Information Provided by the 1994-95 Report Card
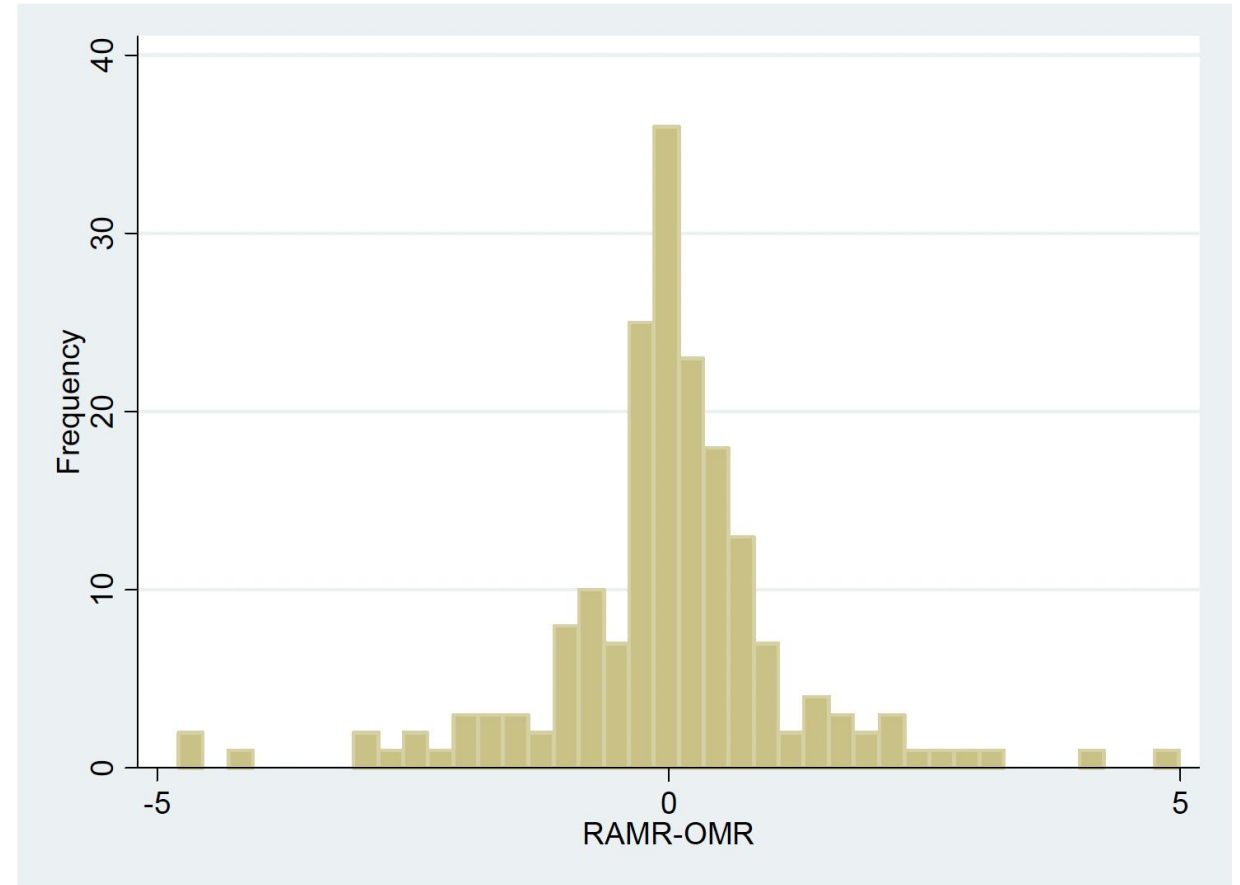
Right (higher RAMR – OMR) is worse

11

Figure 5: Local Polynomial Smoothed Estimates for the Relationship Between New Information and Changes in Volume and Quality
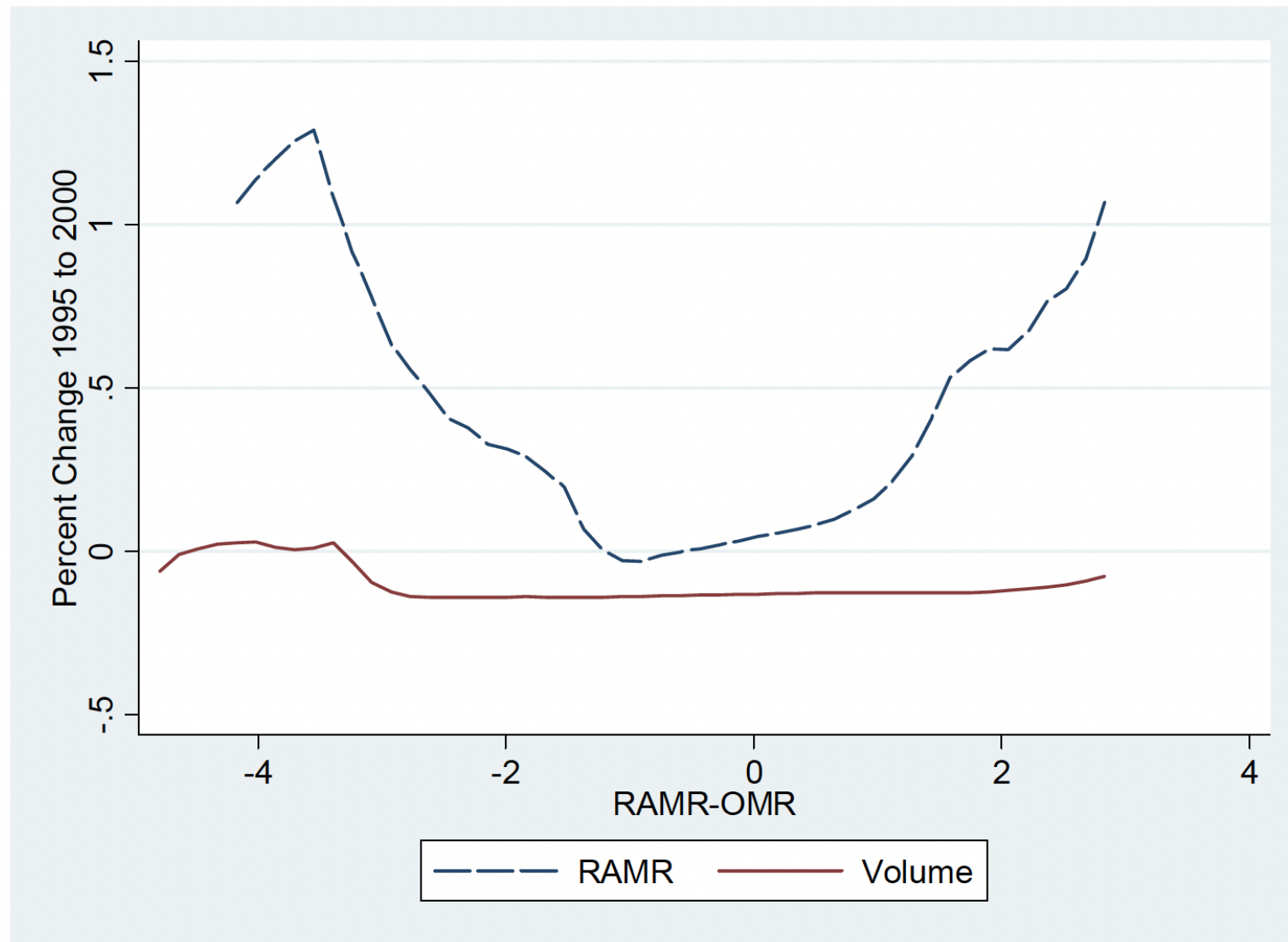
Right (higher RAMR – OMR) is worse

Primary estimating equation

$$\Delta\theta_s = \alpha + \lambda\Delta\prod_s + \xi_n \sum_{n=1}^{5} I_{n,s}(RAMR_{pre} - OMR_{pre}) + X_s + X_h + \varepsilon_{s,h} \quad (6)$$

- $\theta_s = $ *change in RAMR between pre and post*

$$\xi_n \sum_{n=1}^{5} I_{n,s}$$

- Separated the surgeons into quintiles *(RAMR – OMR)*
  - Groups 1, 2 received information that they were worse than they thought (i.e. RAMR > OMR)
  - Middle 20% (group 3) is reference

	(1)			(2)			(3)			(4)		
Dependent Variable: Change RAMR s 1994-95 to 2000												
Intrinsic Incentives												
1994-95 Report Card Info (RAMR-OMR) Group												
Much Better than Expected (0-20%)	-1.016	(0.407)	**	-0.213	(0.350)		-0.988	(0.345)	***	-0.198	(0.286)	
Slightly Better than Expected (20-40%)	-0.332	(0.334)		-0.241	(0.320)		-0.417	(0.374)		-0.305	(0.302)	
Slightly Worse than Expected (60-80%)	-0.855	(0.304)	***	-0.709	(0.280)	**	-0.854	(0.292)	***	-0.681	(0.288)	**
Much Worse than Expected (80-100%)	-2.460	(0.373)	***	-0.827	(0.385)	**	-2.672	(0.391)	***	-0.923	(0.343)	***
Extrinsic Incentives												
Pred Vol No RC-Pred Vol RC	-0.037	(0.028)		-0.015	(0.035)		-0.023	(0.039)		-0.007	(0.030)	
Increased Demand with RC (I[RCDem>0])	0.262	(0.190)		0.066	(0.161)		0.279	(0.202)		0.084	(0.183)	
I[RCDem>0]*Pred Vol No RC-Pred Vol RC	-0.137	(0.063)	**	-0.150	(0.067)	**	-0.118	(0.070)	*	-0.143	(0.071)	**
Controls												
Mean RAMR 1994-95				-0.695	(0.068)	***				-0.699	(0.057)	***
Surgeon License Year (PA)	0.287	(0.087)	***	0.292	(0.067)	***	0.288	(0.090)	***	0.294	(0.073)	***
Surgeon License Year (PA) Squared	-0.007	(0.002)	***	-0.006	(0.001)	***	-0.007	(0.002)	***	-0.006	(0.002)	***
Publications	0.221	(0.067)	***	0.175	(0.074)	***	0.226	(0.066)	***	0.180	(0.063)	***
Market Fixed Effects?	No			No			Yes			Yes		
Observations (surgeon/quarter)	1,572			1,572			1,572			1,572		
R Squared	0.1729			0.3491			0.1896			0.3641		

$$\Delta\theta_s = \alpha + \lambda\Delta\prod_s + \xi_n \sum_{n=1}^{5} I_{n,s}(RAMR_{pre} - OMR_{pre}) + X_s + X_h + \varepsilon_{s,h} \qquad (6)$$

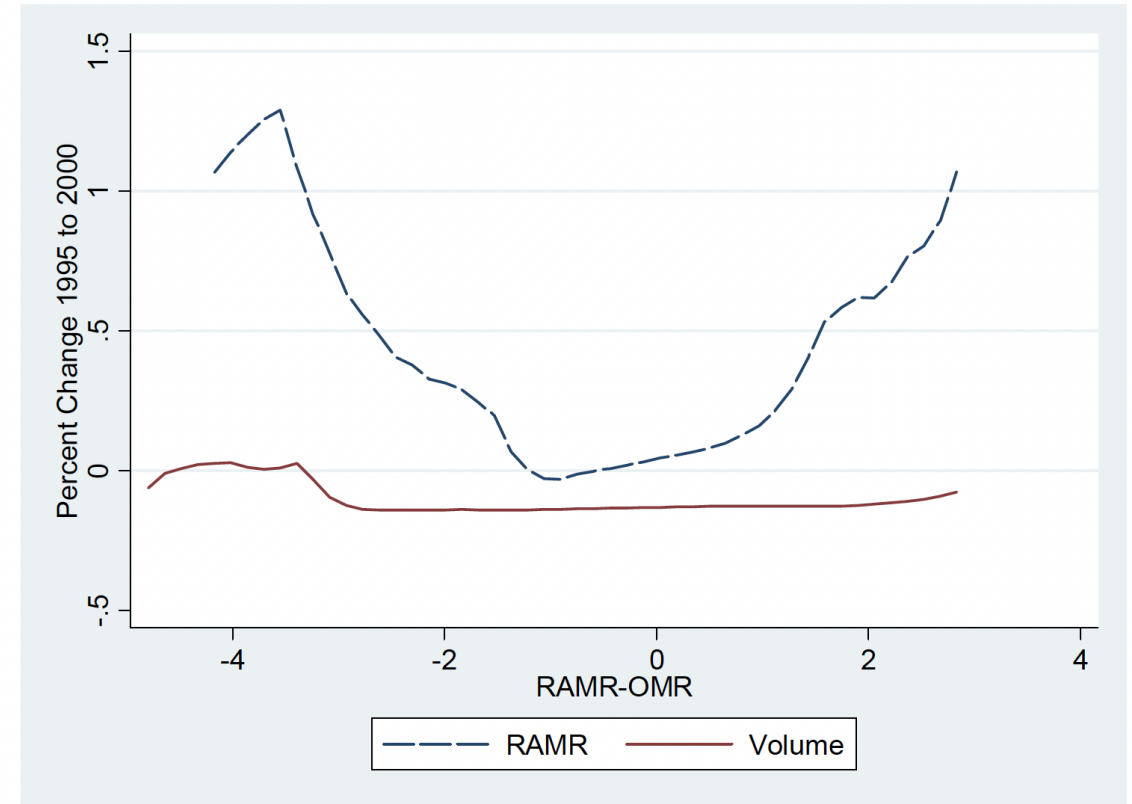|	(4)		
Intrinsic Incentives			
1994-95 Report Card Info (RAMR-OMR) Group			
Much Better than Expected (0-20%)	-0.198	(0.286)	
Slightly Better than Expected (20-40%)	-0.305	(0.302)	
Slightly Worse than Expected (60-80%)	-0.681	(0.288)	**
Much Worse than Expected (80-100%)	-0.923	(0.343)	***
Extrinsic Incentives			
Pred Vol No RC-Pred Vol RC	-0.007	(0.030)	
Increased Demand with RC (I[RCDem>0])	0.084	(0.183)	
I[RCDem>0]*Pred Vol No RC-Pred Vol RC	-0.143	(0.071)	**
Controls			
Mean RAMR 1994-95	-0.699	(0.057)	***
Surgeon License Year (PA)	0.294	(0.073)	***
Surgeon License Year (PA) Squared	-0.006	(0.002)	***
Publications	0.180	(0.063)	***
Market Fixed Effects?	Yes		
Observations (surgeon/quarter)	1,572		
R Squared	0.3641		

Figure 5: Local Polynomial Smoothed Estimates for the Relationship Between New Information and Changes in Volume and Quality

	(4)
Intrinsic Incentives	
1994-95 Report Card Info (RAMR-OMR) Group	
Much Better than Expected (0-20%)	-0.198 (0.286)
Slightly Better than Expected (20-40%)	-0.305 (0.302)
Slightly Worse than Expected (60-80%)	-0.681 (0.288) **
Much Worse than Expected (80-100%)	-0.923 (0.343) ***
Extrinsic Incentives	
Pred Vol No RC-Pred Vol RC	-0.007 (0.030)
Increased Demand with RC (I[RCDem>0])	0.084 (0.183)
I[RCDem>0]*Pred Vol No RC-Pred Vol RC	-0.143 (0.071) **
Controls	
Mean RAMR 1994-95	-0.699 (0.057) ***
Surgeon License Year (PA)	0.294 (0.073) ***
Surgeon License Year (PA) Squared	-0.006 (0.002) ***
Publications	0.180 (0.063) ***
Market Fixed Effects?	Yes
Observations (surgeon/quarter)	1,572
R Squared	0.3641

- Looks like reversion to the mean to me
  - Only includes surgeons who remain in sample, so it's very plausible that the truly bad surgeons dropped out, and the average surgeons (with below-average report cards) reverted to the mean

  - *'I include a surgeon's average RAMR in 1994-1995 in the vector X_s. This eliminates mean reversion in the estimated effect of information...'* (pg 17)

Other issues

- What is in these quality report cards? How much are surgeon-specific vs. hospital-specific?

- Long time lag between report card quality data and report card release (~4 years).

- Just because it says "risk-adjusted", doesn't mean it's perfectly risk-adjusted

Conclusions/Final Thoughts

- Good idea of using incentives other than profit motive in healthcare quality improvement, especially amongst healthcare providers

- I am not sold on his measure of new information (which is central to his paper, model, and findings)

- More detailed report cards, while not beneficial perhaps to the public, could be quite beneficial to providers
  - This could be future study idea – see if specific measures reported are those that improve the most?