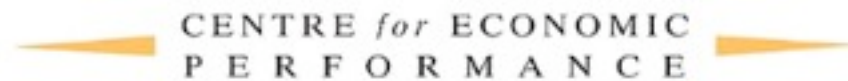


Does Hospital Competition Save Lives? Evidence from the English NHS Patient Choice Reforms

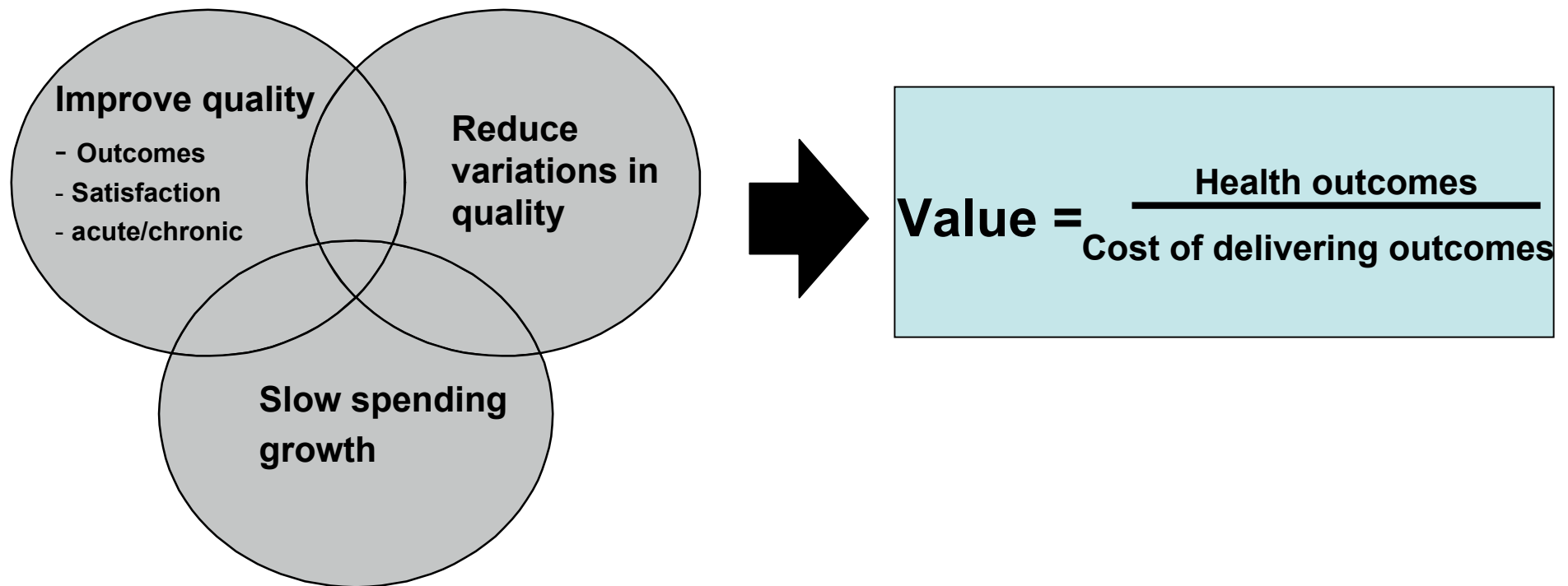
Dr. Zack Cooper (z.cooper@lse.ac.uk)



© Cooper 2011

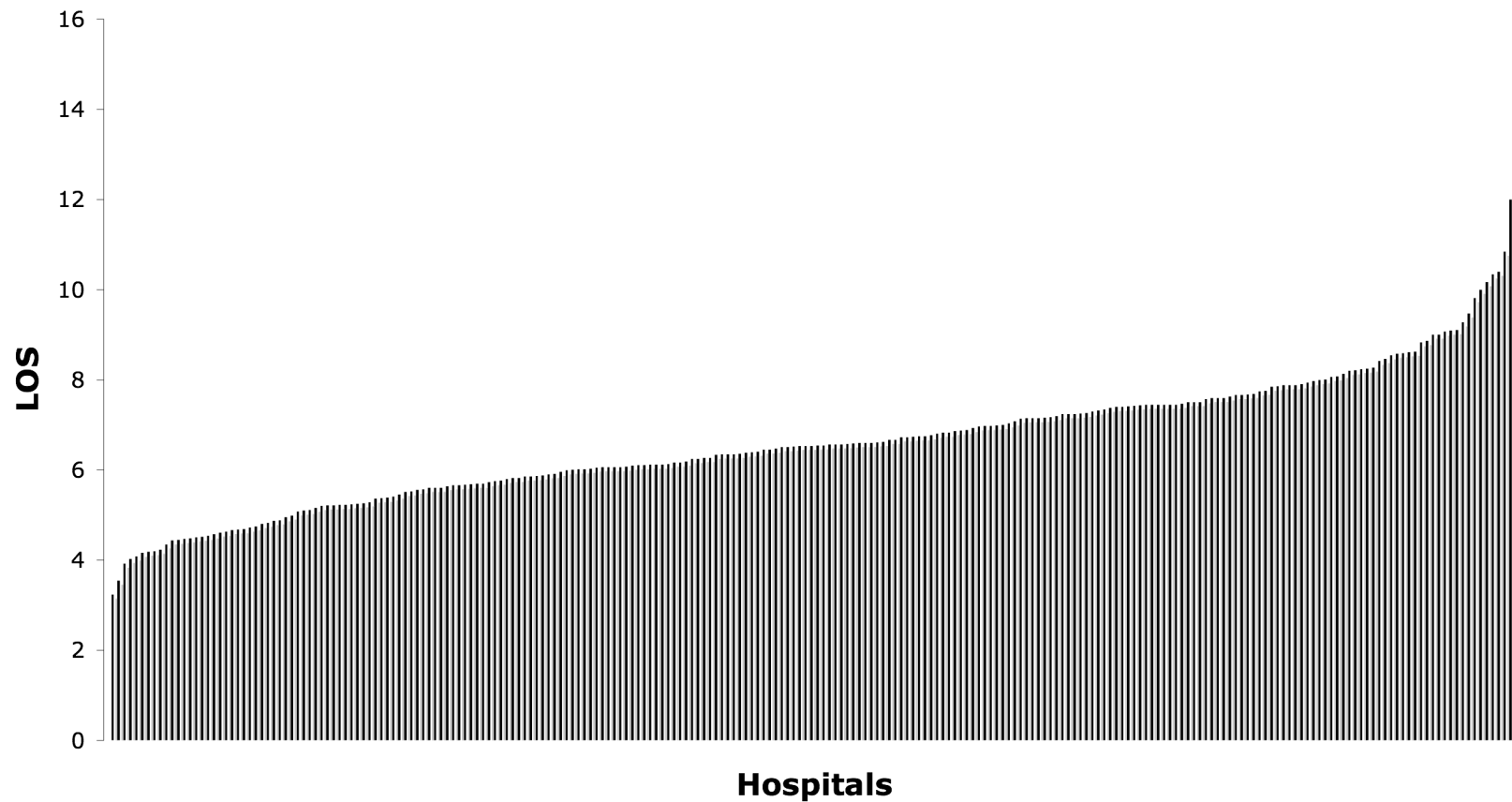


The NHS needs to focus on promoting value



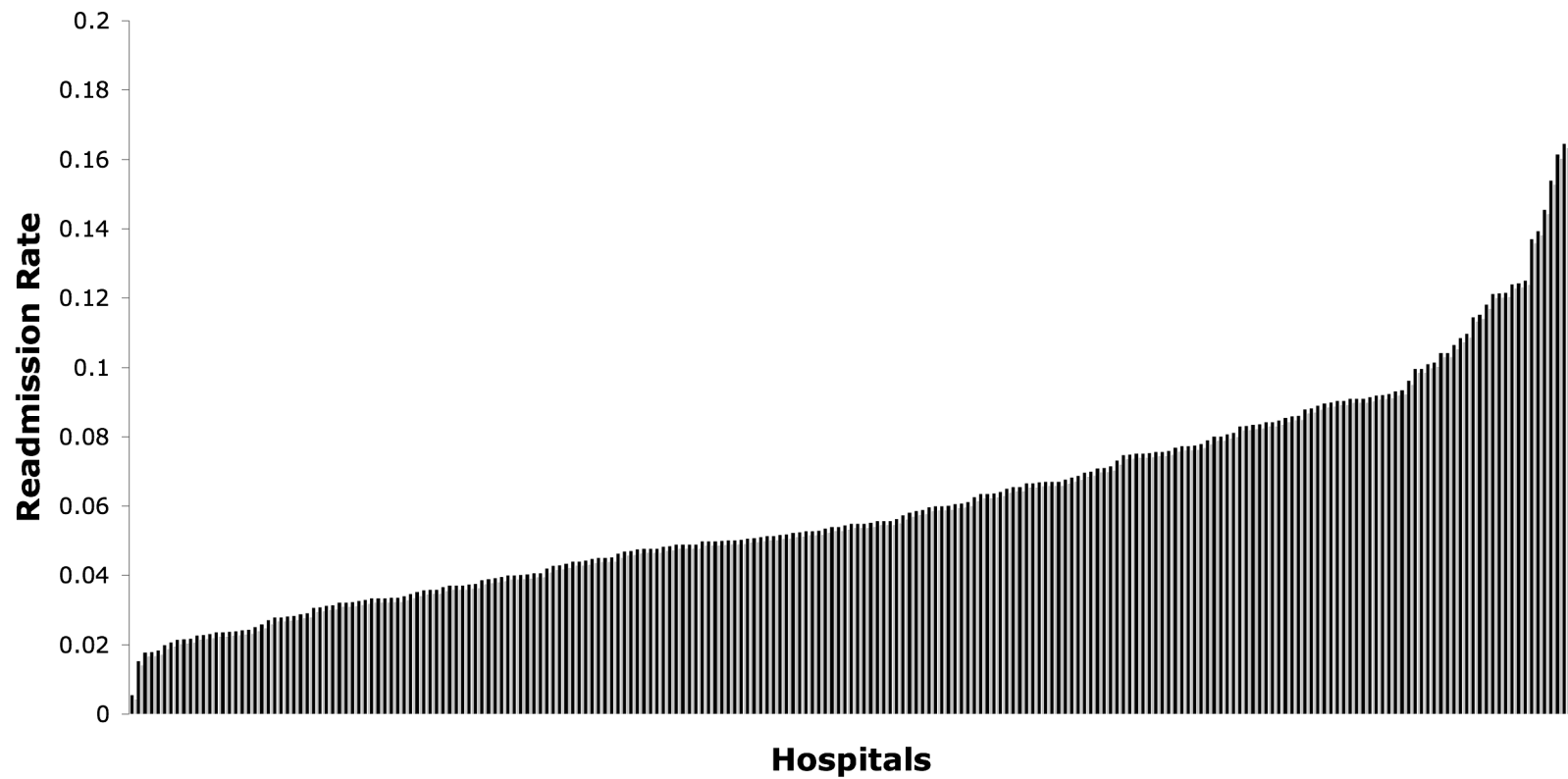
There are huge variations in hospitals' mean length of stay

Length of Stay for Elective Hip Replacement



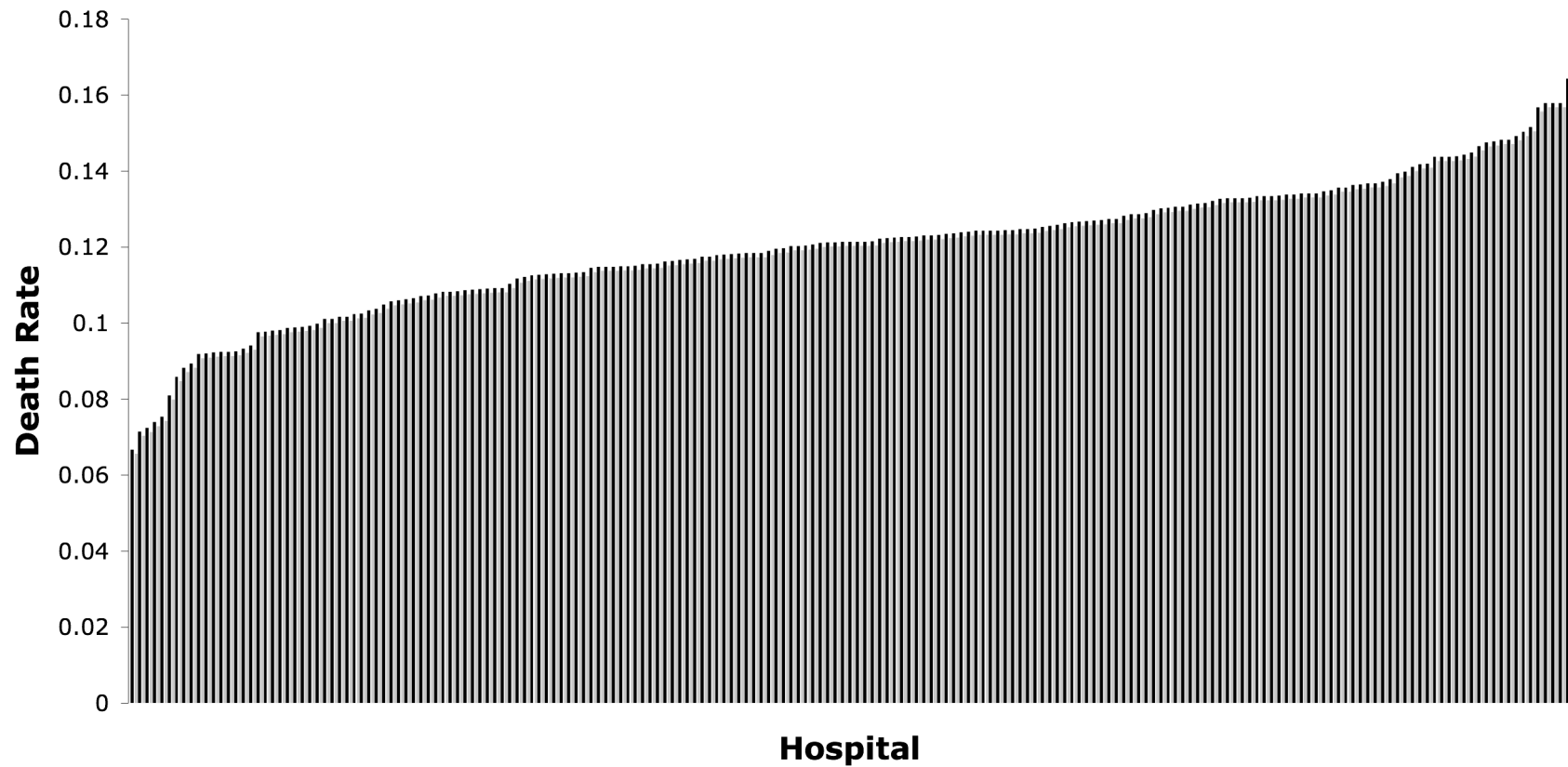
Likewise for readmissions for hip replacement

28-Day Readmissions Rate for Elective Hip Replacements



Unprecedented variations in risk-adjusted death rates for heart attacks

Risk Adjusted 30-day Mortality Rate for Heart Attacks



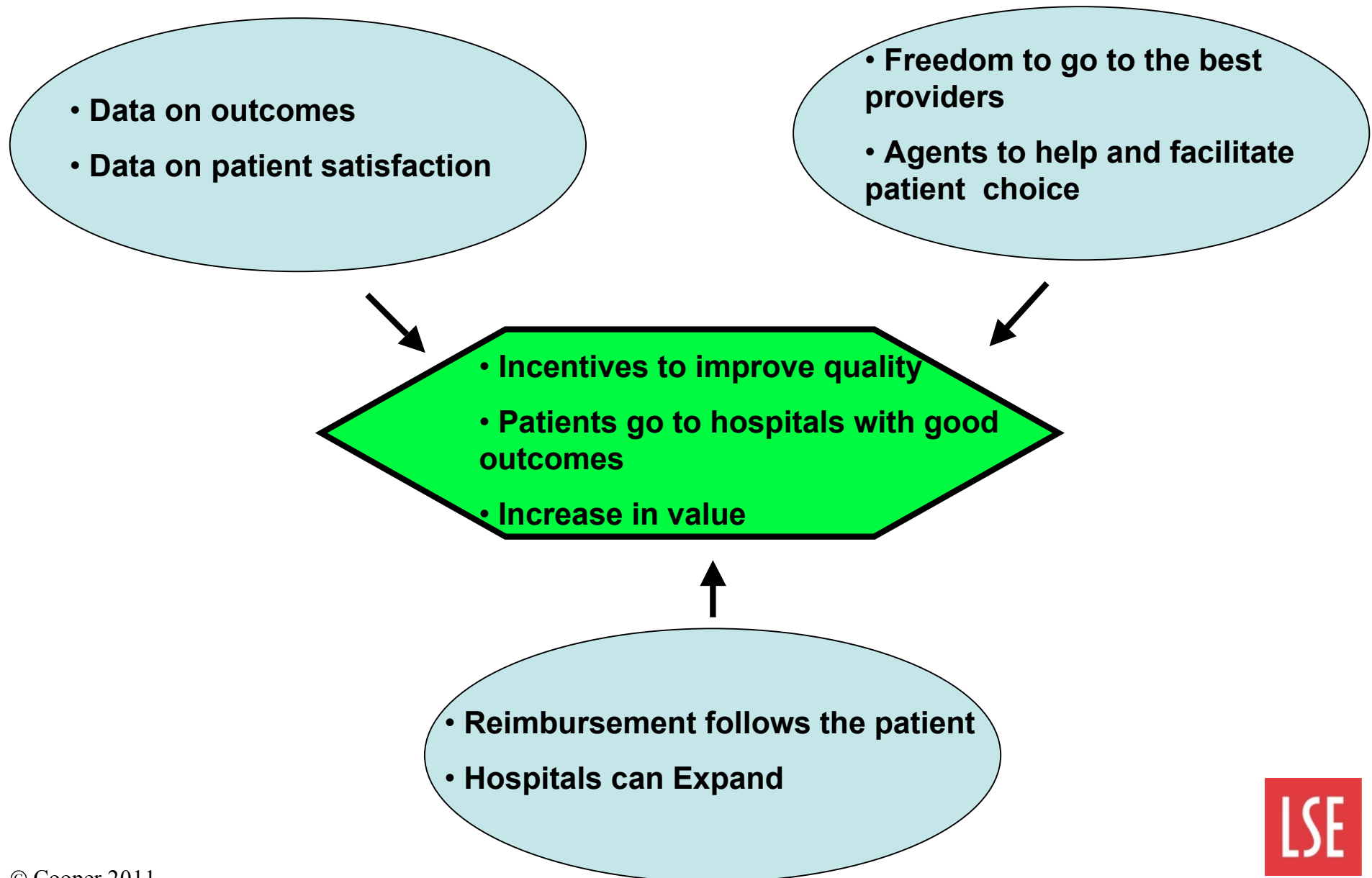
What policies will reduce variation, increase quality and drive up productivity

Trust

**Command
and control**

**Choice and
Competition**

Information, choice and a new reimbursement system creates financial incentives for providers to step up their game



Competition increases providers' autonomy and creates financial incentives for them to up their game

Creates incentives for hospitals to up their game

Health care is too complex and too individualized and too rapidly evolving to manage from top-down

Directly links patient outcomes to success of the provider

Forces providers with bad outcomes to improve or exit the market

Gives providers the autonomy to do things differently and test what works

Competition increases providers' autonomy and creates financial incentives for them to up their game.....BUT

Creates incentives for hospitals to up their game

Patients don't choose; small changes patient flows

Health care is too complex and too individualized and too rapidly evolving to manage from top-down

Need more centralized coordination; more focus on structure

Links patient outcomes to success of the provider

Creates incentives to cream-skim

Forces providers with bad outcomes to improve or exit the market

But people like their 'local'

Gives providers the autonomy to do things differently and test what works

This is a threat to a universal service

Did the 2006 Patient choice reforms in England create incentives that improved hospital quality?

Cooper et al. (forthcoming) looked at the impact of competition on AMI mortality using patient-level data from 2002-2008

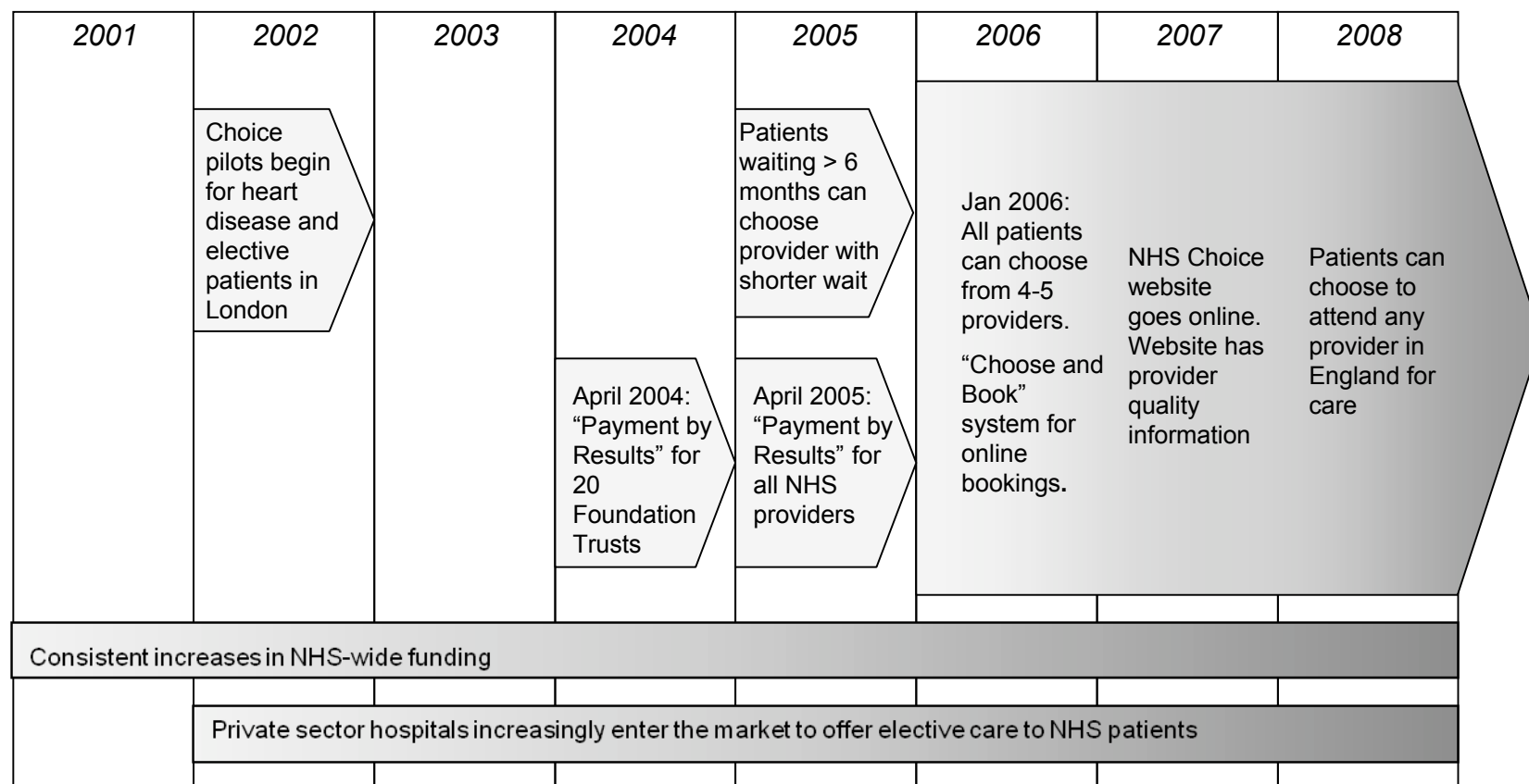
Research Strategy:

- Quasi-natural experiment to look at the impact of the reforms before and after they were introduced via a difference-in-difference-style estimator;
- Compared competitive and non-competitive areas before and after reforms;
- Controlled for patient, provider and regional characteristics;
- Develop a range of measures of market structure;
- Illustrate that results are robust across a range of measures of market structure and placebo tests, and are consistent across multiple estimators

Answer: Yes - based on a 1.s.d gap in competition, death rates fell by 0.3 percentage points per year for patients living in 'high' competition areas off of baseline mortality rate of ~14% after hospitals were exposed to competition

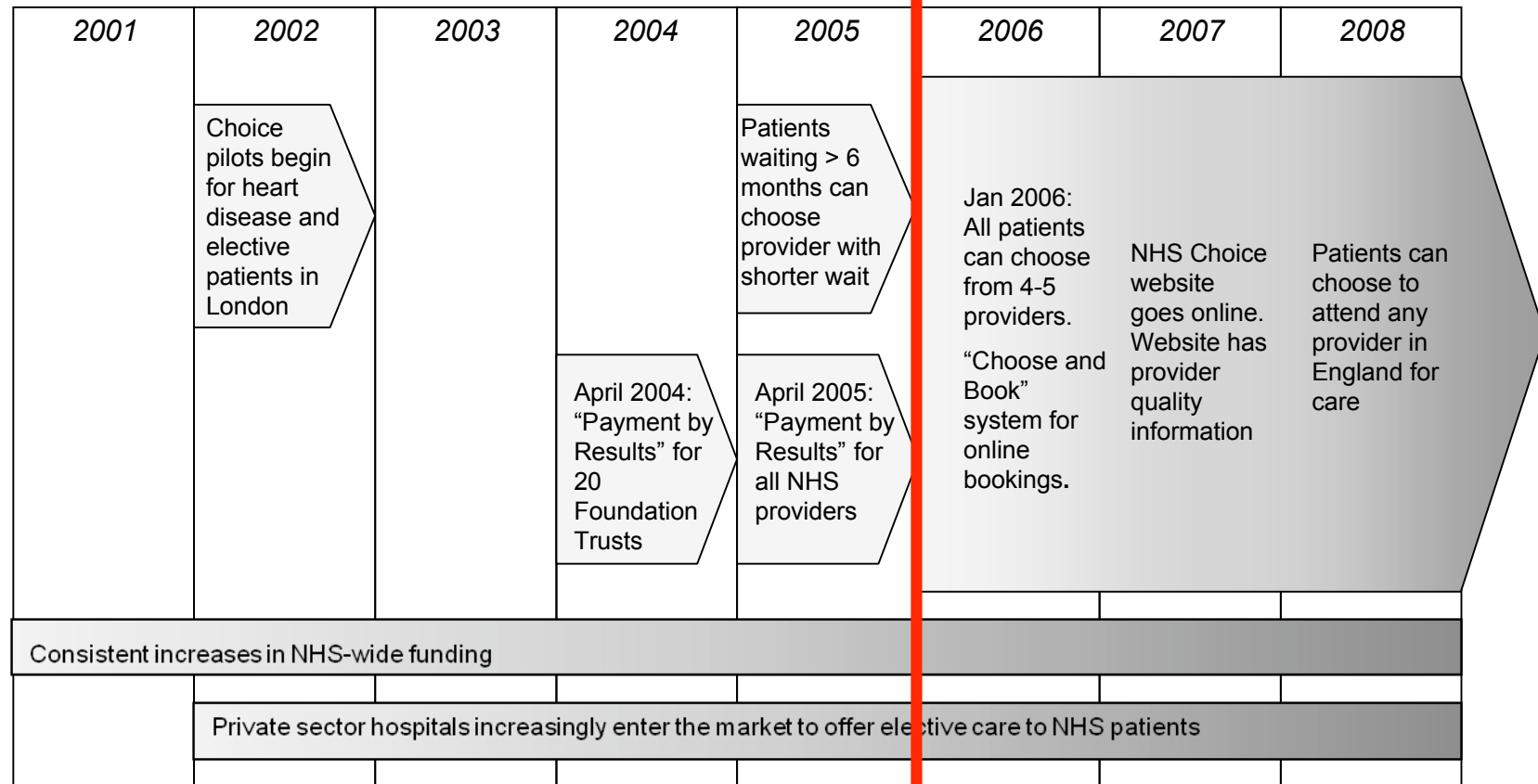
The Results are robust to a number of specifications, inclusion and exclusion of controls and across a wide range of measures of market structure.

A timeline of the NHS market-based reforms



A timeline of the NHS market-based reforms

Policy On

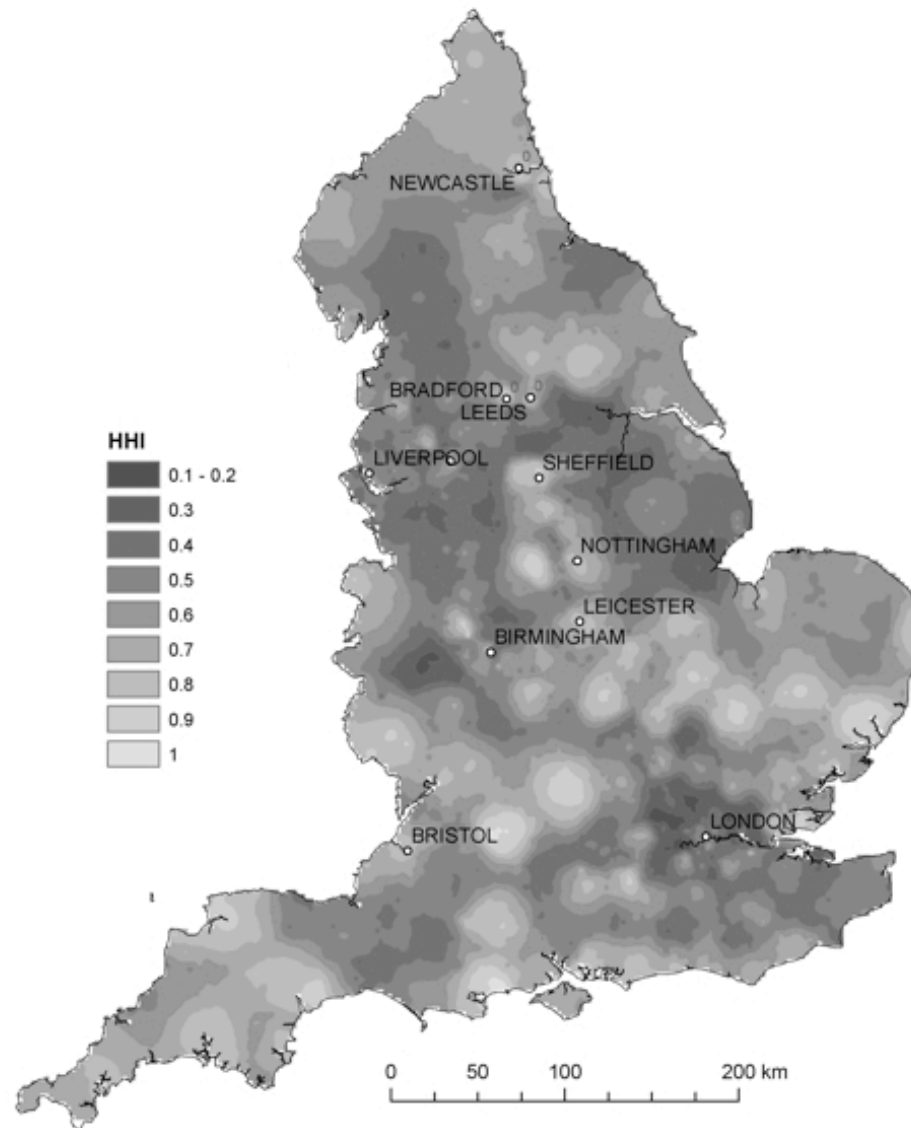


Difference-in-difference regression creates a quasi-natural experiment to test the treatment effect of a policy

$$\text{Treatment Effect} = (\text{Treated}_{\text{post}} - \text{Treated}_{\text{pre}}) - (\text{Control}_{\text{post}} - \text{Control}_{\text{pre}})$$

- **Differences out other confounding factors that are consistent across the two groups**
 - Increases in funding during the period;
 - New technology that improves patient care;
 - Other policy-changes that are universal in both areas
- **Key assumptions**
 - Hospitals in monopoly markets were not impacted by the reforms
 - The treated group would have followed the same trend as the control group, were it not for the introduction of the key policy

Our variable radius market captures market structure but is not correlated with population density



- And, because we can use pre-reform (pre-choice) patient flows, we can attenuate endogeneity

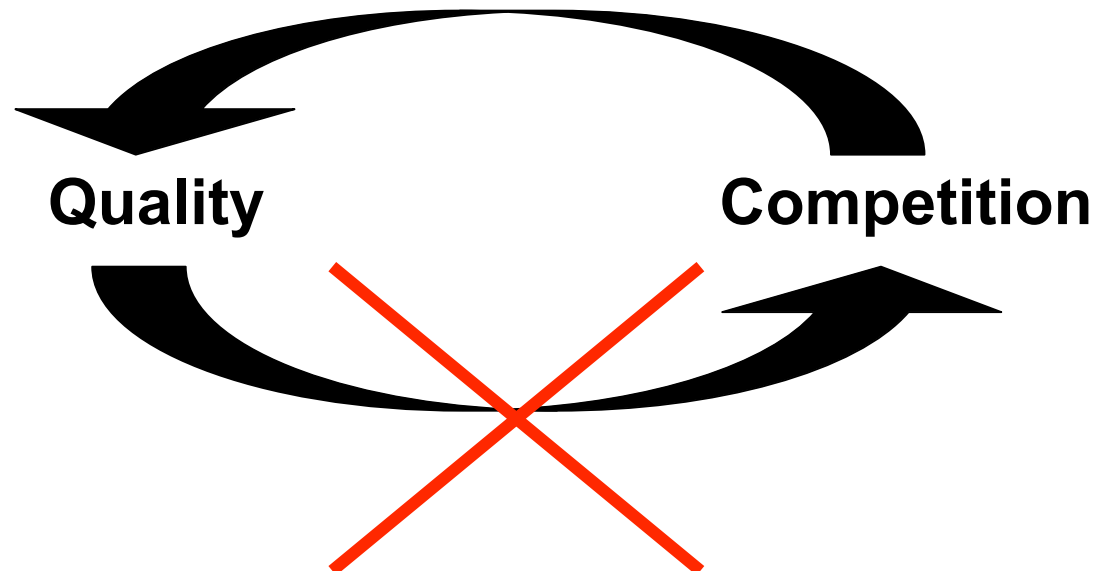
Correlations between measures of market structure and population density	
HHI Measure	Correlation with population density
20km Fixed Radius HHI	-0.4406
30-Minute Drive Radius HHI	-0.3607
95 th Variable Radius HHI	-0.0329
Predicted Patient Flow HHI	-0.3882

Together the papers look at a range of outcomes

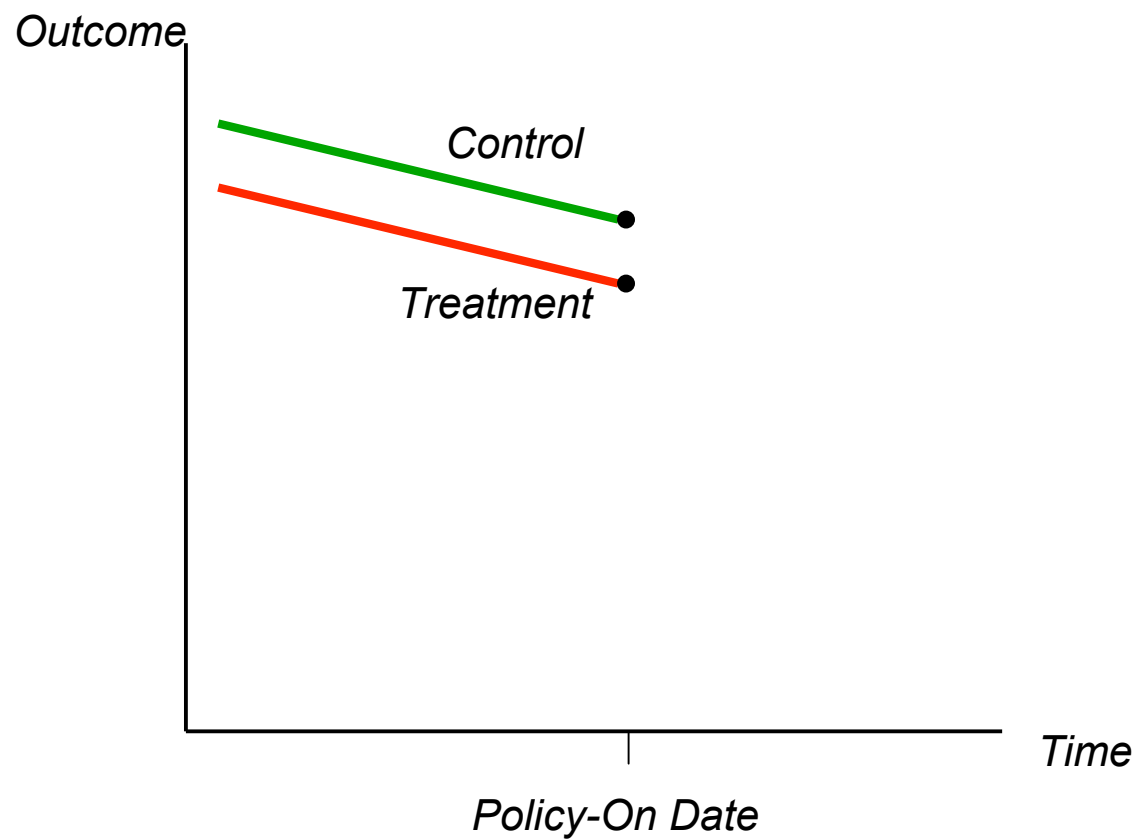
- 30-day mortality from acute myocardial infarction (patient-level & hospital level);
- 28-day all-cause mortality (hospital-level);
- 30-day all-cause mortality (hospital-level excluding AMI deaths);
- Length of stay (hospital and patient level);
- Admissions;
- Expenditure per admission;

Measure competition using elective patient flows and outcomes from an emergency procedure

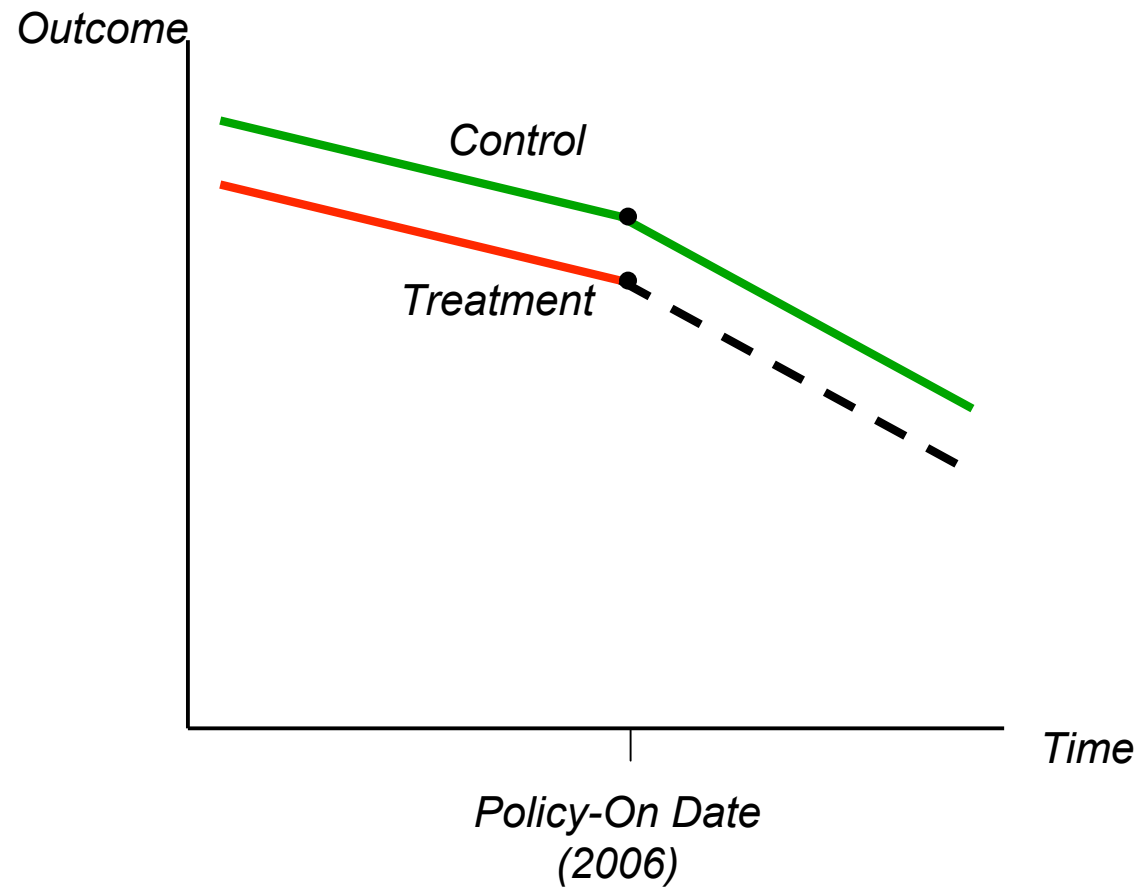
- AMIs are frequently occurring;
 - Substantial mortality rate;
 - Good care reduces bad outcomes (death) and survival is a function of medical care;
 - Unlikely to be biased by gaming;
 - Patient selection not an issue;
 - Correlated with length of stay, readmissions rates and overall death rates
-
- **Helps avoid relationship between competition and hospital quality**



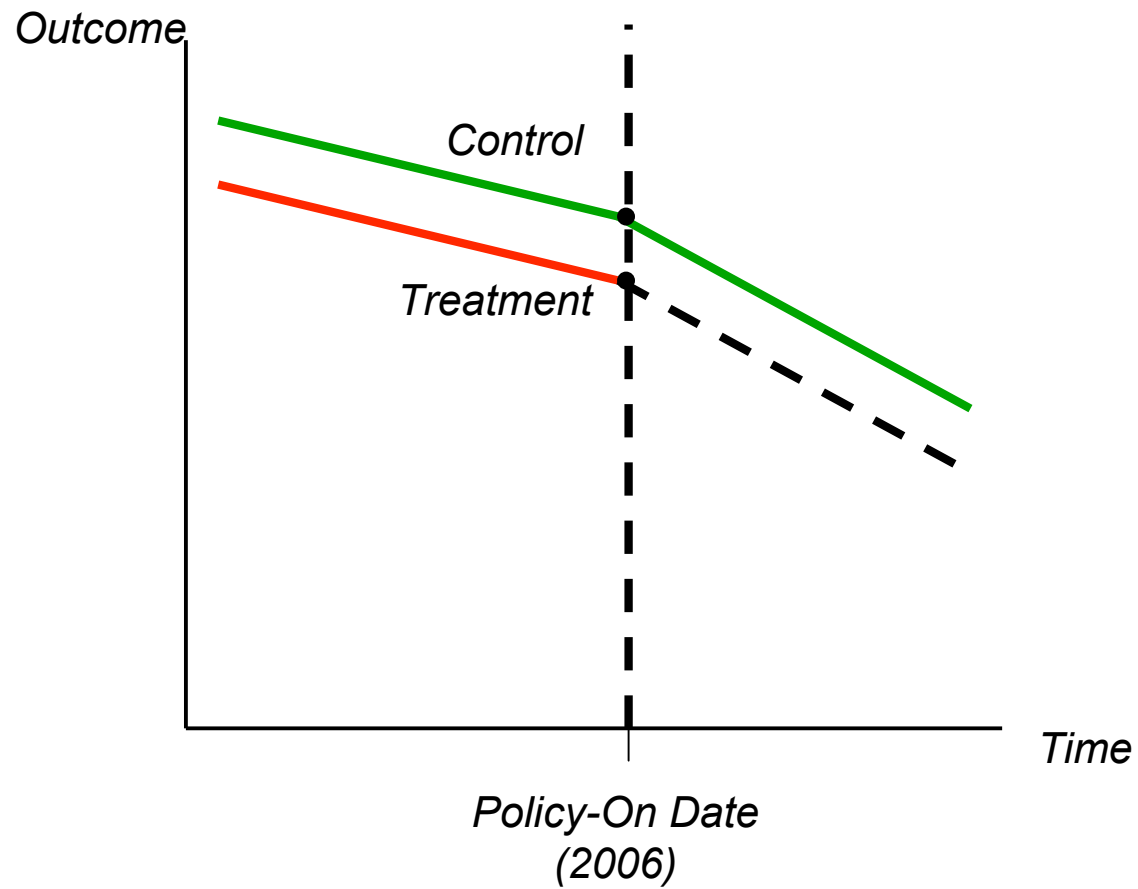
We used a modified diff-in-diff to test pre-reform trends



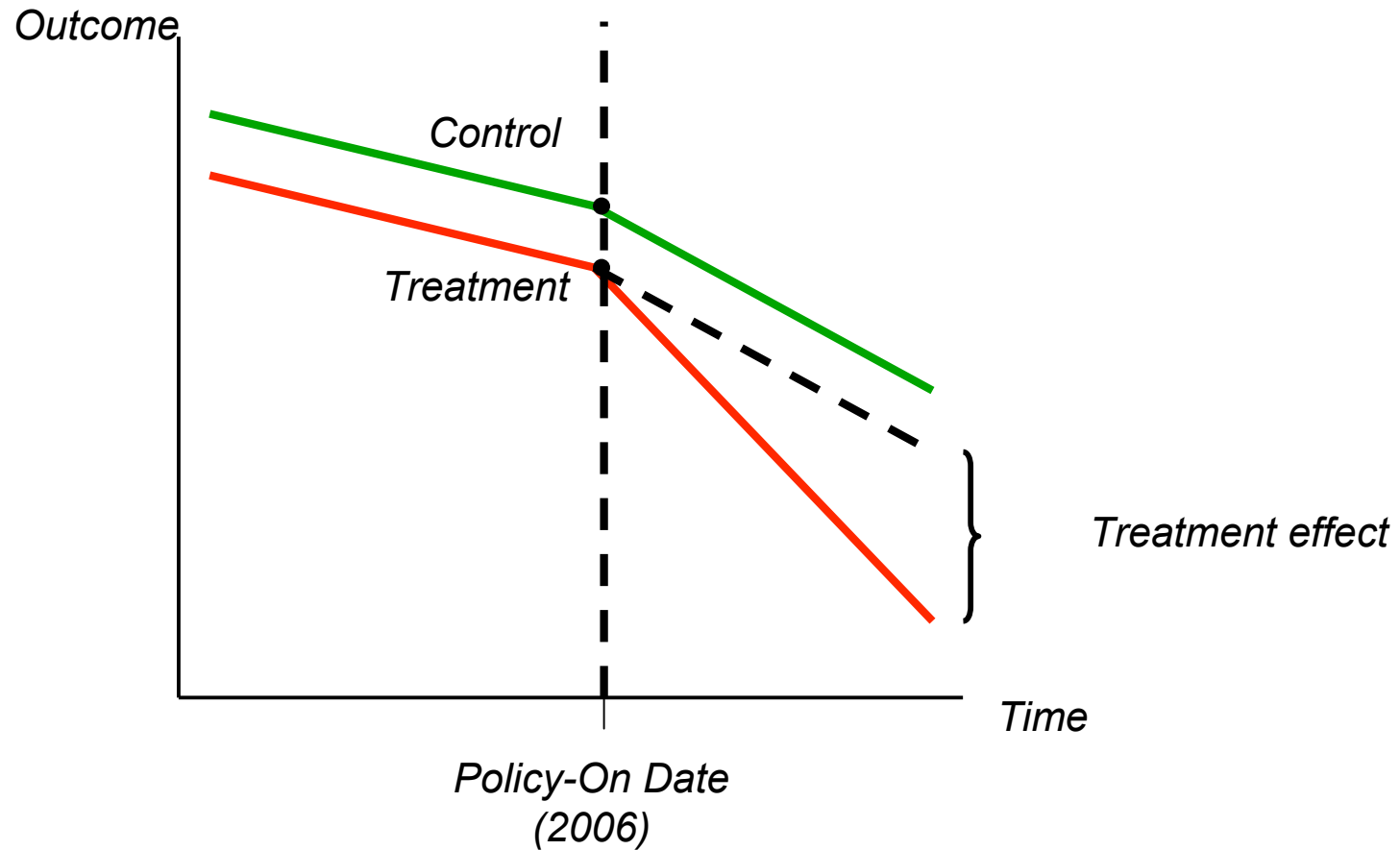
And it assumes that if the policy were not introduced, the trends in treated and control groups would have been identical



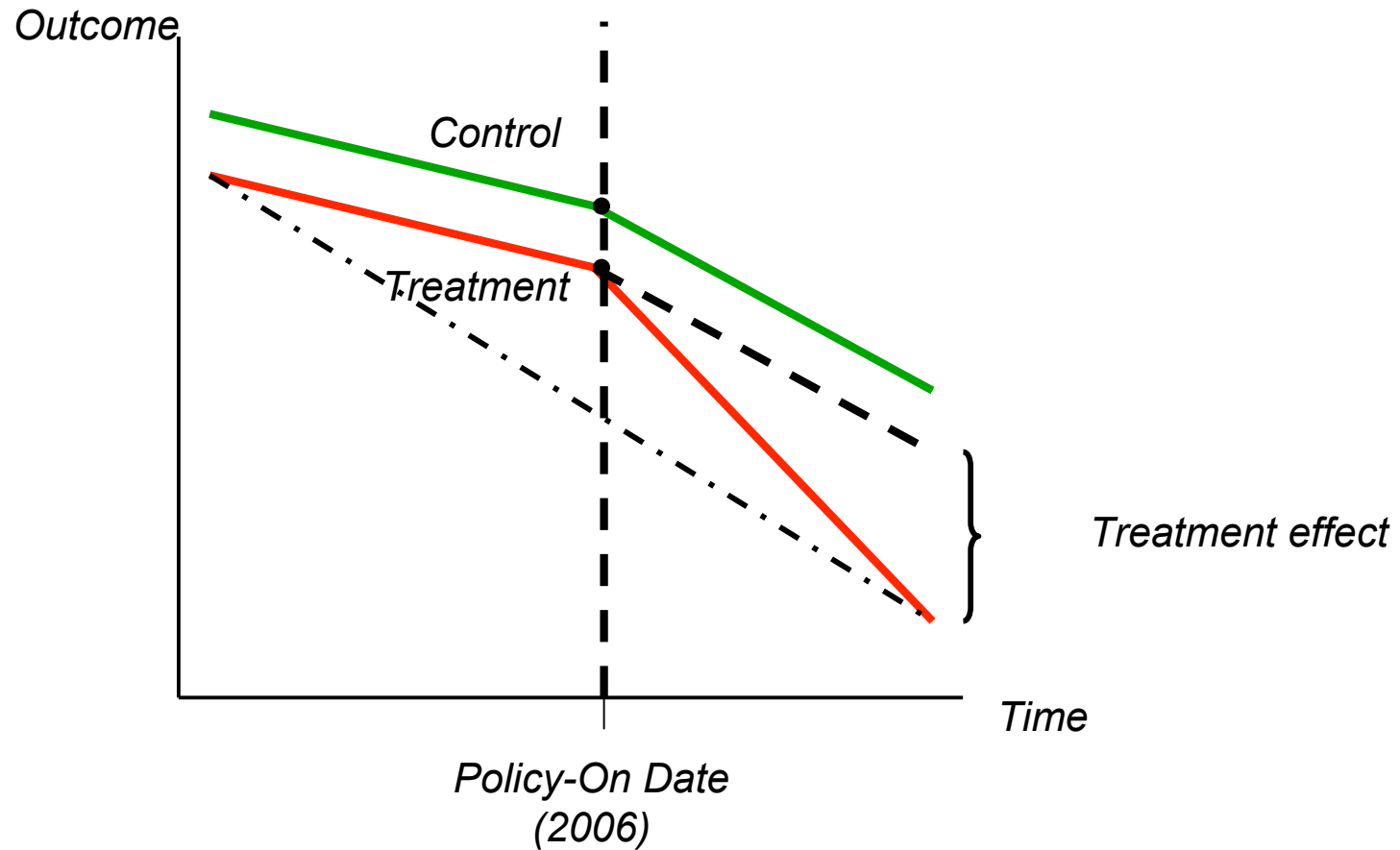
However, there is a policy change introduced at a fixed data



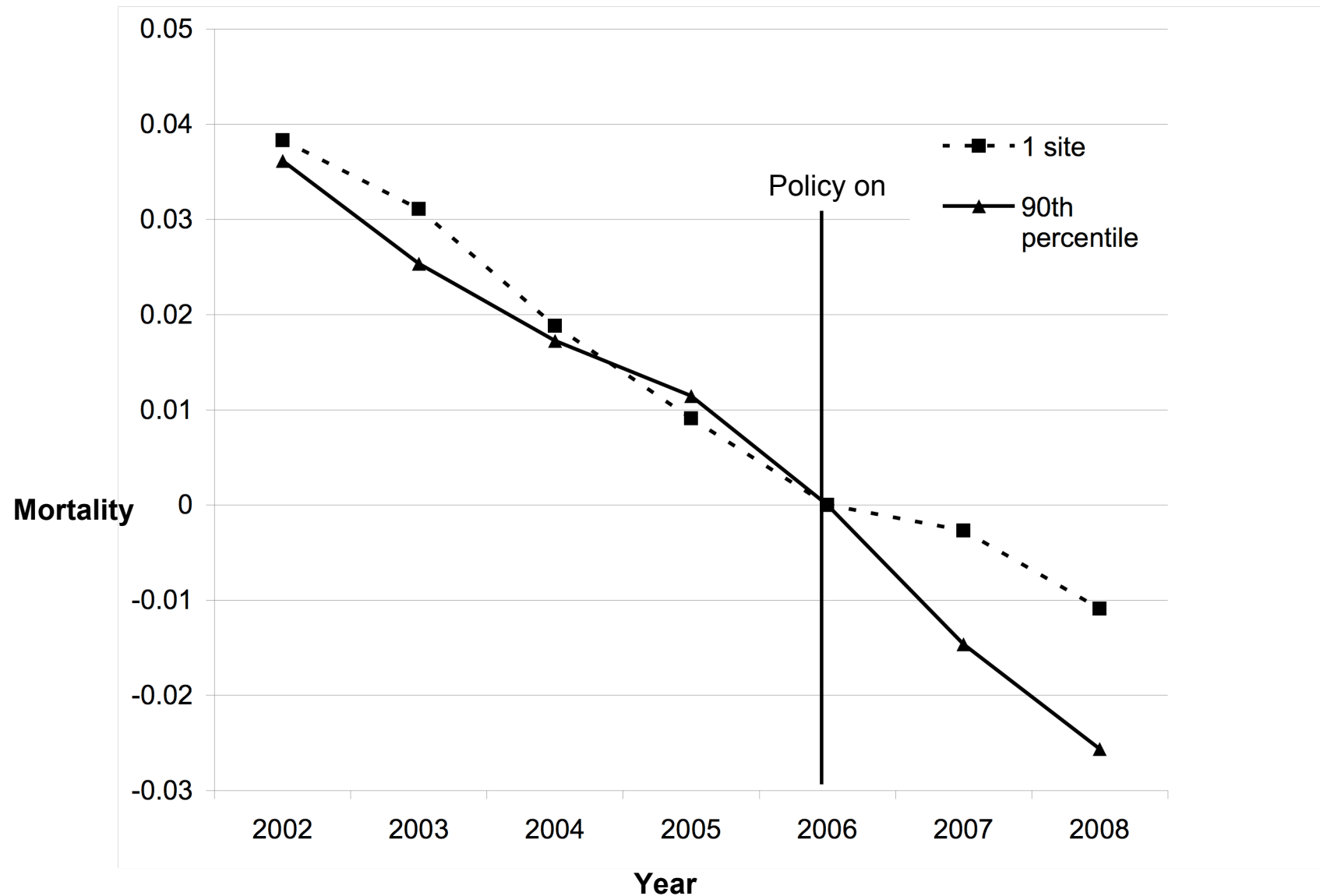
It induces a change in outcomes, which is the treatment effect of the policy



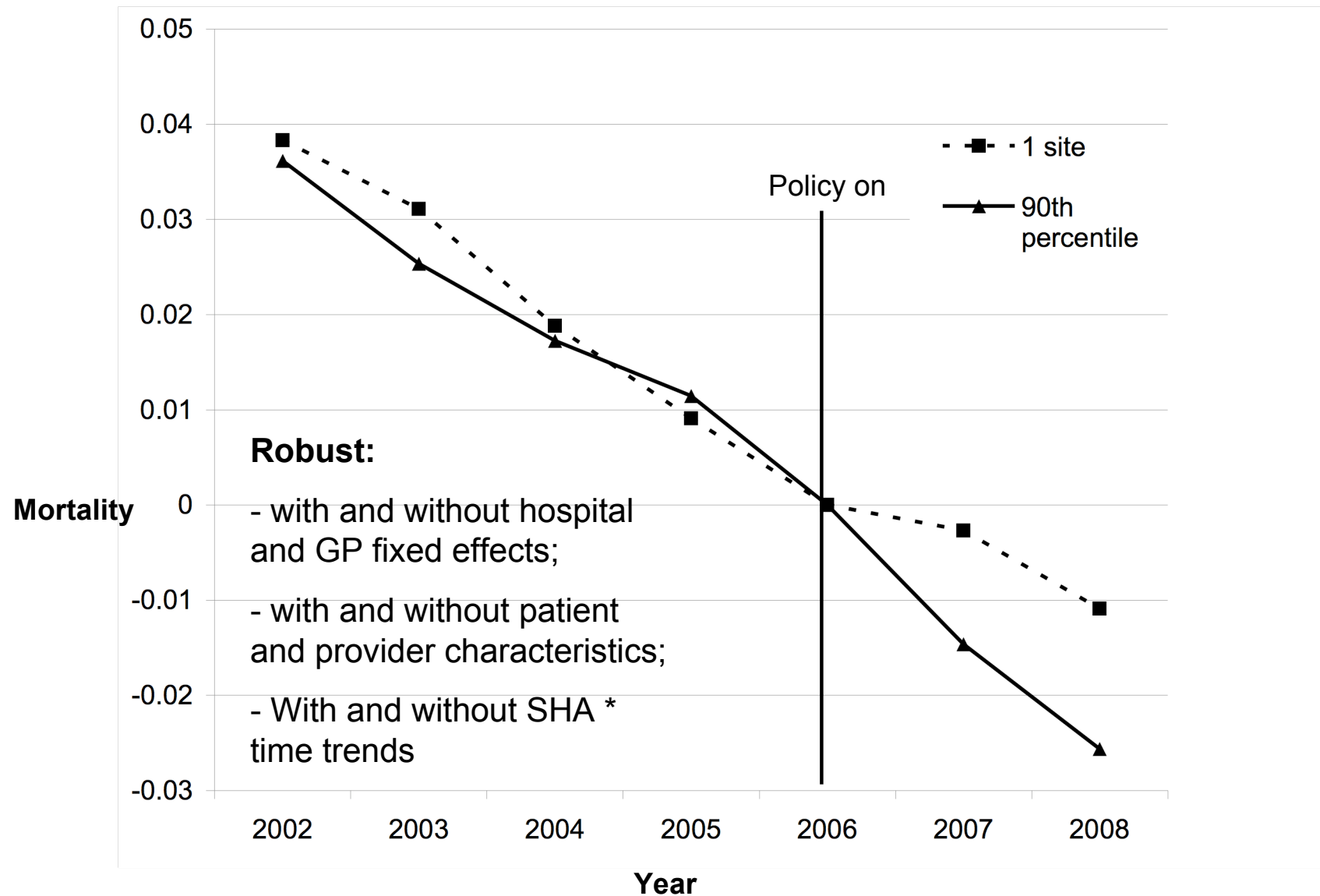
It induces a change in outcomes, which is the treatment effect of the policy



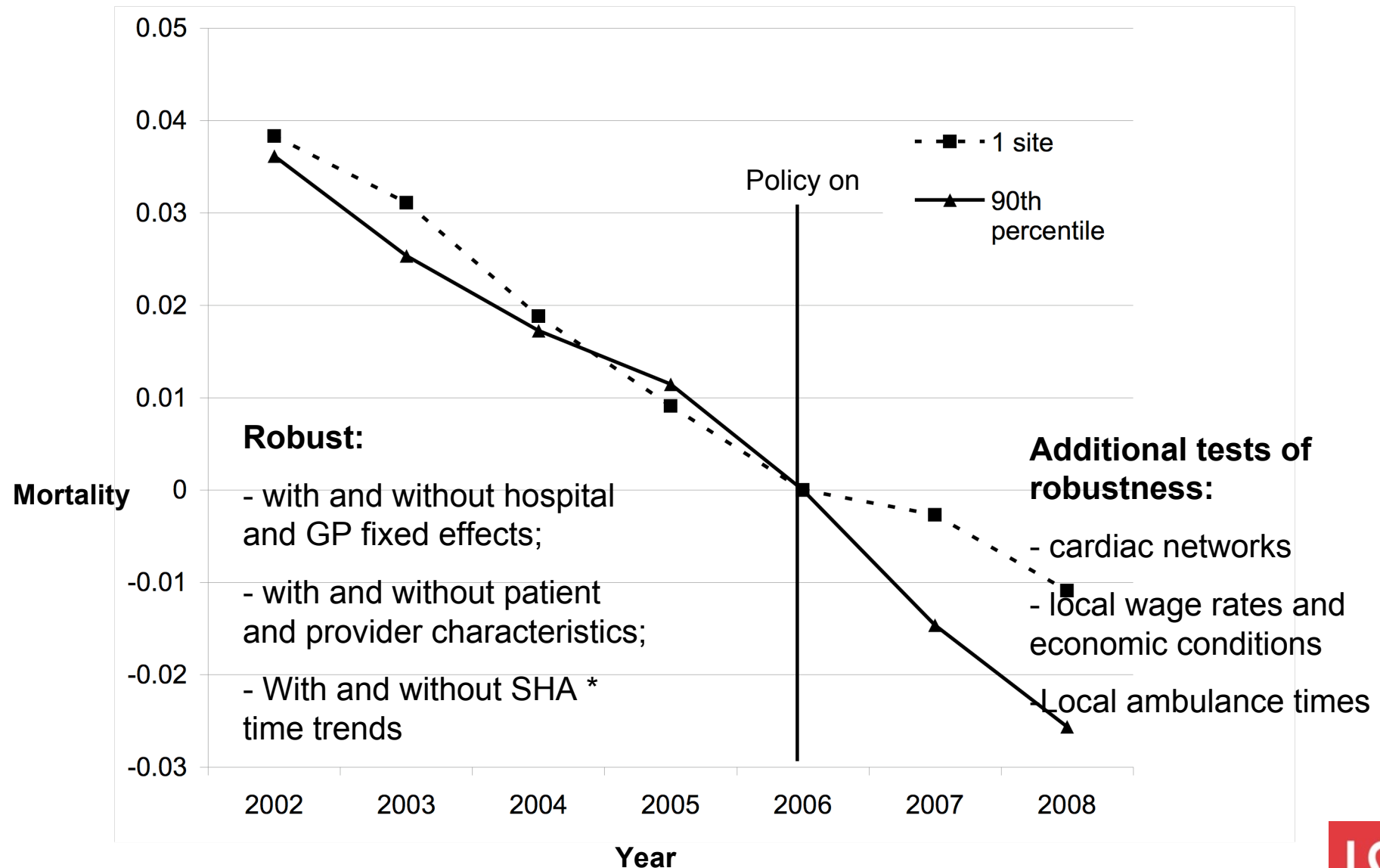
Hospitals located in competitive markets began to lower their mortality more quickly from 2006 onwards



Hospitals located in competitive markets began to lower their mortality more quickly from 2006 onwards



Hospitals located in competitive markets began to lower their mortality more quickly from 2006 onwards

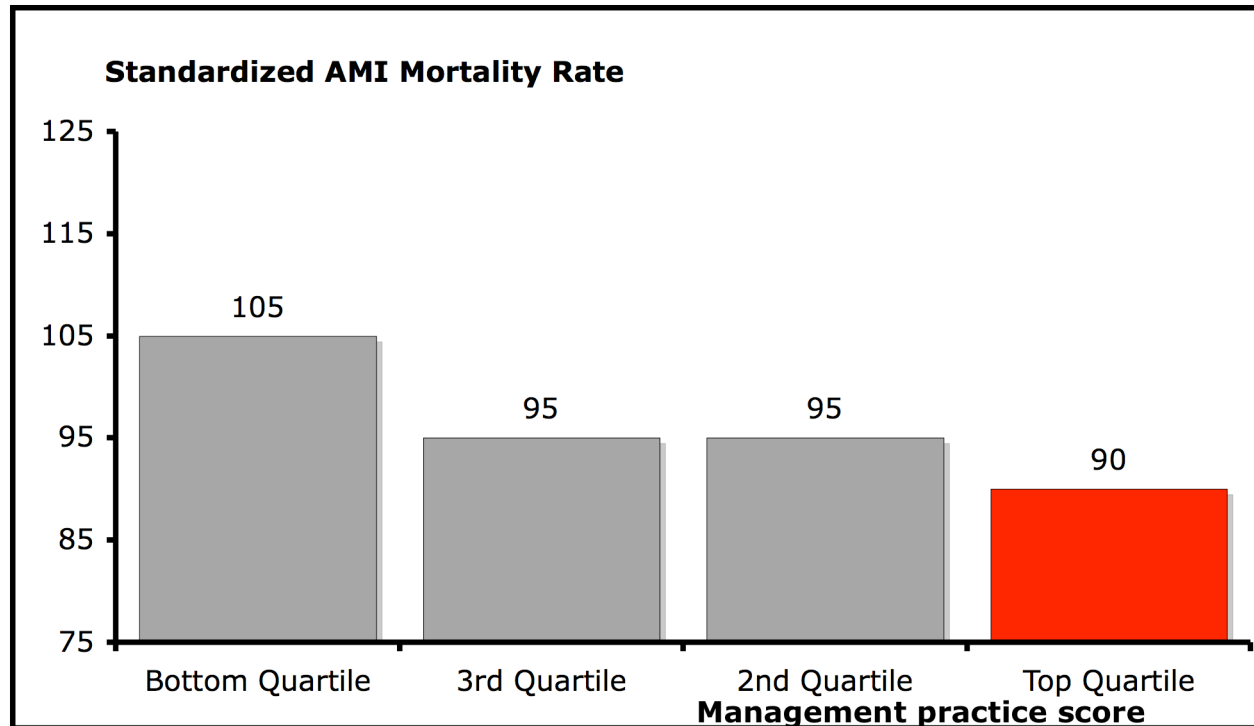


Better management in the private manufacturing sector leads to higher productivity and sales growth



But what about hospitals?

Better managed hospitals have lower death rates and higher satisfaction



- A 20% improvement in management quality resulted in a drop of 6% drop in AMI mortality, a 33% increase in income per bed, and a 20% increase in patient satisfaction
- Greater competition prompts hospitals to improve their management
- The hypothetical addition of a rival hospital would increase management quality and lead to a 10.7% reduction in AMI mortality.

The facts and fallacies about our research

What the research suggests:

- Consistent with theory on fixed price competition, competition improved quality
- Robust evidence that death rates fell more quickly in more competitive areas after choice/competition introduced in 2001;
- Mortality fell for both AMI and all-cause mortality;
- The estimates of the two papers are similar in magnitude and similar to US findings;
- All papers showed that length of stay for elective care fell more quickly in more competitive markets;
- No evidence of increase in costs;

What the research doesn't suggest:

- Results are not a “London thing”;
- This is not a reversion to the mean;
- Has nothing to do with public or private providers;
- Has nothing to do with patients' proximity to providers;
- This is not about heart attacks - the findings is robust across all-cause mortality and mortality from AMI

Sum: the introduction of hospital competition led to improvements in outcomes and shorter lengths of stay without a concurrent increase in



Concluding thoughts

- Robust evidence that the choice/competition reforms created incentives for hospitals to improve their clinical quality
- Did so without concurrent increases in spending - Hence, productivity went up
- Strive to publish better outcomes data at condition level from beginning to end of treatment
- Assist choosers and make it as easy as possible for them to access best performing providers in the country
- Think about whether or not these reforms were that radical?
 - Focus on outcomes
 - Allow patients to attend any providers they want
 - Together with rewarding providers for attracting more business, prompted providers to step up their game.









Cooper et al. (forthcoming) looked at the impact of competition on AMI mortality using patient-level data from 2002-2008

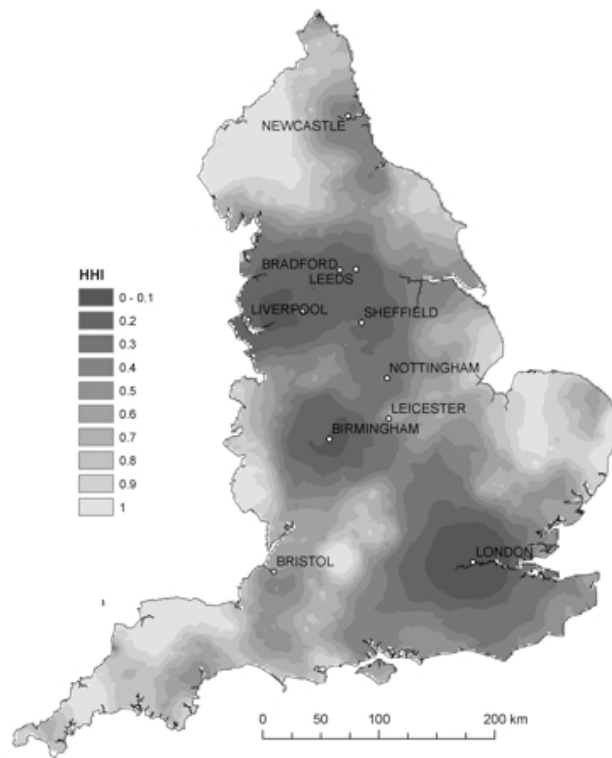
Research Strategy:

- Quasi-natural experiment to look at the impact of the reforms before and after they were introduced via a difference-in-difference-style estimator;
- Introduce linear time trends to test pre-reform differences in AMI mortality
- Develop a range of measures of market structure;
- Develop IV for market concentration;
- Illustrate that results are robust across a range of measures of market structure and placebo tests, and are consistent across multiple estimators

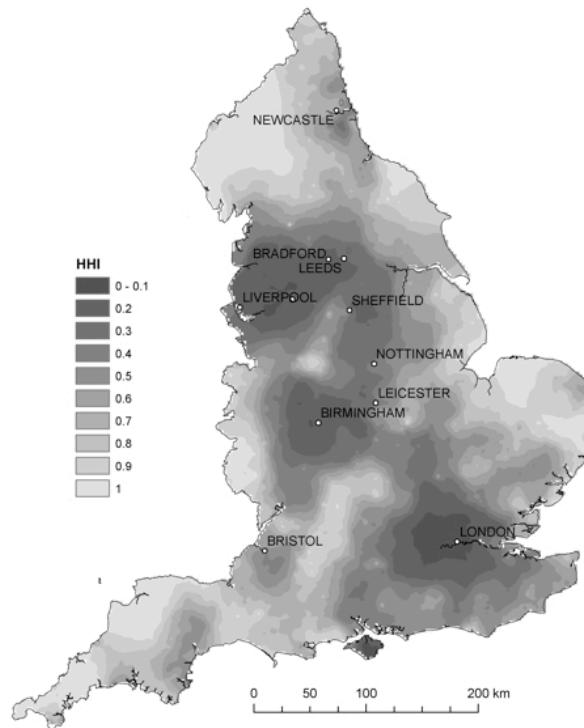
Answer: Yes - based on a 1.s.d gap in competition, death rates fell by 0.3 percentage points per year for patients living in 'high' competition areas off of baseline mortality rate of ~14% after hospitals were exposed to competition

The Results are robust to a number of specifications, inclusion and exclusion of controls and across a wide range of measures of market structure.

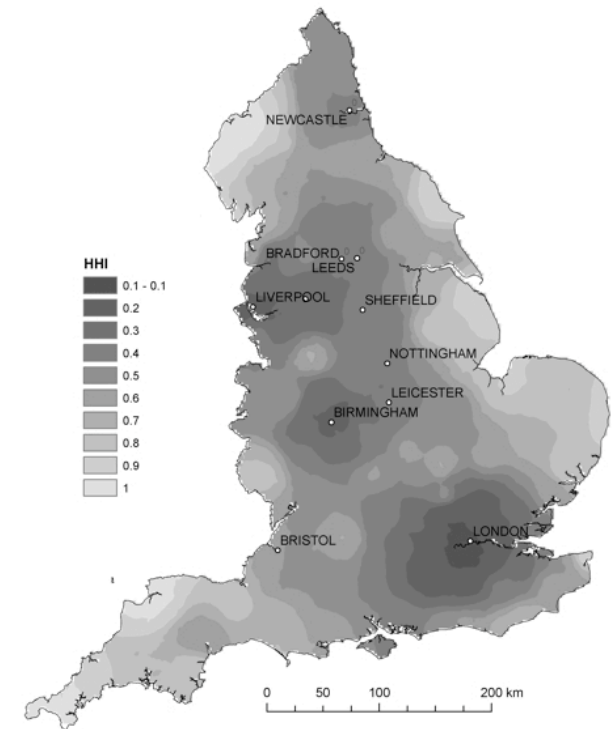
We illustrate that higher competition leads to higher quality, no matter how we measure market structure



**20 km fixed radius
markets**



**30-min Travel Time
Radius**



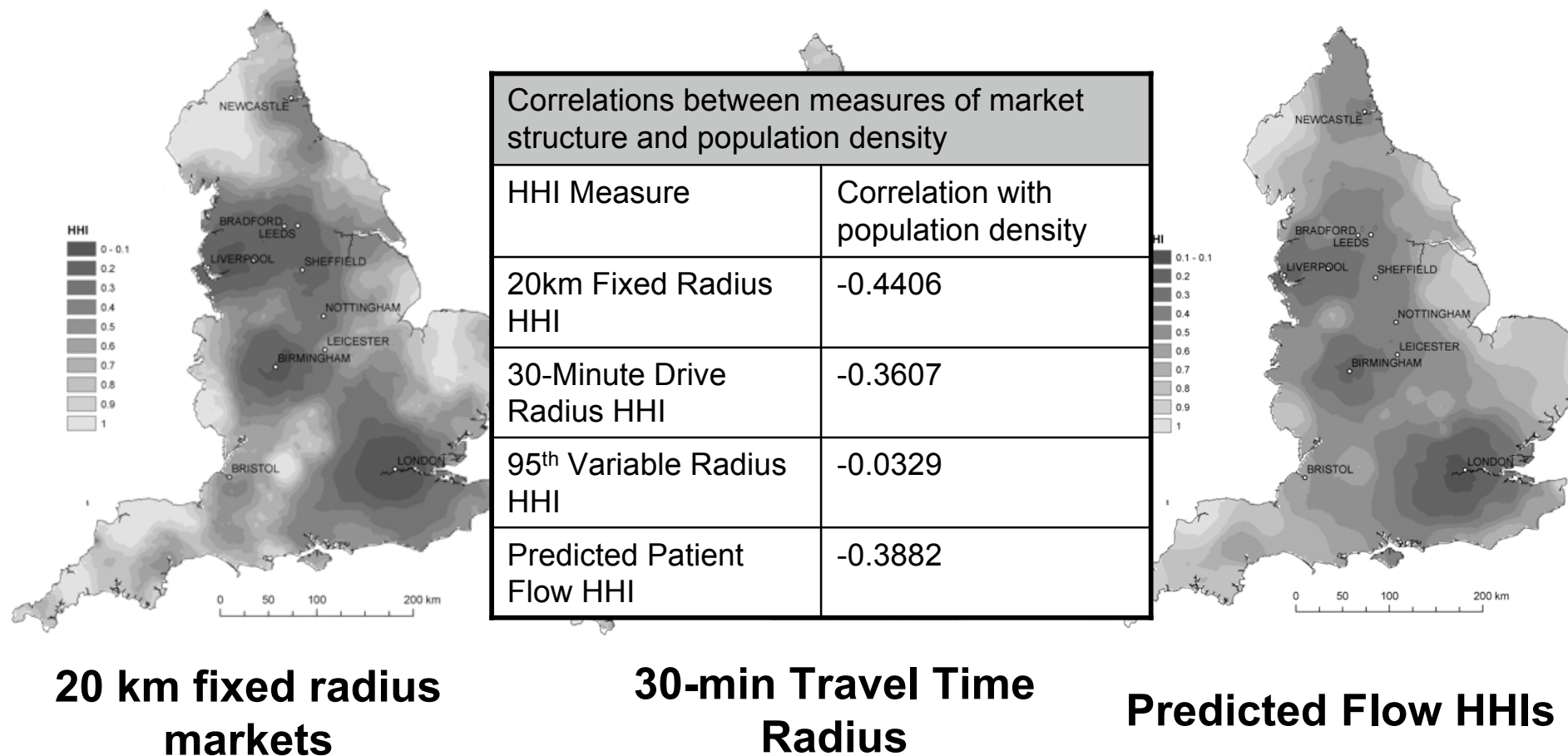
Predicted Flow HHIs

This has not been welcome evidence to those who oppose the idea of introducing hospital competition

Centre stage is the un-peer-reviewed discussion paper from the LSE by the health economist Zack Cooper, which purports to show that deaths from acute myocardial infarction fell more quickly in patients living in competitive markets after the introduction of competition in 2006. The paper documents and then sidesteps the serious limitations in its data and methodology. In fact, the only safe conclusion is that if you live near an NHS hospital or have many NHS hospitals in your area, you may get care quicker and be less likely to die from an acute heart attack. This is hardly a ringing endorsement for competition, or the Department of Health policy of centralisation and hospital closures under the expensive private finance initiative.

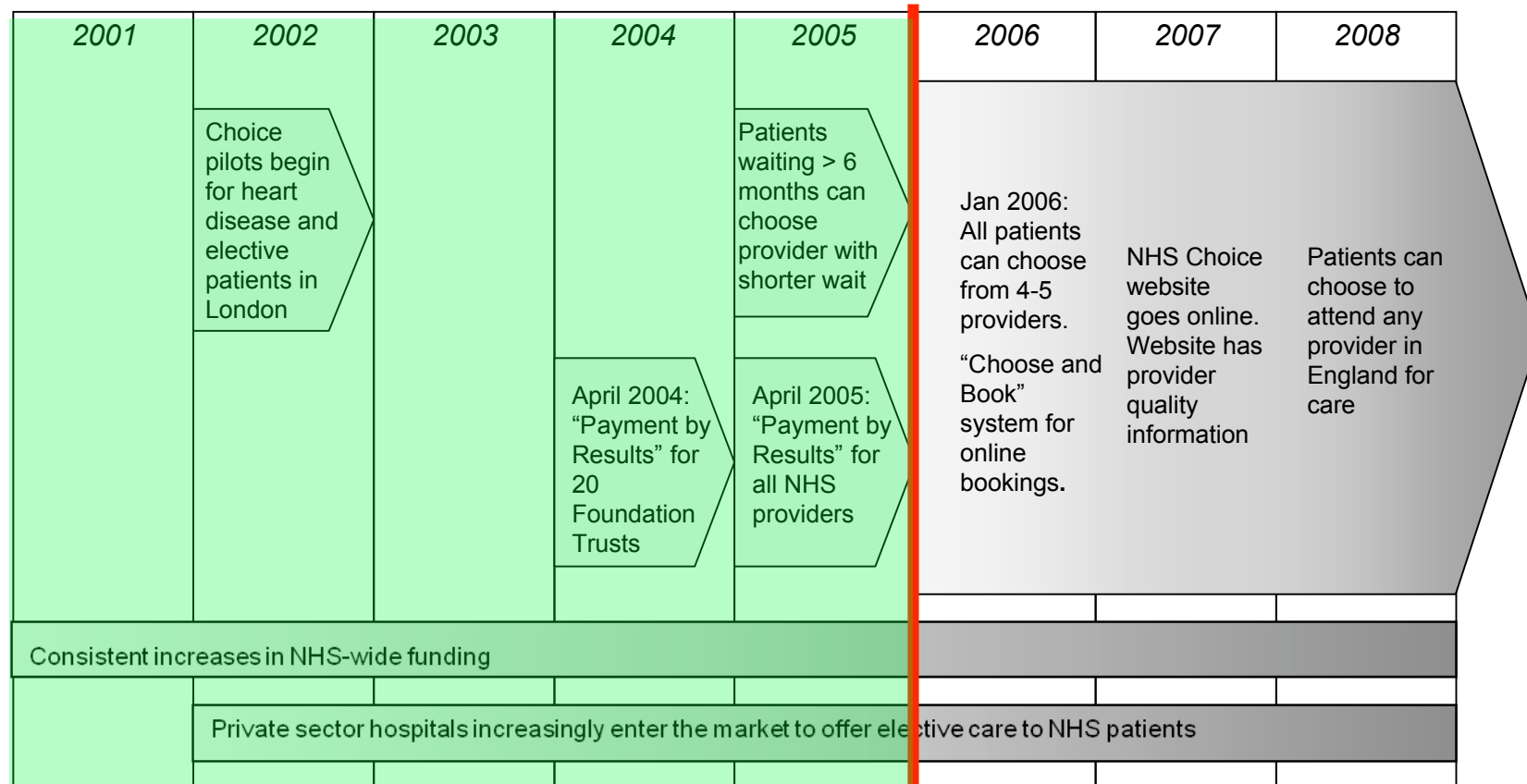
Allyson Pollock, The Guardian, 16 June 2011

We illustrate that higher competition leads to higher quality, no matter how we measure market structure



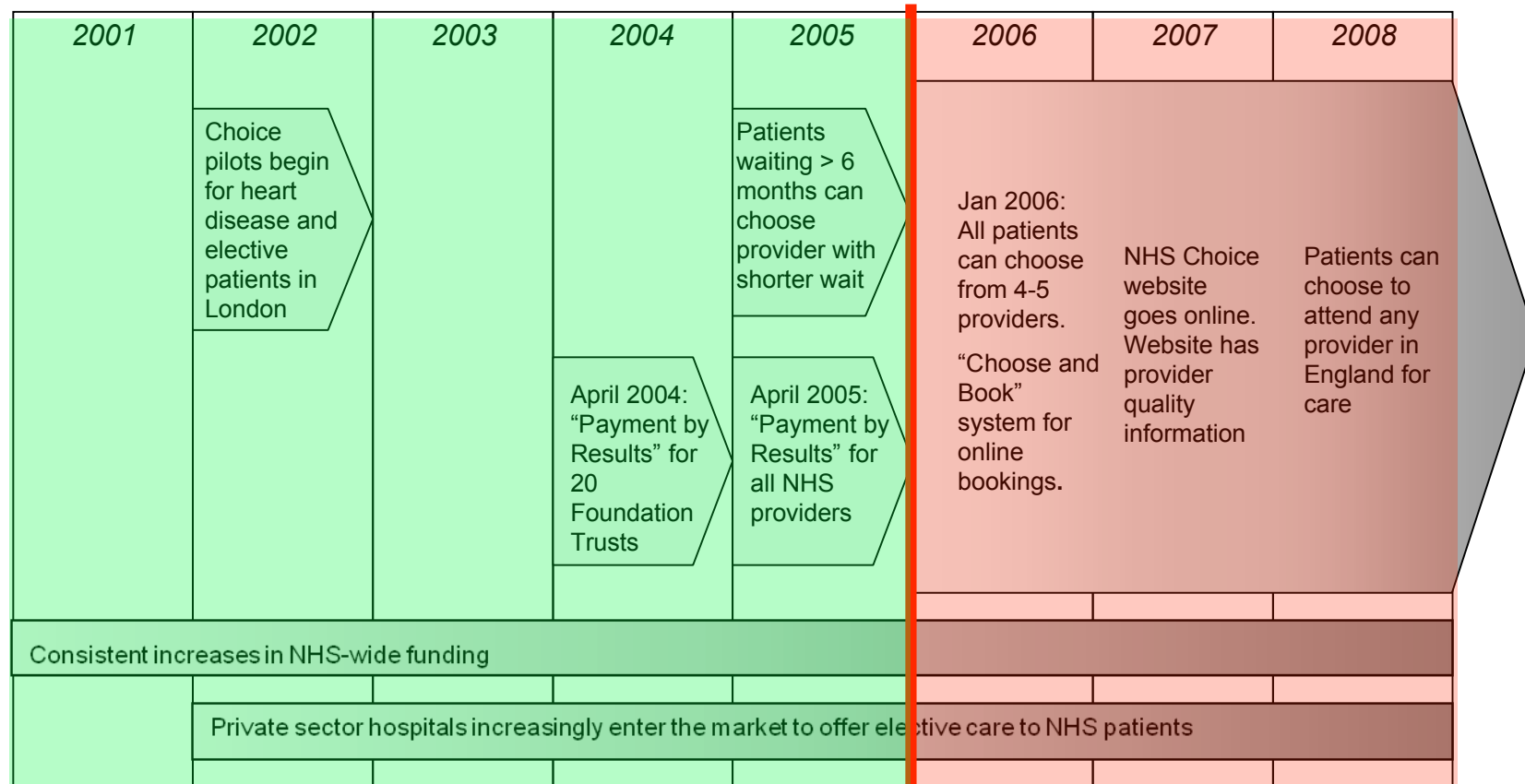
A timeline of the NHS market-based reforms

Policy On



A timeline of the NHS market-based reforms

Policy On





The Spectator, January 7, 2006

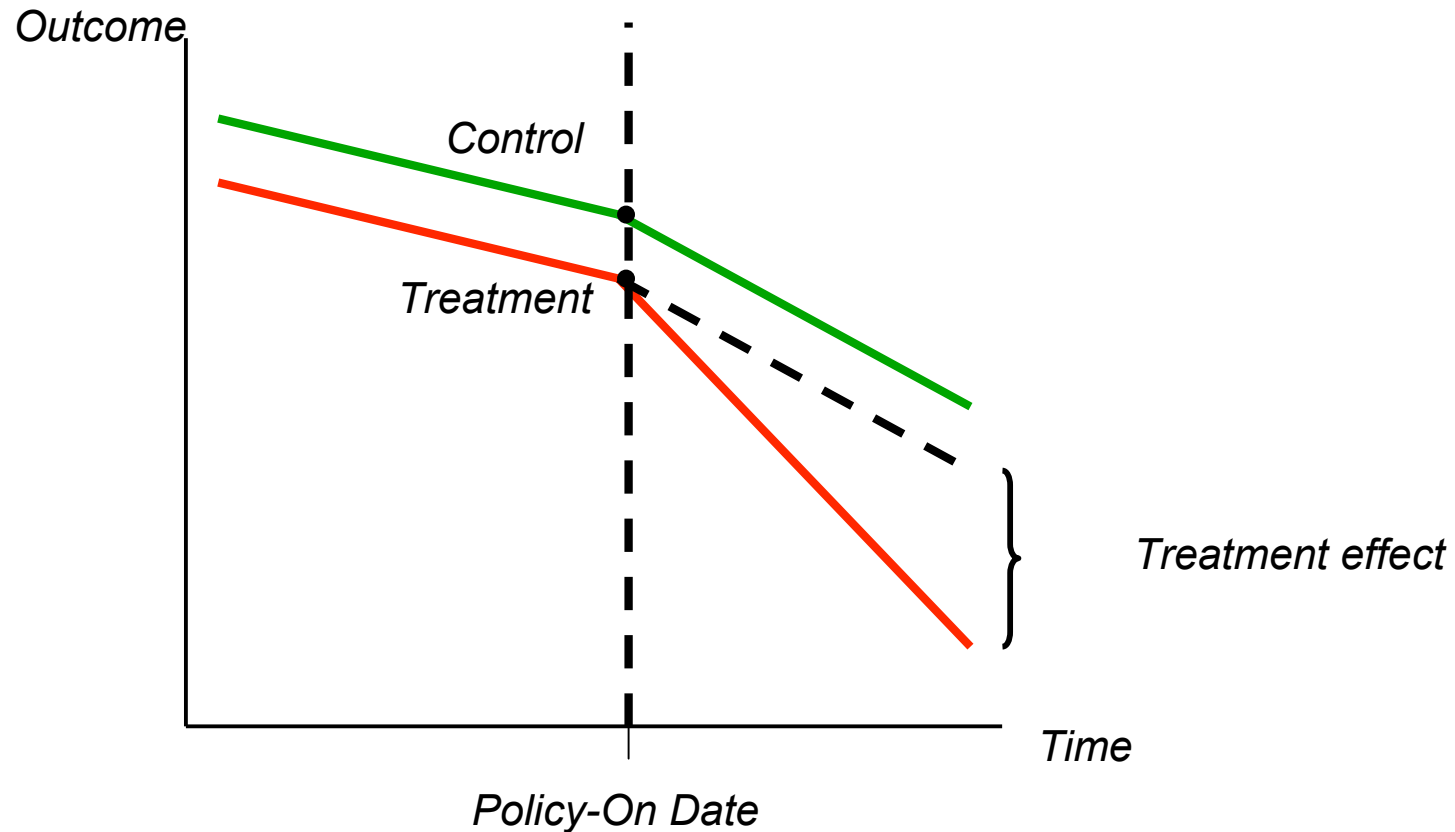
© Cooper 2011



The Guardian, December 7, 2005

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Further need to consider how we measure the impact of the policy and how to identify the treated groups



- How do we measure the treatment effect?
- How do we defined the treatment and control groups?
- Were there other differences between treatment and control groups?

A market in the NHS? The British were skeptical!

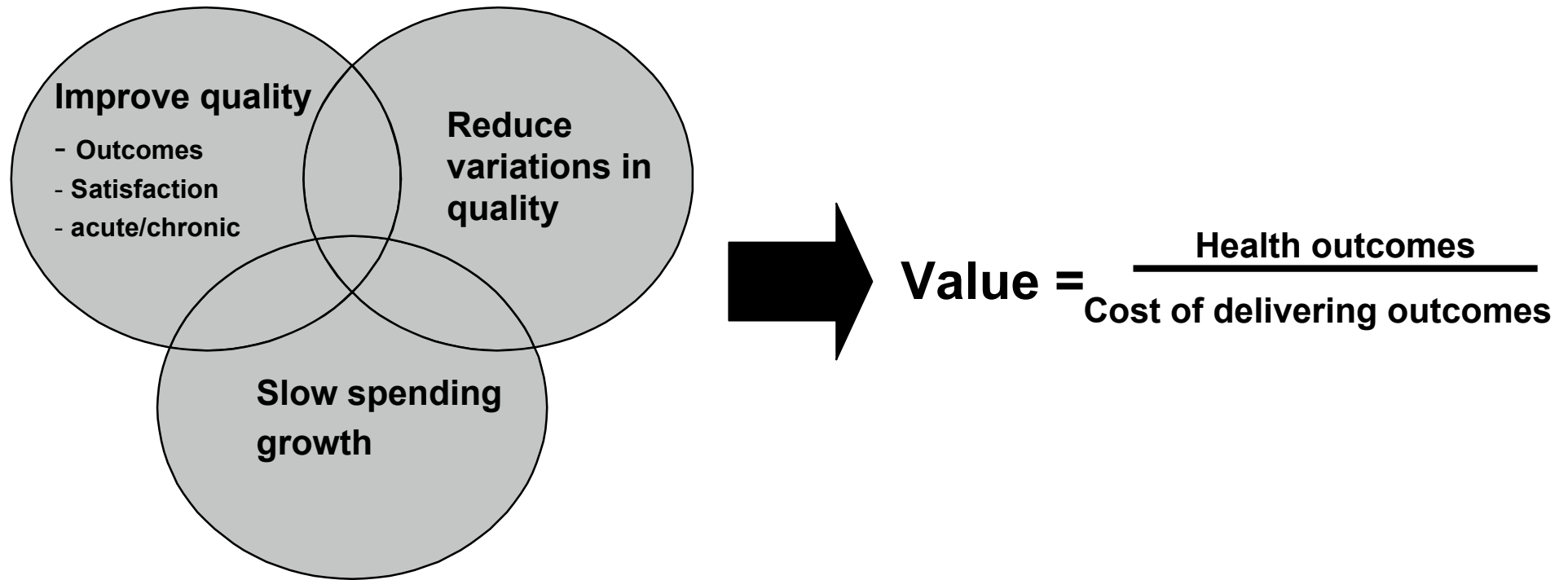
“The whole concept of trying to raise standards by introducing competition between different parts of the NHS is stupid and damaging”

-Frank Dobson, Former Labour Health Secretary from 1997 - 2000

Difference-in-difference articles

- “Does Hospital Competition Save Lives? Evidence from the English NHS Patient Choice reforms”. Forthcoming in the *Economic Journal*. (Cooper, Gibbons, Jones, McGuire)
- “Can Competition Improve Hospital Efficiency”. *Centre For Economic Performance Working Paper Series*, Jan. 2010. (Cooper, Gibbons, Jones, McGuire)
- “Death by Market Power: Reform, Competition and Patient Outcomes in the National Health Service” *NBER Working Paper No 16164*, 2010. (Gaynor, Moreno-Serra, Propper)
- “Free to Choose? Reform and Demand Response in the English NHS”. (Gaynor, Propper and Seiler).

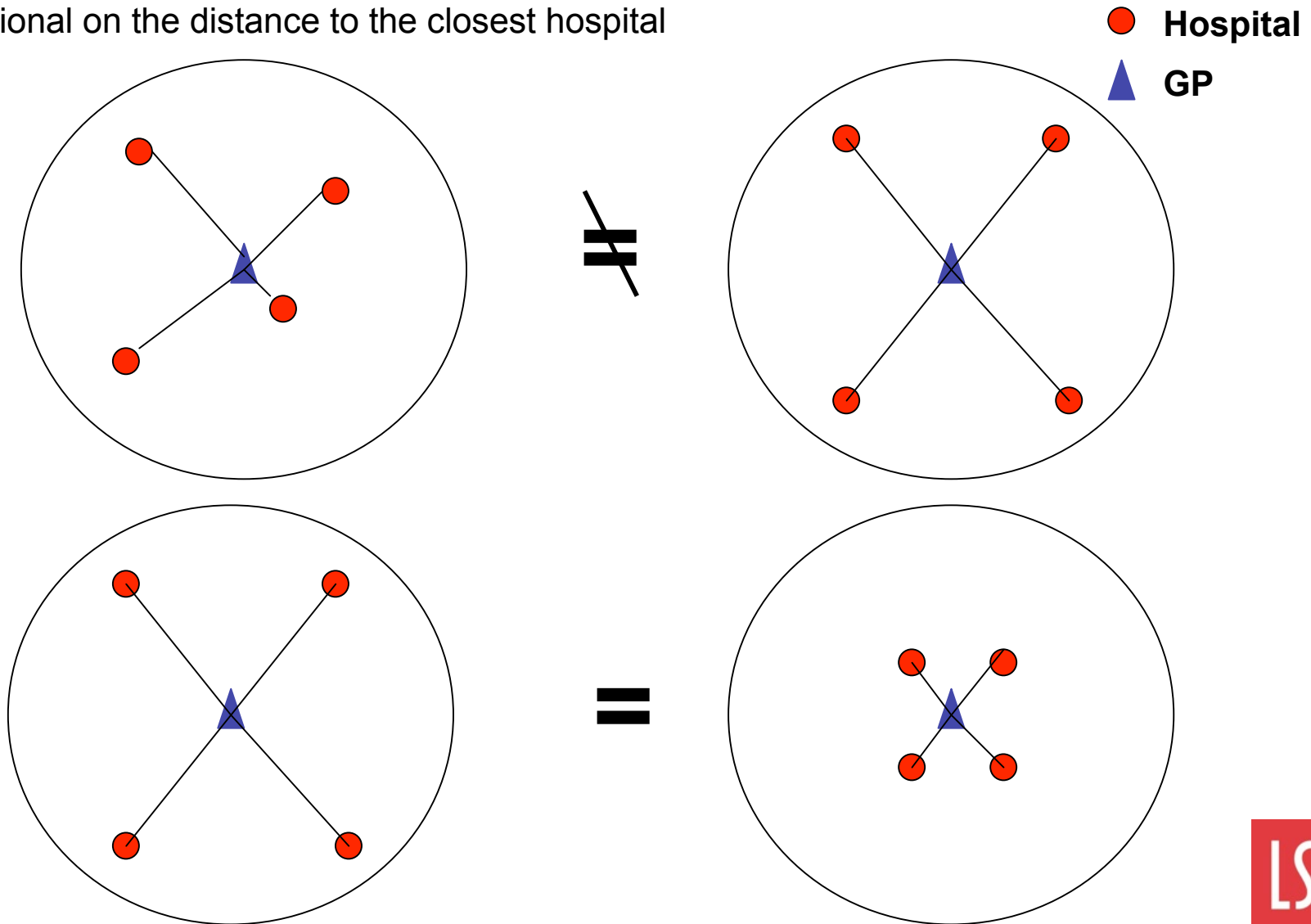
The NHS needs to improve the value of its services for both acute and primary care services



Need to Improve the Way Health Care is Delivered

We also instrument for market structure and run a placebo test using school competition

Instrument using the variation in distance to a patient's nearest four hospitals conditional on the distance to the closest hospital



Gaynor et al. look at AMI and All-Cause Mortality, LOS and hospital expenditure

Research Strategy

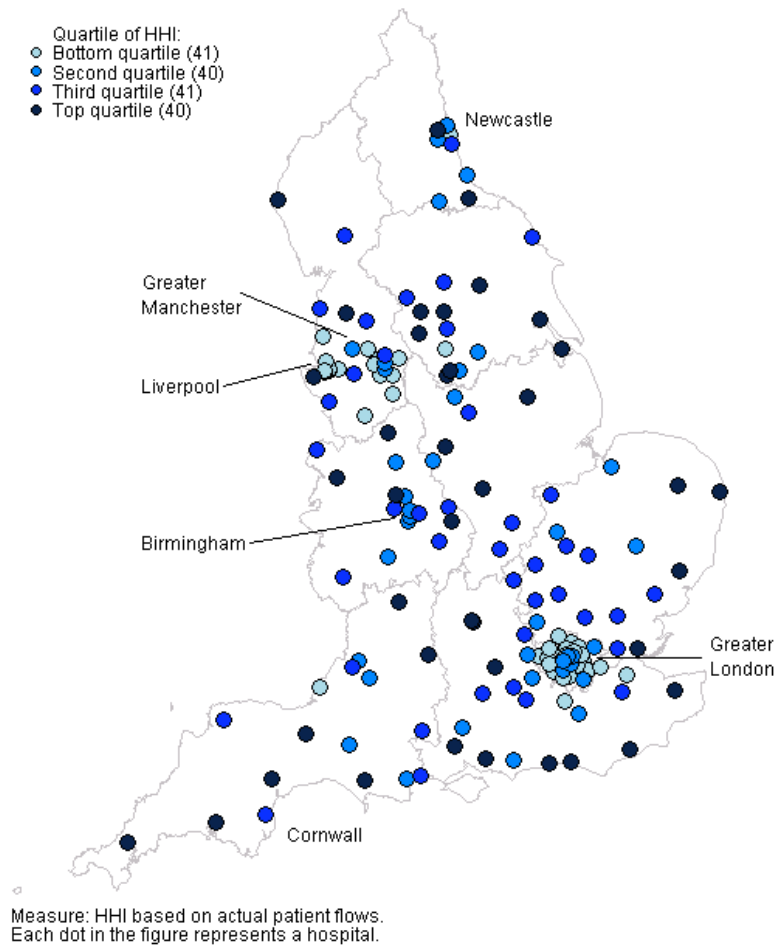
- Long-difference regression (2003, 2007) at hospital level;
- Looked at AMI and all-cause mortality, LOS, and hospital expenditure;
- Illustrated that the results led to changes in concentration and patient flows;
- Carried out various test of robustness to show that competition, not other concurrent policies drove the changes in outcomes

Results

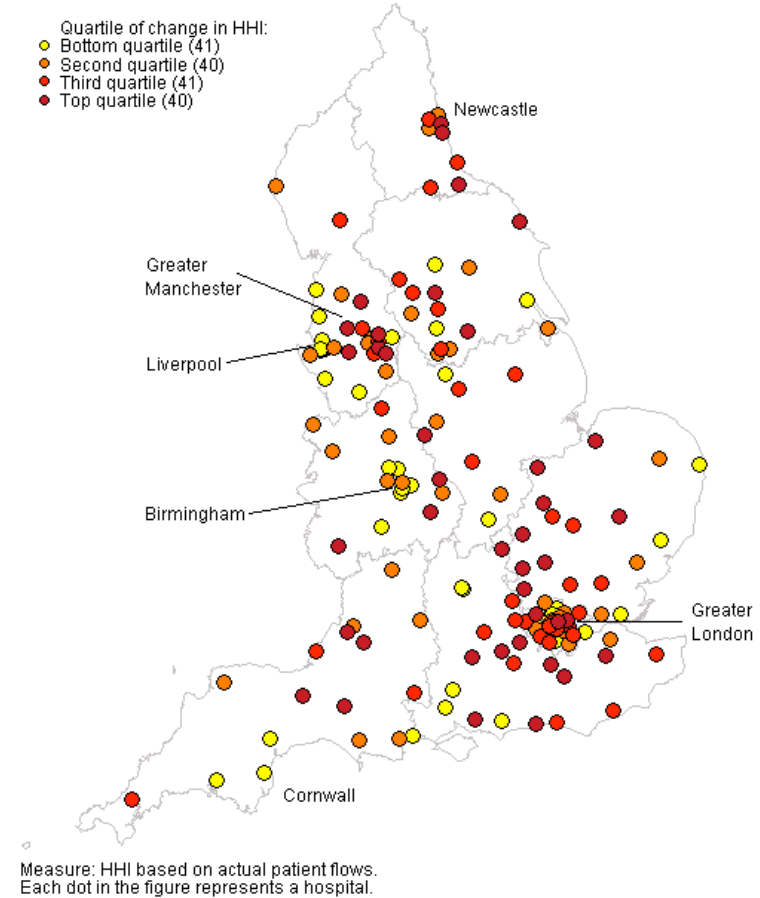
- Higher competition was associated with lower AMI mortality, lower overall mortality, lower LOS and no concurrent rise in expenditure.
- By implication, it raised quality, and raised outputs without increasing costs;
- The reforms shifted patient flows to better hospitals;
- The improvements were not the result of cardiac networks, varying wage rates, patient demographics or other potential drivers.

Changes in market structure illustrate that this was not a 'London' effect

Concentration levels: hospitals
2003/04



Changes in concentration: hospitals
2003/04-2007/08



Gaynor et al. carry out a number of robustness checks and get estimates consistent with broader literature

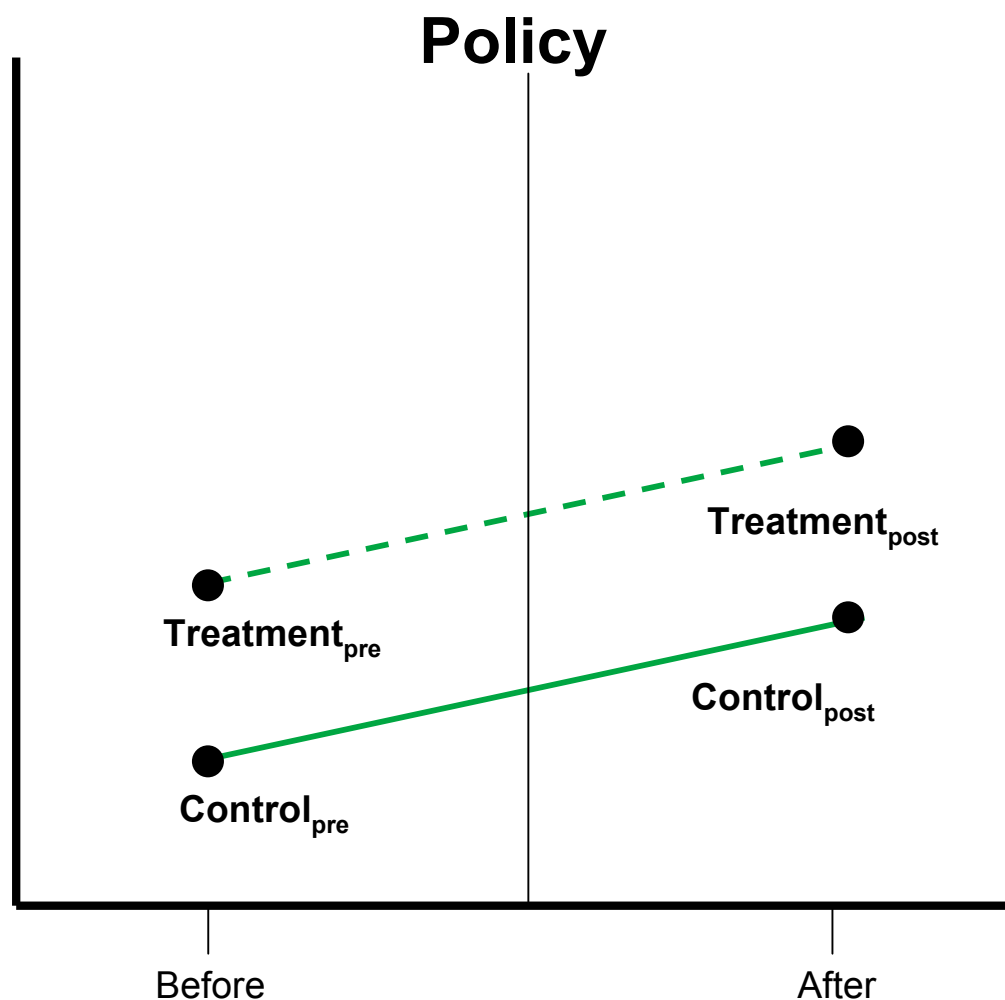
Robustness checks:

- Local wage rates versus the market forces factor;
- Local economic conditions (male wages);
- Local ambulance times;
- Cardiac networks (cardiac treatment measures - PCI/Thrombolysis)

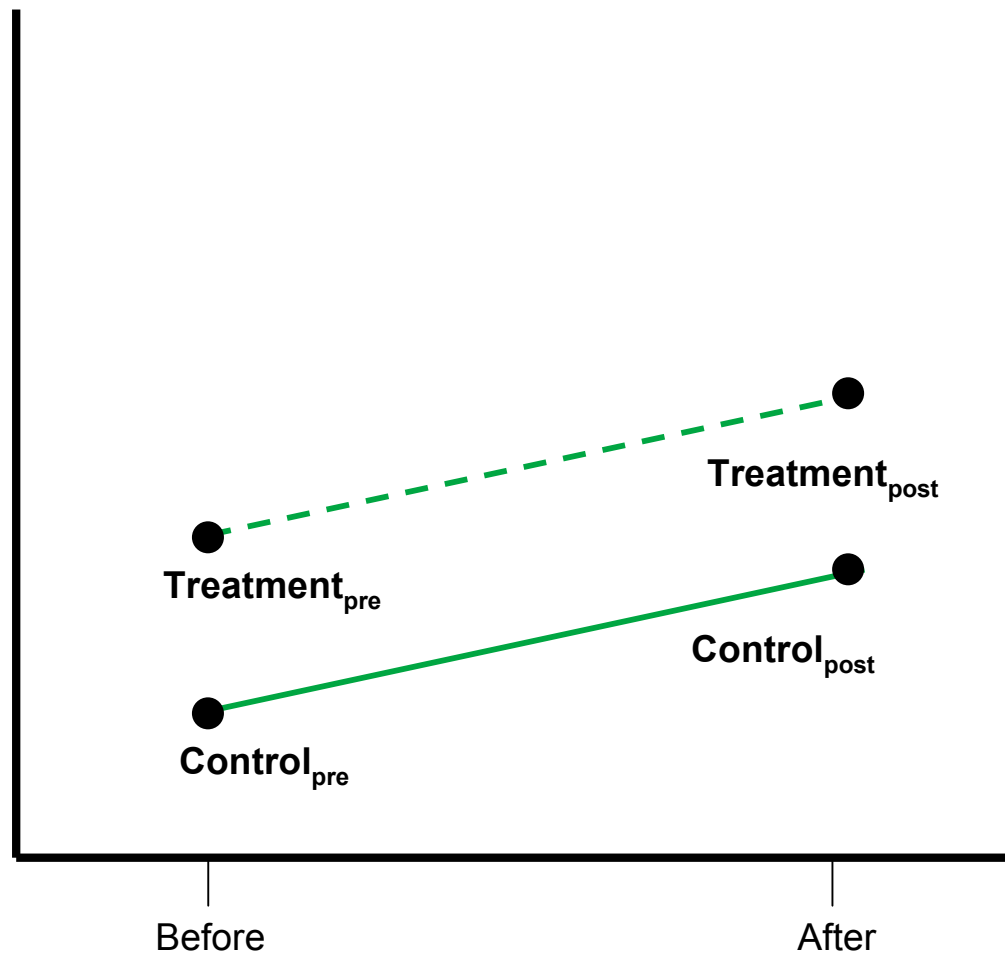
The findings of the two papers are consistent with each other and the broader literature

- Cooper et al. - 1 s.d. increase in competition leads to .31 percentage point reduction in AMI mortality per year.
- Gaynor et al. find a 1.s.d. increase leads to a .21 decrease in mortality per year
- Kessler and McClellan estimate a move from top quartile to the bottom quartile of HHI produces a 3.37 percentage point fall in AMI death rates
- Gaynor et al. find an equivalent figure produces a 2.3 percentage point fall.
- Estimated £298 million saved from life years gained

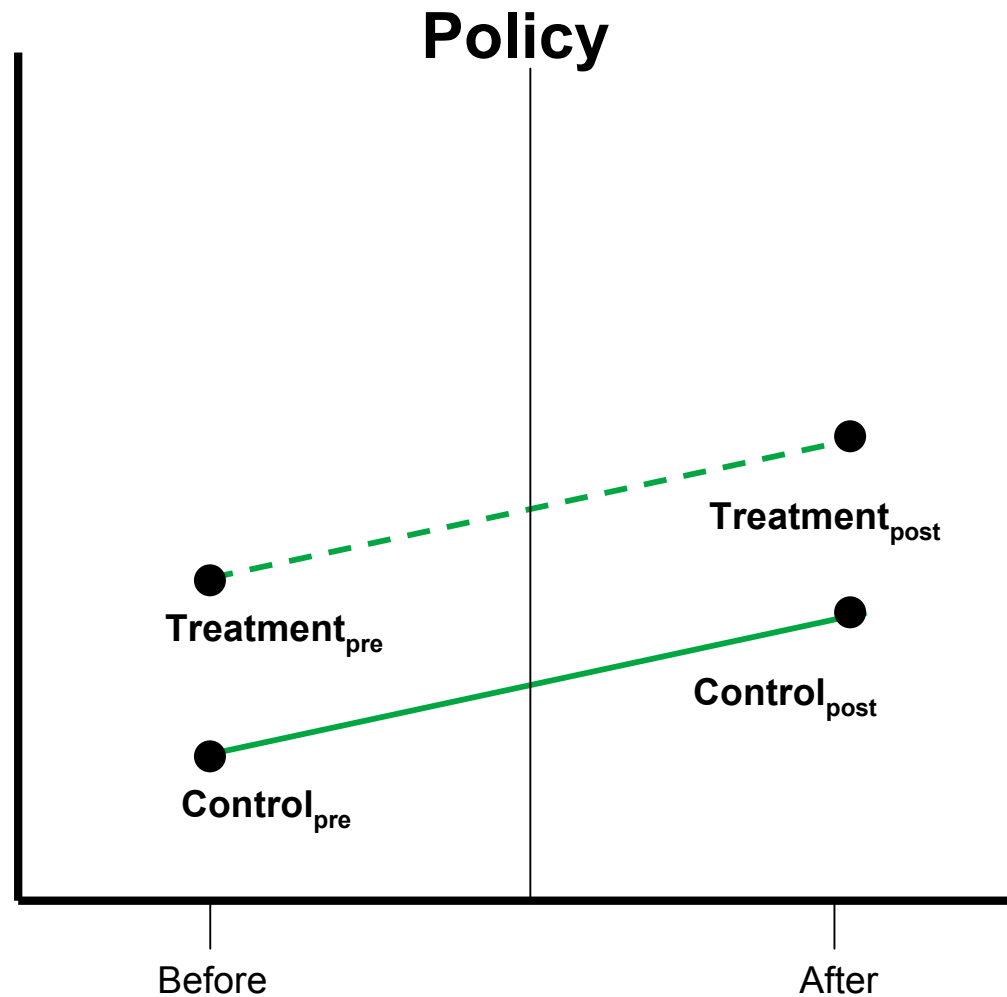
Traditional difference-in-difference looks at change in treatment before and after a policy gets introduced

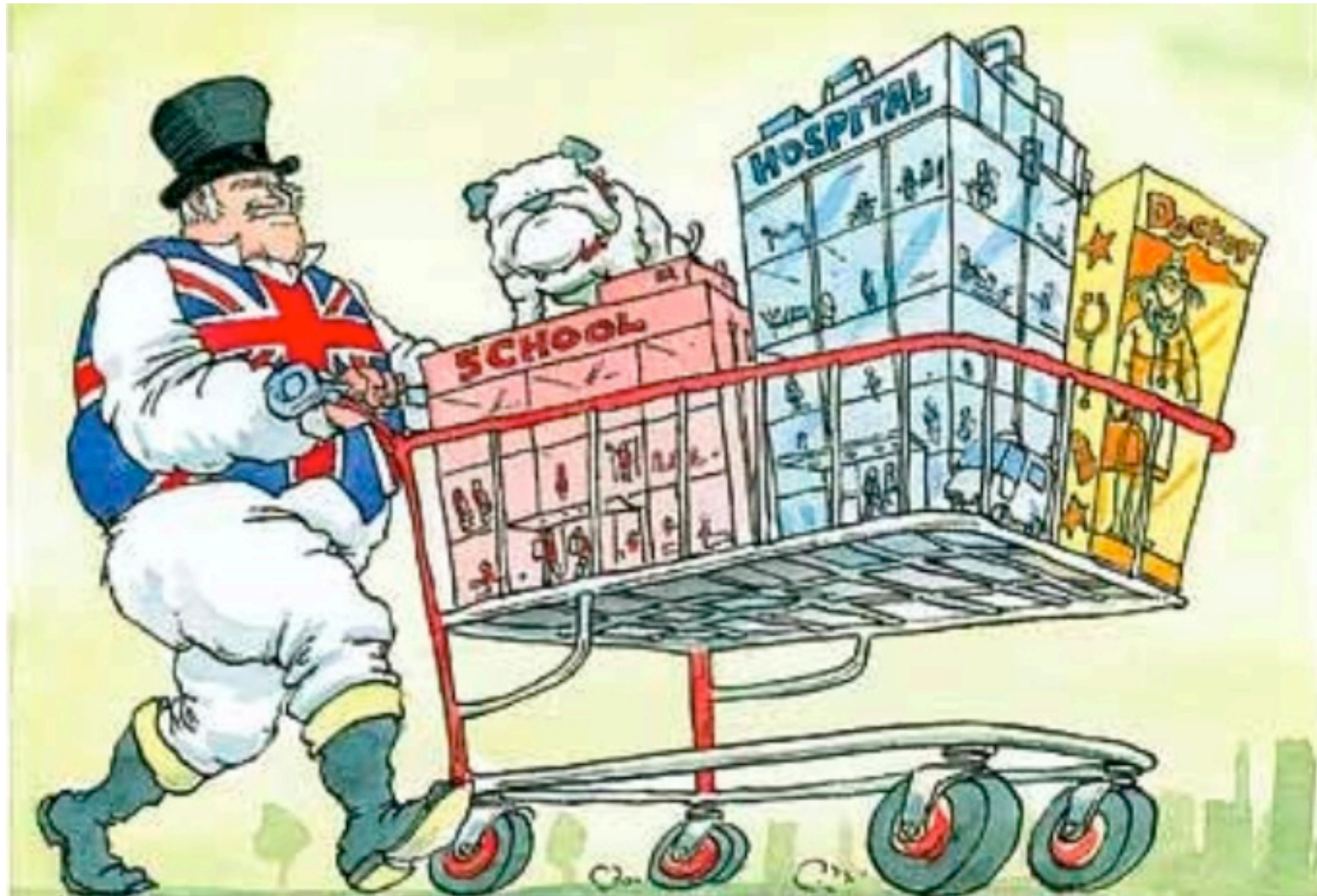


Traditional difference-in-difference looks at change in treatment before and after a policy gets introduced



Traditional difference-in-difference looks at change in treatment before and after a policy gets introduced





The Economist, February 14, 2006

© Cooper 2011

Traditional difference-in-difference looks at change in treatment before and after a policy gets introduced

$$\text{Treatment Effect} = (\text{Treated}_{\text{post}} - \text{Treated}_{\text{pre}}) - (\text{Control}_{\text{post}} - \text{Control}_{\text{pre}})$$

