Cost of Service Regulation in U.S. Health Care: Minimum Medical Loss Ratios

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Research Questions

- How have insurers responded to regulations on actuarial fairness?
- What are implications for cost containment in Health Care?

Outline

- Formalize parallels between minimum Medical Loss Ratio (MLR) requirements and Cost of Service regulation implemented in other sectors.
- Use differential regulatory impact of ACA's MLR rules for identifying variation:
  - Control group: Insurers historically already in compliance
  - Treatment group: Insurers historically below regulated minimum
  - Difference-in-Differences Design
- Estimate Insurer response:
  - MLR
  - Premiums
  - Claims
  - Enrollment

Preview of Results

- Regulation was binding for many insurers:
  - $1.1B in rebates paid in first year (2011)
  - $1.8B in rebates paid thereafter (2012-2015)
- Nearly all response in claims:
  - 7% increase in individual market
  - 2% increase in group markets
  - Magnitudes reflect initial distance from threshold
  - No consistent impact on premiums or enrollment
  - Unable to distinguish prices versus utilization

Outline of Talk

1. Background
2. Parallels with Cost of Service Regulation
3. Data
4. Research Design
5. Results
6. Conclusion

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Medical Loss Ratios

$$MLR = \frac{Claims}{Premiums}$$

- Share of premiums paid out in claims
- Used to monitor actuarial fairness of fully-insured commercial markets
- Calculated at the insurer-state-year for individual/group markets separately
- Before ACA:
  - $\backsim$ Half of states had some form of regulation before ACA.
  - Typically implemented in an informal/forward-looking manner.
  - Allow for various adjustments.

Affordable Care Act: MLRs for Cost Reduction

"*The medical loss ratio provision was inspired by Minnesota's non-profit health system and will help control skyrocketing health care costs.*" - Sen. Franken, 2010.

- Established by Section 2718 of the ACA, "*Bringing Down the Cost of Health Coverage*"
- Introduced rebates: backward-looking regulation.
  - 80% in Individual and Small Group Markets
  - 85% in Large Group Markets
  - Non-profits (through 2014) and Self-insured exempt
- Enforcement began for 2011.
- Administered by CMS:
  - Universe of claims, premiums, formulae released annually.
  - National Association of Insurance Commissioners (NAIC) data collection used as template.



Matthew Yglesias 
@mattyglesias

Follow 

Getting some cash money from Cigna thanks to the Medical Loss Ratio rule.

Thanks, Obama!

10:04 AM - 6 Nov 2017

A Refund from Your Health Insurance Company? Thank the Affordable Care Act



Megan Slack

July 18, 2013

04:40 PM EDT

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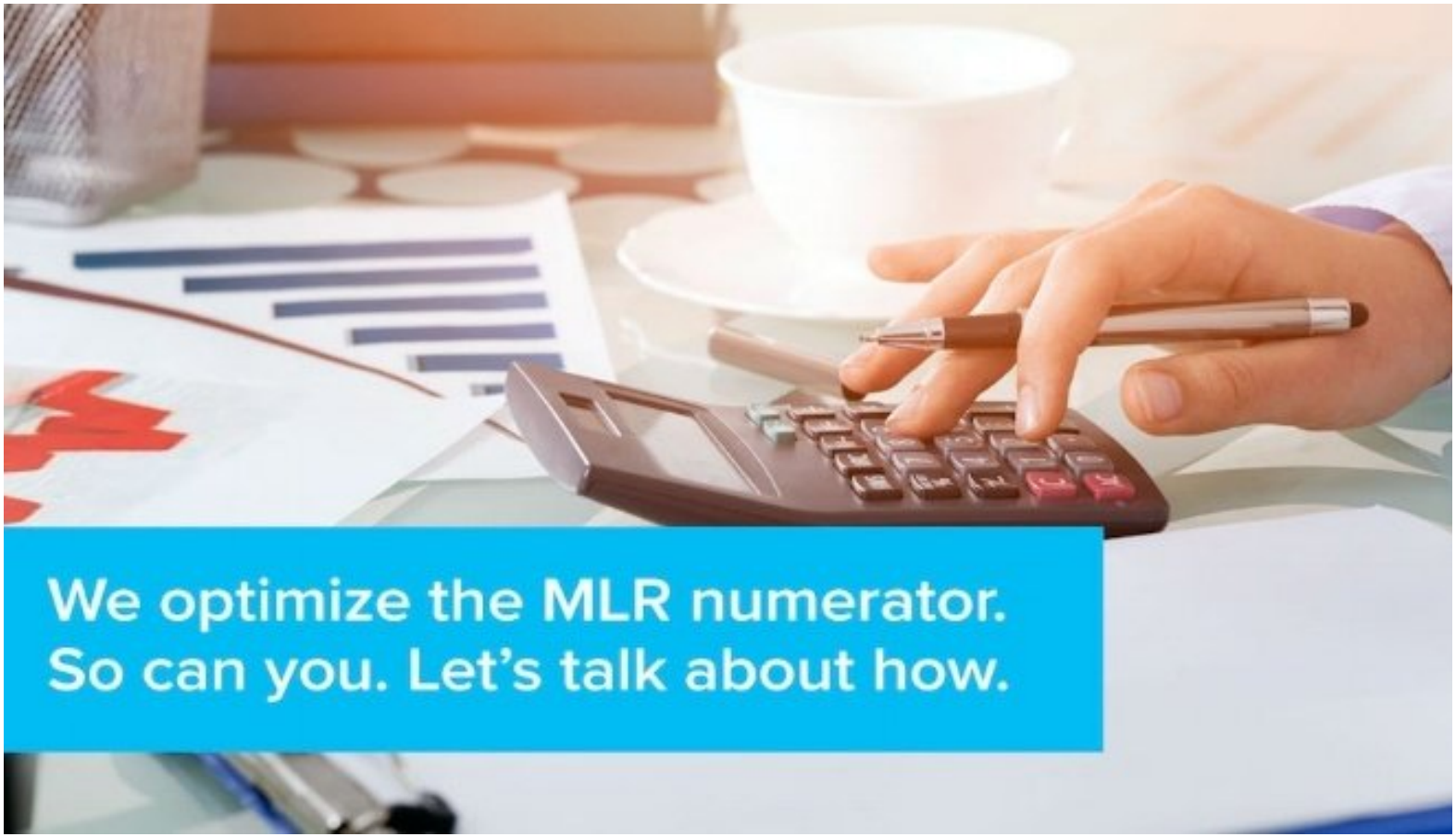
President Barack Obama delivers remarks on the Affordable Care Act's Medical Loss Ratio Refunds, in the East Room of the White House, July 18, 2013. (Official White House Photo by Chuck Kennedy)

Did you know that 8.5 million Americans are getting a refund this year from their health insurance companies?

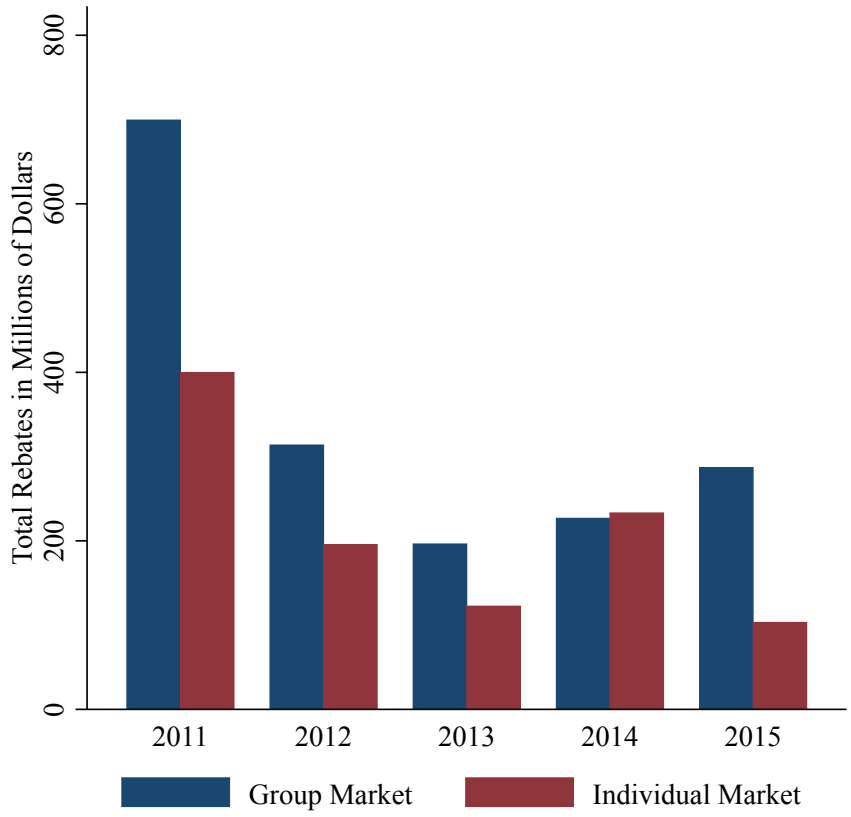
Remarks of the President on the ACA, 18 July 2013

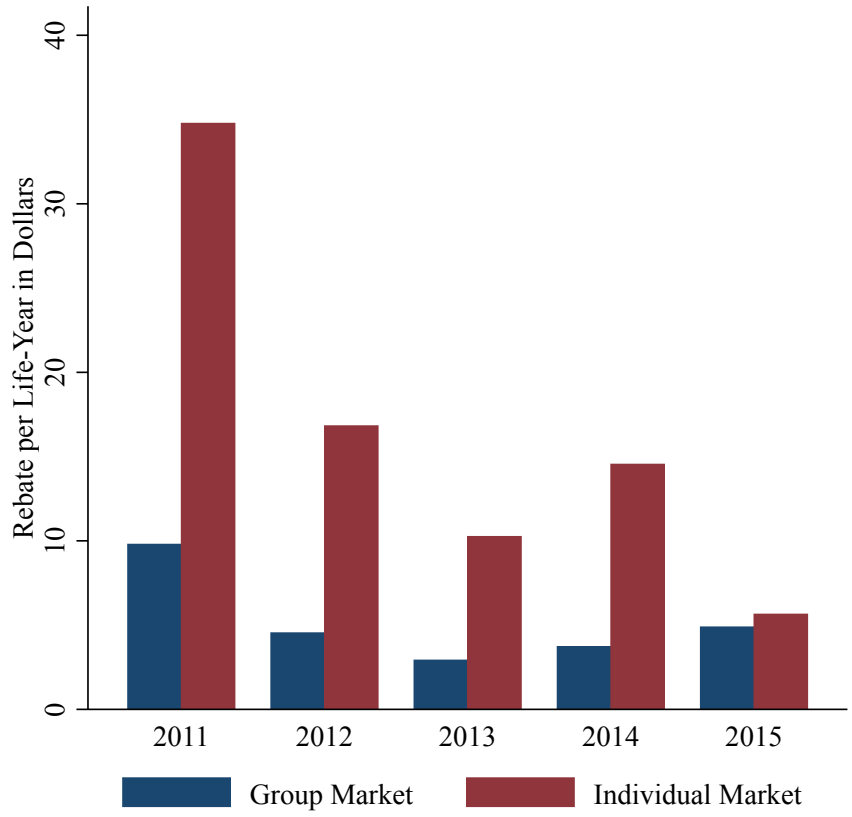
Now, many insurance companies are already exceeding this target, and they're bringing down premiums and providing better value to their customers. But those that aren't now actually have to reimburse you. If they're not spending your premium dollars on your health care – at least 80 percent of it – they've got to give you some money back.

Now, even if you don't get a rebate, even if you didn't get a rebate there's a good chance that these reforms are helping you as well, because one easy way to meet the goal of spending 80 percent of every dollar on care is to charge less for your care.

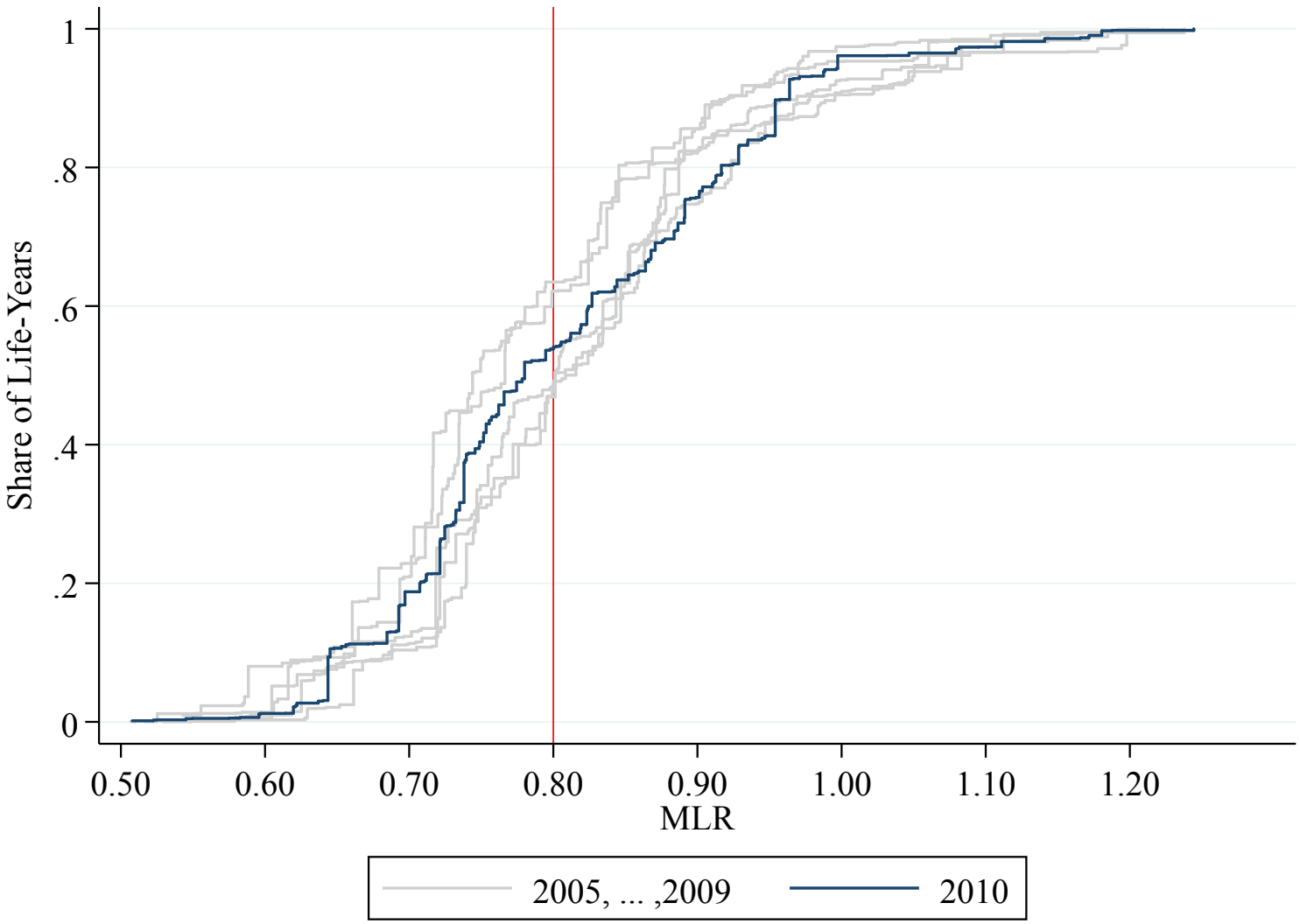

We optimize the MLR numerator.
So can you. Let's talk about how.

Rebates Paid by Year and Market Segment

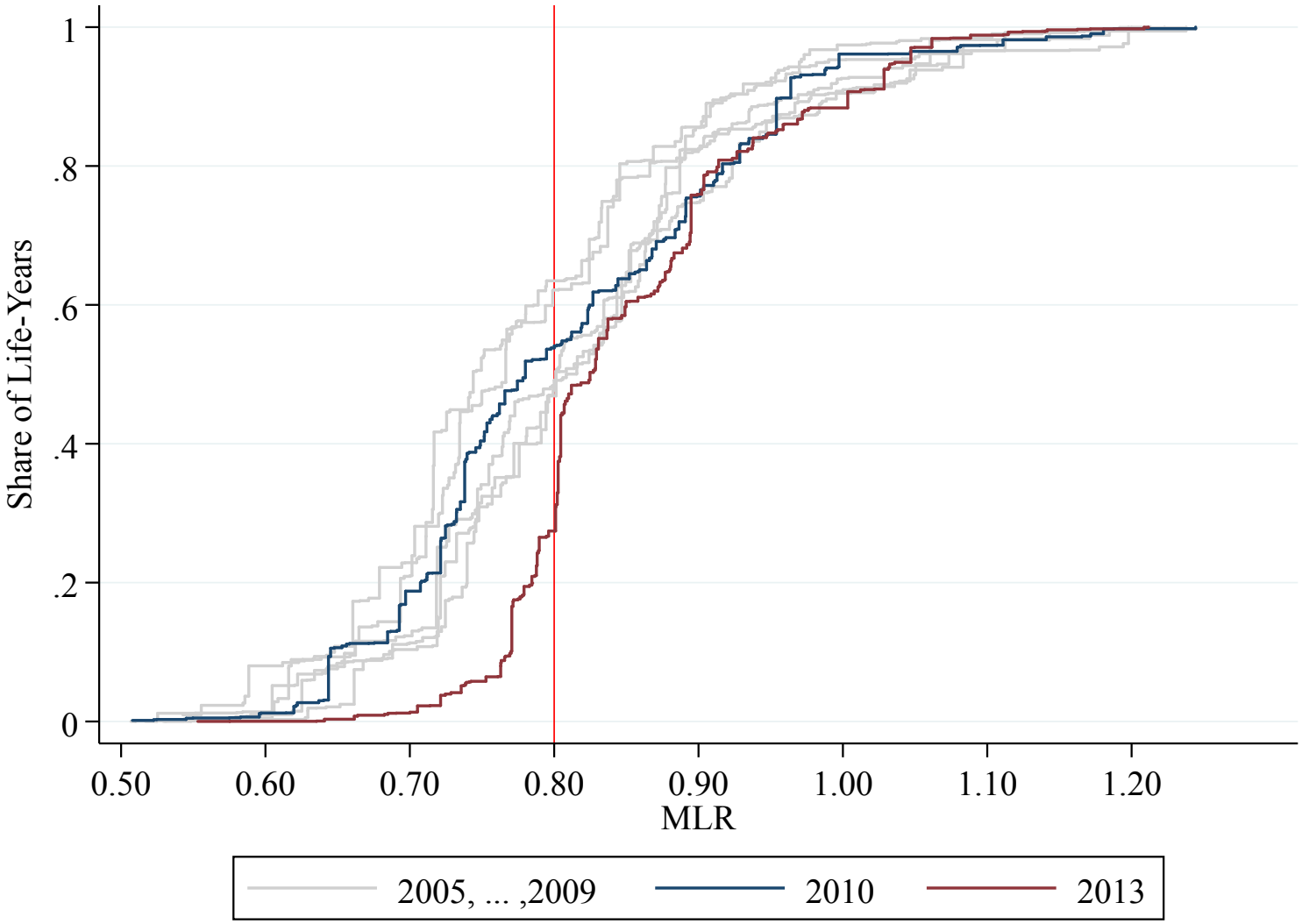




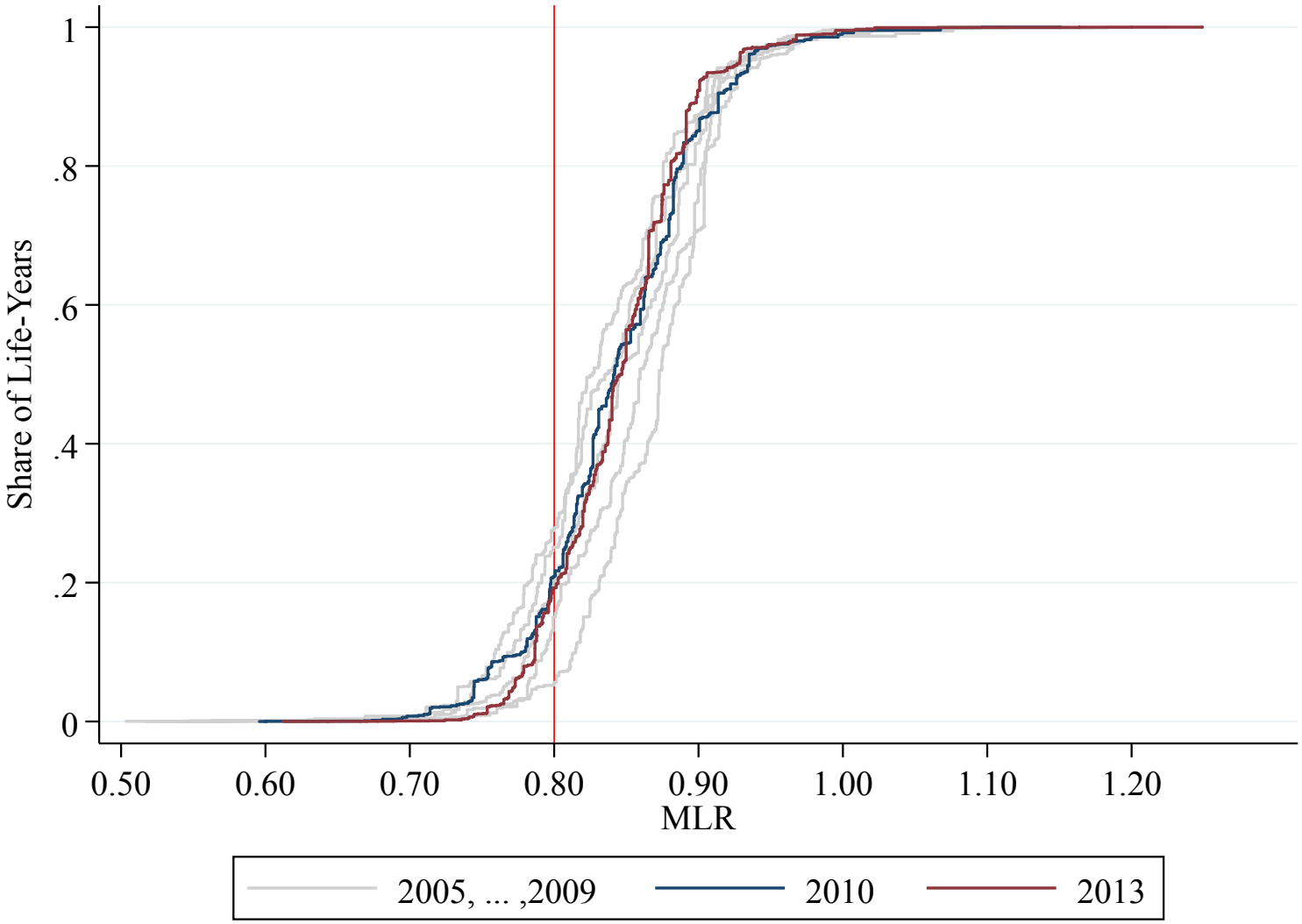
Distributions of MLRs in the Individual Market Over Time



Distributions of MLRs in the Individual Market Over Time



Distributions of MLRs in the Group Markets Over Time



Related Work on Medical Loss Ratios

- Ex ante concerns about exit (Abraham and Karaca-Mandic, 2011)
- Relationship between MLR and market concentration (Karaca-Mandic et al., 2015)
- Evaluations without pre-trends and/or using aggregate statistics (Clemans-Cope et al., 2015; Abraham et al. 2014; McCue et al., 2015)
- Incorporation with analysis of imperfectly competitive markets (Ericson & Starc, 2015; Starc, 2014; Ho & Lee, 2017; Tebaldi, 2016; Jaffe & Shepard, 2017)

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Insurer Response to MLR Regulation

- Risk-Averse Representative Consumer:
  - Faces risk of health shock H with probability r
  - Chooses what share of shock to insure: $q \in [0, H]$
  - Demand for insurance depends on price per dollar $q(p)$

- MLR Regulation:
  - $pq(p)$ is premium revenue
  - $rq(p)$ are claims costs to insurer
  - $\frac{rq(p)}{pq(p)} \geq k$ is the minimum MLR

Insurer Response to MLR Regulation

$$\max_{p} \quad pq(p) - rq(p) + \lambda\left[rq(p) - kpq(p)\right]$$

- MLR regulation is markup regulation
- Yields modified inverse-elasticity rule:

$$p\left(1 + \frac{1}{\varepsilon^D}\right) = \frac{1-\lambda}{1-k\lambda}r < r$$

- Lower markups lead to higher premium revenues and claims paid by insurer.

The Return of Averch-Johnson (1962)

- Electric Utility setting: 'Fair rate of return' on capital
  - Describes utility's penchant for 'gold-plating'
  - Continues to be a problem in Energy (Fowlie, 2010 and Cicala 2015), also recognized in Medicare payments (Acemoglu and Finkelstein, 2008)
  - Procurement distortions in settings with private information
- This problem has the same structure as Averch-Johnson, but one input

Insurer Response to MLR Regulation with Cost-Reducing Effort

- Incorporate agency issues of Laffont-Tirole, 1993 (Ch. 2)
  - Endogenize the cost of insuring health shock
  - Insurers exert effort, e to reduce marginal cost of providing care
  - $\psi(e)$ is a convex effort cost function

$$\max_{p,e} \quad [p - (\beta - e)]\, q\,(p) - \psi(e) \tag{1}$$
$$s.t. \quad (\beta - e) \geq kp$$

- Comparative statics when constraint binds:
  - Effort falls, cost of care rises
  - Total claims rise
  - Ambiguous impact on premiums

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Data

- From the National Association of Insurance Commissioners (NAIC)
  - *Exhibit of Utilization, Premiums, and Enrollment*
  - Template for subsequent CMS administration
  - Insurer-market segment-state-year totals
  - 2005 - 2013
  - No California
  - > 1,000 Life-Years

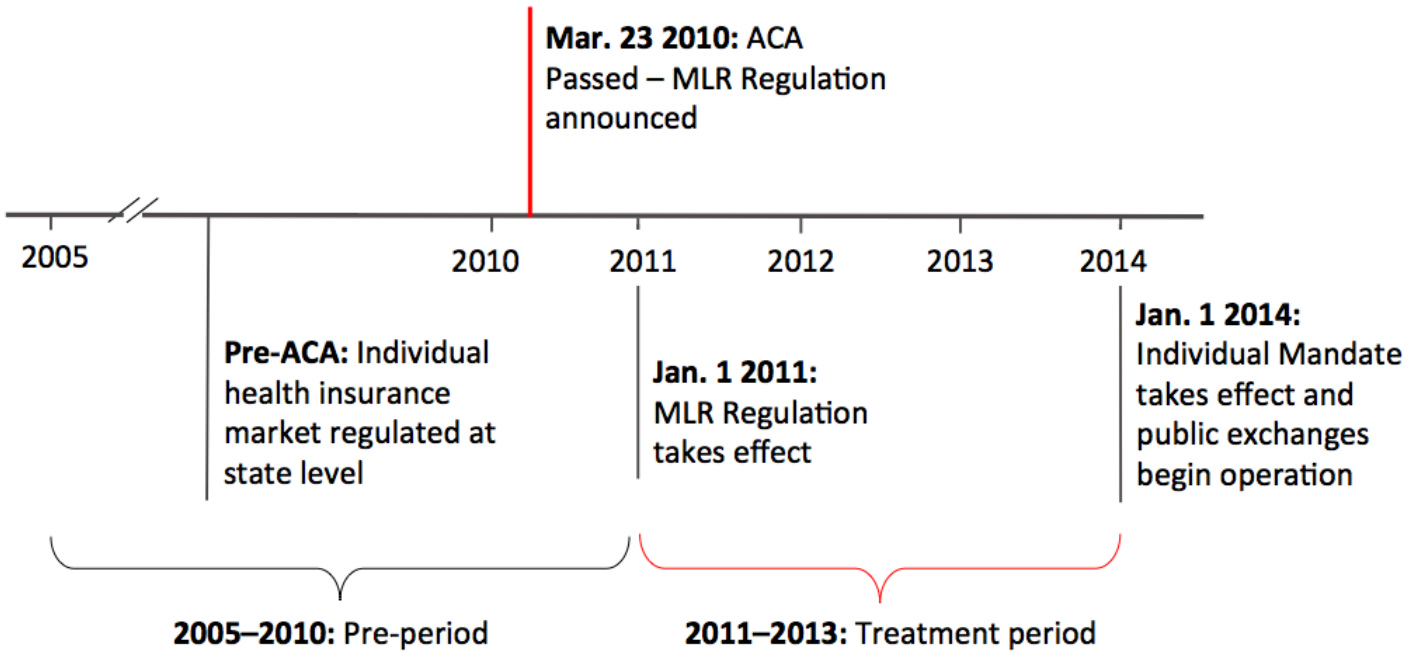
Insurer Summary Statistics (2005–2010)

	Group Market	Individual Market
MLR	0.85	0.81
	[*0.06*]	[*0.13*]
Claims per Life-Year (Dollars)	2,898	2,029
	[*707*]	[*868*]
Premiums per Life-Year (Dollars)	3,414	2,491
	[*806*]	[*814*]
# of Insurers per State	12.4	4.3
	[*6.2*]	[*2.9*]
State Market Scaled HHI	0.26	0.59
	[*0.18*]	[*0.26*]
Share Non-Profit	0.39	0.39
	[*0.49*]	[*0.49*]
Ambulatory Encounters per Life-Year	9.3	7.4
	[*4.6*]	[*3.8*]
Inpatient Admissions per Life-Year	0.07	0.05
	[*0.02*]	[*0.02*]
Lives per Insurer in 2010 (000s)	107.8	37.4
	[*207.9*]	[*62.5*]
Total Lives in 2010 (000s)	42,596	6,691
# of Insurers in 2010	395	179

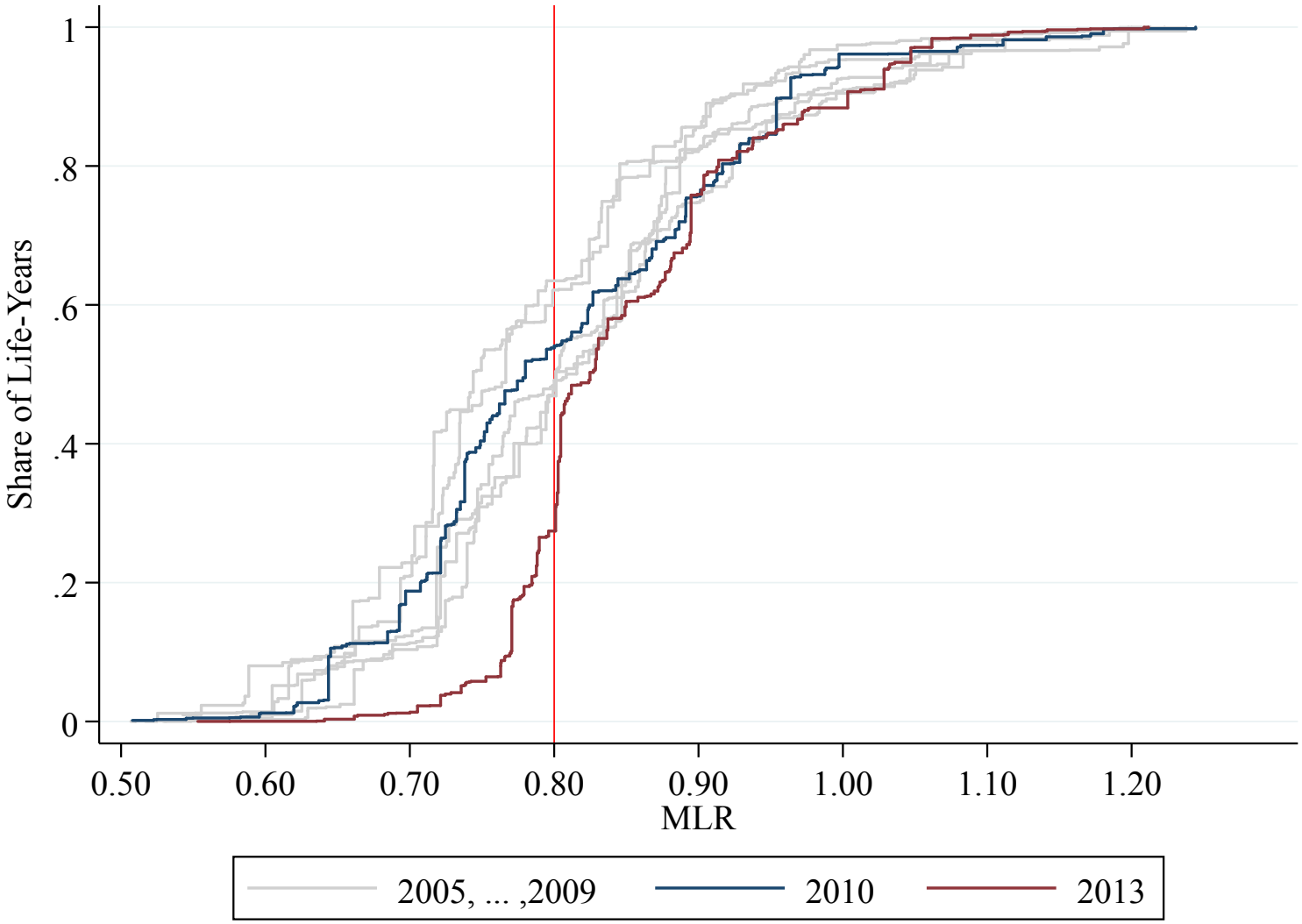
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Implementation Timeline



Distributions of MLRs in the Individual Market Over Time



Research Design

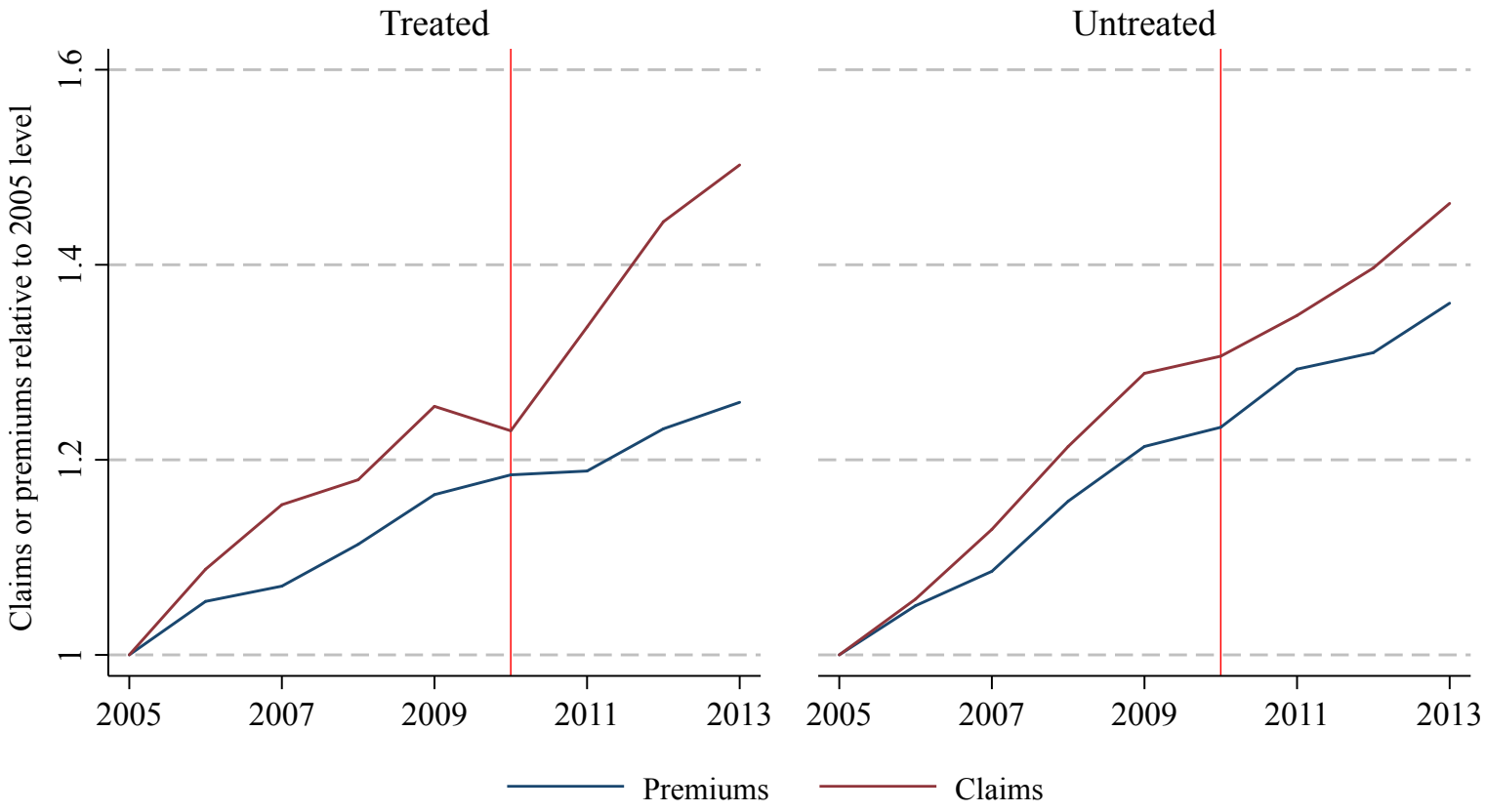
- Use mean MLR during baseline to identify persistently compliant insurers
  - 70(60)% of historical variation is across insurers

$$\hat{d}_i = \begin{cases} 0 & if\ \bar{m}_i \geq k \\ (k - \bar{m}_i) & if\ \bar{m}_i < k \end{cases}$$

- Binary treatment: $D_{it} \equiv \mathbb{1}\left\{\hat{d}_i > 0;\ t > 2010\right\}$
- Compare changes between insurers historically (not) in compliance

$$y_{it} = \gamma_i + \delta_t + \tau D_{it} + \beta t \mathbb{1}\left\{\hat{d}_i > 0\right\} + u_{it}$$

Growth of Claims and Premiums by Treatment Group, Individual Market



Challenges to Research Design

- Actual treatment is unobserved, mean-reversion prospects
  - Robust to treatment definition
  - Instrument for 2009-2010 MLR with prior years
  - Null result for null treatment in Group markets
- Outcomes are equilibrium objects in imperfectly competitive markets
  - Multiple treatments for SUTVA: compliant, but competing with treated insurer
  - Time-invariant treatment definition, FE.
- Contemporaneous regulatory changes (i.e. rest of ACA)
  - End sample in 2013
  - Evaluate enrollment as an outcome

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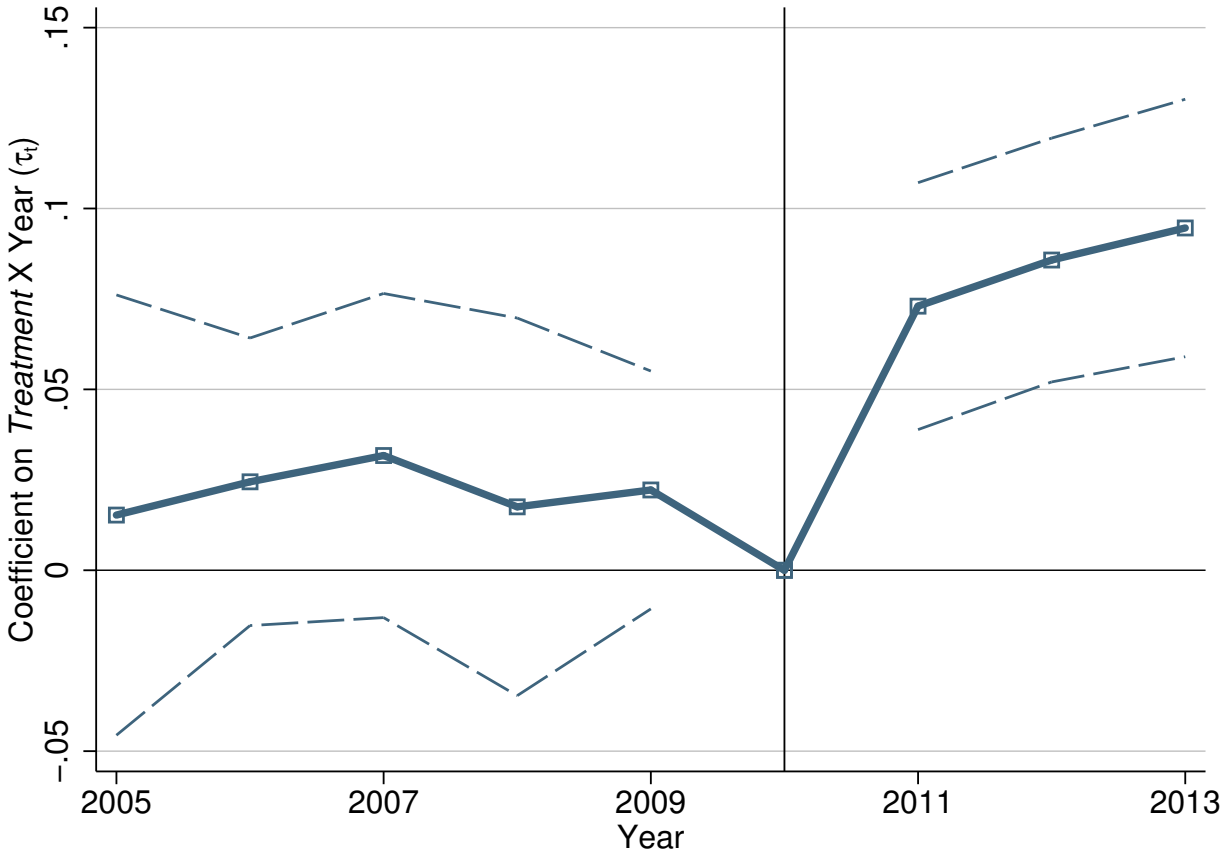
3. Data

4. Research Design

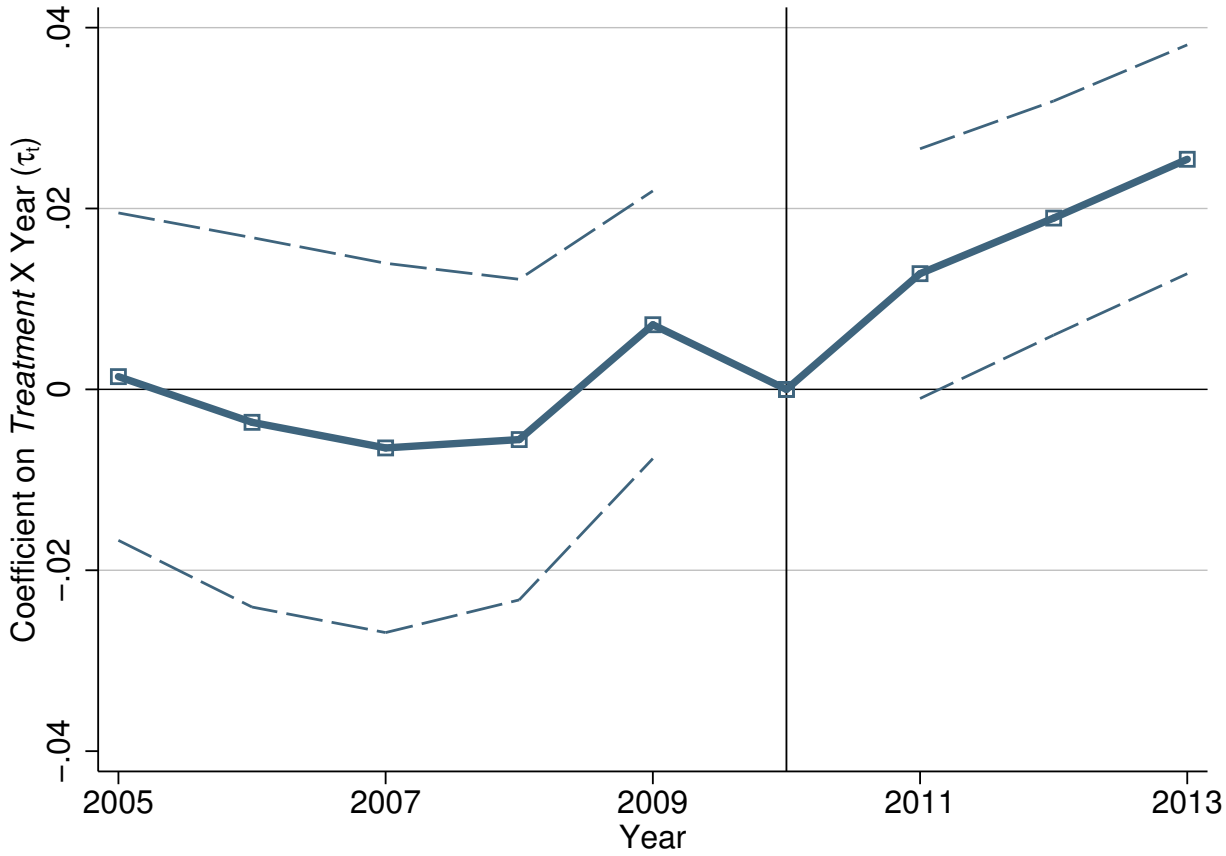
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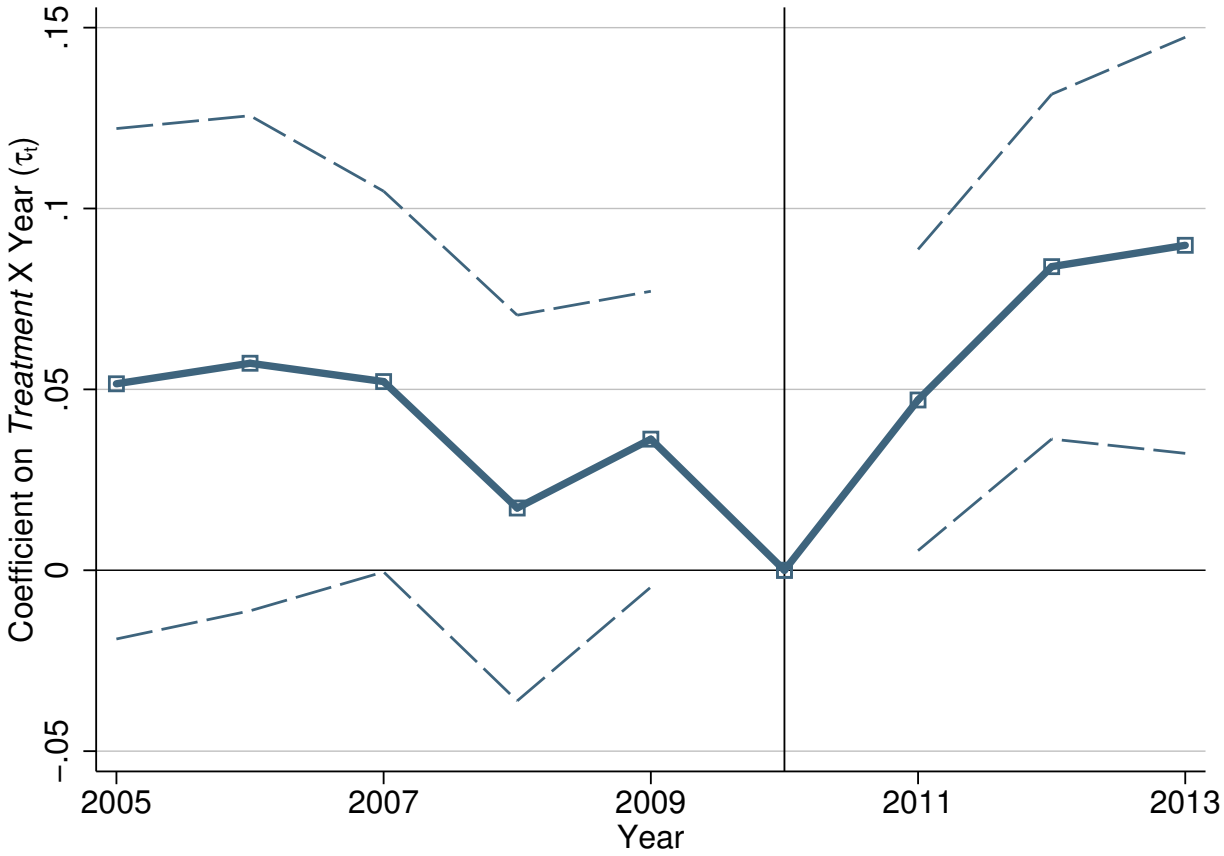
Treatment Effects by Year: *MLR*, Individual Market



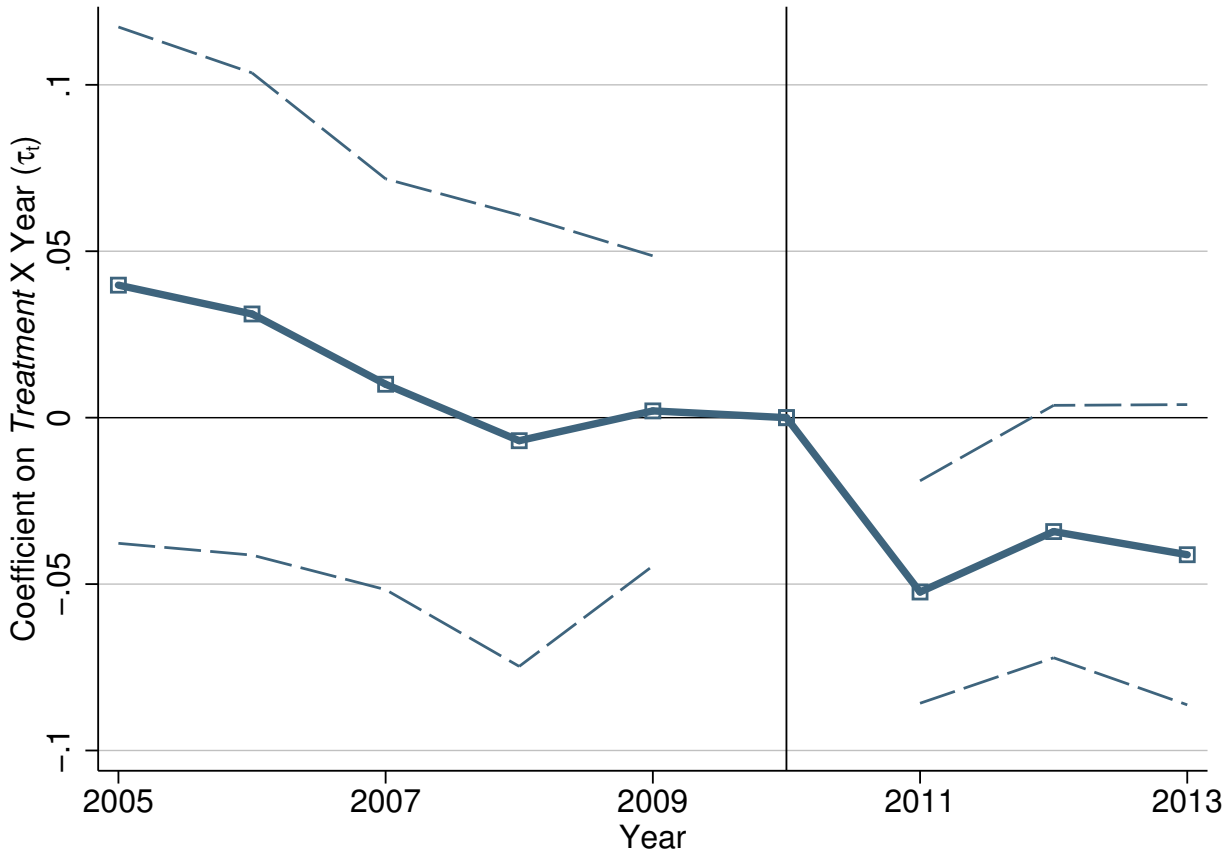
Treatment Effects by Year: *MLR*, Group Market



Treatment Effects by Year: $ln(Claims)$, Individual Market



Treatment Effects by Year: $ln(Premiums)$, Individual Market



Results: Individual Market, Binary Treatment

	MLR		ln(Claims)		ln(Premiums)	
	(1)	(2)	(3)	(4)	(5)	(6)
Year $\geq$ 2011 * *Treatment*	0.073		0.068		-0.025	
	(0.018)***		(0.030)**		(0.024)	
2011 * *Treatment*		0.066		0.048		-0.036
		(0.017)***		(0.027)*		(0.022)
2012 * *Treatment*		0.082		0.095		-0.010
		(0.020)***		(0.035)***		(0.027)
2013 * *Treatment*		0.094		0.112		-0.008
		(0.025)***		(0.042)***		(0.035)
R^2	0.75	0.75	0.89	0.89	0.86	0.86
# Insurers	184	184	184	184	184	184
Observations	1,417	1,417	1,417	1,417	1,417	1,417

Note: Regressions are weighted by enrollment, and standard errors are clustered by insurer. All specifications include year fixed effects, insurer fixed effects, and a treatment group linear time trend. The outcome variables *Claims* and *Premiums* are measured on a per life-year basis. *Treatment* $\equiv \mathbb{1}\left\{\hat{d}_i > 0\right\}$. * p<0.10, ** p<0.05, *** p<.01.

Results: Individual Market, Continuous Treatment

	MLR		ln(Claims)		ln(Premiums)	
	(1)	(2)	(3)	(4)	(5)	(6)
Year $\geq$ 2011 * *Treatment*	0.695		0.700		-0.311	
	(0.117)***		(0.199)***		(0.148)**	
2011 * *Treatment*		0.597		0.415		-0.450
		(0.120)***		(0.184)**		(0.143)***
2012 * *Treatment*		0.719		0.836		-0.214
		(0.112)***		(0.210)***		(0.162)
2013 * *Treatment*		0.835		1.013		-0.200
		(0.162)***		(0.263)***		(0.187)
R^2	0.75	0.76	0.89	0.89	0.86	0.86
# Insurers	184	184	184	184	184	184
Observations	1,417	1,417	1,417	1,417	1,417	1,417

Note: Regressions are weighted by enrollment, and standard errors are clustered by insurer. All specifications include year fixed effects, insurer fixed effects, and a treatment group linear time trend. The outcome variables *Claims* and *Premiums* are measured on a per life-year basis. *Treatment* $\equiv \hat{d}_i$. * p<0.10, ** p<0.05, *** p<.01.

Results: Group Market, Binary Treatment

	MLR		ln(Claims)		ln(Premiums)	
	(1)	(2)	(3)	(4)	(5)	(6)
Year $\geq$ 2011 * *Treatment*	0.015		0.019		0.003	
	(0.007)**		(0.024)		(0.022)	
2011 * *Treatment*		0.011		0.009		-0.004
		(0.007)		(0.019)		(0.016)
2012 * *Treatment*		0.017		0.020		0.001
		(0.009)*		(0.029)		(0.025)
2013 * *Treatment*		0.023		0.069		0.043
		(0.009)**		(0.060)		(0.057)
R^2	0.69	0.69	0.86	0.86	0.87	0.87
# Insurers	406	406	406	406	406	406
Observations	3,295	3,295	3,295	3,295	3,295	3,295

Note: Regressions are weighted by enrollment, and standard errors are clustered by insurer. All specifications include year fixed effects, insurer fixed effects, and a treatment group linear time trend. The outcome variables *Claims* and *Premiums* are measured on a per life-year basis. *Treatment* $\equiv \mathbb{1}\left\{\hat{d}_i > 0\right\}$. * p<0.10, ** p<0.05, *** p<.01.

Impact on Control Insurers Competing with Treated, Individual Market

	MLR		
	(1)	(2)	(3)
Year $\geq$ 2011 * *Treatment*	0.073		
	(0.018)***		
Year $\geq$ 2011 * *Treatment* * *Treated State*		0.089	0.100
		(0.023)***	(0.035)***
Year $\geq$ 2011 * *Untreated* * *Treated State*		0.026	0.027
		(0.020)	(0.022)
Year $\geq$ 2011 * *Untreated* * % *Treated*			-0.006
			(0.027)
R^2	0.75	0.75	0.75
# Insurers	184	184	184
Observations	1,417	1,417	1,417

Note: Regressions are weighted by enrollment, and standard errors are clustered by insurer. All specifications include year fixed effects, insurer fixed effects, and a treatment group linear time trend. *Treatment* $\equiv \mathbb{1}\left\{\hat{d}_i > 0\right\}$. * p<0.10, ** p<0.05, *** p<.01.

IV Results: Individual Market, Binary Treatment

	MLR		ln(Claims)		ln(Premiums)	
	(1)	(2)	(3)	(4)	(5)	(6)
Year $\geq$ 2011 * *Treatment*	0.083		0.096		-0.008	
	(0.024)***		(0.042)**		(0.035)	
2011 * *Treatment*		0.078		0.073		-0.025
		(0.023)***		(0.038)*		(0.031)
2012 * *Treatment*		0.088		0.121		0.011
		(0.027)***		(0.048)**		(0.040)
2013 * *Treatment*		0.094		0.145		0.028
		(0.035)***		(0.060)**		(0.051)
Wu-Hausman p-value	0.000	0.000	0.003	0.033	0.150	0.455
# Insurers	184	184	184	184	184	184
Observations	1,311	1,311	1,311	1,311	1,311	1,311

Note: 2009-2010 MLR instrumented with 2006-2008 MLR. Regressions are weighted by enrollment, and standard errors are clustered by insurer. All specifications include year fixed effects, insurer fixed effects, and a treatment group linear time trend. The outcome variables *Claims* and *Premiums* are measured on a per life-year basis. * p<0.10, ** p<0.05, *** p<.01.

Heterogeneity by Market Structure: Individual Market, Binary Treatment

	MLR		ln(Claims)		ln(Premiums)	
	(1)	(2)	(3)	(4)	(5)	(6)
Year $\geq$ 2011 * *Treatment*	0.081	0.080	0.079	0.056	-0.031	-0.054
	(0.023)***	(0.027)***	(0.049)	(0.062)	(0.042)	(0.050)
Year $\geq$ 2011 * *Treatment* * *Market Share*	-0.014		-0.018		0.009	
	(0.028)		(0.059)		(0.060)	
Year $\geq$ 2011 * *Treatment* * *HHI*		-0.012		0.022		0.050
		(0.036)		(0.080)		(0.079)
Interaction var. mean	.29	.54	.29	.54	.29	.54
R^2	0.75	0.75	0.89	0.89	0.86	0.86
# Insurers	184	184	184	184	184	184
Observations	1,417	1,417	1,417	1,417	1,417	1,417

Note: Regressions are weighted by enrollment, and standard errors are clustered by insurer. All specifications include year fixed effects, insurer fixed effects, and a treatment group linear time trend. The outcome variables *Claims* and *Premiums* are measured on a per life-year basis. HHI is divided by 10,000 so that the HHI variable ranges between 0 and 1. $Treatment \equiv \mathbb{1}\left\{\hat{d}_i > 0\right\}$.
* p<0.10, ** p<0.05, *** p<.01.

Effect of Minimum MLR on Enrollment, Binary Treatment

	Individual		Group	
	(1)	(2)	(3)	(4)
Year $\geq$ 2011 * *Treatment*	0.072		0.060	
	(0.089)		(0.063)	
2011 * *Treatment*		0.081		0.087
		(0.072)		(0.052)*
2012 * *Treatment*		0.052		0.018
		(0.120)		(0.087)
2013 * *Treatment*		0.083		0.040
		(0.164)		(0.113)
R^2	0.91	0.91	0.92	0.92
# Insurers	184	184	406	406
Observations	1,417	1,417	3,295	3,295

Note: The dependent variable is $ln(Enrollment)$. Regressions are weighted by enrollment, and standard errors are clustered by insurer. All specifications include year fixed effects, insurer fixed effects, and a treatment group linear time trend. $Treatment \equiv \mathbb{1}\left\{\hat{d}_i > 0\right\}$. * p<0.10, ** p<0.05, *** p<.01.

Other Margins of Adjustment, Individual Market 2010-2013

	ln(QI Spending)		ln(Admin. Costs)	
	(1)	(2)	(3)	(4)
Year >= 2011 * *Treatment*	0.120		-0.136	
	(0.126)		(0.078)*	
2011 * *Treatment*		0.022		-0.180
		(0.090)		(0.070)**
2012 * *Treatment*		-0.036		-0.193
		(0.118)		(0.064)***
2013 * *Treatment*		0.369		-0.035
		(0.233)		(0.149)
Mean Share of 2010 Premiums	.01	.01	.13	.13
R^2	0.71	0.73	0.72	0.72
# Insurers	171	171	171	171
Observations	617	617	602	602

Note: The dependent variable is given in the column headings ("QI Spending" is Quality Improvement Spending, and "Admin. Costs" are administrative costs). All dependent variables are on per life-year basis. Regressions are weighted by enrollment, and standard errors are clustered by insurer. All specifications include insurer and year fixed effects. *Treatment* $\equiv \mathbb{1}\left\{\hat{d}_i > 0\right\}$. * p<0.10, ** p<0.05, *** p<.01.

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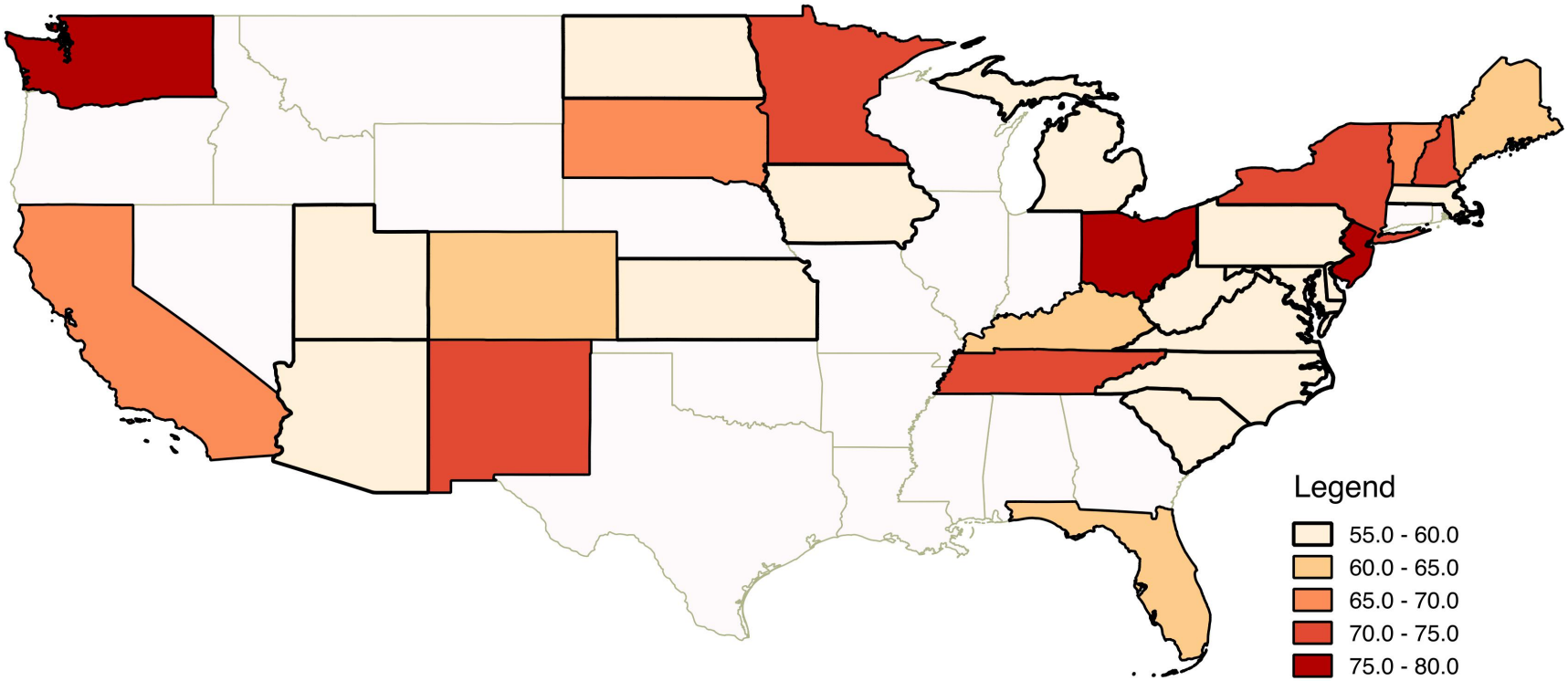
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Conclusion

- Insurers respond to MLR regulations by increasing claims
  - More generous coverage
  - Less cost-reducing effort
- Blunt instrument for market power mitigation
  - Acute in settings with private information
  - Unintended consequences
  - Ambiguous welfare impact

Additional Tables and Figures

States with Individual Market MLR Requirements pre-ACA



Cumulative Growth of Claims and Premiums by Market Segment: 2005–2013

