

Physician Response to Prices of Other Physicians: Evidence from a Field Experiment



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Research Questions



- What if physicians knew the relative cost of specialists?
 - How would this affect their referral patterns to specialists?
- I try to answer these questions using a field experiment in actual medical practices

Brief experiment overview



- Team with group of medical practices (IPA)
 - Calculate historical average costs of ophthalmologists
 - Distribute to randomly chosen primary care physician (PCP) practices
 - Observe PCP referral behavior after distribution, and compare to control group behavior
- Do they direct more referrals to less expensive Ophthalmology practices?**

Result in short



- Treatment group PCPs increased the share of their referrals directed to the least expensive ophthalmology practice
 - ✦ More than double during the first two months post-treatment
- But this response was not seen for patients where the cost impact of each referral on the IPA was approximately fixed
- Response was stronger for referrals of men

IPA Background



- IPA = Independent Practice Association
- The IPA is a group of independent medical practices that form a network of medical resources
- Insurance companies sell HMO plans to customers, but do not have their own medical facilities
- So they pay the IPA to provide HMO network services on their behalf
 - ✦ Example: Medicare Advantage program

IPA Background (2)



- The IPA had about 80 thousand patients, 150 PCPs, and 350 specialists
- Physicians are not employees of the IPA, but of their respective practices
- The IPA is a “middleman.” It pays physicians for providing services out of payments it receives from insurance companies
 - ✦ If any money left over, the IPA gets to keep some share of it

IPA Background (3)



- Primary Care Physicians (PCPs) = IPA gatekeepers
 - ✦ Patients need referrals from their PCPs to see specialists, and the referral has to be approved by the IPA
- PCPs receive bonuses tied to IPA profitability
 - ✦ Lower costs for IPA → higher bonuses for PCPs
- When a patient is referred to a specialist, the specialist is paid one of two ways
 - ✦ Fee-for-service (FFS): paid for each service provided
 - ✦ Capitation: paid flat rate per patient, per month

IPA has been emphasizing cost awareness



- IPA has been working to increase PCP awareness of costs, both their own and specialist costs
 - 2011 provided to the PCPs a list of per-patient costs for gastroenterologists
 - 2011 provided list to PCPs of their own costs, by specialty (but identities were masked by ID numbers instead of names)
 - July 2013 identities were unmasked, so all PCPs could see their own and all others' costs

Two types of patients



- The IPA broadly categorizes patients into two groups
 - Senior HMO patients (Medicare Advantage program) – “SrHMO”
 - Standard HMO patients -- “HMO”

Patient types have different effects on IPA profit



- Ophthalmologists are paid fee-for-service (FFS) for standard HMO Patient services
- Services for SrHMO patients are **capitated 75% of the time**

- **IMPLICATION:** variation in specialist treatment patterns (and thereby costs) will have minimal impact on IPA costs for ophthalmology services for SrHMO patients...
- ...so should responses for the two types differ?

Why Ophthalmology?



- It receives a large number of referrals from PCPs
 - From March 2012 to February 2013:
 - ✦ 3,467 referrals from family practitioners
 - ✦ 2,461 referrals from internists
 - ✦ Fourth most often referred to specialty in the IPA
 - High level of specialization → PCPs cannot substitute with their own services (or those of another specialty)
- PCPs had never before received any information about ophthalmologist costs

Subjects



- Subjects of the experiment are PCPs with **Family Practice** or **Internal Medicine** medical specialties
- 93 total PCP subjects, organized in 55 practices
 - 35 internists (24.3333 practices)
 - 58 family practitioners (30.6667 practices)
- Only excluded PCPs that saw very few IPA patients

Time Frame of Experiment



- Six month pre-period
 - November 2013 through April 2014
- Distribute cost information via USPS
 - Mailed May 5th, 2014
- Six month post-period
 - May 16th through November 15th, 2014
 - May 1st through the 15th dropped to allow time for information delivery

The treatment: Ophthalmology cost report

Average 180-Day Cost for Newly Referred Patients to Ophthalmology
For patients with first encounters with Ophthalmology during the twelve-month period
from July 2012 through June 2013

Practice / Physician Name	HMO Patients	SrHMO Patients
101	\$147	\$450
204	\$215	\$502
302	\$230	\$456
406	\$270	\$575
505	\$292	\$561
603	\$333	\$470

Sent by mail to PCPs on May 5th, 2014

Complete cost report

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Notes:

- (1) Ophthalmology is paid fee-for-service for HMO patients. For SrHMO patients, approximately 75% of procedure codes are capitated, with the rest being fee-for-service. Costs for capitated codes are based on the Medicare fee schedule for claims submitted.
- (2) Averages have been adjusted for observable differences in the underlying health of specialist patient populations, and rounded to the nearest dollar.
- (3) Newly referred patients are those that had not had a claim in Ophthalmology for the previous 180-days and were referred to Ophthalmology by an internist or FP during the previous 180-days.
- (4) Ophthalmology practices included on this report all had at least 300 newly referred patients, had patient satisfaction scores for all practice ophthalmologists exceeding 80%.

Cover
letter that
was
included
with the
cost report

May 1, 2014

Dear Doctor,

As requested by our primary care physicians, we are continuing our efforts to share information on specialty costs by rendering physician. To that end, please find the included report on average costs per patient for IPA Ophthalmology practices. These costs are based on actual claims from encounters with patients who were newly referred to Ophthalmology, and who had their first encounters with Ophthalmologists during the twelve-month period from July 2012 through June 2013. All claims over the 180-day period following the first encounter were used in the calculations.

Since our goal was to produce a broad measure of cost, we calculated the averages using claims for patients across a range of diagnoses. However, in order to increase the comparability of the averages, we only used diagnoses that were common across practices, and adjusted diagnosis proportions to reflect IPA-wide prevalence instead of individual practice level prevalence. As a result, for the patients included in this analysis, cataract diagnoses were the most common, occurring roughly 50% of the time. Since cataract conditions are relatively costly to treat, these patients accounted for almost 71% of the average costs reported.

Lastly, to further improve comparability, only practices that saw more than 300 newly referred patients and had patient satisfaction scores above 80% were included.

Sincerely,

Chief Executive Officer

Data



- The IPA approximates a closed system, observes all “within network referrals” for its patients
 - PCPs enter referral into IPA system for approval – so referrals are not inferred from claims data, they are directly observed
- PCPs grouped into practices
- Observation level: **PCP-Ophthalmology practice pair**

Randomization



- Randomization took place across practices since PCPs with the same office location might talk about the information
 - (28 in treatment group, 27 in control group)
- Stratified randomization using five pre-period dummy variables
 - ✦ Whether Internal Medicine practice
 - ✦ High pre-period SrHMO Ophthalmology referrals
 - ✦ High pre-period HMO Ophthalmology referrals
 - ✦ High pre-period SrHMO claims
 - ✦ High pre-period HMO claims

Comparison of pre-period observables



Variable	Group Mean		<i>t</i> -stat	<i>p</i> -value
	Control	Treated		
Internal Medicine Practice	0.519	0.357	1.200	0.235
Total HMO referrals per-PCP \geq all-practice median	0.556	0.571	-0.117	0.908
Total SrHMO referrals per-PCP \geq all-practice median	0.556	0.500	0.406	0.687
Total referrals per-PCP (all types)	340.265	314.119	0.624	0.535
Total Ophthalmology referrals per-PCP	34.139	31.485	0.635	0.528
Total Ophthalmology HMO referrals per-PCP	11.238	11.661	-0.266	0.792
Total Ophthalmology SrHMO referrals per-PCP	22.901	19.824	0.930	0.357
Total practice referrals (all types)	567.444	604.429	-0.261	0.795
Total practice Ophthalmology referrals	55.481	59.036	-0.276	0.783
Total practice HMO Ophthalmology referrals	18.444	21.500	-0.606	0.547
Total practice SrHMO Ophthalmology referrals	37.037	37.536	-0.057	0.954
PCP's share of referrals that are male patients	0.418	0.420	-0.071	0.944
PCP's share of referrals that are patients 60 or older	0.608	0.573	0.926	0.359
PCP's share of referrals that are patients ages 40 to 59	0.281	0.301	-0.786	0.435
PCP's share of referrals that are patients ages 18 to 39	0.110	0.125	-0.939	0.352

Outcome variable: referral share



θ_{pst} = specialist practice s ' share of PCP practice p 's total Ophthalmology referrals in period t

$$= \frac{\text{period } t \text{ referrals from } p \text{ to } s}{\text{all period } t \text{ referrals from } p \text{ to all ophthalmology}}$$

Period length = two months

Characteristics of ophthalmology practices



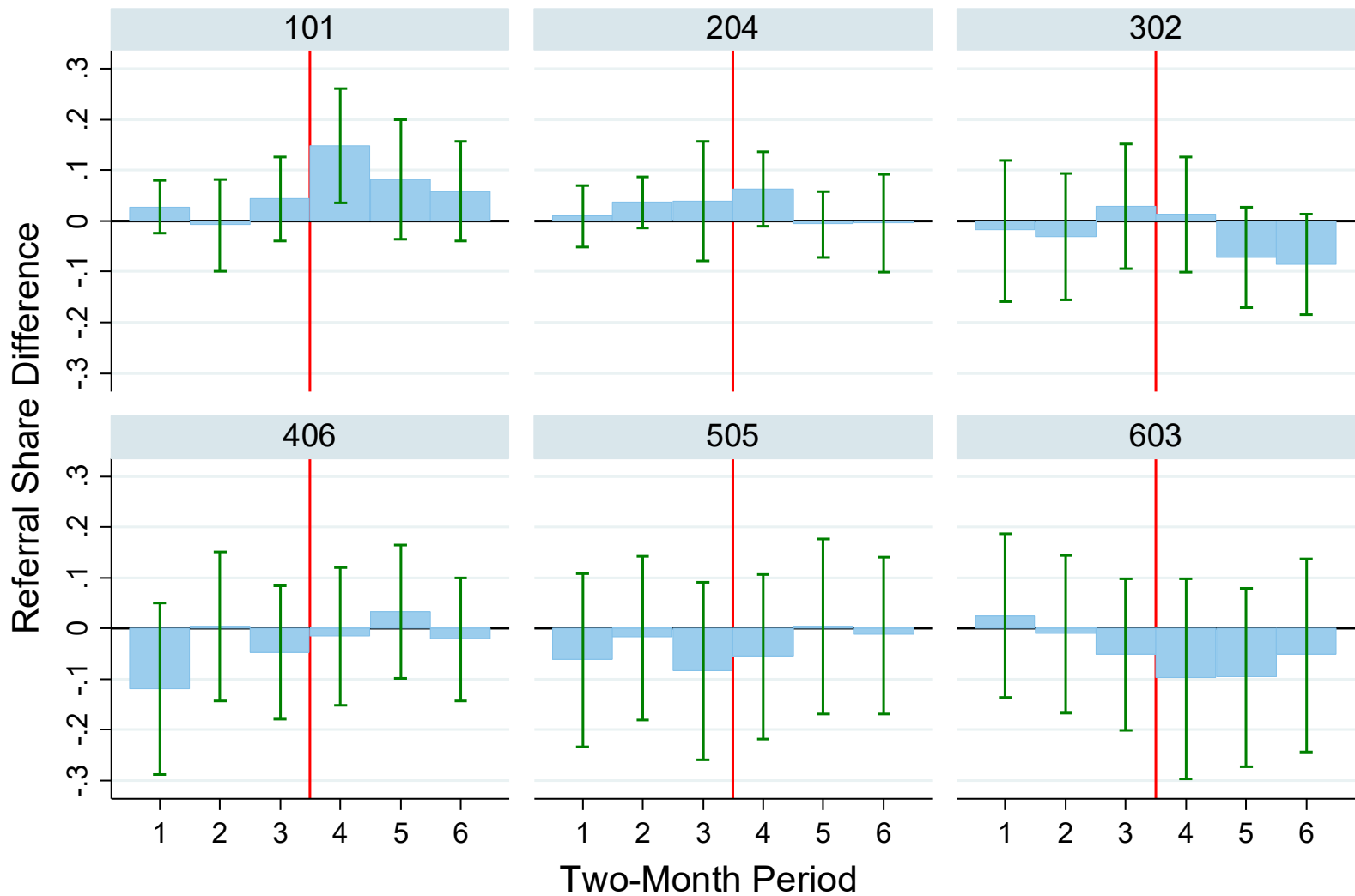
Pre-period summary statistics

Practice ID	Total Referrals Received		Average Cost (as Reported to PCPs)	
	Count	Share of all referrals	HMO Patients	SrHMO Patients
101	343	10.9%	147	450
204	241	7.6%	215	502
302	459	14.6%	230	456
406	636	20.2%	270	575
505	646	20.5%	292	561
603	400	12.7%	333	470
All Others	426	13.5%	.	.

Referral share difference by period

(treatment minus control)

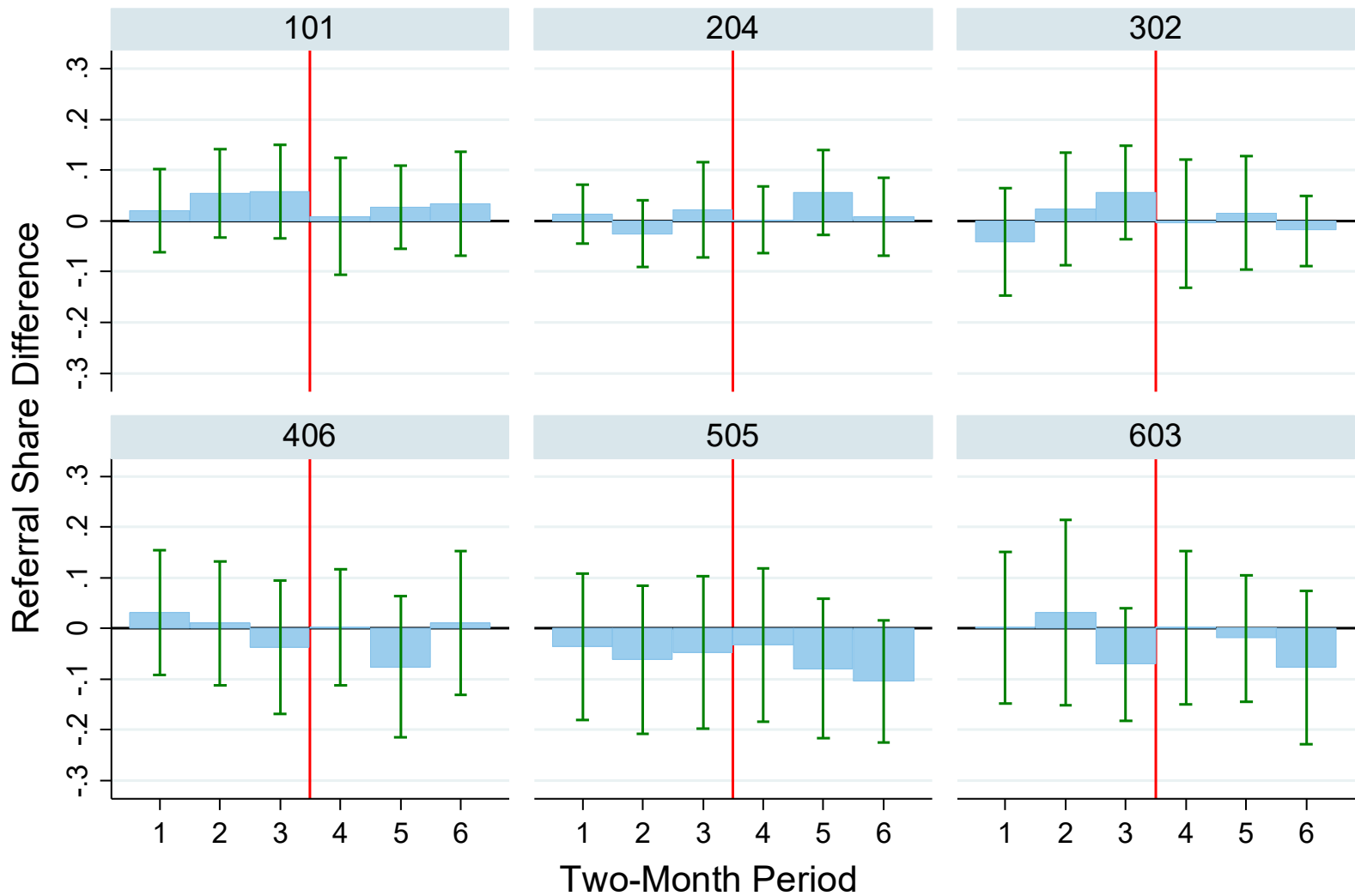
HMO Patients



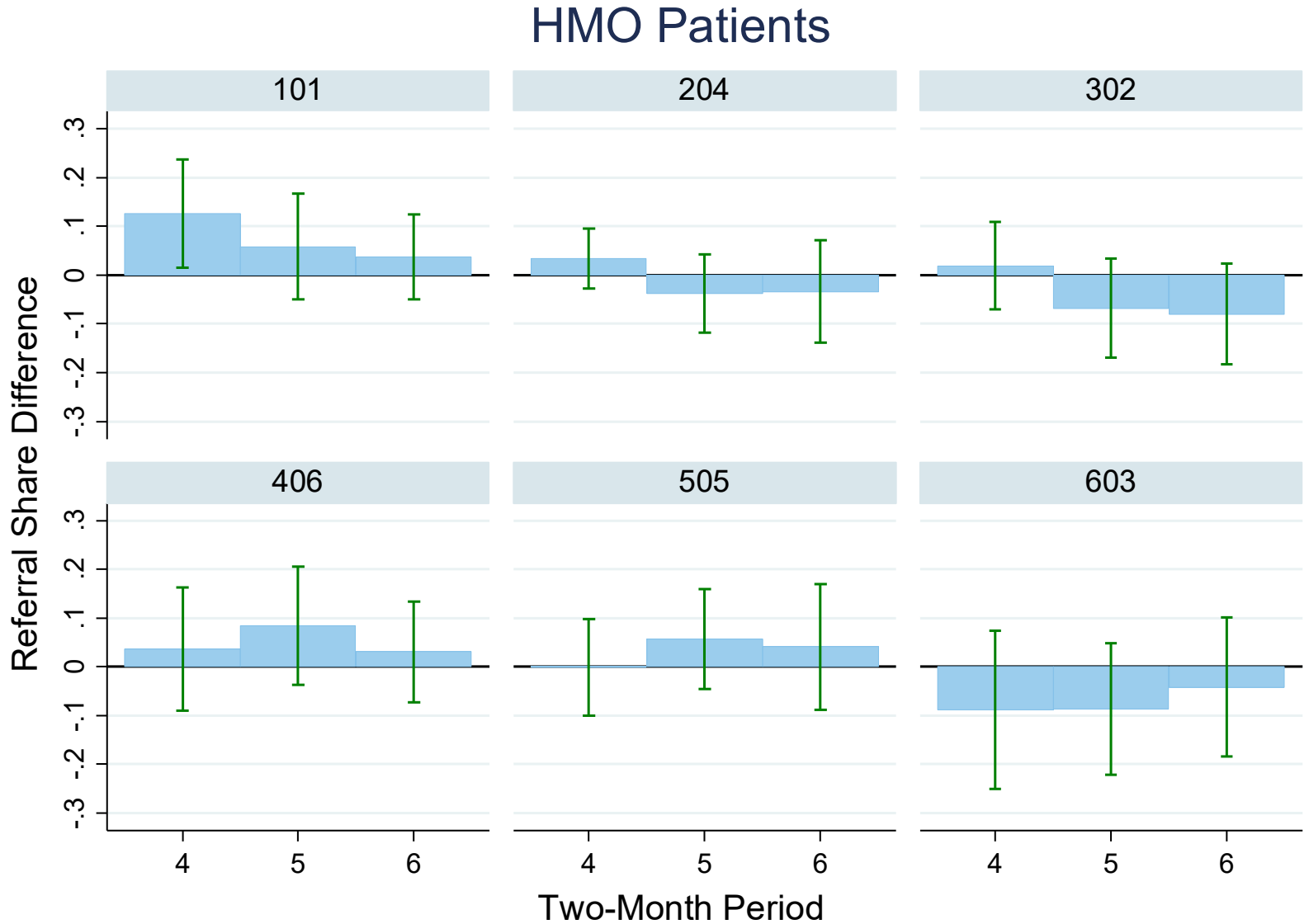
Referral share difference by period

(treatment minus control)

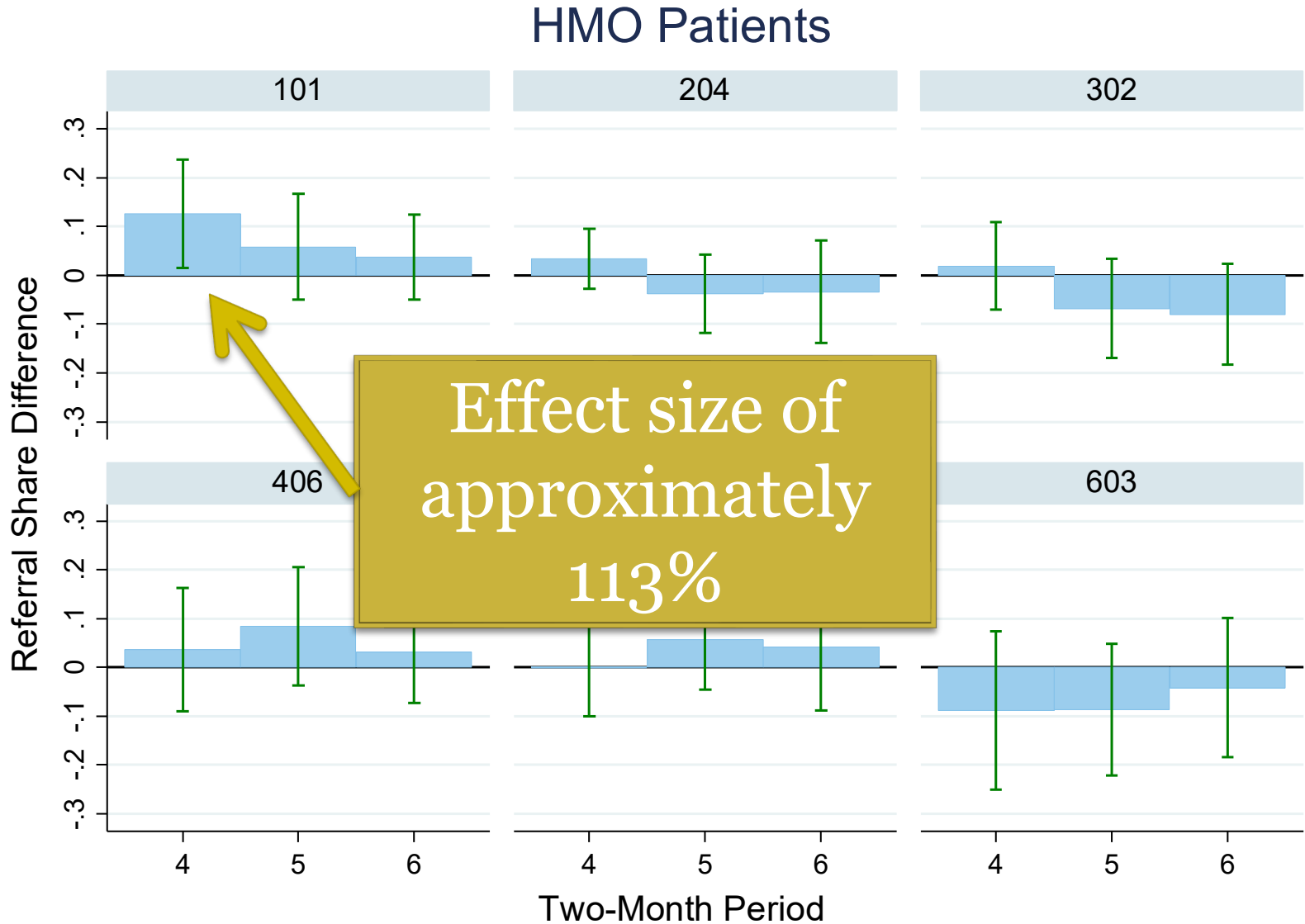
SrHMO Patients



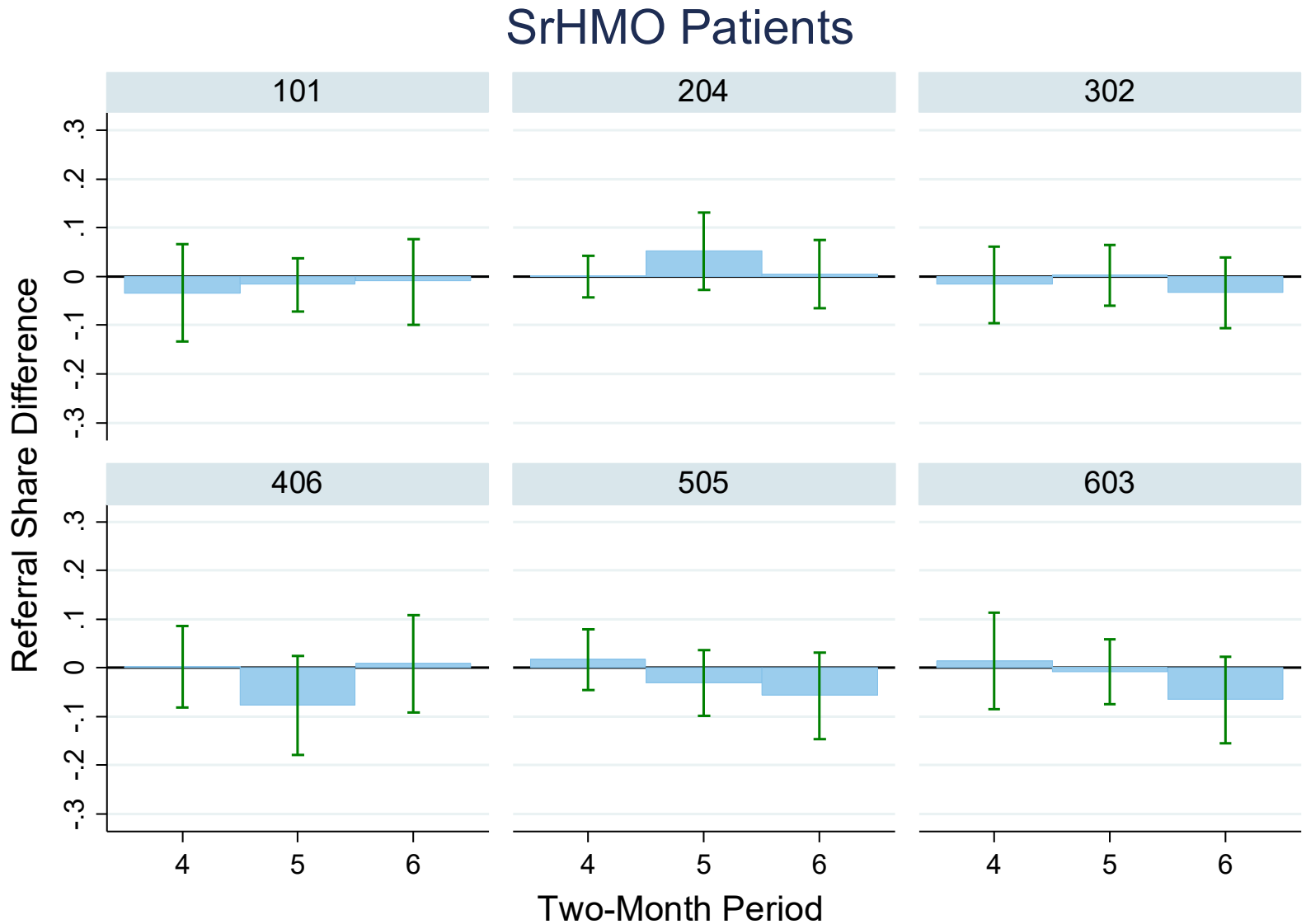
Effect on referral share after controlling for pre-period, within practice differences (via regression)



Effect on referral share after controlling for pre-period, within practice differences (via regression)



Effect on referral share after controlling for pre-period, within practice differences (via regression)



PCPs did not change referrals to Ophthalmology in response to the treatment



$$\eta_{p\tau} = \beta_1 A_\tau I_p + \beta_2 A_\tau + \beta_3 I_p + u_{p\tau}$$

$\eta_{p\tau}$ = Ophthalmology's share of PCP p 's total referrals **or** a dummy indicating zero referral periods

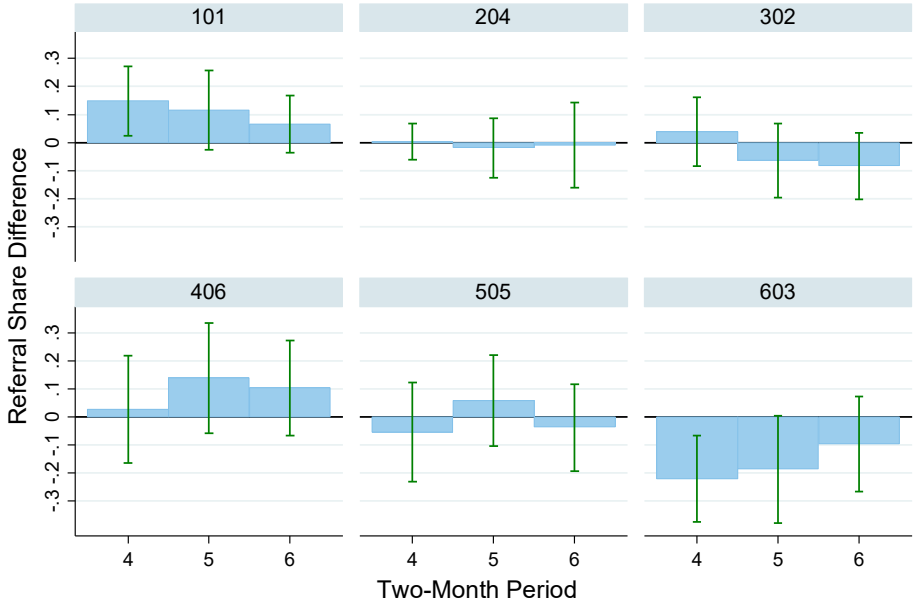
Model Outcome Variable	Diff-in-Diff Estimated Effect	
	HMO patients	SrHMO patients
Referral Share	-0.0032 (0.0094)	0.0050 (0.015)
Periods With No Ophthalmology Referrals	0.022 (0.046)	-0.037 (0.033)
N	330	330

No estimates are statistically significant; SEs (clustered at PCP practice level) in parentheses; Each cell reports results from a separate regression

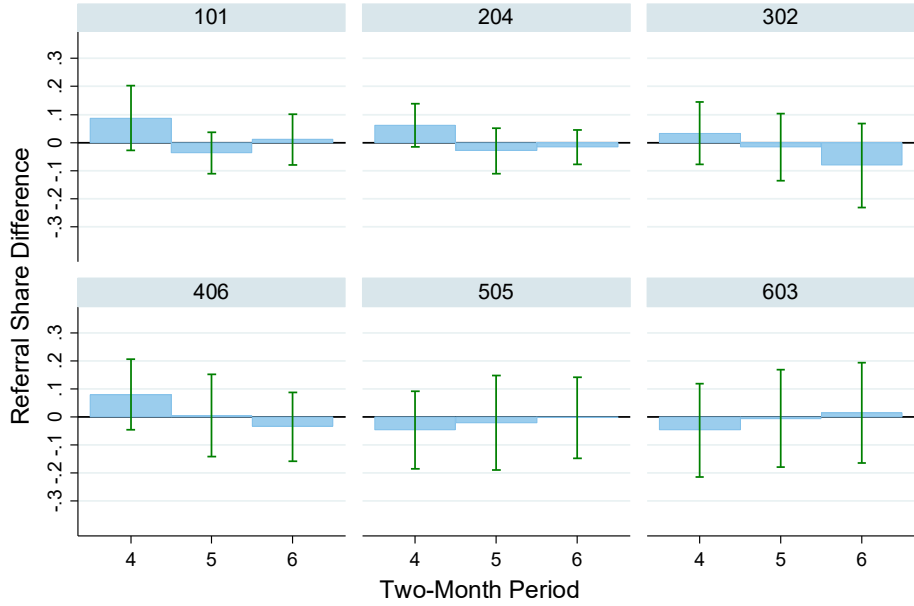
HMO Effect seems to be stronger for referrals of men



Male HMO Patients



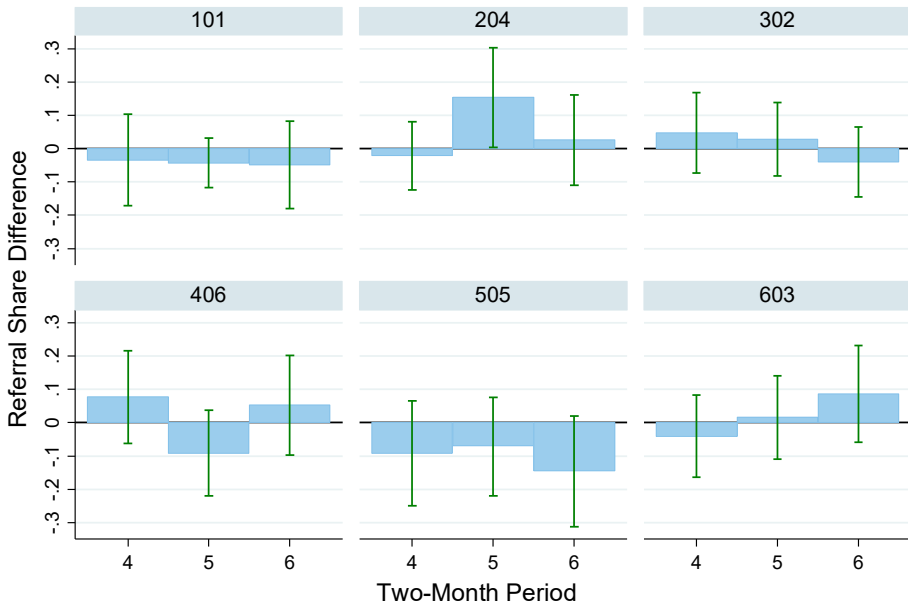
Female HMO Patients



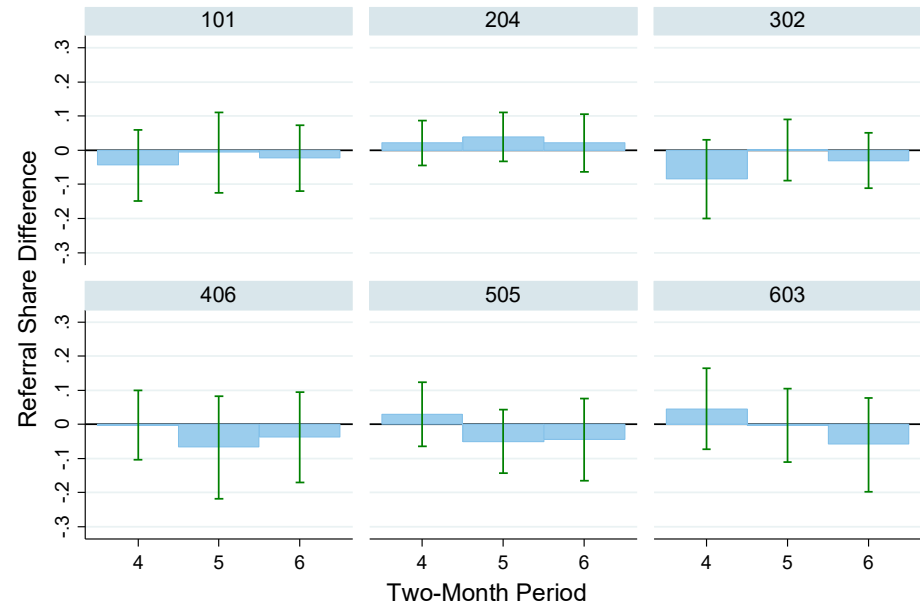
No pattern emerges for SrHMO patients when splitting male and female referrals



Male SrHMO Patients



Female SrHMO Patients



Effect difference by patient type due to financial incentive?

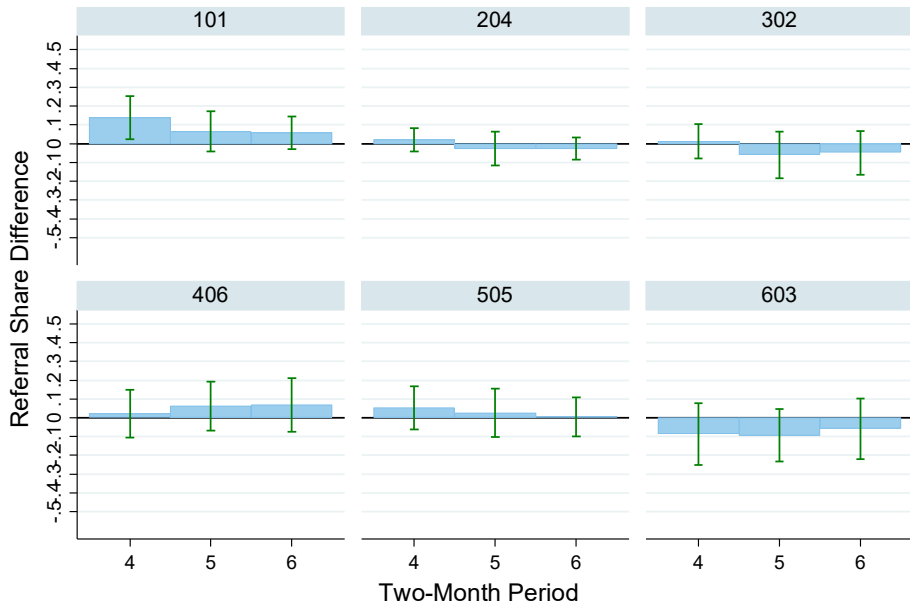


- SrHMO patients are all Medicare Advantage patients, so they are all 65 or older
- The substantial share of HMO patients are under 65
 - ~ 85% of HMO referral patients are under 65
- So financial incentive is not the only possible driver of differential response
- Can split HMO patients into above/below 65 groups to see if response differs

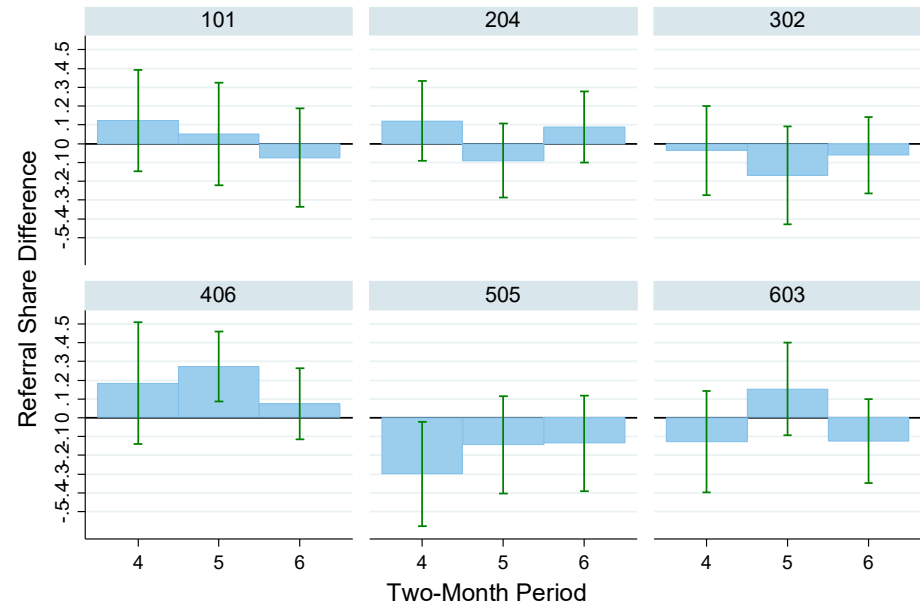
Effect on HMO patients above/below age 65



Under 65 HMO Patients



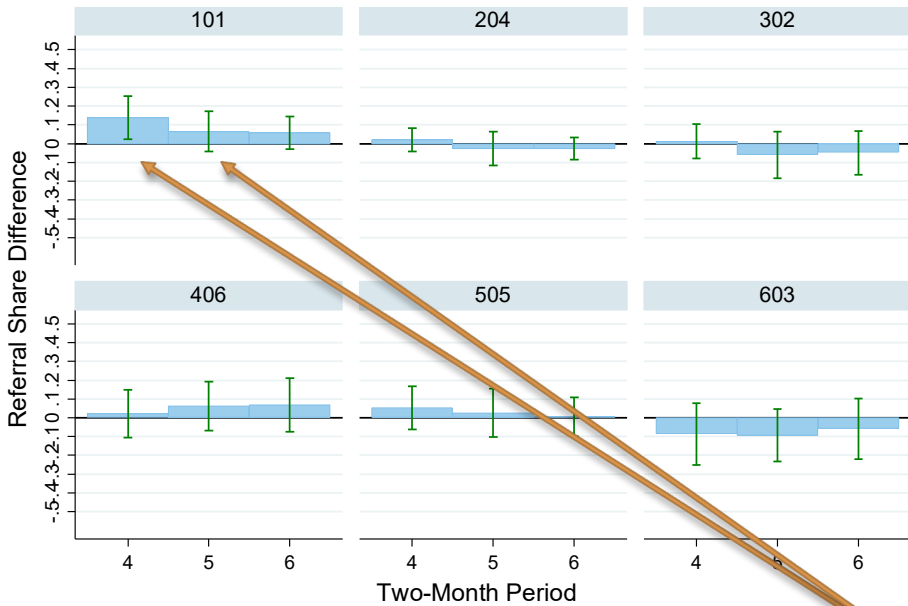
65 & Over HMO Patients



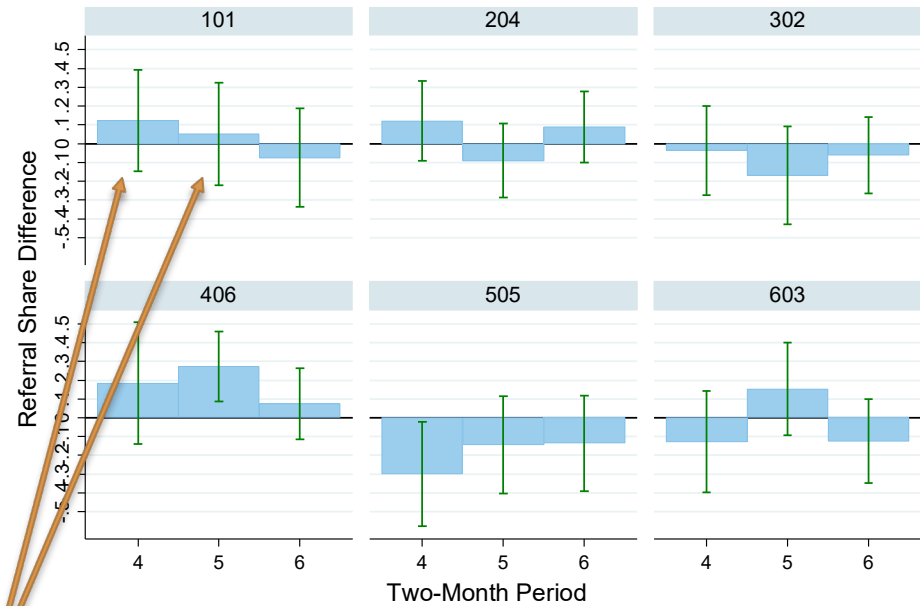
Effect on HMO patients above/below age 65



Under 65 HMO Patients



65 & Over HMO Patients



Point estimates
are similar

Conclusion



- PCPs appear to have re-allocated their HMO patient referrals towards the least expensive ophthalmology practice – at least initially
- Much weaker/no response for patients that are highly capitated, a result that is consistent with:
 - **PCPs being cognizant of the difference between capitated and non-capitated patients**
 - **A concern for financial incentives related to referrals**
- Response was stronger on referrals of men

THANK YOU!



- All questions and comments appreciated!
- Feel free to contact me at sbarkow@clemson.edu