Multimarket Contact in Health Insurance

SUPPLEMENTAL ONLINE APPENDIX

In this appendix, we present results for several alternative regression specifications and samples, along with details of our dataset construction.

1 Construction of Dataset

The final analytic data are comprised of several publicly available datasets. Here, we present step-by-step details of our dataset construction. We begin with the set of all plans operating under approved contracts (i.e., contracts approved by CMS to operate in a given market) from the "MA Contract Service Area by State/County" files merged to plan-level enrollment and plan characteristics data from the "Monthly MA and PDP Enrollment by CPSC" files.[1] This excludes, for instance, plans that maintain some enrollees who have since moved from the county where they purchased their MA plan. We average the monthly enrollment data across months for each year, resulting in a contract/plan/county/year unit of observation.

As detailed in Table 1, there are nearly 10.5 million observations in the full data. We then drop 180,640 observations in which the plan operates in the Virgin Islands, American Samoa, Puerto Rico, Northern Mariana Islands (denoted by state abbreviation "MP" in the plan data), and Guam. We further drop 9,388,521 observations designated as special needs plans (SNPs) or 800-series plans. The 800-series plans, identified as such by having a plan ID in the 800s, are employer- or union-sponsored health plans. While highly prevalent in MA, these plans constitute a very small fraction of MA enrollments. We drop an additional 3,746 observations with missing plan IDs or county FIPS codes, and we exclude 48,409 observations associated with non-traditional plan types

[1] Unless otherwise noted, all data files are available for download from the CMS website: https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/MCRAdvPartDEnrolData/index.html.

such as Medicare Cost plans or demonstration/pilot plans, focusing on the more common HMO, PPO, and PFFS plans.[2]. To these data, we merge the following: contract quality ratings from the MA star ratings data;[3] total county-level MA enrollments from the MA state-county penetration files; monthly plan premiums and other characteristics from the MA landscape files;[4] average plan risk scores, CMS rebates, and CMS payments from the plan payment data;[5] benchmark rates for MA plans from the annual ratebooks as well as average Medicare FFS costs by county;[6] county-level demographics from the American Community Survey;[7] and hospital characteristics from the Healthcare Cost Report Information System (HCRIS), which we subsequently aggregate to the county level.[8]

Our analysis is ultimately limited to plans with observed enrollments (about 30% of all observations) and other restrictions that vary by outcome as discussed in the text. Since enrollments are missing for plans with 10 or fewer enrollees, restricting the sample to plans with observed enrollments is practically relevant as it excludes plans with little to no presence in the overall MA market.

2 Generated Instrument Analysis

Results from our generated instrument regressions are presented in Table 2, where we see that the proposed instruments are individually and jointly significant predictors of insurer-level MMC. We stress that the generated instrument regression is not the first stage regression. Instead, it is a purely statistical construct in which we regress our endogenous variable only on the instruments with no other market or insurer controls. Once we obtain our predicted MMC, the remaining

[2]CMS classifies these non-traditional plans as "other Medicare health plans" because each plan type has "special rules and exceptions." Additional details of these types of plans are available at https://www.medicare.gov/sign-up-change-plans/medicare-health-plans/other-health-plans/other-medicare-health-plans.html.

[3]Star ratings data available at https://www.cms.gov/Medicare/Prescription-Drug-Coverage/PrescriptionDrugCovGenIn/PerformanceData.html.

[4]Landscape files available at the same site as the star ratings data.

[5]Data available at https://www.cms.gov/Medicare/Medicare-Advantage/Plan-Payment/Plan-Payment-Data.html.

[6]Data available at https://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Ratebooks-and-Supporting-Data.html.

[7]In order to obtain county-level estimates for all years, we use the 3-year summary files for 2008, and we use 5-year summary files in all subsequent years. The 5-year files provide census information for essentially all counties, while the 3-year files require that counties have at least 20,000 residents. Moreover, the 5-year files were not available prior to 2009, while the 3-year summary files were discontinued as of 2014. Data are available at https://www.census.gov/programs-surveys/acs/data/summary-file.html.

[8]HCRIS data are available for download at https://www.cms.gov/Research-Statistics-Data-and-Systems/Downloadable-Public-Use-Files/Cost-Reports/.

exogenous variables are still employed in the traditional first stage of the FE-IV. Therefore, consistent with the discussion of generated instruments in Wooldridge (2010), we do not include any additional covariates in forming our generated instrument since all such covariates are ultimately part of the FE-IV estimator.

The results for our generated instrument regression employed in the main text are provided in column 1, while the results in column 2 include additional market-level covariates, including year and county fixed effects, county level demographic variables, hospital variables, the average FFS cost in the county, and the MA benchmark rate. The purpose of the estimates in column 2 is to provide a more appropriate assessment of the monotonicity assumption. In particular, we note the negative estimates in column 1 do not persist when adjusting for the full set of relevant market characteristics. If we instead include the full set of market characteristics, as would be done in a traditional first stage of a 2SLS estimator, all estimated coefficients on our instruments are positive. We therefore conclude that, conditional on relevant market characteristics and fixed effects, our instrument set indeed tends to increase MMC as initially predicted.

3 Quality Domains

Table 3 lists the 9 quality measures employed in our quality analysis, the respective domains of each measure, and the description and underlying source for each measure. In each domain, recall that our contract-level measure of quality is a dummy for whether at least half of the measures in that domain received a rating of 4-stars or higher (i.e., high-rated). Our market-level measure of quality is the count of contracts for which at least half of the measures in a given domain were high-rated.

4 Effects of MMC at Market Level

We argue in the main text that one likely mechanism by which firms can adjust quality is by their selection of which contracts to offer in which markets. This mechanism presumes that there is some temporal variation in which contracts are offered in which counties. Figure 1 presents a cursory examination of such variation, which summarizes the average number of contracts per county as well as the average number of new contracts in each year and the average number of contracts that ultimately exit a county at the end of the year. As is evident in the figure, there is clear variation

in the number of contracts offered per county, particularly in the first half of our panel.

We also briefly examine the relationship between MMC and plan offerings in order to provide some empirical justification for the claim that insurers strategically select which contracts to offer in which counties. To do this, we estimate Equation 2 from the main text at the market level, where our outcome of interest is the number of contracts offered in the market. Our key independent variable is lagged MMC, with lagged predicted MMC as the instrument. With this specification, we estimate a coefficient of -0.087 with a p-value of 0.008. This suggests that a one standard deviation increase in MMC at time $t-1$ leads to a reduction of about 0.4 contracts in an average market at time t. MMC therefore does tend to deter competition in the form of fewer contracts. This negative effect of MMC on the number of contract offerings is also consistent with the interpretation of MMC as facilitating collusive outcomes; however, this result does not speak to which types of contracts are ultimately offered in each market, which is the subject of our market-level quality analysis in the main text.

In addition, if MMC influences an insurer's contract offerings in a given county, then it is plausible that this influence would affect not just quality but also prices. We therefore re-estimate our market level regressions using average plan prices as our outcomes. Results are summarized in Table 4, where we again estimate a positive and economically meaningful effect of MMC on prices.

5 Robustness

Here, we consider the sensitivity of our results to several potential issues raised in Section 6.2 of the main text. First, premium information is missing for around 4% of plan/county/year observations in our data. Similarly, our MMC variable is undefined for markets with just one insurer, in which case MMC is set to a missing value by construction. Due to these missing values along with different sets of plans for which traditional bidding rules apply, our sample sizes vary across different outcomes of interest. We therefore restrict our sample only to contract/county observations (or plans operating under such contracts) for which all relevant variables are non-missing in all available years. For example, contracts observed in a given county in year t, but with missing values in year $t+1$ and then observed again in year $t+2$, are dropped. Results are presented in column 1 of Table 5 and are qualitatively unchanged from the original analysis. Note that concerns over missing dependent variables are irrelevant in our market-level analysis, and as such, the market-level quality results match those of the main text.

Second, we re-estimate our results from the main text after excluding markets in which both merging insurers existed prior to the merger. Estimates based on this alternative sample are presented in column 2 of Table 5, where we see that the presence of these insurers generally has little influence on our qualitative findings.

And finally, we consider four alternative measures of MMC. The first measure weights each pairwise overlap by market size, where relative market size is measured by the number of MA eligibles in a given market divided by the largest market (highest number of MA eligibles) across the country in each year. We also calculate MMC only among the top 5 insurers and when weighting markets by the HHI. Finally, we consider MMC measured at the firm-market level. We focus our analysis of quality at the market level – as discussed in the main text, this is the margin by which insurers can most directly influence average quality in the Medicare Advantage market.

Estimated effects are presented in columns 3-6 of Table 5, respectively. Note that the means and standard deviations of these alternative MMC measures differ from those of the main text, and as such, the magnitude of the point estimates differ. For example, the mean (standard deviation) of MMC when weighted by relative market size is 0.105 (0.056), the mean (standard deviation) for MMC among the top 5 insurers is 8.84 (3.88), and the mean (standard deviation) for MMC when weighted by HHI is 1.471 (0.931). Point estimates on bids/prices when weighting MMC by market size are therefore much larger, but qualitatively similar when interpreted relative to a one standard deviation change.

References

Wooldridge, Jeffrey M. 2010. *Econometric analysis of cross section and panel data*. MIT press.

Tables and Figures

Figure 1: Entry and Exit in Medicare Advantage

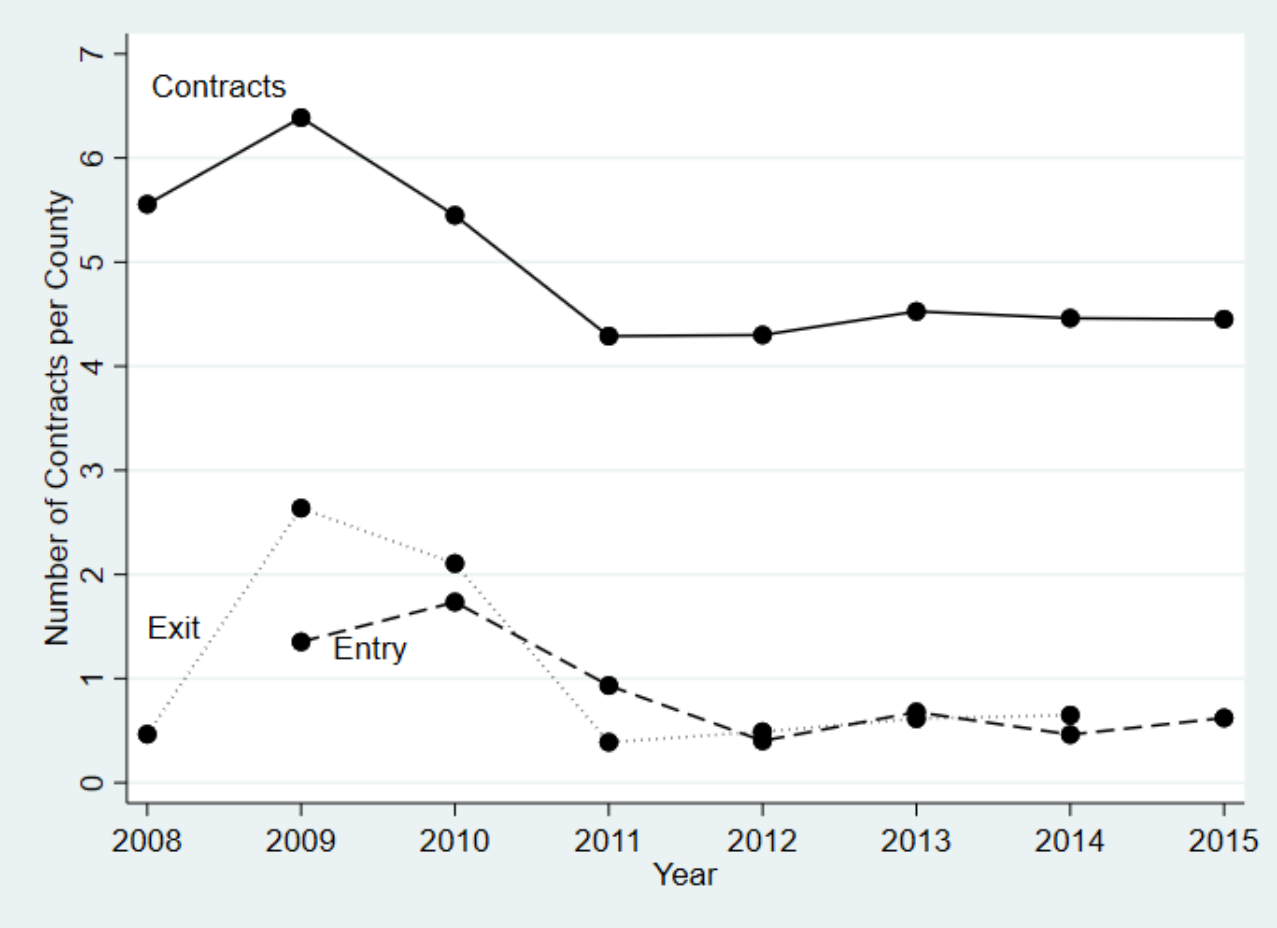

Table 1: **Details of Dataset Construction**

	2008	2009	2010	2011	2012	2013	2014	2015	Total
Full Data	776,853	1,608,923	1,331,060	1,102,092	1,190,504	1,209,009	1,222,286	1,200,995	10,455,455
No. of Observations Remaining after Exclusions of:									
Outlying Territories	757,676	1,581,654	1,311,207	1,085,481	1,170,690	1,188,635	1,204,224	1,182,078	10,274,815
SNP & 800-Series	156,533	153,682	110,697	68,035	67,371	67,869	62,378	54,176	886,294
Missing FIPS or Plan ID	155,765	152,908	109,950	68,003	67,246	67,835	62,344	54,157	882,548
Non-traditional Plan Types	148,906	146,361	105,530	62,646	61,177	61,604	56,113	47,162	689,799
Missing Enrollments	28,988	33,224	29,212	22,447	22,337	23,029	22,000	21,430	202,667

Table 2: **Preliminary Regression Results for Generated Instrument**[a]

	No Controls	With Controls
Exposure to Double-Bonus at Baseline		
× 2012	1.927***	1.652***
	(0.609)	(0.063)
× 2013	1.744***	1.419***
	(0.571)	(0.056)
× 2014	1.623***	1.169***
	(0.522)	(0.058)
× 2015	1.155**	0.794***
	(0.491)	(0.060)
Exposure to Urban Floor at Baseline		
× 2008	2.023*	0.415***
	(1.195)	(0.039)
× 2009	2.815**	0.814***
	(1.353)	(0.044)
× 2010	1.919	1.182***
	(1.173)	(0.043)
× 2011	0.653	1.223***
	(0.901)	(0.050)
× 2012	-0.839***	0.400***
	(0.247)	(0.061)
× 2013	-0.604**	0.525***
	(0.285)	(0.059)
× 2014	-0.473	0.609***
	(0.365)	(0.064)
× 2015	-0.536	0.545***
	(0.357)	(0.069)
Merger-induced Overlaps from 2011 Mergers		
× 2011	-3.320***	0.369**
	(1.210)	(0.171)
× 2012	-3.275***	0.348*
	(1.173)	(0.187)
× 2013	-1.668***	0.741***
	(0.301)	(0.116)
× 2014	-1.127***	0.583***
	(0.353)	(0.149)
× 2015	-0.367	1.199***
	(0.240)	(0.143)
Merger-induced Overlaps from 2012 Mergers		
× 2012	-0.040	0.136***
	(0.100)	(0.018)
× 2013	0.101	0.257***
	(0.124)	(0.018)
× 2014	0.245***	0.313***
	(0.074)	(0.020)
× 2015	0.311***	0.385***
	(0.062)	(0.022)
Merger-induced Overlaps from 2013 Mergers		
× 2013	-1.027***	0.201***
	(0.337)	(0.029)
× 2014	-0.902***	0.162***
	(0.300)	(0.029)
× 2015	-0.736***	0.312***
	(0.218)	(0.034)
Merger-induced Overlaps from 2014 Mergers		
× 2014	-0.991***	0.106***
	(0.235)	(0.032)
× 2015	-0.991***	0.110***
	(0.212)	(0.040)
R^2	0.118	0.630
N	77,540	63,587

[a]Estimates from linear regression of insurer-level MMC on the instrument set. Standard errors in parenthesis clustered at the insurer level. * p<0.1, ** p<0.05, *** p<0.01

Table 3: **Quality Domains and Individual Measures**[a]

Measure	Description	Source
Domain 1: Keeping People Healthy		
Colorectal Cancer Screening	% of MA enrollees aged 50 to 80 who had appropriate screening for colorectal cancer	HEDIS
Flu Vaccine	% of surveyed Medicare enrollees who received an influenza vaccination between September and December during the measurement year	CAHPS
Domain 2: Managing Chronic Illness		
Osteoporosis Management	% of female MA enrollees 67 and older who suffered a fracture during the measurement year, and who subsequently had either a bone mineral density test or were prescribed a drug to treat or prevent osteoporosis in the six months after the fracture	HEDIS
Blood Pressure Controlled	% of surveyed MA enrollees with hypertension on or before June 30 of the measurement year, and whose most recent chart notation of systolic BP was 140 or less and diastolic BP was 90 or less during the measurement year	HEDIS
Rheumatoid Arthritis Management	% of MA enrollees diagnosed with rheumatoid arthritis during the measurement year, and who received at least one prescription for a disease modifying antirheumatic drug	HEDIS
Improving Bladder Control	% of MA enrollees 65 years of age or older who reported having a urine leakage problem in the past six months and who received treatment for their current urine leakage problem	HOS
Reducing Risk of Falling	% of MA enrollees 65 years of age or older who had a fall or had problems with balance or walking in the past 12 months, and who were seen by a practitioner in the past 12 months and received fall risk intervention from their current practitioner	HOS
Domain 3: Handling of Appeals		
Timely Appeals	% of appeals timely processed by the plan out of all the plan's appeals cases decided by the IRE (excluding dismissed cases and cases with unknown timeliness)	IRE
Fairness of Appeals	% of appeals cases where a plan's decision was "upheld" by the IRE out of all the plan's cases ("upheld" & "overturned" cases only) that the IRE reviewed	IRE

[a]HEDIS: Healthcare Effectiveness Data and Information Set; HOS: Health Outcomes Survey; CAHPS: Consumer Assessment of Healthcare Providers and Systems; IRE: Independent Review Entity.

Table 4: **Effects of MMC on Prices at Market Level**[a]

	(1)	(2)	(3)
FE Regression Results			
Part C Bids	1.284***	1.299***	1.283***
	(0.179)	(0.178)	(0.178)
Part D Bids	-0.054**	-0.051*	-0.054**
	(0.026)	(0.026)	(0.026)
Premium	-0.155**	-0.149**	-0.157**
	(0.063)	(0.063)	(0.063)
Part C Premium	-0.079	-0.075	-0.080
	(0.049)	(0.049)	(0.049)
Part D Premium	-0.081***	-0.078***	-0.081***
	(0.030)	(0.029)	(0.030)
FE-IV Regression Results			
Part C Bids	3.516***	3.510***	3.544***
	(0.892)	(0.890)	(0.890)
Part D Bids	0.870***	0.873***	0.859***
	(0.166)	(0.166)	(0.166)
Premium	-0.414	-0.416	-0.325
	(0.361)	(0.360)	(0.361)
Part C Premium	-0.357	-0.358	-0.323
	(0.272)	(0.272)	(0.272)
Part D Premium	0.394**	0.396**	0.398**
	(0.182)	(0.181)	(0.182)
Specification			
County, Year FE	✓	✓	✓
HHI		✓	
Count of Contracts			✓

[a]County-level regression results ($N = 14,130$) with standard errors in parenthesis clustered at the county level. Additional independent variables not in the table include county and year fixed effects, county-level demographic variables, average prescription drug coverage in the county, average FFS costs in the county, the average MA benchmark rate, and measures of the local (county) hospital market including HHI, total discharges, and number of hospitals. * p<0.1, ** p<0.05, *** p<0.01

Table 5: **Effects of MMC with Alternative Measures and Samples**[a]

	Balanced Panel	No Mergers	MMC Size	MMC Top 5	MMC HHI	MMC_{im}[b]
Effects on Plan-level Pricing						
Part C Bids	3.211***	4.189***	77.670***	8.451***	13.531***	18.753***
	(0.740)	(1.068)	(28.446)	(1.590)	(2.834)	(2.213)
Part D Bids	0.090	0.045	-3.803	1.445***	-0.085	-0.091
	(0.130)	(0.154)	(5.379)	(0.271)	(0.511)	(0.280)
Premium	0.542	0.576*	-5.808	1.619***	0.992	4.984***
	(0.353)	(0.323)	(11.788)	(0.455)	(1.071)	(0.851)
Part C Premium	0.628**	0.639***	14.985	0.557*	1.917**	4.596***
	(0.263)	(0.240)	(9.194)	(0.328)	(0.817)	(0.717)
Part D Premium	-0.065	0.065	-24.245***	1.457***	-0.655	-0.604*
	(0.151)	(0.178)	(6.766)	(0.293)	(0.602)	(0.321)
Effects on Market-level Quality						
Overall Rating	-0.242***	-0.274***	-7.120***	-0.374***	-1.002***	n/a[c]
	(0.030)	(0.037)	(1.141)	(0.052)	(0.108)	
Keeping Patients Healthy	-0.313***	-0.388***	-10.948***	-0.382***	-1.268***	
	(0.038)	(0.049)	(1.346)	(0.061)	(0.137)	
Managing Chronic Disease	-0.131***	-0.161***	-2.259*	-0.263***	-0.558***	
	(0.028)	(0.034)	(1.210)	(0.044)	(0.101)	
Appeals	-0.007	0.013	3.675***	-0.091***	-0.118	
	(0.023)	(0.025)	(0.996)	(0.035)	(0.083)	

[a]FE-IV regression results for plan-level prices and market-level quality, with standard errors in parenthesis clustered at the county level. Additional independent variables not in the table include contract fixed effects, county and year fixed effects, county-level demographic variables, an indicator for prescription drug coverage, average FFS costs in the county, the MA benchmark rate, and measures of the local (county) hospital market including HHI, total discharges, and number of hospitals. * p<0.1, ** p<0.05, *** p<0.01

[b]Denotes MMC measured at the insurer-market level.

[c]Examining market-level quality requires a market-level measure of MMC. Estimated effects from firm-market level MMC are therefore not applicable.