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DOES MEDICARE HMO ENROLLMENT CAUSE ADVERSE SELECTION IN MEDIGAP?

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DOES MEDICARE HMO ENROLLMENT CAUSE ADVERSE SELECTION IN MEDIGAP PLANS?

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A. INTRODUCTION

The enrollment of Medicare beneficiaries in managed care plans grew significantly during the last half of 1990s, under the Medicare risk and Medicare+Choice programs. Between 1995 and 1999, enrollment in these plans (here, collectively called Medicare HMOs) doubled, reaching more than 6 million in 1999. Over the same period, a rising majority of plans offered coverage for prescription drugs, often with zero premium (Gold, 2001). Since 1999, Medicare HMO enrollment has declined, as many plans have withdrawn from the Medicare market or reduced their service areas.

The number of Medicare HMO enrollees that enter from a Medigap plan has not been documented, but there are good reasons to expect that expanding Medicare+Choice enrollment has drawn extensively from the ranks of existing Medigap policyholders.[1] Probably most important, Medicare beneficiaries can enter a Medicare HMO plan without medical underwriting. In contrast, if they attempt to change Medigap policies or carriers, the are medically underwritten and may be denied new coverage—or if accepted, rated up. Thus, for a Medigap policyholder with health problems, a Medicare HMO may be the best or only alternative to remaining in his current Medigap policy indefinitely, regardless of the policy's price or his satisfaction it. Moreover, Medicare+Choice plans that offer coverage for

[1] Early research on enrollment in Medicare HMOs suggests that they may be especially attractive to new Medicare beneficiaries and those older than age 65 who did not enroll in supplemental coverage during the guaranteed-issue period at age 65 (Brown et al., 1993). A substantial number of Medicare HMO enrollees also enter from private supplemental insurance (retiree coverage or Medigap), and some employers have encouraged their retirees to join a Medicare HMO (Fox, 2000).

prescription drugs – especially for zero premium – appeal not only to the vast majority of Medigap policyholders without coverage for prescription drugs, but also to Medigap policyholders who pay very high premiums for coverage of prescription drugs.[2]

Despite guaranteed-issue in Medicare HMOs, early research on enrollment in Medicare risk plans suggests that they enjoyed favorable risk selection (Brown *et al.*, 1993). If the people leaving Medigap plans to enroll in Medicare HMOs are systematically lower-cost, this could drive deterioration of the Medigap risk pool, especially in older age categories where insurer underwriting and rating generally discourage new enrollment. Deterioration of risk in the Medigap market, in turn, may cause problems of access for Medicare beneficiaries: faced with adverse selection, insurers typically close Medigap policies to new enrollees, raise premiums sharply, or both.

Based on more recent evidence, it is unclear whether selection bias has favored or disfavored Medigap insurers. As Medicare+Choice enrollment accelerated between 1997 and 1999, individual Medigap enrollment in several plans – A, B and H – declined dramatically.[3] Nationally, individual enrollment in A and B policies declined nearly 40 percent; individual enrollment in H policies declined 83 percent, but from a much lower base of enrollment. Favorable selection into Medicare HMOs might explain the fast rise in A and B premiums compared to other standard Medigap policy forms, as covered lives in A and B policies declined: between 1997 and 1999, the median state saw an average increase 19 percent for A coverage and 23 percent for B coverage. Moreover, by 1999, about one-third of standard Medigap policyholders were enrolled in closed plans – suggesting that insurers in many states have had problems with adverse selection (Chollet and Kirk, 2001).

These observations notwithstanding, a recent survey of Medicare beneficiaries indicates that Medicare HMO enrollees are much more likely to be in fair or poor health than Medigap enrollees. In 2000, 32 percent of Medicare HMO enrollees reported their health status as fair or

[2] In 1999, premiums for H, I or J coverage typically exceeded $1,000 per year, about 35 percent more than the average premium for a Medigap policy that did not include prescription drugs. In some states, J premiums ranged as high as $3,600 per year (Chollet and Kirk, 2001).

[3] Medigap insurers have been allowed to issue only 10 standard policy forms since 1992. Policy form A includes only the standard "basic benefits" that are common to all Medigap policies. The most popular policy forms are F, C and B. Policy forms H, I and J are the only standard Medigap products that provide coverage for prescription drugs. H and I policies offer the same coverage for prescription drugs; J's maximum benefit for prescription drugs ($3,000 per year) is more than twice that in H or I policies ($1,250).

poor, compared to 24 percent of Medigap enrollees. Conversely, 20 percent of Medigap enrollees reported their health status as excellent, compared to just 15 percent of Medicare HMO enrollees (Gold and Mittler, 2001).

This paper examines the relationship between rising Medicare risk and Medicare+Choice enrollment and the claims experience reported by Medigap insurers between 1996 and 1999. We develop a simple theoretical model and estimate a reduced form linear model using data from the NAIC merged over the four years. We present our empirical results, and offer concluding observations about the Medigap market.

B. AN EMPIRICAL MODEL OF RISK SELECTION IN THE MEDIGAP MARKET

If Medicare risk or Medicare+Choice plans draw enrollment from Medigap policies that is nonrepresentative, it would bias the risk selection of remaining Medigap policyholders. Favorable selection into Medicare HMOs would generate adverse selection in Medigap plans, and conversely adverse selection into Medicare HMOs might improve the risk selection of Medicare beneficiaries who remain in Medigap policies. Changes in risk selection among the residual population of Medigap policyholders, either favorable or adverse, should be observable immediately as a change in Medigap insurers' medical claims experience.

A theoretical model of expected claims would incorporate information about the health of the pool of covered lives, controlling for the benefits covered by alternative Medigap policies. That is:

$$(1) \qquad \sum_i C_{ik} = \sum_i f(H_{ik}, B_k),$$

where C_{ik} is the expected claims experience of Medigap enrollee i in plan k; H_{ik} is the health status of enrollee i in plan k, and B_k is a vector of characteristics describing the benefit design of plan k.

However, the health status of enrollees in plan k is endogenous. It is determined by the various factors that affect how individuals choose whether to be insured at all, and then which insurance product they select. These include the demand characteristics of individuals enrolled in plan k (D_{ik}), such as self-perceived health status and risk aversion. They also include various

characteristics of insurance supply (S_k), such as the absolute and relative price of coverage, the availability of alternative coverage, insurer underwriting practices, and insurer underwriting precision. In short:

$$(2) \qquad \sum_i H_{ik} = \sum_i f(D_{ik}, S_k)$$

In each Medigap plan design, expected claims are determined by the risk selection that the plan attracts and retains. Both insurer and enrollee behavior determine the degree to which the enrolled population resembles or differs from the total eligible population. For example, sicker individuals may prefer a product that provides greater coverage; but if the insurer is able also to attract healthier individuals into that product (for example, by identifying and offering healthier individuals a lower price – that is, by underwriting with precision), the product may not experience adverse selection.

The availability of alternatives to the product also affects its susceptibility to adverse selection. An individual with health problems may prefer to leave a basic Medigap policy for one that offers more coverage, but would remain in the basic policy if the only alternative is no coverage or coverage at a price that is higher than he is willing or able to pay.

To estimate an empirical model of risk selection, we measure the expected health status of individuals in plan *k* as the plan's average medical claims in year *t*. The plan's benefit design is measured as its standard design designation (standard plan A through J) and whether it is a Medicare Select plan – that is whether it offers reduced cost sharing for services obtained from a preferred network of hospitals and physicians. The plan's underwriting features include whether it is closed to new enrollment, enrolls guaranteed-issue, accepts disabled Medicare beneficiaries and is agent-marketed. We control for endogenous underwriting effects by including the proportion of covered lives enrolled in the last three years and total plan enrollment. Finally, we control for myriad other factors by including both year and state fixed effects. Controlling for all of these factors, we estimate the potential impact of greater HMO penetration among Medicare beneficiaries on expected medical claims in Medigap plans.

In summary, we estimate a linear model of the following form:

$$(3) \quad E(CLAIMS_{st}) = f\,(PLAN_{st}, MEDSELECT_{st}, ISSUE_{st}, DISABLED_{st}, CLOSED_{st}, AGENT_{st}, LIVES_{st}, NEWLIVES_{st}, HMO_{st}; YEAR_{t}, STATE_{s})$$

where, in state *s* and year *t*,

E(CLAIMS)	=	average medical claims in current dollars;
PLAN	=	a vector of dummy variables for Medigap standard plans A through J;
MEDSELECT	=	a dummy variable indicating whether the plan offers reduced cost sharing through a network of providers;
ISSUE	=	a dummy variable indicating whether the product is guaranteed issue;
DISABLED	=	a dummy variable indicating whether the product accepts disabled Medicare beneficiaries as well as aged beneficiaries;
AGENT	=	a dummy variable indicating whether the plan is agent-marketed;
CLOSED	=	a dummy variable indicating whether the plan is renewing policies in force, but not accepting new enrollees;
LIVES	=	the number of covered lives in the product;
NEWLIVES	=	the percent of covered lives enrolled in the last three years;
HMO	=	Medicare HMO enrollment as a percent of all Medicare beneficiaries in the state;
YEAR	=	a vector of dummy variables indicating the year; and
STATE	=	a vector of dummy variables indicating the state where the product is sold.

C. DATA AND METHODS

The data used to estimate this model are taken from the annual reports that insurers file with every state department of insurance, providing detailed information about their Medigap business in the state. These data are compiled and sold by the National Association of Insurance

Commissioners (NAIC). The data used here reflect insurers' reports over four years, from 1996 through 1999.

Insurers file a separate report for each standardized product in each state where they have enrolled lives. Thus, the unit of analysis is specific to the product, insurer, and state: if an insurer sells (or renews) one policy form in 20 states, the NAIC data include 20 observations for that insurer. Similarly, if an insurer sells (or renews) four policy forms in one state, there are four observations for that insurer.

We include observations only for standardized products that report covered lives, earned premiums and medical claims that are greater than zero. Pre-standard Medigap products and plans with zero or negative values for covered lives, premium or claims (comprising 1 to 3 percent of all observations in each year) are excluded. The remaining database includes approximately 8,500 product records per year, totaling 35,838 observations. State-level Medicare HMO penetration was calculated from publicly available data released by the Centers for Medicare and Medicaid Services (CMS) and is measured as the percentage of beneficiaries in the state enrolled in a Medicare HMO.

Table 1 presents descriptive statistics for all variables used in the model as well as means for 1996 and 1999. Because the distribution of average claims is highly skewed, we use the natural log of average claims (LnCLAIMS) as the dependent variable in all models estimated. The state and year effects are modeled as fixed effects.

We first estimate the reduced-form model as specified in (3), and then re-estimate it separately for plans with 100 or fewer lives and more than 100 lives, respectively. To develop a more intuitive estimate of the impact of HMO enrollment on Medigap claims (given the log transformation of the dependent variable), we calculate predictive margins – estimating the effects HMO enrollment on average claims.[4] Finally, we estimate the impact of changes in HMO enrollment separately for each plan type. These results are presented below.

D. RESULTS AND DISCUSSION

The parameter estimates presented in Table 2 suggest that growing Medicare HMO enrollment has indeed changed the risk composition of individual enrollment in Medigap

[4] In calculating predictive margins, we used a retransformation technique appropriate to the normal heteroskedastic characteristics of the error term. We also used bootstrap techniques to estimate empirical confidence intervals for two of the predictive margins, with 1000 repetitions for each estimate.

policies, and that it has produced more favorable risk selection in Medigap policies. Specifically, greater Medicare HMO penetration reduced Medigap claims, all else being equal. This is consistent with recent survey information indicating lower average health status among Medicare beneficiaries in HMOs compared to those in Medigap policies. However, in aggregate, the impact was not large, and it was significant only at 95 percent confidence. Retransforming the dependent variable to calculate predictive margins, a one-standard deviation increase in HMO penetration (from the four-year mean of 10.5 percent to 21.4 percent) reduced average annual Medigap claims by about 5 percent, or $52.

While this result might reflect adverse selection into HMOs from Medigap coverage, at least two other explanations also deserve consideration. First, growth in Medicare HMO penetration may correlate with growth in managed care penetration among the non-Medicare population. Increasing HMO penetration might change provider behavior across all markets in a way that reduces Medigap claims. We were unable to develop an instrumental variable that controlled adequately for HMO penetration among the nonelderly population. Second, there is also some evidence to suggest that some beneficiaries maintain their Medigap coverage even after enrolling in a Medicare HMO. If sufficient numbers of beneficiaries did this, it would reduce average Medigap claims, regardless of risk selection into Medicare HMOs.

We also estimated the model separately for large and small Medigap plans, and found that rising Medicare HMO penetration did not significantly affect the small Medigap plans' claims experience, but it did affect that of larger Medigap plans. Between 1996 and 1999, approximately 70 percent of standard Medigap plans had fewer than 100 lives enrolled in the state. Thus, while rising Medicare HMO enrollment may have improved the claims experience of larger insurers, it seems not to have affected the vast majority of Medigap insurers in any significant way.

Finally, we considered the impact of Medicare HMO enrollment on Medigap plans individually, together with the potentially offsetting impact of new enrollment in the Medigap plan. These results are summarized in Table 3. Aside from removing the vector of dummy variables that controls for the standard plan design, the empirical model for these results was specified exactly as before.

Two aspects of the results estimated by plan type are notable. First, rising Medicare HMO enrollment reduced average claims in A and B Medigap policies, but it did not significantly

affect average claims in any other policy form. Similarly, new Medigap enrollment also improved claims experience in every Medigap policy form, but for A and B policies – where the impact of HMO enrollment was significant – the impact of greater Medicare HMO penetration (implicitly, the exit of covered lives) improved claims experience much more than new enrollment did. The impact of a percentage-point increase in HMO enrollment on Medigap claims was approximately three times that of a percentage-point increase in new Medigap enrollment.

E. CONCLUDING REMARKS

Our results indicate that adverse selection into Medicare HMOs has reduced average medical claims in standard Medigap plans. This impact appears to have been significant in particular for A and B Medigap plans and for larger Medigap plans – that is, those that enrolled at least 100 Medicare beneficiaries state-wide.

Some discussion of the possible limitations of our analysis is in order. The most important of these are the data that underlie our estimates. The NAIC data rarely have been used for research purposes, and the occurrence of improbable values in the data as a whole suggests some problems with data quality. However, there is no way to assess the magnitude of this problem. We assume that error in these data is random (producing conservative estimates of significance, but unbiased parameter estimates); in the event of systematic error, the direction of bias would be difficult to predict.

Second, endogeneity within our empirical models (which would produce biased estimates of the parameters) is possible. The Medigap and HMO markets are substitute markets, and *ex ante* the direction of causality of selection is unclear: adverse selection in Medigap markets from any source could drive growth in Medigap premiums that in turn could drive beneficiaries into HMO plans. However, our ability to control for the most obvious sources of claims growth – producing parameter estimates of the anticipated signs – suggests that endogeneity may not be a significant problem for our estimates related to Medicare HMO penetration. During the study period, premiums for A and B Medigap policies rose faster than for other standard policies, but rising HMO penetration does not seem to have driven that trend.

Finally, given the recent decline in Medicare HMO enrollment, whether these estimates can be generalized to a period of declining Medicare HMO enrollment is of some concern. That is,

do Medicare beneficiaries leaving Medicare HMOs cause adverse selection into Medigap plans? Since 1999, the withdrawal of Medicare+Choice plans entirely or from local markets has displaced nearly 2 million Medicare beneficiaries (Gold, 2001). Some of these enrollees probably returned to the Medigap market, but under federal law they could select among only four standard policy forms (A, B, C and F) guaranteed-issue.[5]

While the claims experience of insurers offering guaranteed-issue policy forms may have deteriorated at the margin, insurers have had the opportunity to re-rate returning beneficiaries. For insurers that use entry-age rating, re-rating would allow them to charge a higher entry-age premium, reflecting new enrollment at a later age. In states where insurers are able to rate on health status, re-rating would reflect re-underwriting. Thus, the return of Medicare beneficiaries to the Medigap market may be much less problematic for insurers than one might expect.

However, the withdrawal of Medicare+Choice plans could be very problematic for Medicare beneficiaries, especially if these plans are withdrawing from markets where they experienced particularly significant adverse selection. The ability of insurers to re-rate Medicare beneficiaries returning to the Medigap market may cause many of them to leave the supplemental market altogether, populating the ranks of the elderly who rely on Medicare alone for health insurance coverage. Moreover, in the majority of states that do not require Medigap insurers to community rate (and instead allow them to rate on health status), the high cost of re-entering the Medigap market may pose a particular hardship for Medicare beneficiaries with ongoing health problems.

[5] In most states, there may be at least one guaranteed-issue H, I, or J policy also available. However, the very low enrollment in these policies suggests that relative premiums for these products are high, and average premiums – especially those charged to older Medicare beneficiaries– are prohibitive (Chollet and Cook, 2001).

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TABLE 1

DESCRIPTIVE STATISTICS, ALL YEARS
AND 1996 AND 1999 MEANS

Variable	Mean	Standard deviation	1996 Mean	1999 Mean
CLAIMS	904.63	1,623.29	771.58	1,017.47
PLAN A	0.17	0.38	0.18	0.17
PLAN B	0.14	0.35	0.14	0.14
PLAN C	0.2	0.4	0.2	0.21
PLAN D	0.07	0.25	0.06	0.08
PLAN E	0.03	0.18	0.03	0.03
PLAN F	0.21	0.41	0.21	0.21
PLAN G	0.06	0.24	0.06	0.06
PLAN H	0.02	0.16	0.03	0.03
PLAN I	0.05	0.22	0.06	0.05
PLAN J	0.03	0.17	0.03	0.03
MEDSELECT	0.04	0.21	0.03	0.05
ISSUE	0.15	0.36	0.16	0.15
DISABLED	0.24	0.43	0.25	0.25
AGENT	0.73	0.44	0.75	0.73
CLOSED	0.13	0.34	0.11	0.15
LIVES (1,000s)	523.99	4,249.73	515.23	476.2
NEWLIVES (%)	57.85	37.85	70.25	47.2
HMO penetration	10.52	10.84	7.94	12.32
n	35,838	--	8,001	9,378

SOURCE: Authors' analysis of NAIC data.

TABLE 2

PARAMETER ESTIMATES FOR ALL PLANS, LARGE PLANS, AND SMALL PLANS
(Dependent = LnCLAIMS)

	All Plans		Plans with more than 100 lives		Plans with 100 lives or less	
Variable	Coefficient	Std. Err.	Coefficient	Std. Err.	Coefficient	Std. Err.
Intercept	6.1300 *	0.1340	6.7900 *	0.2200	5.8890 *	0.1310
PLAN B	0.5050 *	0.0170	0.2460 *	0.0210	0.4780 *	0.0220
PLAN C	0.6700 *	0.0160	0.3350 *	0.0180	0.6080 *	0.0210
PLAN D	0.2730 *	0.0220	0.0190	0.0230	0.2060 *	0.0290
PLAN E	0.2060 *	0.0290	0.0740	0.0380	0.2370 *	0.0360
PLAN F	0.6510 *	0.0160	0.2480 *	0.0180	0.5860 *	0.0210
PLAN G	0.2900 *	0.0230	-0.0510 **	0.0260	0.2920 *	0.0280
PLAN H	1.1480 *	0.0330	0.5970 *	0.0390	1.2520 *	0.0400
PLAN I	1.1200 *	0.0240	0.6960 *	0.0290	1.1550 *	0.0300
PLAN J	1.3860 *	0.0300	0.8370 *	0.0350	1.4730 *	0.0380
MEDSELECT	-0.2550 *	0.0240	-0.2670 *	0.0190	-0.2120 *	0.0340
ISSUE	-0.0570 *	0.0180	0.1250 *	0.0180	0.0200	0.0250
DISABLED	-0.0170	0.0120	0.0040	0.0110	-0.0280	0.0150
AGENT	-0.0520 *	0.0150	-0.0250 **	0.0120	-0.0090	0.0220
CLOSED	0.0240	0.0150	-0.0660 *	0.0130	0.0700 *	0.0190
LIVES (1,000s)	0.0000 *	0.0000	0.0000	0.0000	0.0060 *	0.0000
NEWLIVES	-0.0060 *	0.0000	-0.0070 *	0.0000	-0.0060 *	0.0000
HMO	-0.0050 **	0.0030	-0.0050 **	0.0020	-0.0050	0.0030
n	35,838		25,556		10,282	
n-k	35,768		25,486		10,212	
F	137		96		94	
R^2	0.21		0.21		0.39	
Root MSE	0.91		1.02		0.43	

SOURCE: Authors' analysis of NAIC data.

NOTE: Coefficients for fixed state and year dummies are not presented. Reference category for plan type is Plan A.

* Significant at 0.99
** Significant at 0.95

TABLE 3

PARAMETER ESTIMATES FOR HMO PENETRATION AND PERCENT NEW LIVES, BY PLAN TYPE
(Dependent = LnCLAIMS)

	HMO penetration (HMO)			Percent new lives (NEWLIVES)			Regression statistics			
Plan type	Coefficient		Standard error	Coefficient		Standard error	n	F		Adj. R2
A	-0.0174	**	0.0072	-0.0047	*	0.0004	6,260	15.15	*	0.1212
B	-0.0153	**	0.0077	-0.0063	*	0.0004	5,014	13.37	*	0.1308
C	0.0037		0.0054	-0.0072	*	0.0003	7,333	19.72	*	0.1347
D	0.0068		0.0103	-0.0042	*	0.0058	2,453	6.48	*	0.1200
E	-0.0277		0.0190	-0.0047	*	0.0009	1,147	3.19	*	0.0998
F	-0.0045		0.0047	-0.0072	*	0.0002	7,693	25.92	*	0.1650
G	-0.0124		0.0104	-0.0048	*	0.0006	2,206	4.93	*	0.0980
H	0.0218		0.0143	-0.0047	*	0.0008	893	3.10	*	0.1240
I	-0.0003		0.0099	-0.0048	*	0.0005	1,788	5.84	*	0.1417
J	0.0241		0.0157	-0.0066	*	0.0008	1,051	4.01	*	0.1487

SOURCE: Authors' analysis of NAIC data.

* Significant at 0.99
** Significant at 0.95