Risk Sharing Between Competing Health Plans And Sponsors

Analysis of Dutch health plan data points to ways in which payment systems can be improved in other countries.

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ABSTRACT: In many countries, competing health plans receive capitation payments from a sponsor, whether government or a private employer. All capitation payment methods are far from perfect and have raised concerns about risk selection. Paying health plans partly on the basis of capitation and partly on the basis of actual costs ("risk sharing") reduces plans' incentives for selection but sacrifices some incentives for efficiency. This paper summarizes our empirical research on Dutch health plans with respect to various forms of risk sharing. All sponsors can improve their payment systems by either implementing or changing their form of risk sharing.

COMPETING HEALTH PLANS in the United States and several European countries receive capitation payments from a sponsor, be it government or a private employer.[1] In some settings the capitation payments constitute plans' entire revenue, while in others the plans may charge members an additional premium. In the latter case, a plan usually has to quote the same premium to each member that chooses the same modality of the specified benefits package.[2] Under capitation, a plan has incentives to provide the highest quality of health care at the lowest possible price. However, a plan also has incentives to select individuals that it expects to be profitable ("preferred risk selection").

As far as we know, all practical applications of capitation leave ample room for risk selection. This is especially true for capitation based solely on demographic variables, but it also holds for capitation partly based on diagnostic information from prior hospitalizations.[3] The first type of capitation is used by various sponsors in Europe, while the latter type has been applied since 1 January 2000 by U.S. Medicare to pay at-risk health maintenance organizations (HMOs). Obviously, improving capitation methods may reduce in-

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centives for risk selection, but such improvement appears to be difficult for sponsors to achieve. Therefore, some sponsors have decided to pay plans partly on the basis of capitation and partly on the basis of a plan's actual expenditures. Various names are used for such combinations of prospective and retrospective payment systems: "blended payment systems," "mixed payment systems," "partial capitation," "pooling," and "risk sharing."

In this paper we use the latter term.[4] We assume that the purpose of risk sharing is to reduce plans' incentives for selection while retaining their incentives for efficiency as much as possible. The simplest form of risk sharing is that a plan is reimbursed for a certain fraction of all actual costs of all members.[5] We refer to this form of risk sharing as "proportional risk sharing." A second form of risk sharing is that health plans are (partially) reimbursed for the expenditures of a member above a certain threshold.[6] We refer to this as "outlier risk sharing."

As far as we know, the relative strength of these and other forms of risk sharing has not yet been studied. Therefore, we compared the consequences of the two forms of risk sharing mentioned above and those of two alternative forms as well. In our empirical analyses, we use demographic capitation, because this type is widely used, and data are generally available. Moreover, under demographic capitation the selection problem is larger than under the Medicare capitation in use since January 2000. We focus on the question of which form of risk sharing yields the best trade-off between incentives for efficiency and incentives for preferred risk selection.

■ **Study assumptions.** We assume a regulated competitive health plan market. "Health plans" can be sickness funds, such as in Belgium, Germany, or the Netherlands. They can be HMOs, such as in the Medicare sector in the United States, or they can be (groups of) health care providers that receive capitation payments, such as general practitioner (GP) fundholders in the United Kingdom in the 1990s. The "sponsor" commonly is the government, but it also may be an employer or a group of employers. We assume a specified benefit package that covers short-term care such as hospital care, prescription drugs, and physician services.[7] Moreover, we assume that plans may contract selectively with providers of care and that they may offer various insurance modalities of the specified benefit package, provided that each modality covers all specified types of care.[8] We assume that plans have to periodically accept anyone who wants to buy a modality of the specified benefit package ("open enrollment"). Therefore, consumers can choose the plan and the insurance modality they like the most, on either a mandatory or voluntary basis. Finally, we assume that a plan has to quote the same

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premium to each member that chooses the same insurance modality.

■ **Selection/efficiency trade-off.** In the situation described above, health plans can apply various tools to improve the efficiency of care, such as utilization management, disease management, and high-cost case management.[9] The potential savings appear to be substantial.[10] However, it has been argued that plans may use many (subtle) tools for preferred risk selection, such as the service of the plan; the quality, reputation, and service of its contracted health care providers; the design of the benefit package; and the design of supplemental health insurance policies, selective advertising, and direct mailing.[11]

Although a plan might gain by selection, it has drawbacks for society as a whole.[12] First, access to good health care for the chronically ill may be hindered. Second, efficient plans might lose market share to inefficient plans that are successful with selection. Third, any resources used for selection can be seen as social welfare losses. Given these drawbacks, many are convinced that the prevention of selection is critical to the success of a regulated competitive individual health plan market.

It is well known that major incentives for selection exist under capitation based only on demographic variables. With risk sharing, plans' incentives for selection can be reduced, but some of their incentives for efficiency will be lost. In our empirical analyses, we simulate a health plan's potential selection gains under various forms of risk sharing as a supplement to demographic capitation. We also simulate which part of various cost reductions a health plan would retain under the various forms of risk sharing. Under demographic capitation without risk sharing, a health plan retains all of the savings, but when risk sharing is employed, a health plan shares the savings with the sponsor.

■ **Forms of risk sharing.** Risk sharing can take many forms.[13] Here we assume that the sponsor would require the risk sharing to be budget-neutral from its own point of view.[14] We analyze the two forms of risk sharing mentioned earlier (proportional and outlier) and applied in practice. We also analyze two other forms of risk sharing: one where plans are reimbursed for the expenditures of a small, fixed fraction of their members who actually were the costliest ("risk sharing for high costs") and one where plans are reimbursed for the expenditures of a small, fixed fraction of their mem-

bers that the plans themselves have designated for risk sharing in advance ("risk sharing for high risks"). Under the latter, plans are allowed to designate those members whom they expect to generate the largest losses, given the capitation payments. As far as we know, neither of these types of risk sharing is currently applied in practice.

■ **Prior costs as a risk adjuster.** An alternative to risk sharing is to base capitation payments partly on prior costs. A simple way to do this is to reimburse the plans for a certain fraction of their members' spending in the previous year. This clearly resembles proportional risk sharing. So, a relevant question is whether supplementing a certain capitation formula with (proportional) risk sharing or employing prior-year costs as an additional risk adjuster within the capitation formula yields the same trade-off between selection and efficiency.[15]

Empirical Analyses Of Risk Sharing

■ **Data.** For this study we analyzed administrative data for six consecutive years (1988–1993) for 47,210 members of one Dutch sickness fund. Originally, the data were gathered in the context of a study on capitation payments that were based in part on diagnostic information from previous hospitalizations.[16] All members had the same insurance coverage and the same benefits. The data include demographic characteristics, the annual costs for several types of care, and the diagnoses from hospital admissions. For a subset of 10,553 members, health survey data were available as well. Data on annual health care spending included virtually all short-term health care expenditures (including the costs for prescription drugs). The average amount spent on health care in 1993 was U.S.$829 per member.[17]

■ **Methods.** First, we calculated demographic capitation payments and analyzed the plan's incentives for selection (Exhibit 1). Then, we analyzed the four forms of risk sharing as a supplement to these capitation payments. This was done in two ways. In the first case, the four forms of risk sharing were specified so that for each form the plan would retain the same fraction of its savings if it reduced all expenditures by 10 percent. This way, the plan's incentives for efficiency are roughly similar for the four forms of risk sharing; this enabled us to examine incentives for selection while keeping incentives for efficiency constant (see Exhibit 1). In the second case, the forms of risk sharing were specified such that the plan would earn the same amount of money by selecting all individuals it expects to be profitable under demographic capitation payments and avoiding all others. So, we could examine incentives for efficiency while keeping incentives for selection constant (Exhibit 2).

Finally, we calculated capitation payments based on the demo-

EXHIBIT 1
Mean Losses In 1993 By A Health Plan, Per Member, For Some Subgroups Of Members After Application Of Risk Sharing, In U.S. Dollars

Subgroup	Percent of members	Mean loss under demographic capitation[a]	Mean loss when type of risk sharing is added to demographic capitation			
			Proportional risk sharing[b]	Outlier risk sharing[b]	Risk sharing for high costs[b]	Risk sharing for high risks[b]
Members with the highest costs for prescription drugs in 1991 (>$1,047)[c]	1.0%	$5,179	$4,143	$3,644	$2,519	$1,483
Members with the most years with hospitalization in the period 1989–1992 (3 or 4 years)[c]	1.0	5,298	4,238	3,480	2,174	1,108
Members with chronic illness[d]						
Heart disease	1.8	1,850	1,482	1,463	869	801
Diabetes	1.7	1,237	990	1,025	749	691
Cancer	1.2	2,394	1,915	1,482	835	515

SOURCE: Based on E.M. van Barneveld, "Risk Sharing as a Supplement to Imperfect Capitation: A Tradeoff between Selection and Efficiency," *Journal of Health Economics* 20, no. 2 (2001): 147–168.
NOTE: The specific variants presented here are proportional risk sharing with a weight of 0.2 on actual costs; outlier risk sharing with a threshold of U.S.$17,094; risk sharing for high costs for 0.5 percent of the members; and risk sharing for high risks for 3 percent of the members. Under these variants, the plans' incentives for efficiency are roughly constant.
[a] Based on ordinary least squares regression with costs in 1993 as the dependent variable and age, sex, degree of urbanization, and disability as the independent variables. $R^2 = .047$.
[b] All losses are statistically significantly different from zero (two-sided t-test, $p < .05$), except the loss of $515 under risk sharing for high risks for the subgroup with cancer.
[c] Value was chosen to yield a subgroup with 1 percent of plan members.
[d] Subgroups formed on the basis of the health survey data.

graphic variables as well as prior-year expenditures. Subsequently, we compared the plans' incentives for selection under these capitation payments with those under the demographic capitation payments supplemented with proportional risk sharing (Exhibit 3). The weight on actual costs in the latter case was chosen to equal the weight on prior costs in the first case. This way, the plans' incentives for efficiency are kept constant.

■ **Results.** Exhibit 1 shows, for various subgroups, how much the plan would lose on these members, on average, per member. Because the plan can identify these subgroups in advance of the year, these losses are predictable losses. The higher the predictable losses, the higher are the incentives for selection. The exhibit shows the remaining predictable losses after each of four forms of risk sharing is used as a supplement to demographic capitation.

For those with the highest costs for prescription drugs two years before, proportional risk sharing reduces the loss from $5,179 to $4,143, and outlier risk sharing reduces it to $3,644. Risk sharing for high costs would reduce the loss to $2,519, and risk sharing for high

EXHIBIT 2
Proportion Of Savings Retained By A Health Plan, After Application Of Risk Sharing

Assumed savings	Proportional risk sharing	Outlier risk sharing	Risk sharing for high costs	Risk sharing for high risks
Various types of care				
Hospital[a]	70%	52%	72%	83%
Prescription drugs	70	88	94	90
Paramedical	70	92	98	93
Various subgroups of members[b]				
Heart patients	70	41	76	68
Diabetes patients	70	57	89	71
Cancer patients	70	38	65	47

SOURCE: Based on E.M. van Barneveld, "Risk Sharing as a Supplement to Imperfect Capitation: A Tradeoff between Selection and Efficiency," *Journal of Health Economics* 20, no. 2 (2001): 147–168.
NOTES: We assumed a 10 percent reduction of the costs for various types of care and a 20 percent reduction of the costs for various subgroups of members, respectively. Given such an assumption, we subsequently calculated the portion of the savings that would be retained by the plan itself. The other part of the savings is retained by the sponsor as a result of the risk sharing. In all cases risk sharing is a supplement to the demographic capitation payments. The specific variants presented here are proportional risk sharing with a weight of 0.3 on actual costs; outlier risk sharing with a threshold of U.S.$8,547; risk sharing for high costs for 0.5 percent of the members; and risk sharing for high risks for 1.5 percent of the members. Under these variants, the plan's incentives for selection are roughly constant.
[a] Including the costs of specialist care.
[b] Based on health survey data.

risks, to $1,483. The latter two forms of risk sharing reduce incentives for selection more than the first two forms do. An advantage of risk sharing for high risks in comparison with risk sharing for high costs is that it yields greater reductions in predictable losses for the subgroups distinguished here.

For each of the four forms of risk sharing, Exhibit 2 shows the plan's portion of savings if each one is used as a supplement to demographic capitation. If the plan reduced the costs for hospital and specialist care by 10 percent, it would retain 70 percent of the savings in the case of proportional risk sharing. In the case of outlier risk sharing, it would retain only 52 percent. Under the other forms of risk sharing, the plan's portion of the savings would be higher.

A disadvantage of risk sharing for high risks in comparison with risk sharing for high costs is that it apparently retains fewer incentives for efficiency with respect to several subgroups that a plan could choose for the application of disease management. For instance, if the plan reduced the cost for diabetes patients by 20 percent, it would keep 89 percent of the savings under risk sharing for high costs. In the case of risk sharing for high risks, it would keep only 71 percent. Thus, if disease management for the chronically ill is seen as the most promising strategy to improve efficiency of care, risk sharing for high costs may be more appropriate than that for high risks.

Exhibit 3 shows the predictable losses for some subgroups in the case of proportional risk sharing as a supplement to demographic

EXHIBIT 3
Mean Losses In 1993 By A Health Plan, Per Member, Based On Demographic Capitation And Prior-Year Costs, In U.S. Dollars

Subgroup	Percent of members	Proportional risk sharing[a]	Prior-year costs
Members with the highest costs for prescription drugs in 1991 (>$1,047)	1%	$3,055[b]	$2,732[b]
Members with the most years with a hospitalization in the period 1989–1992 (3 or 4 years)	1	3,126[b]	2,315[b]
Members with chronic illness[c]			
Heart disease	1.8	1,092[b]	562
Diabetes	1.7	730[b]	593
Cancer	1.2	1,413[b]	1,090

SOURCE: Based on E.M. van Barneveld "Risk Sharing as a Supplement to Imperfect Capitation in Health Insurance: A Tradeoff between Selection and Efficiency" (Doctoral thesis, Erasmus University, Rotterdam, the Netherlands, 2000).
NOTES: The R^2 value of the relevant ordinary least squares regression equation is .197.
[a] The weight on actual costs is set at 0.41, which equals the regression coefficient of prior-year expenditures in the prior cost model.
[b] Statistically significantly different from zero (two-sided t-test, $p > .05$).
[c] Based on health survey data.

capitation and in the case of capitation payments based on demographic variables and prior-year costs. Remember, the higher these losses, the greater the plan's incentives for selection. Using prior-year costs as an additional risk adjuster next to demographic variables yields a greater reduction of the plan's incentives for selection than does proportional risk sharing as a supplement to the demographic capitation payments, while the plan's incentives for efficiency are kept constant.

Discussion

In many countries competing health plans receive demographic capitation payments from a sponsor. If for whatever reason such capitation payments cannot be improved, the sponsor might consider reimbursing the plans using proportional risk sharing or outlier risk sharing. Our empirical analyses shows that, roughly speaking, these forms of risk sharing yield similar trade-offs between selection and efficiency. More importantly, our analyses show that three other forms of risk sharing yield a better trade-off: risk sharing for high risks, and employing prior costs as an additional risk adjuster. None of these three alternatives yields a uniformly better selection-efficiency trade-off than the others.

■ **Limitations of the study.** Our study is limited in several ways. First, we assumed that a plan has to quote the same premium to each member who chooses the same insurance modality of the specified benefit package. If this rate restriction is weakened by allowing a plan to vary the premium within a certain minimum and maximum,

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outlier and proportional risk sharing are still straightforward. However, the two other forms of risk sharing may make premium calculations difficult, because it would be unclear for which part of a potential member's future costs the plan is at risk. Second, we assumed that a definition of so-called acceptable expenditures within the context of the specified benefit package and cost data are available for at least two consecutive years. The definition of "acceptable expenditures" could become problematic if the specification of the benefit package becomes less detailed and health plans offer many different insurance modalities of the specified package. If cost data are not available for all types of care, it might be possible to use imputed costs (based on health care utilization and imputed prices). Another option would be to limit risk sharing to types of care for which cost data are already available, such as hospital care.[18]

Third, we assumed that the purpose of risk sharing is to reduce plans' incentives for selection while maintaining their incentives for efficiency as much as possible. In other studies, the purpose of risk sharing appears to be different.[19] If such is the case, different trade-offs have to be made. Finally, we included four forms of risk sharing in the empirical analyses. Other forms of risk sharing are also possible, such as condition-specific risk sharing.[20] However, such risk sharing may result in discussions over which conditions should make members eligible for risk sharing and may induce manipulation by plans. With the forms of risk sharing that we analyzed, this is not the case.

■ **Implications for health policy.** Given that all current applications of capitation payments leave ample room for risk selection, it is remarkable that most sponsors do not employ any form of risk sharing as a supplement to their capitation payments. In 2001 this is the case in the Czech Republic, Germany, Switzerland, and the United States. Some sponsors have supplemented their capitation payments with either proportional risk sharing or outlier risk sharing (Belgium and the Netherlands). In sum, all countries with a competitive health plan market could improve their methods of paying plans either by implementing some form of risk sharing or by changing the form of risk sharing they now use.

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NOTES

1. W.P.M.M. van de Ven and R.P. Ellis, "Risk Adjustment in Competitive Health Plan Markets," in *Handbook of Health Economics*, volume 1, ed. A.J. Culyer and J.P. Newhouse (Amsterdam: Elsevier Science BV, 2000).
2. In this paper we assume these premium rate restrictions. The reason is that they are common, presumably because without them there may arise serious problems with respect to "access to health care coverage for high risks." See W.P.M.M. van de Ven et al., "Access to Coverage for High-Risks in a Competitive Individual Health Insurance Market: Via Premium Rate Restrictions or via Risk-Adjusted Premium Subsidies?" *Journal of Health Economics* 19, no. 3 (2000): 311–339.
3. See L.M. Lamers, "Risk-Adjusted Capitation Based on the Diagnostic Cost Group Model: An Empirical Evaluation with Health Survey Information," *Health Services Research* 33, no. 6 (1999): 1727–1744.
4. Risk sharing differs from reinsurance in two ways. Risk sharing is mandatory for all plans and it is not (fully) risk-rated, whereas reinsurance is voluntary and risk-rated. R.R. Bovbjerg, "Reform of Financing for Health Coverage: What Can Reinsurance Accomplish?" *Inquiry* 29, no. 2 (1992): 158–175.
5. J.P. Newhouse, "Rate Adjusters for Medicare under Capitation," *Health Care Financing Review* (Annual Supplement 1986): 45–55.
6. J.C. Beebe, "An Outlier Pool for Medicare HMO Payments," *Health Care Financing Review* 10, no. 1 (1992): 59–63.
7. Long-term care such as nursing home care or care provided by institutions for mentally or physically disabled persons is commonly excluded from capitation payment systems.
8. Because we assume that the health plans are allowed to contract selectively with providers, we also assume that they are allowed to offer different insurance modalities of the specified benefit package. These modalities may differ with respect to the list of contracted health care providers and with respect to the conditions that have to be fulfilled to cover the costs of care.
9. See A.L. Hillman, "Managing the Physician: Rules versus Incentives," *Health Affairs* (Winter 1991): 138–146; J.P. Weiner and G. de Lissovoy, "A Taxonomy for Managed Care and Health Insurance Plans," *Journal of Health Politics, Policy and Law* 18, no. 1 (1993): 75–112; A.C. Enthoven, "On the Ideal Market Structure for Third-Party Purchasing of Health Care," *Social Science and Medicine* 39, no. 10 (1994): 39–57; R.H. Miller, and H.S Luft, "Managed Care Plan Performance since 1980: A Literature Analysis," *Journal of the American Medical Association* 271, no. 19 (1994): 1512–1519; and M.R. Gold et al., "A National Survey of the Arrangements Managed-Care Plans Make with Physicians," *New England Journal of Medicine* 333, no. 25 (1995): 1678–1683.
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11. H.S. Luft and R.M. Miller, "Patient Selection in a Competitive Health Care System," *Health Affairs* (Fall 1988): 98–119; and J.P. Newhouse, "Patients at Risk: Health Reform and Risk Adjustment," *Health Affairs* (Spring 1994): 132–146.
12. W.P.M.M. van de Ven and R.C.J.A. van Vliet, "How Can We Prevent Cream Skimming in a Competitive Health Insurance Market? The Great Challenge for the 1990s," in *Health Economics Worldwide*, 23–46.
13. Suggestions for forms of risk sharing have been given in the following papers: L. Gruenberg, S.S. Wallack, and C.P. Tompkins, "Pricing Strategies for Capitated Delivery Systems," *Health Care Financing Review* (Annual Supplement 1986): 35–44; Newhouse, "Rate Adjusters for Medicare"; S.S. Wallack, C.P. Tompkins, and L. Gruenberg, "A Plan for Rewarding Efficient HMOs," *Health Affairs* (Fall 1988): 80–97; van de Ven and van Vliet, "How Can We Prevent"; and W.P.M.M. van de Ven et al., "Risk-Adjusted Capitation: Recent Experiences in the Netherlands," *Health Affairs* (1994): 118–136. Empirical results for two forms of risk sharing are available in Beebe, "An Outlier Pool"; and E.M. van Barneveld, R.C.J.A. van Vliet, and W.P.M.M. van de Ven, "Mandatory High-Risk Pooling: A Means for Reducing Incentives for Cream Skimming," *Inquiry* 33, no. 2 (1996): 133–143.
14. In our empirical analyses, we financed the risk sharing via a proportional reduction of the normative costs that constitute the basis for the calculation of the capitation payments. See also E.M. van Barneveld, "Risk Sharing as a Supplement to Imperfect Capitation: A Tradeoff between Selection and Efficiency," *Journal of Health Economics* 20, no. 2 (2001): 147–168.
15. This question is addressed in chapter 8 of E.M. van Barneveld, "Risk Sharing as a Supplement to Imperfect Capitation in Health Insurance: A Tradeoff between Selection and Efficiency" (Doctoral thesis, Erasmus University, Rotterdam, the Netherlands, 2000).
16. L.M. Lamers, "Capitation Payments to Competing Dutch Sickness Funds" (Doctoral thesis, Erasmus University, Rotterdam, the Netherlands, 1997).
17. In January 2001 one U.S. dollar was worth about 1.06 Euro and about 2.34 Dutch guilders.
18. Beebe, "An Outlier Pool."
19. Ibid.; Newhouse et al., "Risk Adjustment and Medicare"; and E.B. Keeler, G.M. Carter, and J.P. Newhouse, "A Model of the Impact of Reimbursement Schemes on Health Plan Choice," *Journal of Health Economics* 17, no. 3 (1998): 297–320.
20. In Israel some form of condition-specific risk sharing is being employed as a supplement to demographic capitation payments. This form of risk sharing covers five severe diseases and about 6 percent of overall expenditures.