

This paper is prepared for presentation at the lecture, “Sickness Fund Compensation and Risk Selection” at the annual meeting of the Verein für Socialpolitik, Bonn, Germany September 29, 2005.

September 19, 2005

Contending with Risk Selection in Competitive Health Insurance Markets

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Acknowledgements: Research for this paper was supported by the Agency for Healthcare Research and Quality (P01 HS10803) and the National Institute for Mental Health (R34 MH071242).

Introduction

In many countries, residents choose a health plan or sickness fund through which to receive health insurance benefits. These choices are regulated and at least partially paid for by governments and employers. Collective financing of health care redistributes the burden of cost from the sick to the healthy and from the poor to the rich, in comparison to a market system where everyone pays their own way. At the same time, societies seek the virtues of markets: choice, innovation, and cost and quality competition from their health insurance plans. Melding these desires for both a fair and controlled, and an efficient and innovative, health insurance sector is a central and common problem facing all developed nations. As Rice and Smith (2001) point out, a common approach to this problem consists of national governments collecting the funds to pay for health care, but then devolving responsibility for the purchasing of health care to a local organization, a private insurance plan as in the federal Medicare program in the U.S., local government in the U.K., Canada and Australia, or sickness funds as in Germany, Israel, Netherlands and Belgium. Governmental involvement intends to distribute the cost burden fairly, and competition among the decentralized participants is intended to promote efficiency.

One of the major concerns with such a policy is adverse selection (Enthoven, 1993; van de Ven et al., 2003). Generally, health plans or sickness funds may take actions to discourage or encourage potential enrollees from joining, and these actions may have efficiency or fairness implications. For one thing, they may refuse some applicants, although overt actions to discourage individuals are normally prohibited. More troublesome and difficult to monitor is that plans may distort the mix of the quality of health care they offer to discourage high-cost persons from joining the plan. As a number

of papers have observed, decisions about what care is medically necessary are fundamentally outside the scope of direct regulation (Miller and Luft, 1997; Newhouse, 1996).

The purpose of this paper is to consider how economic analysis can help address the problem of adverse selection in health insurance within a centrally financed, but competitively supplied, health insurance system. Most health economists' answer to the question of how to address selection in this context centers around the policy of risk adjustment of the premiums paid to insuring organizations. Whether risk adjustment is helpful and/or necessary, and what form of risk adjustment is most useful, depends on the form of the problem raised by adverse selection, and on the tools the regulator (or employer) has to deal with these problems. In this paper, after setting out the problems caused by selection in health insurance, we organize our discussion about addressing these problems around five cases varying according to what the payer knows and can do about selection. We will consider both contracting and information-based policies as well as risk adjustment. Theory will be tied, where possible, to experience in the U.S. of payers in situations corresponding to the theoretical analysis. The paper closes with some observations about contending with adverse selection within the German system of health care financing. The term "health plan" will be used in general discussions, and "sickness fund" used in the application to Germany.

The Basic Adverse Selection Problem

One aspect of selection is when enrollees with different costs are distributed unevenly across health plans or sickness funds. In Medicare in the U.S., there is plenty of evidence

that lower cost beneficiaries are more likely to enroll in managed care plans paid by risk-adjusted capitation, and higher cost beneficiaries remain in the fee-for-service (FFS) sector.¹ In private health insurance, managed care plans also attract lower cost enrollees.² In Germany, differences in contribution rates at sickness funds are evidence for selection since the contribution rates are partly driven costs.³

Selection of this form may or may not constitute a social efficiency problem. In any population, there will be diversity in tolerance for cost-control mechanisms, in the evaluation of different benefits, and in locational preferences. If any of these factors or other factors are correlated with expected health care costs, an efficient division of the market among plans (that is, one respecting diversity in tastes) will be characterized by selection of higher risk individuals into some plans. As Feldman and Dowd (2000) and Pauly (1985) have effectively argued, evidence of risk segmentation of this form does not constitute a per se violation of conditions for economic efficiency in insurance markets.⁴ Nonetheless, selection of this type can be associated with unfairness in the sense of differential premiums or contribution rates. In the analyses referred to above, health plans are assumed to offer a fixed product, and the efficiency issue is sorting people among plans.

Analysis of adverse selection and efficiency of health insurance is incomplete, however, without recognizing that plans take actions to affect their membership. Plans

¹ Eggers and Prihoda (1982) showed that people in Medicare HMOs had significantly lower costs than those in traditional fee-for-service sector. A survey by Rossiter and Wilensky (1986) indicated that most of the studies during 1974-1986 supported the existence of selection behavior by HMOs. Brown et al. (1993) found that the spendings of Medicare enrollees in a managed care plan would be 10% lower than average if they had been in the FFS sector. Greenwald et al. (2000) showed that there were significant differences between the actual cost of managed care and FFS beneficiaries for inpatient services. Also see Hellinger (1995).

² Nicholson et al. (2004). See also Cutler and Zeckhauser (2000) for a review.

³ Buchner and Wasem (2003). We discuss this more below.

⁴ See Knaus and Nuscheler (2004) for a parallel discussion in the German context.

can do two main things. First, if a plan or fund knows the likely cost of an identifiable potential enrollee will be more (or less) than the revenue the plan receives for that person, the plan might take actions to discourage (or encourage) enrollment at the individual level. Suppose a government or employer pays a plan a fixed amount for each enrollee in the plan, disregarding observable factors, such as age, when paying the plan. Older workers cost more than younger workers. A plan has an obvious incentive to accept a young worker and deny enrollment to an older worker. Health plans are generally prohibited by regulation from denying enrollment to eligible applicants, but some covert actions to discourage costly applicants may be hard to stop.

Plans can do a second thing, which does not require illegal actions directed against individuals. The plan can underprovide some services and overprovide others, attracting the low risks and deterring the high risks (Newhouse, 1996; Van de Ven and Ellis, 2000). Plan manipulation, in Cutler and Zeckhauser's (2000) terminology, emerges in models of health insurance when plans compete on the basis of service quality (Glazer and McGuire, 2000; Nuscheler and Knaus, 2004). The basic idea draws on early analyses of insurance by Rothschild and Stiglitz (1976). Demand for treatment of chronic conditions, for example, may be much better anticipated, and more unevenly distributed in a population, than demand for acute care. In such a case, the health plan has a financial incentive to distort the mix of its care away from chronic care and towards acute illness, in order to deter/attract the high/low risks. Nearly all writers on the efficiency of health insurance markets with managed care acknowledge this effect, though they vary in the emphasis they put on it. It is in the foreground of discussion in Cao (2002), Frank et al. (2000), Glazer and McGuire (2000), Luft and Miller (1988) and Newhouse (1997;

2002a), while noted but given less prominence in Cutler and Zeckhauser (2000), Feldman and Dowd (2000), Pauly (2000), and van de Ven and Ellis (2000). When a plan can set prices as well as quality, a version of this strategy is to provide low quality overall, and set a low price, to attract the low-risks.

This quality distortion problem has received a good deal of attention in the literature in health economics. We present the basic adverse selection model here, as a point of reference, in order to highlight some of the key assumptions behind the model. Reconsidering these assumptions will structure our analysis of ways a regulator can address problems of adverse selection.

Suppose that there are two types of individuals, L and H, who can contract two illnesses, a and c . Illness a we call an acute illness and both types of people have the same probability of contracting this illness, $p_a > 0$. The two types are distinguished in their probability of contracting the chronic illness c . Let p_i , $i \in \{H, L\}$ denote the probability that a person of type i contracts illness c . Then, $p_H > p_L > 0$. The proportion of H types in the population is λ , $0 < \lambda < 1$. Let $p_c \equiv \lambda p_H + (1 - \lambda)p_L$ denote the (expected) probability that a randomly drawn person contracts the chronic illness. Throughout our analysis we assume that each individual knows her type.⁵ We also assume that each individual must choose one plan.

If a person (of either type) has illness j , $j \in \{a, c\}$, her utility from treatment will be increased by $V_j(q_j)$, where $q_j > 0$ denotes the “quality” of the services devoted to

⁵ For more discussion of the assumptions in this section, see Glazer and McGuire (2000).

treat illness j , with $V'_j > 0$ and $V''_j \leq 0$.⁶ Thus, we make the simplifying assumption that the benefits from treatment are independent of one another and the same to all individuals. If a person has both illnesses, her utility, if treated, will simply be increased by $V_a(q_a) + V_c(q_c)$.

Treatment services are provided by health plans. A health plan is characterized by a quality pair (q_a, q_c) , where $q_j, j \in \{a, c\}$ is a summary indicator of the quality of services that the plan provides, devoted to treating illness j . Thus, if a person of type $i, i \in \{H, L\}$ joins a plan with a quality pair (q_a, q_c) , her expected utility will increase by:

$$(1) \quad U_i(q_a, q_c) = p_a V_a(q_a) + p_i V_c(q_c)$$

Throughout the analysis we assume that each plan gets to choose its quality pair and a plan can offer only one quality pair. All plans have the same cost function. A plan's cost of treating a person with illness $j, j \in \{a, c\}$ at a quality level q_j is $C_j(q_j)$, where $C'_j > 0, C''_j > 0$. Thus, if a person of type $i, i \in \{H, L\}$ joins a plan that offers a quality pair (q_a, q_c) , the plan's costs are expected to increase by

$$(2) \quad C_i(q_a, q_c) = p_a C_a(q_a) + p_i C_c(q_c)$$

The *socially efficient* quality pair (q_a^*, q_c^*) equalizes marginal benefit of treatment to marginal cost, thus solving the following pair of equations:

$$(3) \quad V'_a(q_a^*) = C'_a(q_a^*)$$

$$V'_c(q_c^*) = C'_c(q_c^*)$$

⁶ The economic literature models quality in two ways: as a form of quantity rationing, as here and in Pauly and Ramsey (1999), or as a shadow price as in Keeler et al. (1998) or Frank, Glazer and McGuire (2000). When consumers are identical in their demands given they are ill, and differ only in the probability of having an illness, the two approaches are equivalent.

High and low risk types have different probabilities of becoming ill, but once ill, receive the same utility from treatment. Thus, the efficient level of quality is independent of the probability of becoming ill and is the same for both types.

We postulate the existence of a public regulator or payer whose objective is to implement the socially desired quality. The focus of our analysis will be on the tools that the regulator can use in order to achieve his goal and on the conditions under which these tools can be applied. We assume the regulator can enforce an open enrollment policy. The following five assumptions are made in order to present the basic adverse selection result. In the analysis that follows this result the significance of these assumptions and the consequences of relaxing them will be discussed.

Assumptions:

- 1) Quality is not contractible. The public regulator cannot condition payments to plans (either by the regulator or by the individuals) on the basis of their delivered quality.
- 2) Cost is not contractible. The public regulator cannot condition payments to plan on the basis of costs per person.
- 3) Plans can freely enter and exit the market. The public regulator cannot condition a plan's participation on the basis of its quality. However, once a plan participates, the regulator can require that it accepts every applicant.
- 4) Consumers can observe the quality of each plan and can freely move from one plan to the other.
- 5) There is no risk adjustment. More specifically, we assume that the premium is set such that the plan is expected to break even if it offers the socially efficient

quality pair (q_a^*, q_c^*) and attracts randomly drawn individuals from the entire population. Thus, the premium is set at r^* , where $r^* = p_a C_a(q_a^*) + p_c C_c(q_c^*)$.⁷

The order of moves in our model is as follows: first plans (simultaneously) choose their quality pair, (q_a, q_c) , then individuals choose plans and plans collect a revenue of r^* per enrollee, finally each individual's health state (whether she has illness a and/or c) is realized and plans pay the costs of treatment. Our definition of a competitive equilibrium in this case is similar to that of Rothschild and Stiglitz (1976). A *competitive equilibrium* in this market is a set of quality pairs such that, when individuals choose plan to maximize expected utility, (i) no quality pair in the equilibrium set makes negative expected profit, and (ii) there is no quality pair outside the equilibrium set that if offered, will make a positive profit.

The following proposition builds on Rothschild and Stiglitz (1976) and Glazer and McGuire (2000):

Proposition: If λ (the proportion of the H types in the population) is sufficiently large, then a competitive equilibrium exists and is characterized by two quality pairs.⁸ H types choose the plan(s) that offer the quality pair:

$$(4) \quad \begin{aligned} (q_a^H, q_c^H) &= \operatorname{argmax} U_H(q_a, q_c) \\ \text{s.t.} \quad C_H(q_a, q_c) &= r^* \end{aligned}$$

⁷ The assumption that plans cannot compete on premium is not essential to the analysis. The starting point of our analysis is that when quality is multidimensional, adverse selection incentives induce plans to distort quality. If plans could also choose premium, premium would be just another instrument plans could use to "select" patients, but this instrument by itself would not generally be enough and plans would still have the incentives to distort quality in order to affect the mixture of enrollees. Even if we allowed for the possibility that plans choose copayments, the results would not change much, unless the plans could choose different levels of copayments for the different services they provide.

⁸ The exact condition is that λ should be sufficiently large so that $U_L(q_a^L, q_c^L) \geq U_L(q_a, q_c)$ for every (q_a, q_c) for which $p_a C_a(q_a) + p_c C_c(q_c) = r^*$.

and L types choose the plan(s) that offer the quality pair:

$$(5) \quad \begin{aligned} (q_a^L, q_c^L) &= \operatorname{argmax} U_L(q_a, q_c) \\ &\text{s.t. } C_L(q_a, q_c) = r^* \\ &\text{and } U_L(q_a, q_c) = U_H(q_a^H, q_c^H) \end{aligned}$$

The proof of the proposition above is well established (see Glazer and McGuire, 2000). The reason that the socially efficient quality pair (q_a^*, q_c^*) cannot be an equilibrium pair is that if all plans offer this quality profile, each (single) plan will have an incentive to deviate to a different pair, say (q_a', q_c') with a better acute care (i.e., $(q_a' > q_a^*)$) and a worse chronic care (i.e., $(q_c' < q_c^*)$), attracting only the L types and making a strictly positive profit. The equilibrium is described in Figure 1. The curves r_i^* , $i = H, L$ represent all plans, i.e., pairs of (q_a, q_c) , that break even if the plan attracts only individuals of type i , when the premium is r^* . The points denoted by q_i , $i = H$ or L , depict the plan chosen by type i in equilibrium, i.e., $q_i = (q_a^i, q_c^i)$. Curves u_i , $i = H, L$, represent type i 's indifference curves that goes through the point q_i . The curve r^* represents all plans that break even if the plan attracts a random sample of the population, and the point q^* depicts the socially efficient levels of quality. We can see, therefore, that in a market where the five assumptions above hold, plans will not offer the socially efficient quality profile in equilibrium.

Figure 2 depicts the arrangements among consumers, a central government and health plans corresponding to the set up of the model just described. Consumers are represented by sick and healthy types, with sicker individuals being more costly. Sicker types need more of both hospital bed days and more physician visits than the healthy

types. Their composition of demand is also different: they need and value hospital care relatively more than the healthy. All consumers pay in funds to the central government (employer) in the form of taxes or premiums. These consumers choose among plans, in the figure represented by Plans 1, 2 and 3. Plans receive funds from the central government, set enrollment policies, and decide about the nature of the product they offer consumers. Plans can do two things, illustrated by actions Plans 1 and 2. Plan 1 distorts its product, de-emphasizing hospital care and putting resources in to doctors, in order to attract the healthy and deter the sick. Plan 2 puts barriers in enrollment in front of the sicker potential enrollees.

The policy tools available to a regulator correspond to the five assumptions laid out above. Relaxing each assumption in turn can be used as a basis for discussion of different approaches to dealing with the basic adverse selection problem. For each of these cases we will discuss the theoretical concepts and will present, where possible, policy settings that resemble the case. The cases that will be discussed are the following:

1. Paying on quality-quality is observable and verifiable by a third party so the regulator can make payments to plans based on quality of the services the plans provide.
2. Cost sharing- cost per individual is observable and verifiable by the regulator. Payment per individual to the plan can be based on the plan's spending on that individual.
3. Restricting entry- quality is observable by the regulator but it is not verifiable. Even though the regulator cannot make payments to plans dependent on the

quality of their services, it can decide which plans may participate in the market after observing their quality.

4. Quality reporting –quality is not verifiable, it is observable by the regulator but not by the consumers. The regulator can choose how much information about quality to provide to consumers.
5. Risk adjustment-quality is not verifiable and not observable by the regulator.

Consumers, on the other hand, can observe (but not pay on the basis of) quality.

CASE 1: Quality is Verifiable- Pay for Performance

If plans' quality is verifiable payments can be made on the basis of quality. The regulator can construct a contract by which a plan receives a premium per person that is a function of the plan's quality. If the premium function is such that when all plans offer the socially desired quality each plan makes zero expected profit and no plan wishes to deviate to another quality profile (possibly attracting only one of the two types), then the regulator's objective is obtained. One such premium function would be the one that pays plans nothing if their quality is different than the socially desired one and pays them exactly their expected costs, if they offer the socially desired quality.

Notice that in case discussed above there is no need for competition in order to implement the desired quality. However, what is needed is for the regulator to "know" exactly the socially desired quality, in order for the premium to be dependent on any gap between the plan's actual quality and the desired one. One could assume a somewhat more realistic scenario where the quality is observable and verifiable but the regulator does not have enough information (e.g., about plans' costs or enrollee's health care needs)

to be certain about the level of quality of each service that defines the socially desired. In such a case the regulator may enhance quality by having many plans and paying higher premiums to plans with higher quality.

One should note, however, that there are some major problems with paying on quality, and this case is noted here for conceptual completeness rather than as a basis for practical discussion. First of all, it is very hard to measure quality precisely, especially since a good quality measure needs to take into account illness severity of each and every patient. Adjusting for severity is quite complex and involves many of the issues related to risk adjustment to be discussed later. Furthermore, even if one can come up with a good quality measure for some services, it is practically impossible to come up with a good measure of all services. However, paying on quality only for some services and not the other, may introduce a major multitasking problem.⁹

In sum, while experimenting with paying for performance is becoming more and more popular, it is a small part of contracts, and with current information about quality health care, is unlikely to be able to contend with selection related quality concerns.

CASE 2: Cost Per Individual is Verifiable

When plans' costs are verifiable the regulator has the choice of several different payment schemes, conditioning payments to plans on their actual expenditures. One simple and commonly used strategy is cost sharing. Under cost sharing the payer, in addition to paying the plan a fixed premium, covers a prespecified share of the plan's costs. (see Ellis and McGuire 1986 and Newhouse 1996). One can easily see that in the model studied

⁹ Rosenthal and Frank (2004) contains a survey of the incentive issues and empirical results of pay-for-performance studies. One conclusion is that, "Despite the assertions of its proponents, the empirical foundations of pay-for-performance in health care are rather weak."

above, such a strategy will not solve the adverse selection problem. In Figure 1, cost sharing will simply mean a (parallel) shift in the zero profit curves and the resulting equilibrium will still be a separating one. In a more general framework, however, cost sharing could reduce plans incentives to select enrollees, as it makes the cost differential between a high cost individual and a low cost individual smaller. These weaker incentives to select enrollees might result in a more efficient equilibrium outcome, at least as far as adverse selection is concerned. Notice that in order to implement the cost sharing payment scheme, all the payer needs to be able to verify is a plans' total costs and not the cost per individual.

If the regulator can verify a plan's cost per individual, other payment schemes are feasible, the most commonly used and widely discussed one is outlier cost reimbursement. Under outlier cost reimbursement the payer covers a share of the plan's expenditures on those individuals whose costs exceed a certain prespecified threshold level (van de Ven and Ellis, 2000). When public funds are limited, or incentives are an issue, other, more general approaches can be considered (Kifmann and Lorenz, 2005). In our stylized model discussed above, one can see that under such a payment policy, if only a share of the plan's cost beyond the threshold level, are covered, the equilibrium will still be a separating inefficient one, and if all plan's costs, beyond the threshold level, are covered, multiple equilibria will emerge with only one of them being the efficient equilibrium. In a more general setting, however, one should expect the outlier cost reimbursement scheme to lessen plans' incentives to discourage high risk enrollees as they are no longer that more expensive to the plan than the low risk ones.

While cost sharing mechanisms seem to be helpful in addressing adverse selection problems, they may also create some new problems. If plans costs are, at least partially covered, plans will have less of an incentive to save on costs on more of an incentive to over provide some services (See Newhouse 1996). The tradeoff between these two forces must be carefully examined before one is to apply a cost sharing mechanism.

CASE 3: Quality is Observable and the Regulator Can Select Plans on the Basis of Quality

Assume that the regulator can observe each plan's quality. Further assume that the regulator, after learning a plan's quality, can decide whether or not the plan is eligible to offer its services to the consumers. In such a case the regulator can easily implement the socially desired contract by announcing a premium per person that exactly covers a plan's expected cost at the socially desired contract and announcing that only the plans with the desired quality will be allowed to participate. It is easy to see that in the model presented above, such a mechanism will implement an equilibrium in which all plans offer the desired quality. This approach requires only that the payer be able to observe quality, and be prepared to not contract with health plans that offer unsatisfactory quality.

Case 3 corresponds to the private health insurance market in the U.S. It is common in the U.S. for workers and their families to obtain health insurance offered through their employer. Private health insurance is regulated in terms of pricing, coverage, and who must be offered coverage in complex ways by both the federal and state governments. As a general matter, however, there is no standard benefit, and no universal requirement that employers offer coverage. Nonetheless, because of favorable

tax treatment of health insurance included as part of employee benefits, approximately 71% of workers in the U.S. are covered through employer-based health insurance (Gruber and McKnight, 2002).

In order to minimize costs of worker compensation, employers have an incentive to offer an attractive health insurance benefit to workers, which, because of worker heterogeneity, may include choice of forms of health insurance. The U.S. is characterized by a private market in health insurance with a wide variety of products, varying according to the services covered, the degree of provider choice permitted, and the stringency of managed care arrangements.

It can be expected that in the presence of some choice of different types of health insurance, workers who anticipate being more healthy and low cost, will sort themselves into plans in systematic ways. There is ample evidence that risk selection among types of plans takes place in the private health insurance market in the U.S. (Nicholson et al., 2004). How have private employers contended with issues raised by selection in the market for health insurance?

To begin, it is notable what private employers do not do. Private employers do not use formal risk adjustment. By “formal risk adjustment” we mean setting a price for individual or family enrollees to pay to health plans based on personal characteristics such as age, gender or past health care use. Employers adjust their premiums for risk in several different ways, but formal risk adjustment is rarely used. While public purchasers rely heavily on formal risk adjustment, very few private purchasers use formal risk adjustment to pay health plans. Indeed, among private employers, which account for the majority of enrollees in health plans, formal risk adjustment is virtually nonexistent, with

the exception of a few purchasing coalitions. While the data we present are for 1998, we know of no evidence that use of formal risk adjustment among private employers is increasing. In light of the importance of the potential implications of this “market test” of risk adjustment, it is worth considering practices of the private sector in more detail.

Relative to public purchasers, large employers may choose from additional practices that effectively address risk selection problems (Glazer and McGuire 2001a discuss these strategies). First, larger private purchasers (usually more than 200 employees) may decide to “self-insure,” meaning that they pay the claims incurred by their employees or beneficiaries plus a fee to the health plan administering the benefits. Such firms’ health care costs thus track the actual use of medical care by their employees. This practice has become increasingly common, even among firms with as few as 100 employees, in part because self-insured firms are exempt from state benefit mandates. An estimated 48 million employees and dependents are enrolled in self-insured plans (McDonnell and Fronstin, 1999; InterStudy, 2000). Since health plans are not at risk for medical care, the incentive for risk selection at the plan level is removed.

Large employers make additional decisions that influence the potential for risk selection. In particular, although many large employers offer a choice of products (a health maintenance organization [HMO], a preferred provider organization [PPO], and a point-of-service [POS] plan, for example), employers often contract with one carrier to provide all products. Because the entire risk pool of employees remains with the one carrier, there are no incentives at the plan level to influence risk selection among the various products. In fact, large employers offer a choice of carrier relatively infrequently: in 1997, 15% of firms with 500 or more employees offered a choice of carrier (32% of

employees with choice), while 13% of firms with 50-499 employees (18% of employees) did so (Marquis and Long (1999); see also Frank and Rosenthal (2001) for discussion of implications for employers' adoption of formal risk adjustment).

The payment methods in place for large employers may achieve goals similar to formal risk adjustment. In the private sector payment rates often are established by health plans, in negotiation with employers. Here we discuss two approaches to setting rates: experience rating and community rating by class. In experience rating, the prior year(s) health plan expenditures are used as a basis for the next year's premiums. Because individual-level variations tend to average out as the group size increases, health plans regard experience data for large firms as highly credible (Sturm, 2001). Rates for very large firms (more than 1,000 employees) may be based entirely on past experience (Sturm, 2001). If the average risk characteristics of a private employer's enrollees remain roughly constant in a plan over time, experience-related rates are useful in aligning premium payments with expected costs – one of the objectives of formal risk adjustment.

Figure 3 draws on data from a number of sources (see Keenan et al., 2001 for methodology) to make a dramatic contrast between the way health plans are paid by the public sector in the U.S. (Medicare and Medicaid) and by private employers. Private buyers accounting for about 80% of enrollees (60.6 million) virtually *never* use formal risk adjustment. Public buyers accounting for about 20% of the enrollees (15.3 million) virtually *always* use formal risk adjustment. The contrast between what the regulators choose to do and what the private buyers choose to do could not be more stark.

The contracting practices of private employers are nearly the opposite of Medicare's in three respects. Employers do not set prices paid to plans. They either

accept prices set by plans, or negotiate with plans about prices. Employers do not accept any qualified plan but choose the set of plans to contract with. The price paid by the enrollee at a plan is set by the plan in the case of Medicare, and by the employer in the private market. Table 1 summarizes these differences.

Employers buy directly from health plans. Prices paid by an employer to a plan reflect bargaining, and the different risk distributions plans expect from different employers. Table 2 shows prices paid by several employers to several health plans in the Boston area in 2001. Two things are evident: first, employers pay different amounts to different plans for the same person. Harvard, for example, pays different prices to plans for enrolling a single employee. Second, plans charge different prices to different employers for membership in the same plan. Harvard Pilgrim Health Care (a PPO-type plan) gets US\$ 237 for a single Harvard enrollee, and US\$ 295 for a single Boston College enrollee. While one can readily come up with various reasons why prices should differ in these two dimensions, we simply make the point here that a price paid is negotiated between the plan and the employers.

Private employers do not contract with every plan in a market. More than half of private employees have no choice of plans (Marquis and Long, 1999). Most state governments act like private employers when buying health insurance for employees, though a few states, such as California, are more “open” with respect to plan contracting. The federal government, as an employer, is a hybrid. It is close to “open” with respect to plans seeking contracts, but negotiates prices (based on a formula) with potential contractors (Merck, 1999). The Federal Employees Health Benefit Plan (FEHBP) has the

authority to deny a contract to a potential health plan, but appears to rarely exercise this authority.

We regard private employers' authority to *not contract* with a plan or provider as the fundamental difference between Medicare and private buyers. The difference may be at root of explanations for why Medicare and private buyers contract in such different ways. The employer's decision about which provider or providers to offer to employees is made simultaneously with any negotiation about price. Employers decide to offer a provider based on the price they receive or can negotiate, and based on the characteristics of the provider.

Private employers, not the health plan, decide how much of the price they pay to health plans will be contributed by workers. Numerous considerations come into plan in an employer's decision about pricing. Since employer contributions receive favorable tax treatment in comparison to wages, employers have a reason to minimize employer contribution. When more than one health plan is offered, an employer has an interest in making the sorting among plans be efficient and pricing to workers can help lead to sorting according to worker tastes for health insurance. One frequently advocated approach is for employers to pay the full cost of the lowest cost plan and pass on any premium above this floor to the employees (Feldman, Dowd and Coulam, 1999). This may improve sorting but it is not fully efficient since the cost difference among plans itself differs by worker type.¹⁰ "Risk adjusting" the premium charged to workers (e.g.

¹⁰ With information about the distribution of costs and tastes, a payer can choose a price differential with which to face consumers to sort the population between plans. See Cutler and Zeckhauser (2000) and Feldman and Dowd (2000) for recent treatments. In special cases, an efficient division of a population between plans can be achieved when the price to consumers for joining the more expensive plan is set so as to just ration the appropriate marginal consumer. As the papers noted above show, this price is not in general the difference in cost for the average consumer in plans. In general however, a payer cannot sort

charging more to older workers) could in principle improve efficiency of sorting, but this, or any other form of risk adjusted charge) is infrequently observed in the US context. It may be that any incremental gains in efficiency over average cost pricing may not be worth the loss of fairness across types of workers at a firm. Miller (2005) points out that employer profit maximization (as opposed to the criterion of compensation cost minimization) implies that if an employer has some monopoly power in “selling” health insurance to its workers, the price it charges for a more extensive coverage plan should also reflect a “markup” on the extra cost.

In sum, private employers address selection by structuring the choices facing their employees, both in terms of the plans the employees may choose among, and in terms of the prices the employees pay to join a plan.

Success of this payment policy can be gauged by two sets of figures. First, employer buying policy has transformed the health insurance market from one in which most employees were in an “unmanaged fee-for-service” plan to one in which this style of health insurance has virtually disappeared. Figure 4 shows that newer forms of health insurance, frequently paid by (non-risk adjusted) negotiated per capita payments are now predominant in the U.S. private market. Second, over the period of introduction of these new forms of insurance – basically the 1990s -- premium costs in the U.S. grew at historically low rates. See Figure 5 for illustration of data from California over that period.¹¹

enrollees efficiently by using demand-side prices for plans since these prices would need to be person-specific.

¹¹ Data in Figure 5 are for the Office of Personnel Management (OPM) of the U.S. federal government. Because of OPM purchasing rules, the OPM premiums track the private market premiums very closely.

CASE 4: The Regulator Can Observe Quality but Consumers Cannot-Choosing

What to Report

The basic adverse selection result presented above requires that consumers can observe all plans' quality before choosing a plan. The fact that consumers are able to observe the quality of each service each plan provides enables the plans to distort quality in a way that will attract only one type of consumers but not the other.

In reality, consumers cannot observe (many important aspects of) plans' quality and they often rely on information provided to them either by the plan itself or by some third party, before making their choice. In such a case, the general consensus among health policy makers in the U.S. is that by improving what consumers know, health care markets will function better. Better-informed consumers may choose providers more appropriately. Furthermore, consumers choosing on the basis of quality conveys incentives to providers to improve quality in the first place. These arguments are why public regulators and public groups such as business coalitions are making an effort to discover and reveal characteristics of providers' quality of care. The point we would like to make, however, is that revealing more information is a double-edged sword for chronic and other illnesses in policy contexts in which forces of adverse selection are also affecting quality. From the standpoint of incentives to providers and plans, revealing more information about the quality of care for conditions like mental illness can exacerbate incentives to reduce quality. Put bluntly, attracting consumers who value the quality of chronic and mental health care may be exactly what health plans may not want to do.

The following simple but realistic scenario illustrates the policy problem.

Medicaid eligibles in the Boston area can choose among several managed care plans.¹² If an eligible joins a plan, the plan gets a capitation payment. Suppose the plans differ in the quality of mental health care they offer. For example, a better plan might have a larger network of more experienced therapists and/or wider coverage of drugs in its formulary. Suppose this information is known imperfectly by eligibles. What are the effects of reporting more complete information about the relative qualities of mental health care of the plans? One effect – the good effect – is that Medicaid eligible needing mental health treatment can join the plan with better coverage. However, there is a second effect: plans' incentives change when the information is more accurately known. A higher quality mental health care now means that the plan is more likely to attract those who value mental health care. If attracting these eligibles hurts the plan financially, and the evidence is clear that it does, the plan has an incentive to *reduce* the quality of its mental health care, when more information about the quality of this service is reported to beneficiaries. A similar story can be told about Medicare beneficiaries and persons with employer-based coverage, adding up to a market in which forcing plans to disclose the quality of their mental health departments might undermine the quality of care offered to enrollees.

The general point is that the policy choices are not simply to report or not to report. The question that the regulator should ask itself is what is the best way to structure the reports to consumers to give them what they need to make choices but at the same time avoiding the danger of creating incentives to reduce quality of care for chronic and other conditions. One such a direction is the following: instead of providing consumers with a separate rating of the quality of every service the health plan provides, the

¹² Medicaid is a state-run program for low-income individuals.

regulator would group services together and provide consumers only with the average rating of the quality of the different services in the group. For example, instead of getting a separate rating of the network of mental health care from primary care, consumers would get one network rating averaging the characteristics of both. While some information is obviously "lost" by this average in what is transmitted to consumers, from the stand point of incentives to the plan to maintain quality of mental health, there has been a gain. In the presence of an averaged report, if the plan were to reduce the quality of its mental health network, it would reduce the overall network rating, and the plan would lose enrollees who value primary care (the "winners") as well as enrollees who valued mental health care (the "losers"). Tying qualities for various services together in an averaged report forges a positive link between plan's quality choice in a service subject to adverse selection to overall plan profitability.

Our idea of averaged quality reporting can be easily demonstrated with the model discussed above. For a given quality pair (q_a, q_c) , chosen by a plan, and $0 < \alpha < 1$, let

$$(6) \quad \bar{q}_\alpha = \alpha q_a + (1 - \alpha) q_c$$

be the (weighted) average quality of this plan.

Assume that individuals cannot observe (q_a, q_c) . Assume that the regulator, who can observe (q_a, q_c) , chooses to inform consumers only about the average quality, \bar{q}_α , of each plan. That is, individuals cannot observe the quality of each of the services a plan offers, but they can observe some summary indicator of the plan's quality profile, reported to them by the regulator.

The fact that individuals can only observe the "average" quality of each plan, and not the quality of each service a plan offers, will affect the market equilibrium. The

profitability of any quality pair (q_a, q_c) , offered by a plan, depends on individuals' beliefs about the quality of each of the two services, given that they can only observe the average quality of the services. Therefore, in order to analyze competitive equilibrium in the market where individuals only observe average quality of each plan, one needs to incorporate individuals' beliefs about quality in the definition of equilibrium. We apply the following definition.

A competitive equilibrium is a set of quality pairs offered by plans and a set of individuals' belief functions that specify for each individual her beliefs about the quality pair of each plan, for every possible average quality \bar{q}_α of that plan,¹³ such that: (i) each plan maximizes its profit given all the other pairs offered and given individuals' beliefs, (ii) each individual chooses a plan that offers her the highest expected utility given her information and given her beliefs, (iii) there is no quality pair outside the equilibrium set that if offered will make a positive profit and (iv) in equilibrium, individuals' beliefs are confirmed.

Optimal Quality Reporting

The following result (studied in Glazer and McGuire, forthcoming) portrays the theoretical potential of averaged quality reporting:

Proposition: Suppose that all individuals can only observe the weighted average quality of each plan and $\alpha = \alpha^*$, where α^* is given by

¹³ Formally, the assumption is that for each consumer k there is a belief function $B_k: \mathbb{R}_+ \rightarrow \mathbb{R}_+ \times \mathbb{R}_+$, such that for every average quality \bar{q}_α , the function specifies beliefs about a plan's quality profile (q_a, q_c) given that average quality. In order to simplify the analysis, we assume that a consumer's beliefs depend only on the plan's average quality and not on the plan's identity or the average quality of the other plans. It can be shown that all our results will hold if we allow for more general belief functions.

$$(7) \quad \frac{p_a C'_a(q_a^*)}{\alpha^*} = \frac{p_c C'_c(q_c^*)}{1 - \alpha^*},$$

then all plans offer the socially efficient quality pair (q_a^*, q_c^*) in the competitive equilibrium.

A detailed proof of this result can be found in Glazer and McGuire (forthcoming). Here we provide a sketch of the proof. The first observation to make is that for every $\alpha, 0 < \alpha < 1$, if individuals can only observe the average quality \bar{q}_α of each plan and if, in equilibrium, a plan offers the quality pair (q'_a, q'_c) and a share λ' , $0 \leq \lambda' \leq 1$, of the individuals that join this plan are of type H, then it must be that

$$(8) \quad \frac{p_a C'_a(q'_a)}{\alpha} = \frac{p'_c C'_c(q'_c)}{1 - \alpha}$$

where

$$(9) \quad p'_c = \lambda' p_H + (1 - \lambda') p_L.$$

The intuition for this first result is quite simple and very general. Since individuals can only observe the average quality of all the services a plan offers, the plan has no incentive to provide a quality profile that yields the same average as another quality but costs more. Condition (8) above (later referred to as the incentive compatible (IC) condition) specifies the quality pair that minimizes the plan's costs given a prespecified level of quality.

For a given $\alpha, 0 < \alpha < 1$, the curve $IC(\alpha, \lambda)$ in Figure 6 represents all quality profiles that satisfy equation (8) above, for the (pooling) case where $\lambda' = \lambda$, i.e., the case

where the plan attracts a random sample of the population. The curve r^* in that figure depicts all quality profiles that satisfy the zero profit (pooling) condition:

$$(10) \quad p_a C_a(q_a) + p_c C_c(q_c) = r^*$$

The second part of the proof of the Proposition is to show that, for every α , the quality pair that is located at the intersection of these two curves, denoted by (q_a^α, q_c^α) , is the unique quality pair offered by the plans in the competitive equilibrium in the case where individuals can only observe the average quality of each plan.

In order to show that (q_a^α, q_c^α) is indeed an equilibrium, assume that (all) individuals' beliefs are such that for every average quality (\bar{q}_α) they observe, and for every plan, individuals believe that the plan has chosen the quality profile that satisfies the IC condition, with $\lambda' = \lambda$, that yields \bar{q}_α . Thus, individuals believe that among all quality profiles that yield an (observed) average quality, the plan offers the one located on the curve $IC(\alpha, \lambda)$ in Figure 6. Given these beliefs, one can see that if all plans offer the quality pair (q_a^α, q_c^α) , individuals' beliefs will be confirmed. Given the beliefs above, one can also see that if all plans offer the quality profile (q_a^α, q_c^α) , no plan has an incentive to deviate and, hence, it is an equilibrium.

In order to show that (q_a^α, q_c^α) is the unique equilibrium, notice first that there cannot be any other (pooling) equilibrium in which each plan attracts a random sample of the population. Using the single crossing property one can also show that in the case where consumers observe only an averaged quality, there cannot exist a separating equilibrium.

The last part of the proof is to show that when α is given by the condition in (7) the equilibrium quality is the socially desired one. This, however, is straightforward given the way α^* is defined.

Returning to equation (7), one can see that the relative weights on quality of services a and c depend on the probabilities of the two illnesses and the marginal costs of quality at the efficient quality. The quality weights are like relative prices equal to marginal cost at the efficient level of production.

Casting quality reports as a policy instrument turns up an important and simple conclusion: an averaged quality report can remedy adverse selection incentives in markets for health plans. The reasoning is straightforward. Averaging quality across its many dimensions and reporting only the average enforces pooling in health insurance. Choosing the weights in the average to reflect relative marginal benefits at the efficient quality mix ensures health plans allocate resources to elements qualities in the right way.

The power of quality reporting to correct selection-related incentives seems not to have been appreciated previously. For purposes of comparison, as we have shown here, in the basic adverse selection model, an averaged quality report matches the performance of optimal risk adjustment.

CASE 5: Consumers Can Observe Quality and the Regulator Can Observe

"Signals" about Consumers' Types-Risk Adjustment

When a plan is paid using risk adjustment, the premium paid to the plan (often referred to as "capitation") is conditioned on observable characteristics of the enrollee. The capitation payment might be based, for example, on the enrollee's age, with older

enrollees having higher payments associated with them because they are expected to cost more. Methods of risk adjustment are concerned with how much more to pay the plan for an older enrollee than for a younger enrollee (see Cutler and Zeckhauser, 2000 and van de Ven and Ellis, 2000).

Two approaches to addressing this question have been taken in the economic literature. Conventional risk adjustment sees the goal of risk adjustment as to pay plans as close as possible to the amount the enrollee is expected to cost. If an older enrollee is expected to be twice as expensive as a younger enrollee, conventional risk adjustment would pay twice as much for the older enrollee. Many factors other than age matter for expected costs. Research on conventional risk adjustment is statistical and data oriented. Researchers seek to find the right combination of variables (referred to as risk adjustors) to include in regression models so that the explained variation in health care costs is high, without relying on risk adjustors that are difficult to collect in practice or can be manipulated by providers seeking to increase revenue. The premise behind this research – sometimes regarded to be so obvious as to not require justification or analysis -- is that the health care market in question will function better the better job the regression model can do in predicting health care costs of enrollees.

Optimal risk adjustment methods also yield an answer to how much more to pay for an older enrollee but by a different method. Optimal risk adjustment views risk adjustment as a set of incentives aimed to induce providers to behave in accordance with some well defined objective. Calculating the optimal risk adjustment begins with an explicit assumption about the functioning of price in the relevant market and a model that relates the terms of that price (e.g., the payment for young and old) to the behavior of

providers and patients. The economic objective (usually efficiency) is also stated explicitly. Then, using principal-agent methods, the optimal risk adjustment is derived as the prices for young and old which maximize the efficiency of the health care market. Notice, therefore, that the term "optimal risk adjustment" does not refer to particular weights, but rather to a procedure by which the optimal weights are obtained. Optimal risk adjustment also relies on data, but the optimal weights are not in general regression coefficients, but a more complex function involving an economic maximization.

To illustrate how conventional and optimal risk adjustment are calculated and how they might differ in their effectiveness we can return to the model presented above. Suppose that the regulator gets a signal about each consumer's type. The signal could be, for example, the consumer's age . The signal s can take a value of 0 or 1 ("young" or "old"). The signal contains information in the sense that type H person is more likely than type L person to get the signal 1. Let $y_i, i = H \text{ or } L$, be the probability that consumer of type i gets the signal 1. We assume that $y_H > y_L \geq 0$. (Note that if $y_H = 1$ and $y_L = 0$, the signal is perfect i.e., the regulator knows the individual's type .)

Let λ_s be the posterior probability the consumer is of type H given the signal s . Since the signal is informative, using Bayes' rule one can show that $1 \geq \lambda_1 > \lambda_0 \geq 0$. Thus, if a person got the signal 1, that person is more likely to be of type H than a person who got the signal 0. Let,

$$(12) \quad P_s = P_H \lambda_s + P_L (1 - \lambda_s) \text{ for } s = 0, 1.$$

And

$$(13) \quad r_s = C(q_a^*) + P_s C(q_c^*) \text{ for } s = 0, 1.$$

P_s is the probability that a person with signal s will contract illness c and r_s is the expected health care costs of such a person at the efficient quality of care. Clearly $P_1 > P_0$ and $r_1 > r_0$. One can readily confirm that if plans are paid r_s for each person who got the signal s , and consumers are randomly distributed across plans, plans break even providing the optimal level of care.

The capitation payment r_s is what we mean by "conventional" risk adjustment. It can be shown, however, that conventional risk adjustment does not implement the socially desired outcome; that is, at the competitive equilibrium, plans do not provide the socially efficient quality. The same forces that break the efficient pooling equilibrium when premiums are not risk adjusted will also break the efficient pooling equilibrium when premiums are conventionally risk adjusted. Market equilibrium under conventional risk adjustment will still be a separating one where the H types and the L types choose different plans with a different quality profile. This separating equilibrium is more efficient (i.e. induces a higher expected utility) than the one without risk adjustment, but it is not the best the regulator can do. As demonstrated below, an optimal risk adjustment can be constructed to implement precisely the socially desired quality.

Let

$$(14) \quad r_H^* = C(q_a^*) + P_H C(q_c^*)$$

and

$$(15) \quad r_L^* = C(q_a^*) + P_L C(q_c^*).$$

r_i^* is the expected costs of an individual of type i at the efficient quality profile.

We are now ready to discuss the conditions under which risk adjusters implement the socially desired contract:

Proposition: Let r_s^* , $s = 0,1$ be solution to the following system of equations:

$$(16) \quad y_H r_1^* + (1 - y_H) r_0^* = r_H^*$$

$$(17) \quad y_L r_1^* + (1 - y_L) r_0^* = r_L^*,$$

then if plans are paid a premium r_s^* $s = 0,1$ for each individual who got the signal s , all plans will offer the socially desired quality in equilibrium.

The left hand side of equation (16) is the expected premium a plan receives for each enrollee of type H, under the risk adjustment scheme r_s^* . The right hand side of (16) is the plan's expected cost of an enrollee of type H, under the socially desired quality bundle. Equation (16) states the condition for the expected premium for a type H individual to be equal to the individual's expected cost. Equation (17) does the same thing for a type L individual.

Conventional risk adjustment redistributes some, but not enough, resources from the low-cost to the high-cost types. In Figure 1 this redistribution appears as a shift in the zero-profit curves relative to the curves in the no risk adjustment case. As the proposition above shows, the regulator may shift the zero-profit curves even further than is implied by conventional risk adjustment, by "overpaying" for a consumer who got the signal 1, compensated by "underpaying" for consumers who got the signal 0, and by so doing, bring the market closer to the socially desired outcomes. "Overpaying" and "underpaying" are in comparison to the conventional risk adjustment premiums. Figure 7 illustrates the equilibrium under optimal risk adjustment.

Intuitively, this result can be understood as follows: If the signal is not very precise, the difference in premium conventional risk adjustment pays for a consumer who got the signal 1 and a consumer who got the signal 0 will be small. Furthermore, the proportion of consumers who got the signal 0 among the L types is not much larger than the proportion of consumers who got this signal in the entire population. Thus, by offering a quality profile that attracts only the L-type consumers a plan can reduce its cost by a significant amount relative to the reduction in the premium it is expected to receive. If, on the other hand, the premium for an individual who got the signal 0 is significantly lower than the premium for an individual with a signal 1, the plan is severely punished for attracting only individuals of type L.

The example studied above is, of course, very simple and presented just in order to demonstrate the main idea of optimal risk adjustment. Glazer and McGuire (2002) characterize optimal risk adjustment in a more general framework and show that it depends on the first and second moments of the distribution of health care utilization patterns by service in the population. To equalize incentives to ration all services, the covariance of the risk adjusted payment with the use of every service must track the covariance of the total predicted costs associated with the increase in use of the service. Intuitively, the optimal risk adjustment formula must have the property that by spending on a service, the cost consequences to a plan relate to the revenue consequences in the same way for all services. It is important to stress that the result for optimal risk adjustment says how a given average payment should be risk adjusted, but does not answer the question of how high or low on average the payment should be.

The optimal risk adjustment emerges as a set of linear equations one for each service, with unknowns equal to the variables available for risk adjustment. An interesting feature of this optimal risk adjustment scheme is that the number of parameters available for risk adjustment could be greater or less than the number of services a plan is deciding about. (Some risk adjustment systems have scores of weights.) If the number of available risk adjustment parameters is larger than the number of services whose quality the plan decides on, there may be many risk adjustors that achieve optimality in the sense of incentive balance across services. Glazer and McGuire (2002) label and characterize “minimum variance” optimal risk adjustment as the solution to the optimal risk adjustment formula that minimizes the symmetric loss function in the square of deviations between payments and actual costs. The “second best” optimal risk adjustment, when the number of risk adjustment parameters is less than the number of services, has not yet been described in the literature. Other papers have studied optimal risk adjustment in other contexts. See Jack (2004) and Shen and Ellis (2002).

In closing this section it should be emphasized, however, that while the theoretical basis of optimal risk adjustment is well understood by now, its practical application is yet to be developed. The challenge for proponents of the idea of optimal risk adjustment is to translate ideas from economic theory into concrete improvements in the way risk adjustment is done in practice.

CASE 5: Medicare in U.S.

In this description of Medicare’s buying practices, we focus on two aspects of Medicare’s contracting. First, Medicare employs nationwide rules about rates of payment to qualified

plans and providers. In essence, Medicare sets prices. In the case of health plans, Medicare applies a formula to determine the price that it will pay for a beneficiary joining a plan. The formula is based on adjusted average costs in the fee-for-service sector in the beneficiary's county in past years, the national average of those costs, and risk adjuster variables. The person-specific risk adjusters are age, gender, and Medicaid status, and since 2000, diagnoses from hospital claims from the previous year (Pope et al., 2000). The premium formula is determined in advance and made known to plans, including the rules by which the premium is adjusted over time.¹⁴

The second key feature of Medicare contracting is that Medicare accepts any qualified plan or provider that wishes to supply at those prices. Health plans decide to contract with Medicare (for a period of a year) based on the prices they would be paid for beneficiaries and on the costs they anticipate, including any extra administrative costs associated with Medicare participation. Health plans are free to accept beneficiaries from some counties and not others. Once a plan decides to accept enrollees from a county, it must accept all enrollees who apply and the volume of business is determined by demand response.

Since the mid-1980s, the Medicare program has offered beneficiaries a choice between remaining in traditional Medicare where payment is by fee-for-service and coverage is partial, to enrolling in health plans that receive a risk-adjusted payment capitation for more comprehensive services from Medicare. Medicare's intention was to both expand choice for beneficiaries, and reduce overall Medicare program expenditures. The strategy for achieving savings was based on Medicare's payment to a risk-based plan

¹⁴ Health plans must provide the same basic services available to Medicare beneficiaries in the FFS sector. In addition, Medicare employs a regulatory mechanism to estimate costs of these services at a plan.

of only 95 percent of the projected cost of what a beneficiary would cost in traditional Medicare. Capitation-based alternatives never succeeded in attracting more than 20 percent of Medicare beneficiaries, and this percent is currently under 15 percent. Furthermore, analysis of who joined the risk plans implied that rather than reducing program costs, the risk-based payments increased program costs. Healthier, lower-cost beneficiaries were joining the health plans. According to one analysis (Brown, 1993), beneficiaries joining risk plans were more than 10 percent less expensive than traditional beneficiaries, even after accounting for the risk adjustment in Medicare's payment, so rather than reducing program expenditures by 5 percent for every beneficiary joining a plan, the capitation alternative was costing Medicare 5 percent more. Other studies confirm that risk-based plans attract beneficiaries less costly than those that stay in traditional Medicare (see Cao and McGuire, 2002 for a review).

During the 1990s, health plan participation and beneficiary enrollment in risk-based plans began to expand rapidly, mirroring the growth in managed care enrollment occurring in private health insurance. In 1998, the number of health plans contracting with Medicare reached 346, enrolling 18 percent of beneficiaries. See Figures 8 and 9. In 1998, Medicare renamed its program Medicare + Choice (M+C), added options for plan structure, and introduced a number of changes in the payment formula for plans, including raising the floor of payments, and averaging local with national rates, leading to small absolute decreases in payments in some areas. In addition, in 1998, Medicare began phasing in health status-based risk adjustment. Altogether these changes stimulated exit, not entry, among plans in Medicare, contradicting the hopes of government planners (Gold et al., 2004), and leading to a drop of 50 percent in the number of plans contracting

with the government. Many beneficiaries were involuntarily dropped from the program as their plan no longer accepted Medicare. As one review recently put it, Medicare + Choice (M+C) “is widely viewed as a failure, with plans leaving the program and fewer, less attractive choices for beneficiaries.” (Gold et al., 2004)

After some stop-gap policy changes in the years 1999-2002, Medicare again renamed its program, now to Medicare Advantage (MA), and raised payment rates in 2004 and 2005 through a series of administrative changes in the formula. The MMA act creating MA expands the options for beneficiaries by allowing for regional PPO-type plans as well as tradition HMO-like plans at the local level. The MA program also pays plans more generously in order to stabilize the market and provide incentives for plans to enter the program (Gold and Harris, 2005). One change is to raise the base rate for calculations from 95 percent to 100 percent of the estimated fee-for-service cost (MedPAC, 2004). Even more fundamentally, starting in 2006, Medicare payment to MA plans will begin to occur through a competitive bidding system rather than being a preset risk-adjusted price from Medicare.¹⁵ For each plan the government will set a benchmark (either local or regional) that is based on the 2005 annual MA capitation rates determined using an administrative pricing formula as described above, adjusted for projected cost growth (CMS, 2005a). These benchmarks will be adjusted for demographics and health-status risk for each MA plan. For 2006, the CMS Hierarchical Condition Category (CMS-HCC) risk –adjustment model will be applied at 75% risk-adjusted payment, with the

¹⁵ In another major change, in 2006-07, the Medicare program will share risk for medical expenses with all regional plans through risk corridors, structured such that there is no risk sharing within 3% of a target based on a plan’s bid, risk shared 50-50 between 3% - 8% of the target, and Medicare takes 90% of the risk above 8% of the target (MedPAC, 2004). In addition, the MMA established a \$10 billion “stabilization fund” for promoting regional level PPO participation in the MA program (Kaiser Family Foundation, 2005b).

remaining 25% a demographic payment (CMS, 2005c).¹⁶ Each MA plan must submit a risk-adjusted bid for covering beneficiaries. If a bid is below the benchmark then 75% of savings will be rebated to beneficiaries, while the government keeps the remaining 25% (MedPAC, 2004). If a bid is greater than the benchmark, beneficiaries who enroll in the plan must pay the difference. Beneficiaries in traditional FFS Medicare will not have to pay any difference over plan bids, except for those participating in a premium support demonstration project, scheduled for 2010.

Risk Selection in Sickness Funds in Germany

This section addresses the problem of adverse selection among sickness funds in Germany, drawing on the preceding analyses. Comments are offered in a spirit of modesty. There are a number of fine papers on the health insurance in Germany, with clear descriptions of the evolution of the health care payment system and relevant analyses of selection, giving an outsider an informative introduction to the issues in Germany. The only realistic goal in our paper, however, is to offer a few ideas that hopefully will stimulate thinking of researchers more familiar with German institutions.

In Germany, a social health insurance system (GKV) is where 90% of the population, all but the highest income group, receives its health insurance (Buchner and Wasem, 2003). An individual or family chooses from among hundreds of sickness funds, which differ in sponsorship for historical reasons.¹⁷ Sickness funds are non-profit, with regulations specifying that their reserves fall within a narrow bound, requiring essentially

¹⁶ Payments are scheduled to be fully risk adjusted in 2007.

¹⁷ For additional descriptions of the German system for financing sickness funds, see Busse and Riesberg (2004), Buchner and Wasem (2003), and van de Ven et al. (2003).

that they collect what they spend. The contribution to the fund is in the form of a percentage of income, split equally between the worker and employer. A risk adjustment formula redistributes money among sickness funds to deal with differences in income across funds and differences in health care need. In addition to income, adjustments are made on the basis of age, gender, and several other factors. The population is divided in 670 categories and average expenditures per cell are used in the risk adjustment formula. Funds can be thought of as paying into a centralized pool an amount based on the national average contribution rate for their income, and receiving from the pool an amount equal to the standardized national average expenditure for a population with their risk characteristics. The difference between their “financial power” and “financial need,” so defined, determines their transfer from the pool. Funds set their own contribution rates to cover the actual health costs of its population. Sickness funds offer a regulated benefit package that differs in minor ways among plans. Sickness funds negotiate collectively with provider groups and pay them in a unified fashion.

Reading the available literature leaves us with some impressions about the situation in Germany, organized around the potential problems associated with adverse selection:

Quality competition, contractible elements. Only about 5% of the benefit package is discretionary at sickness funds (Buchner and Wasem, 2003, 24), leaving plans with limited scope to use coverage differences as a tool to try to attract good risks. An examination of the additional coverage offered by type of plan (see Table 3) indicates that there are some differences in additional benefits, and these differences may have some relation to risk selection strategies. For example, cancer therapy is less frequently

offered as an additional benefit by the BKK's, but health checkups are more frequently offered. On the other hand, there is not a uniform pattern in terms of services *a priori* one would expect to be attractive to a low-risk consumer (see Table 3 for two other examples). Observers in Germany do not identify this as a major problem (Nuscheler and Knaus, 2004, p. 10). Furthermore, if this were a concern, it could be addressed by direct regulation. The scope of additional benefits could be reduced by either forcing benefits to be within the required bundle, or preventing plans from offering coverage as additional benefits.

Quality competition, noncontractible elements. Non-contractible elements refer to, as in the U.S. cases discussed above, the quality of services for various areas of health care. Favoring primary care versus specialty care by including more or more qualified providers, or favoring maternity care to attract young healthy families, would be examples of this practice. Based on our reading, the German system of uniform payment to providers does not appear to enable sickness funds to selectively “distort” quality in this way. Sickness fund – provider contracting is controlled by tradition and regulation, and furthermore is done collectively by the funds. Selective contracting is not permitted except within very limited domains. Sickness funds do not manage care (Nuscheler and Knaus, 2004, p. 10; Buchner and Wasem, 2003, p. 25). We encountered no evidence that sickness funds engage in quality distortion. With the collective negotiation with health care providers, health care quality in Germany appears to be (for better or worse) in the hands of health care providers, not the funds. Since provider groups care for patients from all plans they have no incentives to distort quality to select enrollees.

We also encountered no evidence that the average quality is being altered at plans to achieve selection. Since premium contribution rate is chosen by a fund, a possible strategy of a fund, in classic Rothschild-Stiglitz fashion, is to set itself up as a low quality – low premium plan to attract the healthy who care less about quality of care because they use it less frequently. No information is available about quality to be able to evaluate this on a plan-by-plan basis, so researchers have attempted to check for this behavior by other routes. Nuscheler and Knaus (2004) use data from the German Socio-Economic Panel from 1995 to 2000, and examine the patterns of switching and the determinants of switching behavior. Over this period, in the sample they analyze, about 8.4% of enrollees switch funds each year, a substantial proportion. Younger people are more likely to switch plans, as are healthier people, even within age categories, and they tend to move to the lower contribution rate plans, mainly to the BKKs. As the authors note, this information, alone, is not evidence that funds are actively recruiting healthier members by a price/quality strategy. Since they see the effect of good health to be about equal in determining switching to BKKs (which might be more aggressive in recruiting) as compared to non BKK plans, the authors conclude that the observed good health effect on switching is not in response to selection activities of the BKK funds. The issue remains of how a plan could take a low-quality strategy even if it wanted to, in the absence of being able to manage care or selectively contract with providers. While the question of quality competition deserves more attention from researchers, selection-driven quality distribution does also not appear, on the basis of the institutional arrangements and the evidence, to be a large problem in the German system.

Open enrollment problems. Numerous regulations prohibit plans from offering their services in an unequal way according to expected costs of enrollees. Papers by van de Ven et al. (2003) and Buchner and Wasem (2003), however, refer to “anecdotal evidence” that funds engage in illegal or questionable activities to selectively recruit enrollees, including relying on internet marketing, encouraging high cost members to move with information about other plans, employer encouragement of enrollment in lower cost funds, and less favorable appointments for older, high cost enrollees. The prevalence of these activities is not reported so it is impossible to evaluate the significance of this problem. In any case, to the extent that these activities are prohibited by regulation, enforcement of these regulations is a direct way to deal with barriers to open enrollment, and this strategy seems to have been successful in other contexts.

Unequal contribution rates. Unequal contribution rates, whereby one plan charges 14.5% for enrollment and another charges 12.5%, is pointed to in many papers on the German system, and is evidence for an unequal distribution of risks across plans, even after the adjustments in the risk adjustment formula. If we assume that plans are all equally efficient from an administrative standpoint and provide a similar quality, differences in contribution rates required at plans will be due to differences in the average risk of enrollees not accounted for by the risk adjustment formula.¹⁸ For historical reasons, sickness funds originated in different regions, or from specific employers or labor associations. Furthermore, some funds are only recently exposed to competition, so differences in the distribution of health cost risks have not been equalized among the plans. Over the 1990s, a series of reforms created competition among plans, leading to

¹⁸ The direction of gain/loss is determined by whether the actual costs are below or above the national standard rates for the risk cells. The magnitude of the percentage contribution required to accommodate this gain/loss is determined by the average income in the plan is relative to the national average.

some movement among plans. Buchner and Wasem (2003, 29), for example, report that 3-4% switched plans each year during 1997 and 1998. Zok (2002) finds that 23.4% of enrollees were thinking of changing funds in 2003.

Figure 9 shows the contribution rate by sickness fund association type over the period 1982 to 2004. In addition to the upward drift, the rates show convergence. The BKK funds have historically had lower rates, but this gap has been narrowing. Around 1990, the difference between the BKKs and the plans with the highest rate was 2.0 points, this narrows to 1.0 by 2004. In 1994, 27% of members made a contribution more than one percentage point different from the average; by 1999, this had fallen to 7% (Busse and Riesberg, 2004). The BKKs, receiving the most new enrollment, have been experiencing the highest rate of growth in their contribution rates over the past several years.¹⁹

Unequal contribution rates, implying a worker with the same income pays different amounts depending on the plan of enrollment, is primarily a fairness, not an efficiency issue. One way to view the fairness issue is to say that as long as everyone has the same choices, the system is fair, but this *ex ante* criterion may be an insufficiently strong from society's point of view. We will here accept a solidarity principle that a goal of the financing system is to achieve equal *ex poste* contribution rates across funds.

One potential solution to the problem of differential contribution rates is patience. Convergence of contribution rates in the past 15 years is due to some combination of risk adjustment and other payment policies, and movement of workers among the funds. If there are few meaningful quality differences among the funds, it is puzzling why

¹⁹ Mobility in Switzerland is lower than some analysts expected following opening of choice. In 1996, 4% of enrollees changed plans (Beck et al., 2002).

employees don't switch more readily to funds with lower contribution requirements (Ellis and van de Ven, 2004). Inertia and switching costs are significant in health insurance and these factors certainly delay adjustments (Strombom, Buchmueller and Feldstein, 2002). One eventual steady state of the German system might be when contribution rates are equal and any plan changes among enrollees could be regarded as being due to factors unrelated to health care cost risk. However, research on Germany and elsewhere finds that is the young and healthy that are more likely to be mobile within sickness funds, creating the potential for dynamics of pricing in the sickness fund market that might lead to some continued inequality in contribution rates. One useful analysis in Germany would be to study the process of enrollment change with the purpose of projecting the path of premium contribution differences. If the link between worker movement and contribution differences could be identified empirically, given the "average cost pricing" required of plans, the path of enrollment and prices could be forecast.

Competition and choice might not fully equalize contribution rates, particularly in the short term. As a number of writers have pointed out, improving the risk adjustment formula in Germany is a way to deal with unequal contribution rates. As the "financial need" component of the redistribution formula becomes more precise, there would be less health cost risk not corrected by the formula, leaving less to be made up by higher contribution rates in funds with sicker members. In the extreme, if costs could be fully forecast, a risk adjustment system could protect funds against any losses or gains associated with a differential distribution of risks.

Researchers have investigated the potential of statistical risk adjustment approaches in the German context. Corinne et al. (2004) study incorporation of

Diagnostic Cost Groups (DCGs), presently being used as the basis for risk adjustment in the U.S. Medicare system, and find that in the German context, adding this form of prospective health status adjustor explains about 10% of the total individual level variance in expenditures, very close to the explanatory power of the DCG-based models in the U.S. (van de Ven and Ellis, 2000). In another empirical study, Breyer et al (2003) emphasize that criteria for evaluation of a risk adjustment policy (or related policy) should go beyond a statistical one of explained variation in a regression. Using data from 1995, they demonstrate the value of socioeconomic variables (such as income) in a statistical sense (raising the explained variance to over 7%), but more importantly, go on to show how an improved model can reduce the contribution rate differences among simulated sickness funds.

Here, we try to carry this thinking a step further by applying the philosophy of optimal risk adjustment. Be explicit about the objective: to equalize contribution rates. Be explicit about the policy tool: the choice of the weights in the risk adjustment formula. Optimal risk adjustment is described by the weights on the risk adjustor variables that do the best job of equalizing contribution rates. The “solution,” or, more accurately, the set of possible solutions, to this risk adjustment problem can be described by a series of equations, one for each sickness fund, indexed by f:

$$(18) \quad tY_f - C_f + \sum_i \beta_i X_{if} = 0, \quad f = 1 \dots F$$

where

- t is national average contribution rate
- Y_f is (projected) average income in the fund
- C_f is (projected) average cost in the fund
- β_i are risk adjustment weights for variable i

X_{if} is value of variable i for the fund

Average income and average cost can be regarded as last year's values trended forward. The F equations in (18) contain i unknowns, the β_i 's, the risk adjustor weights. At present, there are more than 600 risk adjustor variables in use in Germany. An element of X_i would be, for example, the percent of enrollees who were males 45 years old. In the present risk adjustment system, the "weight" on this variable is the national standardized cost. Taking an optimal risk adjustment perspective, instead of finding these weights from a statistical procedure, such as running a regression or averaging within rate cells, the weights are those that solve the solidarity problem. Viewing the weights, as variables, there are very likely to be many solutions, or risk adjustment weights, that fully solve the solidarity problem. In other words, with a choice of weights given by (18), we can pay funds in a way that allow them to cover costs with national average contribution rates.

It is not possible to address all the plusses and minuses of such a system at this point in our paper; it is mainly put forward as an illustration of how to apply economic analysis to a problem raised by risk selection in the German context. Two points can be briefly mentioned. First, the risk adjustment system described by (18) would pay for average costs (lagged) at the national average contribution rate. This might raise incentive problems, if funds worried less about how to cover their costs. One way to address this would be to redefine the solidarity goal to be equal contribution rates within "peer groups" of funds. Peer groups, based on region, size, historical sponsorship or other factors, could be made quite small (say 5) so that there could be considerable uniformity

within a group. Peer groups as small as 5 would restore 80% of the incentives ($1 - 1/N$) in a national prospective capitation system. Second, with many possible choices of the weights that will lead to equal contribution rates at the fund or peer group level, the regulator would have to choose which of among the many possibilities. One way to do this would be to choose the weights that minimize the unexplained variance at the individual level, subject to the constraints in (18). This contends with any selection incentives at a person level (e.g., associated with any residual issues of open enrollment) while still equalizing contribution rates.²⁰ Since the equations in (18) are linear in the weights, this solution is simply the usual risk adjustment regression analysis with linear constraints on the estimated coefficients (Theil, 1961). The main point of this suggestion is to emphasize the value of explicit expression of the objective of risk adjustment policy. If the objective is equalization of contribution rates, the right risk adjustment, which can be readily calculated, can fully achieve the objective.

Empirical evaluation of the set of policies begun to be described here, require simulation analyses, not just statistical analyses of the explained variance of risk adjustment alternatives. Simulation analysis could be used to assess what contribution rates would have to be in the presence of alternative policies for addressing adverse selection.

Concluding Comments

Risk selection among sickness funds in Germany is an important issue for fairness in contribution rates. There may also be effects of risk selection on efficiency and the

²⁰ For a related analysis where the constraints are service-level conditions for efficiency, see Glazer and McGuire (2002).

quality of care, though clear evidence to support this statement is not available. Selection-related problems in Germany seem tame by American standards.

A major policy question facing Germany has to do with the division of labor between sickness funds and providers. Presently, sickness funds' main role is to finance care in a fair way. Funds appear to do little to affect the care their enrollees receive, leaving this task to provider associations and individual providers. Introduction of selective contracting or other tools of managed care would alter the balance, shifting more responsibility for care and cost to sickness funds. After Switzerland (at 11.2% in 2002), health care costs occupy a larger share of GDP in Germany (10.9%) than any other EU country (Busse and Riesberg, 2004, p.83). As pressures to take new steps to control costs increase, various options will probably be considered. If sickness funds are given the power to manage care, they may do so to improve the cost-effectiveness of the care for their members (the intended effect) but also with an eye towards selecting the good risks (the unintended effect). At that point risk selection among plans may involve serious efficiency as well as fairness issues.

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Table 1

Contracting practices of Medicare and private buyers in the market for health plans

	Medicare	Private
Price to Plan	Pricing formula set by Medicare	Negotiated or set by plan or provider
Choice of plans or providers	Takes any willing qualified plan or provider	Chooses one or a few plans or a subset of providers
Price to Enrollee	Set by Plan	Set by Employer

Table 2

Prices paid (US\$) to selected health plans for a single employee four employers, Boston area, 2001

Plan	Employer			
	Boston University	GIC	Harvard University	Boston College
Fallon Community Health Plan (HMO)		184	206	
Harvard Pilgrim health Care (HMO)		240	226	265
Tufts Associated Health Plan (HMO)	231	230	252	
BMC preferred (HMO)	150			
Harvard Pilgrim Health Care (PPO)			237	295

Notes: GIC is Group Insurance Commission buying on behalf of public employees. Not all plans offered by these employers are shown.

Table 3
 Percentage of Funds Providing Selected Additional Benefits

	<u>Regional Funds</u>	<u>Substitute Funds</u>	<u>BKK's</u>
Cancer Therapy	63.6	50.0	14.0
Health Checkups	9.1	8.3	25.5
Nutrition Counseling	90.9	41.7	12.2
Yoga-Meditation	30.0	33.3	12.2

Source: Nuscheler and Knaus (2004)

Figure 1
The Basic Adverse Selection Result

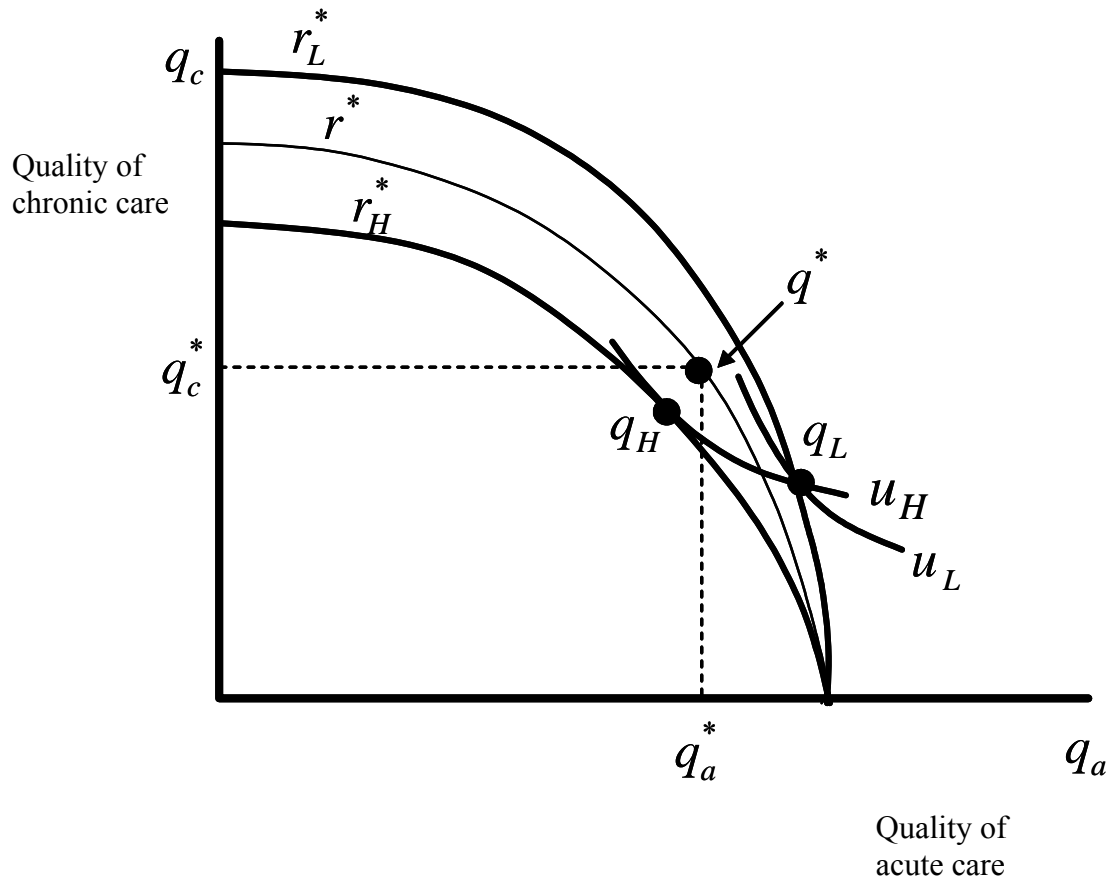


Figure 2
Health Plan Tactics to Achieve Favorable Selection and Regulatory Counter Measures

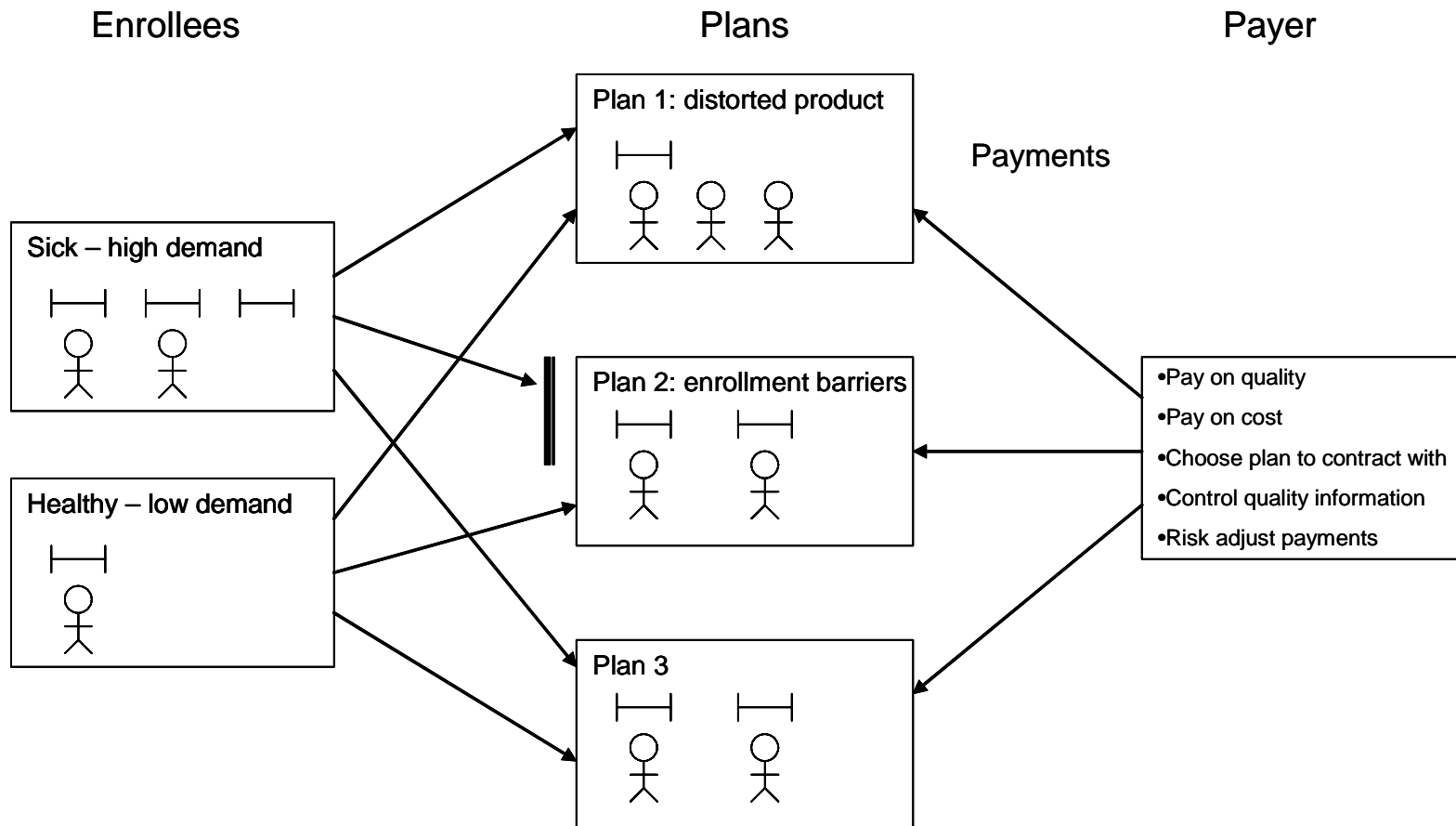
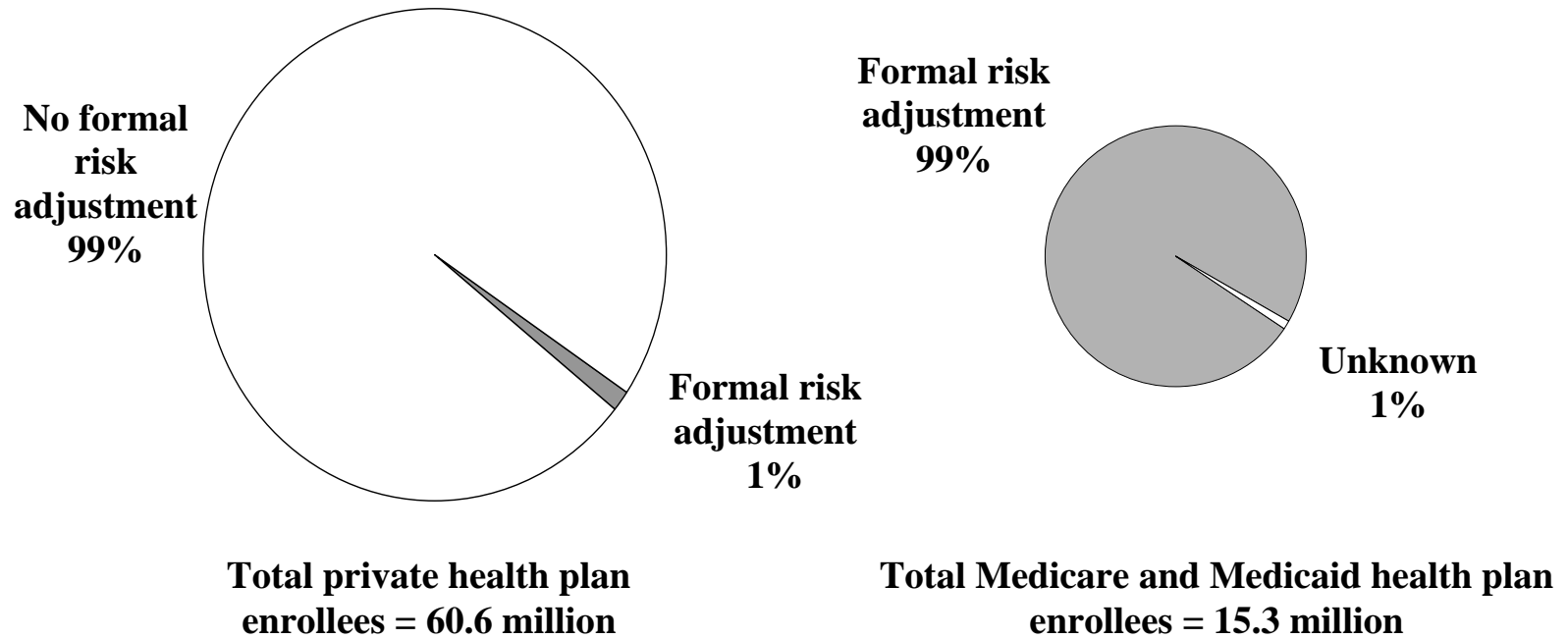


Figure 3

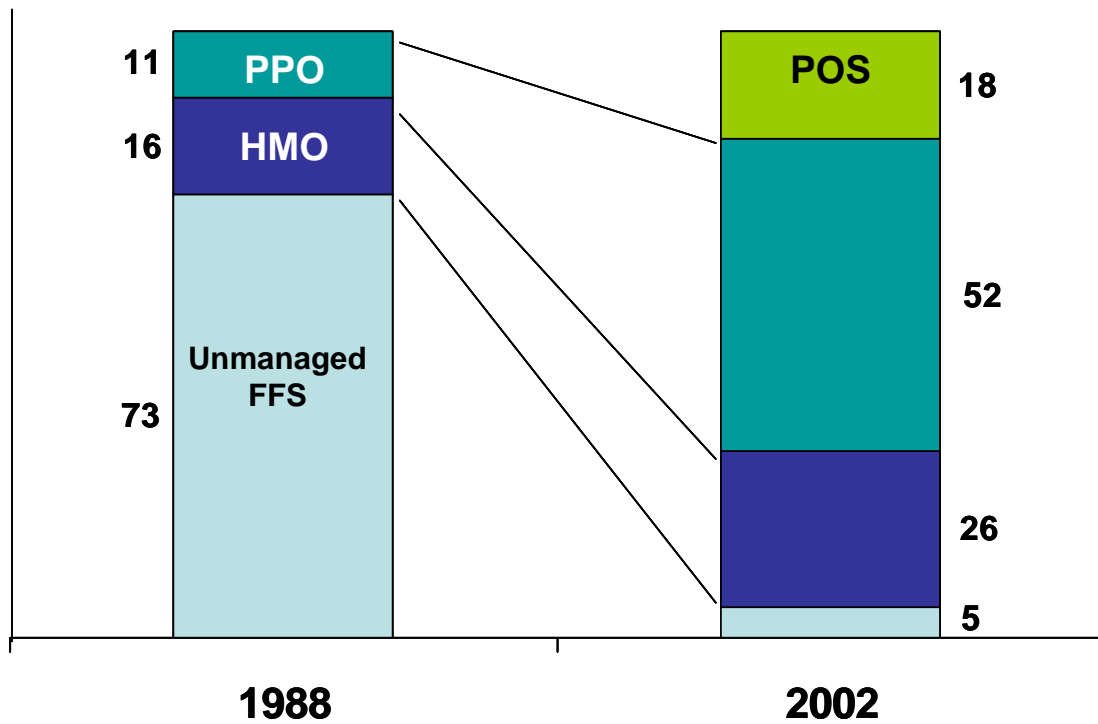
Use of Formal Risk Adjustment in Public and Private Health Insurance in the U.S.



Source: Keenan et al. (2001)

Figure 4

Health Plan Enrollment for Covered Workers in the U.S. by Plan Type 1988 and 2002



Source: The Kaiser Family Foundation and Health Research and Educational Trust, *Employer Health Benefits, 2002 Annual Survey*, Exhibit 5.1.

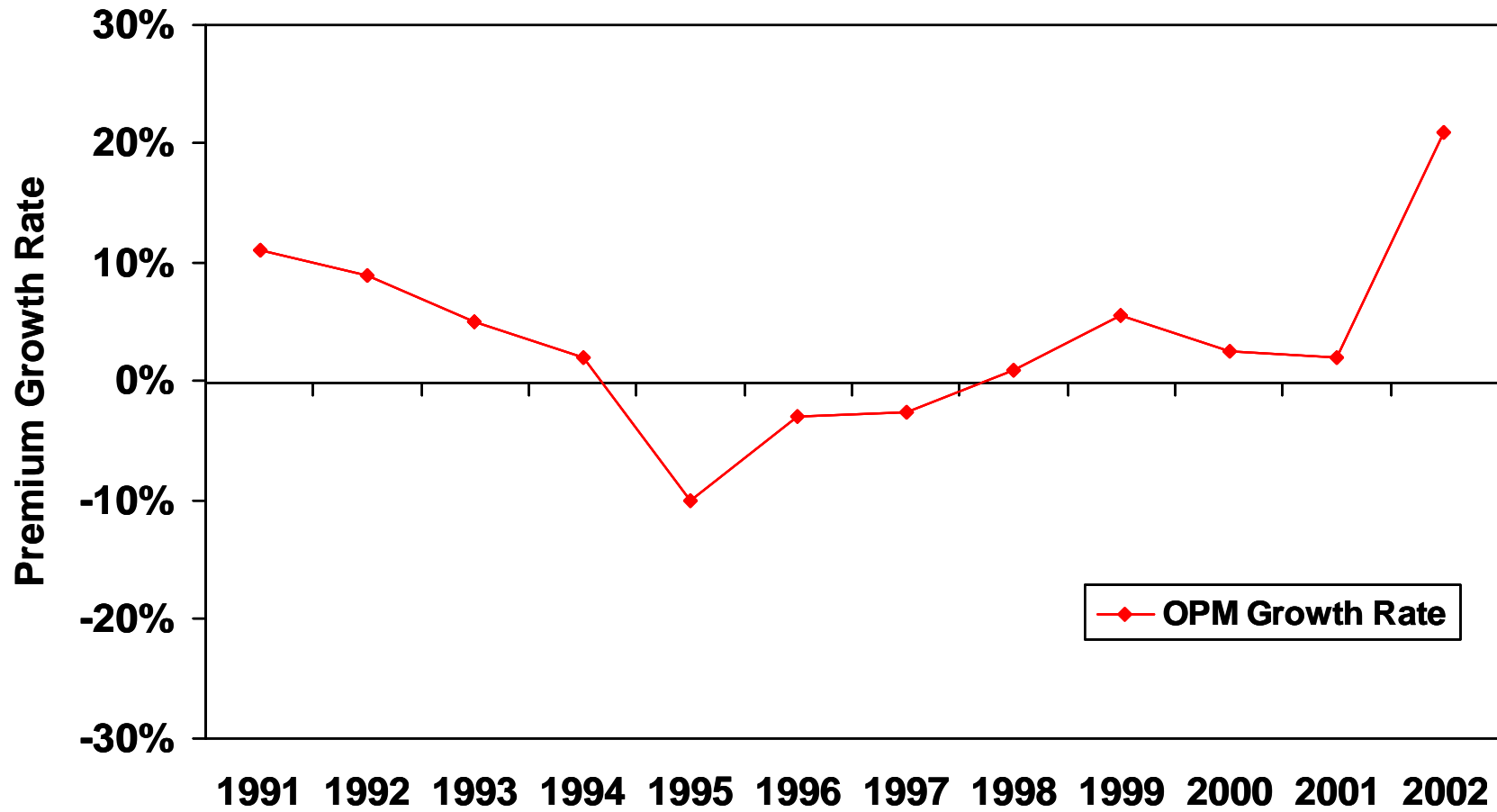
Notes:

* Percentages do not sum up to 100% because of rounding

The 2003 Kaiser/HRET Health Benefits survey includes the following descriptions of types of health insurance:

- [1] Under unmanaged FFS or indemnity health insurance, a person can go to any physician or hospital they choose. The person typically faces a deductible and coinsurance above the deductible.
- [2] With an HMO, a person must receive their care from an HMO physician, otherwise the expense is not covered.
- [3] With a PPO, employees have lower deductibles or lower coinsurance if they use selected hospitals or doctors in the network.
- [4] In a POS plan, employees are reimbursed for services they receive outside the network but they also have a primary care gatekeeper or physician who serves as the patient's initial contact for medical care and referrals. The gatekeeper must approve use of hospital and specialist services.

Figure 5
Private Market HMO Premiums in California in the 1990's



Source: Office of Personnel Management

Figure 6
Market Equilibrium (Pooling) with Optimal Averaged Report

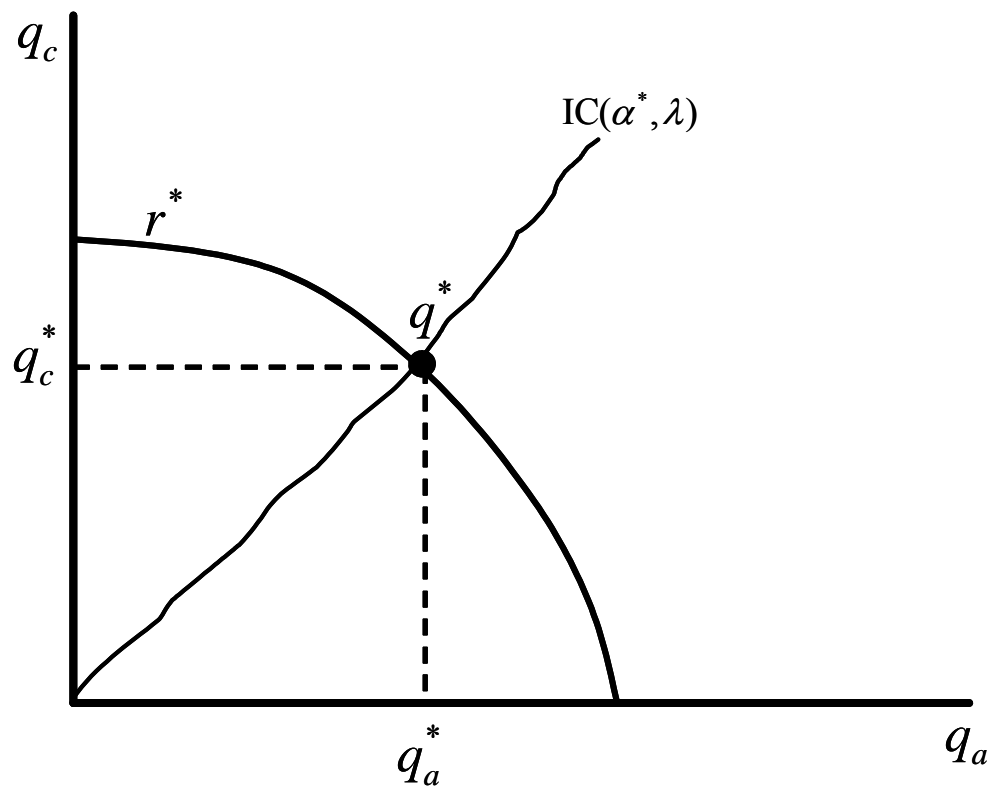


Figure 7
Market Equilibrium under Optimal Risk Adjustment

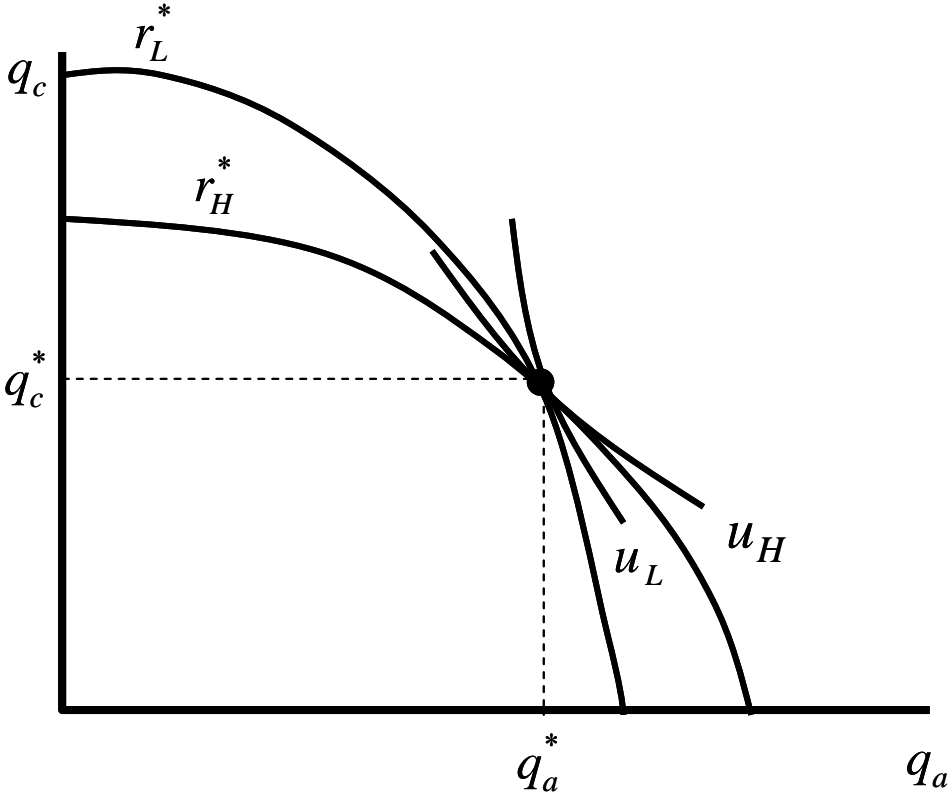
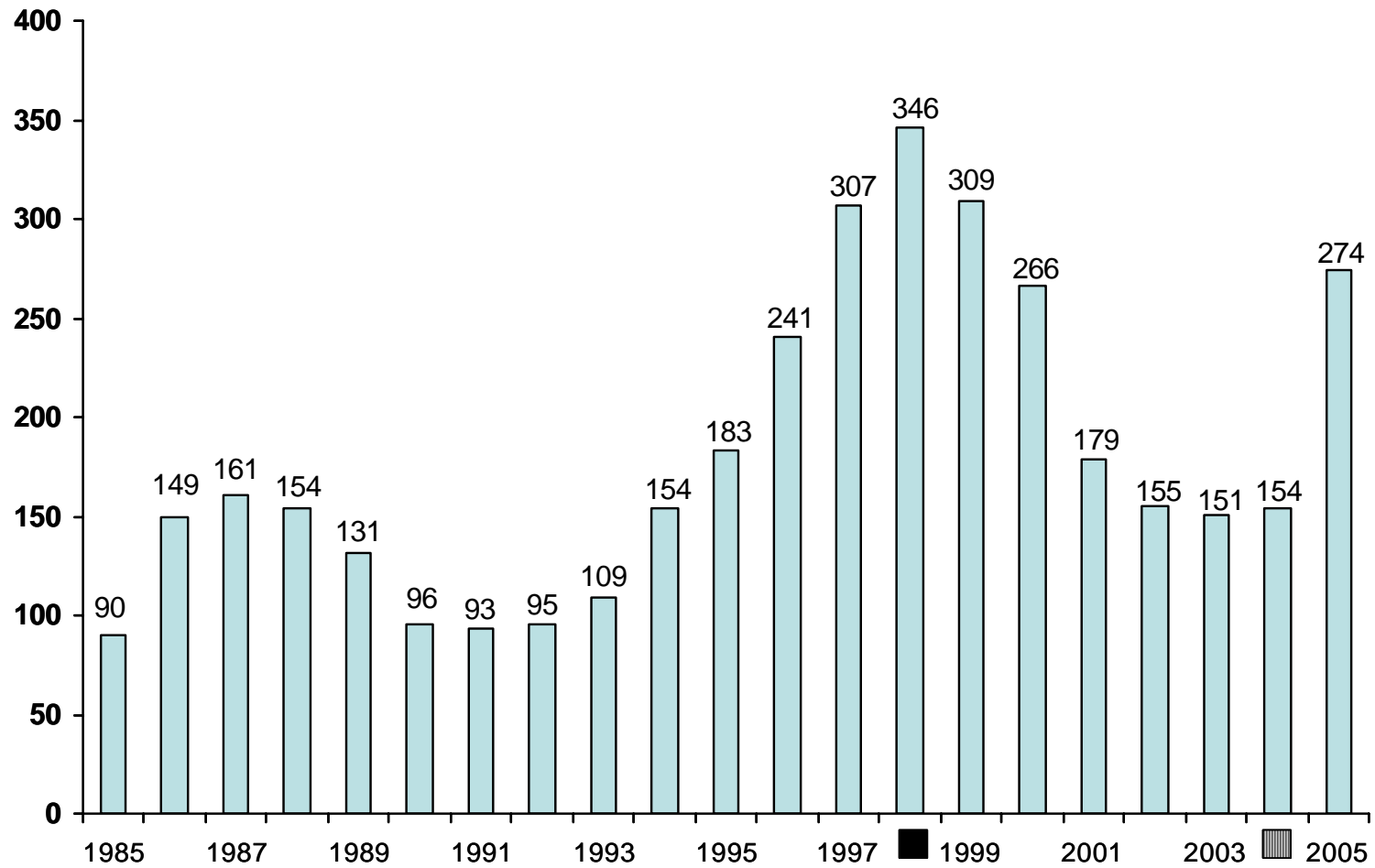


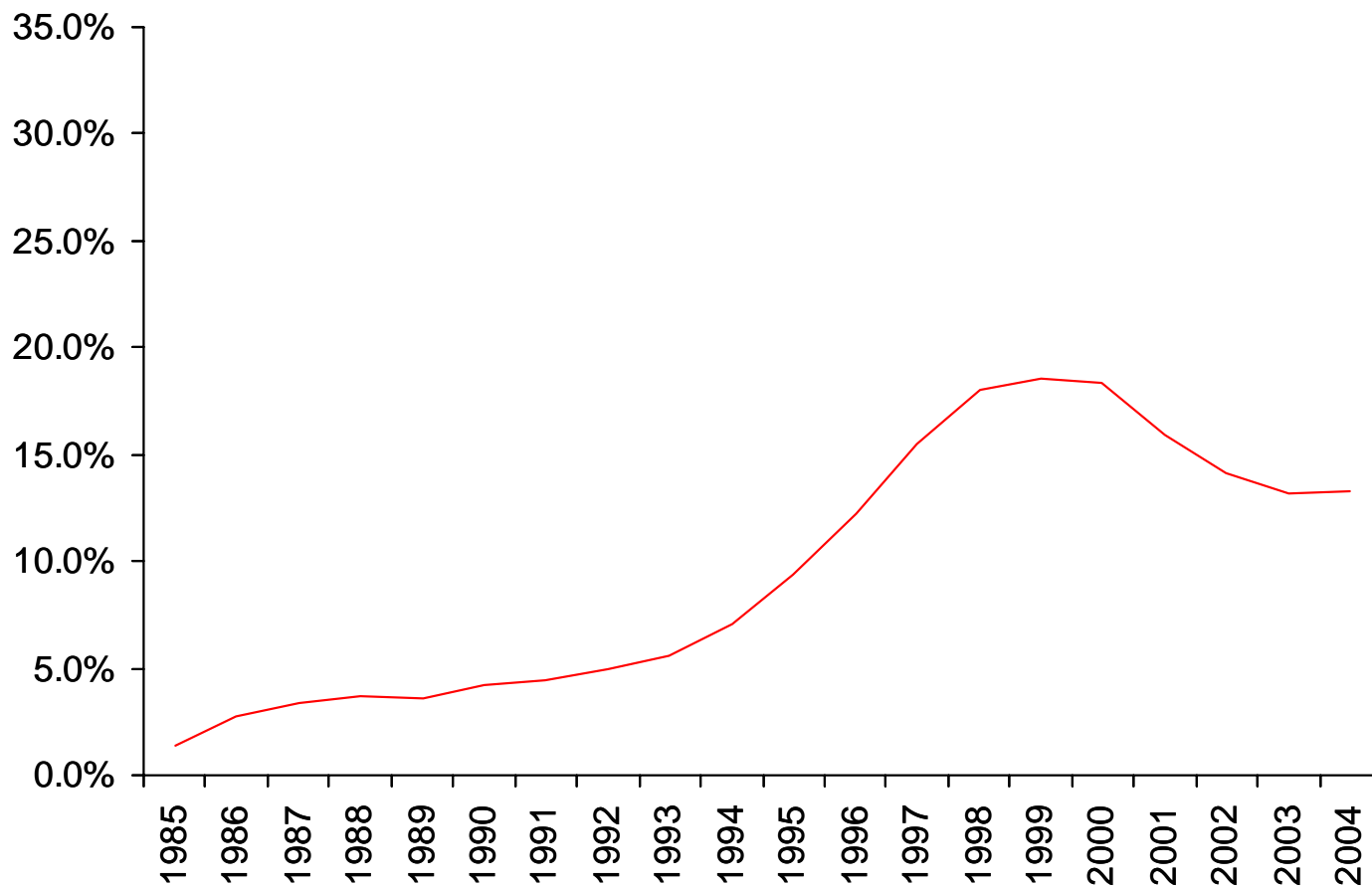
Figure 8
Number of Risk Plans in Medicare – 1985-2005



■ BBA97 introduces health status risk adjustments and alters payment formula

▨ MMA03 increases payments

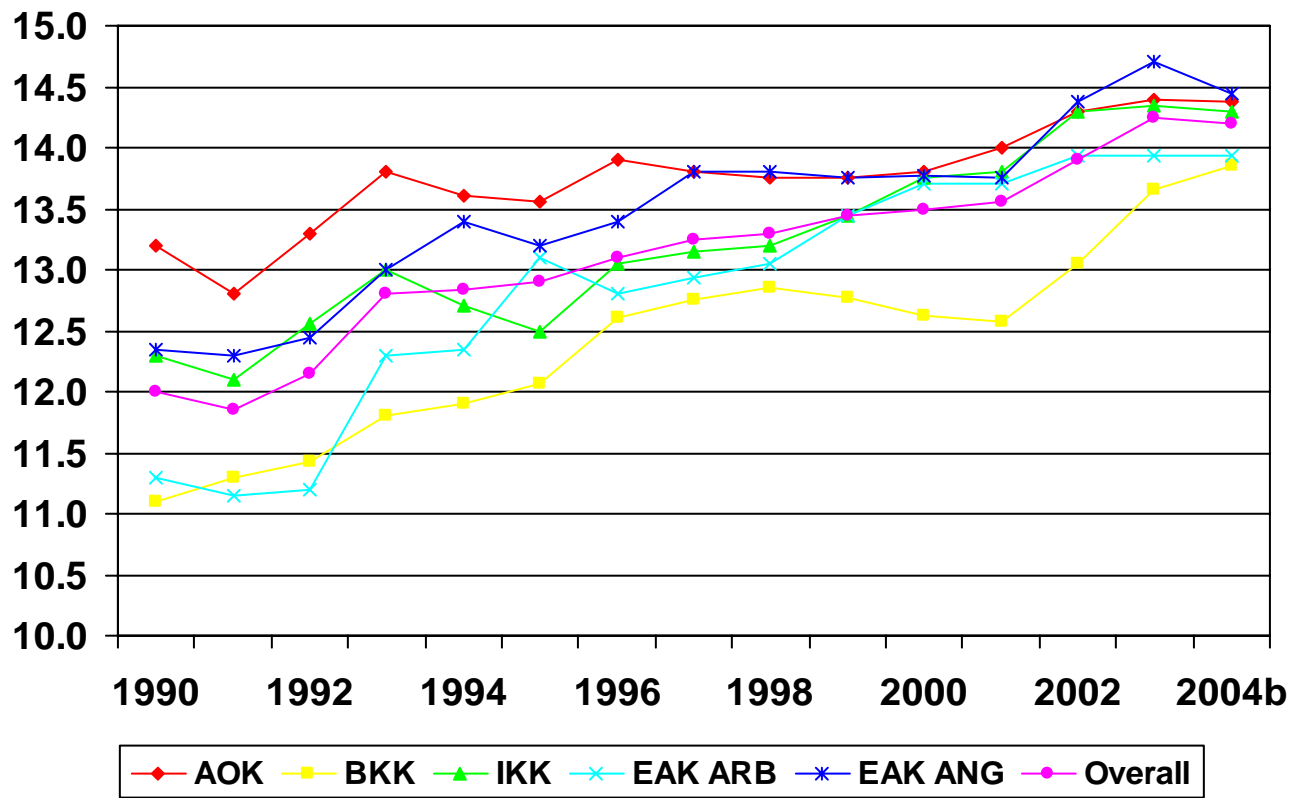
Figure 9
Percent of Medicare Beneficiaries (Elderly Only) In Risk-based Plans, 1985-2004



Total Medicare beneficiary enrollment (elderly only) from July of that year.

Source: CMS, Medicare Enrollment, National Trends 1966-2004, http://www.cms.hhs.gov/statistics/enrollment/natlrends/hi_smi.asp

Figure 10
Annual Contribution Rates by Sickness Fund Association, 1990-2004



Source: Bosse and Riesberg (2004, p.64)