Strategies to Counteract Risk Selection in Social Health Insurance Markets

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Summary and Keywords

Many countries rely on social health insurance supplied by competing insurers to enhance fairness and efficiency in healthcare financing. Premiums in these settings are typically community rated per health plan. Though community rating can help achieve fairness objectives, it also leads to a variety of problems due to risk selection, that is, actions by consumers and insurers to exploit “unpriced risk” heterogeneity. From the viewpoint of a consumer, unpriced risk refers to the gap between her expected spending under a health plan and the net premium for that plan. Heterogeneity in unpriced risk can lead to selection by consumers in and out of insurance and between high- and low-value plans. These forms of risk selection can result in upward premium spirals, inefficient take-up of basic coverage, and inefficient sorting of consumers between high- and low-value plans.

From the viewpoint of an insurer, unpriced risk refers to the gap between his expected costs under a certain contract and the revenues he receives for that contract. Heterogeneity in unpriced risk incentivizes insurers to alter their plan offerings in order to attract profitable people, resulting in inefficient plan design and possibly in the unavailability of high-quality care. Moreover, insurers have incentives to target profitable people via marketing tools and customer service, which—from a societal perspective—can be considered a waste of resources.

Common tools to counteract selection problems are risk equalization, risk sharing, and risk rating of premiums. All three strategies reduce unpriced risk heterogeneity faced by insurers and thus diminish selection actions by insurers such as the altering of plan offerings. Risk rating of premiums also reduces unpriced risk heterogeneity faced by consumers and thus mitigates selection in and out of insurance and between high- and low-value plans. All three strategies, however, come with trade-offs. A smart blend takes advantage of the strengths, while reducing the weaknesses of each strategy. The optimal payment system configuration will depend on how a regulator weighs fairness and efficiency and on how the healthcare system is organized.

Keywords: social health insurance, risk selection, fairness, efficiency, risk equalization, risk adjustment, risk sharing, risk rating, health economics

Social Health Insurance Markets and the Problem of Risk Selection

In various parts of the world, health insurance is subject to both regulation and competition to simultaneously achieve objectives related to fairness and efficiency in healthcare financing.[1] Such systems are referred to as “social health insurance markets.” Examples include national health insurance schemes in European countries such as Belgium, Germany, Israel, The Netherlands, Slovakia, and Switzerland, as well as sectors in the United States including the Marketplaces (also known as Obamacare), Medicare Advantage, and Medicaid. Social health insurance markets are also found in Australia, Chile, Colombia, and Ireland. Though each of these systems follows its own path of reform, there are many commonalities, both in terms of how markets are regulated and the nature of competition. Common regulatory features include standardization of benefits, open enrollment, and community rating per health plan (i.e., per health insurance product).[2] Community rating creates implicit cross subsidies from the low-risk to the high-risk people who choose the same health plan. Though these implicit cross subsidies come with important gains, such as improvements in fairness and reductions in reclassification risk, they also lead to major problems related to risk selection. Newhouse (1996) defines risk selection as “actions by consumers and insurers to exploit unpriced risk heterogeneity.” For the purpose of this article, it is important to note that the concept of “unpriced risk” from the consumers’ perspective can differ from that of the insurers’ perspective (see Table 1).

Table 1. Unpriced Risk: Consumer Versus Insurer Perspective

Perspective	**Concept of "Unpriced Risk"**
Consumer	From a consumer's perspective, *unpriced risk* refers to the gap between her expected spending under a health plan and her net premium for that plan. By the term *net premium* for a plan is meant the gross insurance premium offered by the insurer minus any subsidy (e.g., in the form of a fixed subsidy, tax credit or risk-adjusted voucher) received by the consumer for obtaining that plan.
Insurer	From an insurer's perspective, *unpriced risk* refers to the gap between the spending he predicts for a certain contract and the revenues he receives for that contract. The insurer's revenues for a contract can consist of premiums and other features such as risk equalization payments (see "RISK EQUALIZATION") and risk sharing payments (see "RISK SHARING").

Note. The relevance of this distinction is that the three strategies to contend with risk selection (i.e., risk equalization, risk sharing, and risk rating) can work in different directions, depending on whether they reduce unpriced risk from the consumer's perspective or the insurer's perspective. When this article speaks of the insurance premium, it exclusively means the premium component that covers medical spending. More specifically, the loading fee and risk premium are ignored.

Risk selection can take several forms. Examples of actions by consumers include self-selection "in and out of the market" (i.e., by enrolling or disenrolling health insurance) and "between high- and low-value plans." Examples of actions by insurers include selection via health plan design and cream skimming via selective marketing. Each of these forms comes with specific problems for fairness and efficiency. For example, self-selection by consumers in and out of the market can lead to upward premium spirals and inefficient insurance uptake among low-risk people (Newhouse, 2017). Self-selection by consumers between high- and low-value plans can lead to indirect risk rating (e.g., when healthy people choose a high-deductible plan while the unhealthy choose a low-deductible plan) and to consumers choosing the "wrong plan" (due to distortions of the price mechanism when incremental premiums do not only reflect variation in value but also the effect of selection) (Akerlof, 1970; Einav & Finkelstein, 2011). Selection by insurers can lead to inefficient plan design (Rothschild & Stiglitz, 1976; Glazer & McGuire, 2000). The first goal of

this article is to describe these different forms of risk selection and their (potential) effects.

The second goal of this article is to show how three strategies can mitigate selection problems: risk equalization, risk sharing, and risk rating of premiums. By risk equalization is meant a system of risk-adjusted payments to insurers, as present in many social health insurance markets (Ellis, Rose, & Martin, 2018). Risk sharing refers to cost-based compensations such as excess-loss compensations, as applied in some—but not all—social health insurance markets (McGuire & van Kleef, 2018A). Risk rating means differentiation of consumer premiums on the basis of individual risk characteristics—such as age, region, and tobacco use in the U.S. Marketplaces (Layton, Ellis, McGuire, & van Kleef, 2017). This article discusses the effectiveness of these strategies in mitigating selection problems and the trade-offs involved. It is shown that no single strategy is likely to sufficiently mitigate selection problems on its own. Based on economic theory and international experience, the conclusion is drawn that the three strategies can complement one another, with the best mix depending on the specific circumstances in each country or sector.

Starting Point of the Analysis

Possibilities for risk selection crucially depend on the institutional setting. With highly standardized coverage, for instance, possibilities for risk selection via plan design are fewer than with non-standardized coverage. The same is true for regulations regarding enrollment and contract length. For the purpose of this article, it is therefore important to explicitly define a point of departure. A starting point is deliberately chosen from which most of the real-world selection problems can be described. This starting point consists of six assumptions. First, it is assumed that the regulator has determined a target level of what is referred to as “basic” coverage. This coverage is not necessarily fully specified. Most regulators define basic coverage in terms of a “contract space” in which insurers have some flexibility with respect to health plan design and consumers have a set of choice options. In the Netherlands, the U.S. Marketplaces, and Switzerland, for instance, consumers can choose among different levels of cost sharing (van Kleef, Eijkenaar, Van Vliet, & van de Ven, 2018A; Layton et al., 2017; Schmid, Beck, & Kauer, 2018). In many countries, insurers have (some) flexibility regarding network design and provider contracting (McGuire & van Kleef, 2018B). Second, it is assumed that—with respect to all basic coverage plans—insurers are bound by “open enrollment,” meaning that they have to accept all applicants for basic coverage irrespective of people’s characteristics. Third, it is assumed that—by regulation—premiums for basic coverage must be community rated per plan. In most social health insurance markets, open enrollment and community rating per plan (or something close) are indeed part of the regulation (McGuire & van Kleef, 2018B). Fourth, it is assumed that (by regulation) insurance contracts are on an individual basis (i.e., no family or group contracts) and have a duration of one year. Fifth, for simplicity, it is assumed that consumers face no outside options other than “no coverage.”[3] In case of other outside options, the analysis of selection in and out of basic

coverage will be (much) more complicated than presented here. Finally, also for simplicity, it is assumed that subsidies to consumers (e.g., in the form of tax credits or vouchers) are absent. In terms of the considerations in Table 1, this means that unpriced risk from the viewpoint of a consumer is fully determined by the gap between her expected spending under a health plan and the premium for that plan. The relevance of subsidies to consumers is briefly elaborated on in the “DISCUSSION.”

Forms of Risk Selection and Their Effects

Expected healthcare spending varies substantially among risk types, a critical underlying fact shared by all societies and important for understanding the power of selection-related incentives. This distribution is illustrated in Figure 1 using data on spending and individual characteristics from people with a health plan under the Dutch basic health insurance in 2013. The bars show mean per person spending in 2013 for a series of condition groups classified by the use of prescription drugs in 2012, a classification sometimes used as the basis for risk equalization. Variation in mean spending is substantial: For people with no identified condition (81% of the population), mean spending is about 1,300 euros, while for groups with a condition (19%), mean spending varies from 2,450 to 47,400 euros. The remainder of this section describes, in the face of this risk heterogeneity, how a community-rated premium based on overall mean spending induces selection by consumers and selection by insurers, respectively.

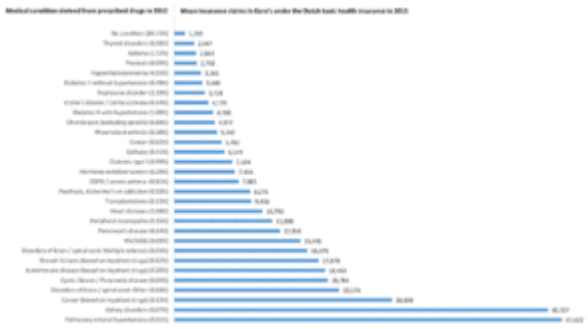

Figure 1. Mean per person spending per medical-condition group. The data used for this figure include individual-level spending and risk characteristics of all individuals with a health plan under Dutch basic health insurance in 2013 (N = 16.6m). The medical conditions are derived from the use of specific pharmaceuticals in the prior year. Overall mean per person spending equals 2,160 euros. The percentages in parentheses represent the relative frequency of these conditions in the total population. Note that in a more refined classification of the population (e.g., based on a combination of prescription drugs and hospital treatments), differences in mean spending among groups will be even larger. In Dutch basic health insurance, predicted spending (from the risk equalization model) at the individual-level ranges from about 500 to 500,000 euros (Cattel, Eijkenaar, van Kleef, Van Vliet, & Withagen-Koster, 2018).

Source: van Kleef et al. (2018C).

Risk Selection by Consumers

Selection of Consumers in and out of Basic Coverage

Risk selection by consumers can mean that low-risk people do not enroll in basic coverage when the premium for basic coverage is beyond what they are willing to pay. Assume consumers are risk averse and willing to pay a risk premium of 50% above their expected spending. This means, for instance, assuming that consumers know their expected spending, that people without a condition (81% of the population in Figure 1) are willing to pay a premium of 1,940 euros (= 1.5 * 1,293 euros). Now imagine that insurers do not anticipate selection by consumers and set their community-rated premium equal to the average spending in the population (2,160 euros). Under these circumstances and in the absence of an insurance mandate, the 81% of the population without a condition will not buy basic coverage.[4]

Risk selection of consumers in and out of basic coverage can conflict with fairness objectives. Once insurers learn that the people without a medical condition in Figure 1 do not enroll in basic coverage, they have to raise the community-rated premium to at least 5,971 euros (i.e., the average spending for those with a medical condition). Then, however, people with a “minor” condition (e.g., thyroid disorder, asthma, diabetes type 2; see Figure 1) may also decide not to buy basic coverage. This upward premium spiral might

continue until a higher equilibrium premium is reached or the market is destroyed entirely, undermining affordability of basic coverage (Price & Mays, 1985; Feldman & Dowd, 1991; Cutler & Reber, 1998).

Selection by consumers in and out of basic coverage also threatens efficiency. To see how this works, recall the assumption that there are no outside options other than "no coverage." The diagram in Figure 2 simulates such a situation and illustrates how community rating can lead to inefficient enrollment into basic coverage. The explanation is as follows. In the presence of community rating, the premium for basic coverage is based on the average spending of people enrolled in the market.[5] In a competitive market, the equilibrium premium P_{eq} is to be found at the intersection of the "average expected spending" curve and the "expected spending plus risk premium" curve (i.e., the point where the community-rated premium equals the premium the marginal consumer is willing to pay). Now here is the point: The corresponding quantity Q_{eq}, can be considered inefficient since those who do not enroll, that is, the people right of Q_{eq}, value basic coverage at more than their expected spending. The consumer surplus lost equals the risk premium these people are willing to pay for basic coverage, indicated by the shaded area.

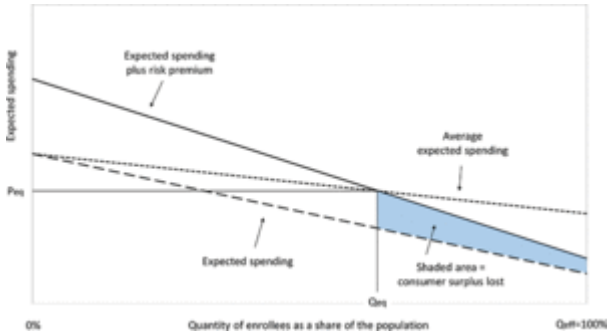

Figure 2. The demand for basic coverage under community rating. The horizontal axis represents the relevant population, which is assumed to be constant across premium levels (and thus ignores the effect of premium changes on individual affordability of basic coverage). Consumers are ordered according to their expected spending under basic coverage. Those with the highest expected spending are on the left and those with the lowest on the right. All consumers are assumed to be risk averse and willing to pay a risk premium on top of their expected spending. Since willingness to pay decreases with expected spending, the "average expected spending" curve is downward sloping (but above the "expected spending" curve). The spirit of this diagram finds its origin in the selection framework developed by Einav and Finkelstein (2011). Compared to that article, the authors use a slightly different terminology (actuarial rather than economic): What Einav and Finkelstein call the "demand curve" is referred to here as the "expected spending plus risk premium curve." The key point, however, is the same: Inefficiency emerges because the market equilibrium occurs where this curve intersects with the *average* expected spending curve instead of the expected spending (i.e., marginal cost) curve.

Source: van Kleef et al. (2018C), based on Einav and Finkelstein (2011).

Note that both the extent and welfare effects of self-selection in and out of basic coverage critically depend on the position and slopes of the curves in Figure 2. For simplicity, it is assumed that the curves are linear. In reality, it is well known that the distribution of expected spending is skewed to the right, meaning that a relatively small proportion of the population is responsible for a relatively large share of (expected) spending. Plugging such a skewed distribution into Figure 2 would cause the three curves to be convex instead of linear, possibly implying that a greater share of the population does not take up basic coverage at any price.

Selection of Consumers Between High- and Low-Value Plans

Geruso and Layton (2017) distinguish between selection by consumers *into* the market and selection by consumers *within* the market. The former refers to the sorting problem analyzed in the previous section ("SELECTION OF CONSUMERS IN AND OUT OF BASIC COVERAGE"), that is, the problem that low-risk consumers choose not to enroll in basic

coverage despite the fact that they value this coverage at more than their expected spending. Selection by consumers within the market refers to the sorting of risk types into high- and low-value plans (Einav & Finkelstein, 2011; Glazer & McGuire, 2011; Bundorf, Levin, & Mahoney, 2012; Geruso, 2016).

Risk selection between high- and low-value plans could mean that people in poor health choose more comprehensive coverage than those in good health. This can be illustrated with a simple example in which consumers can choose between a low-deductible and a high-deductible plan (both within the scope of basic coverage). Community rating causes the incremental premium of the low-deductible plan ΔP_L (i.e., the difference in premium between the low-deductible plan and the high-deductible plan) to be based on the difference in mean spending between the two plans. For healthy people, ΔP_L will exceed their expected incremental spending under the low-deductible plan. The reason is twofold. First, incremental spending under the low-deductible plan will be higher for people in poor health than those in good health. Any ΔP_L based on mean incremental spending will exceed expected incremental spending of healthy people. Second (and as a consequence of the previous point), community rating leads ΔP_L to induce selection of unhealthy people into the low-deductible plan. Such self-selection elevates ΔP_L and further increases the gap between ΔP_L and expected incremental spending of low-risk people. As a result, some of the healthy people might not opt for the low-deductible plan, although the low-deductible plan would have given them more value over costs. This type of inefficient sorting of consumers between high- and low-value plans can occur in any situation where consumer preferences (and sorting) with respect to “contract space dimensions” are correlated with expected spending.[6]

Selection of consumers between high- and low-value plans can also threaten fairness objectives. As explained, selection of unhealthy people into the low-deductible plan elevates the incremental premium for the low-deductible plan. In other words, the incremental premium will (partly) reflect the difference in risk between people choosing different plans. This “indirect risk rating” might be in conflict with the regulator’s concept of fairness in health plan financing.

Selection by Insurers

Community rating confronts insurers with predictable profits and losses. This is illustrated in Figure 3, based on Figure 2. This time, however, the focus is on the group that enrolls in basic coverage, that is, the group left of point Q_{eq} (rather than the group right of Q_{eq} that does not enroll). Given the downward slope of the “expected spending” curve, a community-rated premium results in predictable profits (i.e., the scattered triangle to the right) and predictable losses (i.e., the scattered triangle to the left). With a heterogeneous population, such as the one depicted in Figure 1, predictable profits and losses can be very substantial. For example, in an extreme situation where all people with a medical condition enroll in basic coverage and those without a condition do not, a community-rated premium equals 5,971 euros (i.e., the average expected spending of those with a medical condition). Under these circumstances, the predictable profit on people with thyroid

disorders would be 3,524 euros per person per year (5,971−2,447) while the predictable loss on people with pulmonary arterial hypertension would be 41,449 euros per person per year (= 5,971−47,420). In such a market, insurers have strong incentives to engage in actions to attract profitable consumers and to deter the unprofitable ones.

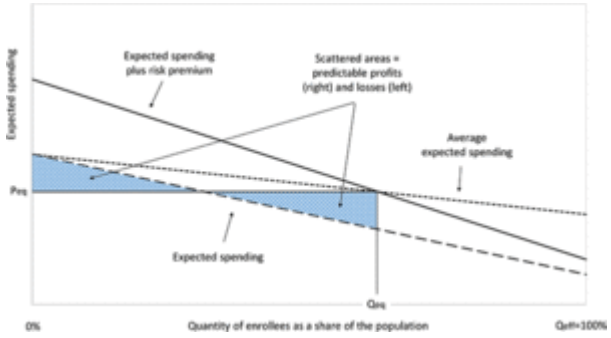

Figure 3. Predictable profits and losses under community rating. See Figure 2 for an explanation of the curves. The shaded triangles represent the predictable profits (right) and losses (left) among those enrolled in the market due to community-rated premium P_{eq}.

Source: van Kleef et al. (2018C).

Though open enrollment, generally present in social health insurance markets and assumed in this article, precludes selective underwriting, insurers can engage in many other forms of risk selection, sometimes referred to as indirect selection (van de Ven & Ellis, 2000; Breyer, Bundorf, & Pauly, 2012). The unprofitable consumers (to the left) are likely to be different from the profitable ones (to the right) in terms of their patterns of healthcare use; for example, the unprofitable people may suffer more often from specific chronic illnesses. In this case, an insurer can design its health plan(s) in a way to appeal differently to these groups (Glazer & McGuire, 2000; Ellis & McGuire, 2007; Layton, Ellis, McGuire, & van Kleef, 2017). Examples include not contracting providers that are particularly attractive to unprofitable people (Shepard, 2016) and setting high (low) copayments for drugs specifically used by unprofitable (profitable) people (Carey, 2017; Geruso, Layton, & Prinz, 2016; Lavetti & Simon, 2018; Han & Lavetti, 2017). In principle, any dimension in which basic coverage is allowed to differ (i.e., the contract space) is a potential instrument for risk selection. Common dimensions include cost-sharing options and provider networks.

Risk selection by insurers threatens efficiency by distorting the form of plan offerings. Ideally, a competitive insurance market incentivizes insurers to design plans to serve consumer preferences rather than designing these in response to selection incentives. Selection via plan design not only reduces efficiency of plan offerings but can also distort the availability of high-quality care, particularly for high-risk people (van de Ven, van Kleef, & Van Vliet, 2015). The reason is that when plans do not cover high-quality care for services particularly used by unprofitable consumers, healthcare providers have disincentives to offer and invest in these services.

In addition to selection via plan design, insurers can also engage in other types of selection actions (e.g., regarding customer service and marketing). In terms of customer service, for instance, insurers might use longer query-response times for high-risk than for low-risk people (Bauhoff, 2012). Marketing actions might include selective advertisement and welcome gifts. Obviously, from a societal perspective, resources used for such activities do not add any value.

As an aside, it is worth mentioning that if insurers themselves are risk averse, selection by insurers can also be triggered by the variance in profits and losses. To see how this works, imagine an extreme case in which insurers are fully compensated for the expected value of profits and losses (e.g., by a risk equalization system). Even when expected profits and losses are zero, community rating can provide insurers with incentives to prefer groups with low predicted spending over those with high predicted spending. Though both types have an expected profit of zero, the second group might be relatively unattractive due to a higher variance of individual-level profits and losses. For simplicity, however, this article does not elaborate on these variance-driven selection incentives and leaves this topic to future research.

Forms of Risk Selection and Their Effects in a Nutshell

Table 2 summarizes the forms of risk selection and their potential welfare effects. It is worth highlighting that these different forms of risk selection are likely to interact. Imagine, for instance, that one insurer drops a hospital from its network because he learned that this hospital is relatively attractive to groups of unprofitable people. In terms of Table 2, this action can be considered a form of “selection via plan design,” leading to inefficient plan design and possibly the unavailability of high-quality care (particularly for high-risk people). But the welfare effects of this action might stretch further since it changes the relative value of health plans in the market. This can induce new patterns of consumer sorting across plans which—on their turn—can incentivize insurers to modify their plans, and so on. Risk selection can thus be a dynamic process driven by actions from both consumers (plan choice) and insurers (plan design).

Table 2. Forms of Risk Selection and Their (Potential) Welfare Effects

Form of Risk Selection		(Potential) Welfare Effects
Consumers (driven by gaps between premiums and consumers' expectation of spending under a health plan)	In/out of basic coverage	• Inefficient uptake of basic coverage • Fairness objectives are not (fully) achieved
	Between high- and low-value plans	• Inefficient sorting of consumers across plans • Fairness objectives are not (fully) achieved
Insurers (driven by gaps between revenues and insurers' expectation of spending under a contract)	Via plan design	• Inefficient plan design • Unavailability of high-quality care
	Via marketing and customer service	• Waste of resources • Fairness objectives are not (fully) achieved in case actions are successful

Strategies to Counteract Risk Selection

This section describes how risk equalization, risk sharing, and risk rating mitigate selection problems, starting with risk equalization. Though risk equalization is a crucial element for payment system design, it has some limitations that might call for supplemen-

tary measures in the form of risk sharing or risk rating of premiums. Since each of these features comes with undesirable side effects, the choice of blend involves trade-offs.

Risk Equalization

Risk equalization (aka risk adjustment) means insurers receive a payment per enrollee based on specific characteristics of that enrollee, called “risk adjusters.” Common risk adjusters include age, gender, and disease indicators derived from (prior) utilization of medical services. Around the world, disease indicators take different forms. Models in Germany and the United States include so-called hierarchical condition categories (HCCs), that is, classifications that categorize people into disease groups on the basis of all-encounter diagnoses (Layton et al., 2017; Wasem, Buchner, Lux, & Schillo, 2018). Within these groups there can be subclassifications based on severity and disease stage. Other models, such as those in the Netherlands and Belgium, use the somewhat less refined “diagnoses-based cost groups” (DCGs) derived from inpatient (and in the case of the Netherlands, also outpatient) hospital diagnoses. Though these DCGs are based on a broad set of diagnoses, they do not explicitly distinguish among severity levels and disease stages within groups (van Kleef et al., 2018A; Schokkaert, Guillaume, & Van de Voorde, 2018). In addition, the Dutch and Belgian models include disease indicators based on selected prescribed drugs—the so-called pharmacy-based cost groups (PCGs)—and a series of socioeconomic and geographic variables. As of 2020, PCGs will be part of the Swiss risk equalization model too (Schmid et al., 2018). Morbidity indicators can also be based on spending instead of diagnoses. Again, an example comes from the Dutch risk equalization model which includes indicators based on multiple year low and high spending (for specific types of care). For detailed descriptions and more discussion of these and other morbidity indicators used for risk equalization, see Ellis et al. (2018).

Effects of Risk Equalization on Risk Selection

To describe the effects of risk equalization on risk selection, a distinction must be made between “internally financed” and “externally financed” risk equalization systems. In the internal system, payments to plans for high-risk people are financed with contributions from plans for low-risk people. Payments and contributions sum to zero. In more technical terms, the risk equalization payment REP for individual i is based on the difference between the predicted spending for individual i ($\hat{y}_i$) and the mean predicted spending in the enrolled population ($\overline{\hat{y}}$):

$$\mathrm{REP}_i = \hat{y}_i - \overline{\hat{y}}$$

(1)

Figure 1 can illustrate the working of an internal risk equalization system. Imagine that the population in Figure 1 represents the pool in which risks are to be equalized. Overall mean spending in this population equals 2,160 euros per person per year. And if 2,160 euros is the community-rated premium, internal risk equalization implies that for people with heart disease insurers receive a compensation of 8,630 euros per person per year (=

10,790−2,160), while for people without a condition they pay a contribution of 867 euros per person per year (= 1,293−2,160). The effects of such a system are graphically illustrated in Figure 4. Compared to Figure 3, a new curve has appeared, the "expected spending minus RE contribution/payment," which results from a rotation of the "expected spending curve." In the extreme case of a complete correction for variation in expected spending, the new curve ends up horizontal, as represented by the red line. In that extreme case, insurers' revenues are in line with expected spending, meaning that selection incentives for insurers are eliminated.

When risk equalization fully compensates insurers for variation in expected spending, it also eliminates selection-driven premium variation across plans. Or, in terms of the consideration in the section "SELECTION OF CONSUMERS BETWEEN HIGH- AND LOW-VALUE PLANS," it eliminates the second source of inefficient sorting of consumers between high- and low-value plans. It does not affect the first source (i.e., the gap between consumers' expected incremental spending and mean incremental spending). Solving this requires alignment of incremental premiums (as faced by consumers) with consumers' expected incremental spending, a form of risk-rating of premiums.

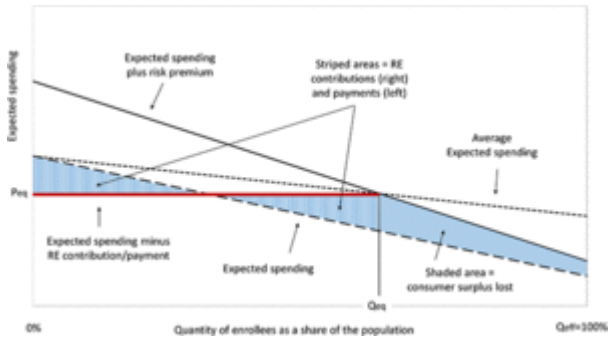

Figure 4. The demand for basic coverage with internal risk equalization. See Figure 2 for an explanation of the curves. In this internal risk equalization system, payments to health plans for high-risk people (striped triangle to the left) are financed with contributions from health plans for low-risk people (striped triangle to the right). With a complete correction for unpriced risk heterogeneity among those enrolled in basic coverage, the "expected spending minus RE contribution/payment" curve ends up horizontal.

Source: van Kleef et al. (2018C).

In an external risk equalization system, risk equalization payments to insurers are financed from an external source such as general tax revenues or earmarked contributions. In a full external system, the risk equalization payment, REP, for individual i can be written as:

$$\mathrm{REP}_i = \hat{y}_i \quad (2)$$

Such systems can be found in Israel and U.S. Medicare (Brammli-Greenberg, Glazer, & Shmueli, 2018; Layton, Ndikumana, & Shepard, 2018B). Other risk equalization systems rely on a combination of internal and external financing. In these schemes, the risk equalization payment can be written as:

$$\mathrm{REP_i} = \hat{y}_i - (\bar{\hat{y}} - S)$$

(3)

where, similar to Equations 1 and 2, $\hat{y}_i$ represents a prediction of spending for individual i and $\bar{\hat{y}}$ is the mean per person expected spending of those enrolled in basic coverage. S can be seen as a fixed per person subsidy financed with external resources. In practice, various levels of S can be observed. In the Netherlands, for instance, S equals about 50% of the mean expected spending in the population (van Kleef et al., 2018A). In Belgium, S nearly equals the average expected spending in the population (Schokkaert et al., 2018).

When S > 0, risk equalization payments no longer sum to zero. Instead, they lead to a net flow of money from the risk equalization fund to insurers. Compared to the internal risk equalization system (i.e., with S = 0), external risk equalization lowers the community-rated premium, making it more attractive for low-risk people to enroll in basic coverage. This is illustrated in Figure 5. The curves reflecting “expected spending,” “expected spending plus risk premium,” and “average expected spending” are similar to those in Figure 4. From the insurers’ perspective, the external per person subsidy S reduces the average expected spending, which is reflected by the new curve “average expected spending minus subsidy S.” If S fully compensates for the gap between the “average expected spending” and “expected spending plus risk premium,” which is the case in Figure 5, all consumers will enroll in basic coverage (i.e., $Q_{eq} = 100\% = Q_{eff}$).

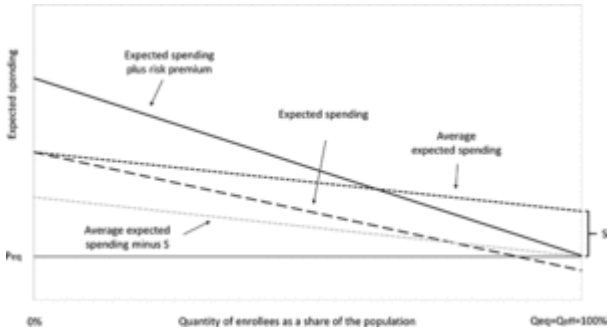

Figure 5. The demand for basic coverage with external risk equalization. See Figure 2 for an explanation of the curves. From the insurers’ perspective, per person subsidy S reduces expected spending, which is reflected in the “average expected spending minus S” curve.

Source: van Kleef et al. (2018C).

Table 3 summarizes the effects of risk equalization on risk selection. Risk equalization reduces selection incentives for insurers and selection-driven premium variation across

plans. When it comes to risk selection by consumers, however, risk equalization has some limitations. First, it cannot fully solve selection of consumers between high- and low-value plans. In addition, internal systems might not avoid that low-risk people do not take up basic coverage.

Table 3. Effects of Risk Equalization (and/or Risk Sharing) on Risk Selection

Form of Risk Selection		Effect of Risk Rating
Consumers (driven by gaps between premiums and consumers' expectation of spending under a health plan)	In/out of basic coverage	Internal systems cannot avoid that low-risk people do not enroll in basic coverage. External systems mitigate this problem by lowering the premium.
	Between high- and low-value plans	Risk equalization (and/or risk sharing) mitigates selection-driven premium differences between high- and low-value plans. However, it does not fully eliminate the gap between incremental premiums and expected incremental spending, leaving some of the selection problem intact.
Insurers (driven by gaps between revenues and insurers' expectation of spending under a contract)	Via plan design	Risk equalization (and/or risk sharing) corrects for predictable profits and losses and thus mitigates insurers' incentives for risk selection.
	Via marketing and customer service	

Risk Equalization and Trade-Offs

One fundamental element of competition in social health insurance markets is that insurers should bear financial risk, encouraging them to restrain spending in order to keep costs (and premiums) of health plans low. Risk equalization can affect incentives for cost containment, confronting regulators with a trade-off. To see why, distinguish between exogenous and endogenous risk adjusters. The former category refers to indicators that cannot be influenced by insurers, such as age, gender, and socioeconomic variables. En-

dogenous risk adjusters refer to indicators that can be influenced by insurers, such as morbidity indicators based on (prior) utilization or spending. Contrary to exogenous risk adjusters, endogenous indicators create a link between treatment decisions and risk equalization payments, which reduces incentives for cost control and can introduce incentives for oversupply and upcoding (i.e., when the incremental payment associated with a treatment exceeds the "costs" associated with that treatment). The extent to which such incentives are present and may have an effect depends on the specification of these endogenous factors and the possibilities for insurers to influence treatment decisions (Geruso & Layton, 2015; Bauhoff, Fischer, Göpffarth, & Wuppermann, 2017). Since exogenous indicators alone are known to be insufficiently predictive of spending, any sophisticated risk equalization model needs some type of endogenous risk adjustment. Design of these models involves trade-offs between risk selection and incentives for cost containment, depending on the institutional setting.

Performance of State-of-the-Art Risk Equalization Models

Although sophisticated health-based risk equalization models considerably reduce predictable profits and losses within the market, some of these predictable profits and losses remain to exist (van Kleef, Eijkenaar, & Van Vliet, 2018B; McGuire et al., 2018). For example, van Kleef et al. (2018B) have merged the claims data used for estimation of the Dutch risk equalization model in 2016 (N = 16.8m) with health survey information from a prior year (N = 384k). This allowed them to calculate predictable profits and losses for a variety of groups identified in the survey information. Figure 6 shows two of these groups: people who report a fair, poor, or very poor health status (one quarter of the sample) and those who report a good or very good health status (three quarters of the sample). Without risk equalization (but with community rating), the difference in mean result between these groups would be 4,468 euros per person per year (=1,114+3,354), indicating considerable unpriced risk heterogeneity (from the viewpoint of insurers). Risk equalization reduces this difference to 699 euros (=187+512), implying that the Dutch model of 2016 substantially mitigates unpriced risk heterogeneity, but not completely. It is not clear that further improvements of risk equalization in terms of risk adjusters will sufficiently mitigate remaining predictable profits and losses to justify their inclusion, given the incentive problems they may create (such as the endogeneity problems discussed in "RISK EQUALIZATION AND TRADE-OFFS"). Combining risk equalization with risk sharing and risk rating can help mitigate remaining predictable profits and losses.

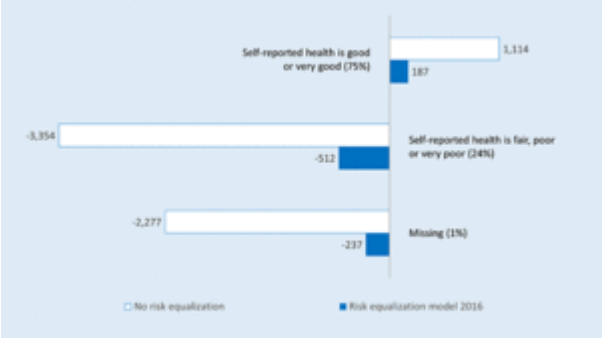

Figure 6. Mean (expected) gap between revenues and spending (in euros per person per subgroup per year) in Dutch basic health insurance in 2016 (*N* = 384k of 19 years and above).

Source: van Kleef et al. (2018B).

Risk Sharing

Risk sharing means that insurers are compensated on the basis of actual spending (instead of predicted spending as with risk equalization). Risk sharing can take a variety of forms. For example, insurers can share in a proportion of spending, as done in Belgium (Schokkaert et al., 2018). Another method is "reinsurance" or "excess-loss compensation," meaning that insurers share in a proportion of individual-level claims in excess of a certain threshold, as is done in Australia (Paolucci, Sequeira, Fouda, & Matthews, 2018). Yet another modality is that insurers share in a proportion of the average profits and losses per person outside a bandwidth (i.e., "risk corridors"), as formerly applied in the Netherlands (van Kleef et al., 2018A) and in the U.S. Marketplaces (Layton, Montz, & Shepard, 2018A). Risk sharing can also take the form of a cost-based compensation for specific ex-ante risk types, also referred to as "high-risk pooling" (Van Barneveld, Van Vliet, & van de Ven, 1996). For descriptions of these and other forms of risk sharing, see McGuire and van Kleef (2018A). Like risk equalization, risk sharing can be financed internally, externally, or by a combination of both.

Effects of Risk Sharing on Risk Selection

When it comes to the effects on risk selection, risk sharing works in the same direction as risk equalization. In the extreme case of 100% risk sharing, for instance, predictable profits and losses are completely eliminated, resulting in the absence of selection incentives for insurers and selection-driven premium variation among plans. When financed internally, however, risk sharing does not affect the average community-rated premium and does not avoid the problem that low-risk people do not enroll in basic coverage. Moreover, risk sharing will not fully eliminate gaps between incremental premiums and consumers' incremental expected spending under high- versus low-value plans. For these effects, see the section "EFFECTS OF RISK EQUALIZATION ON RISK SELECTION."

Risk Sharing and Trade-Offs

Risk sharing inherently diminishes insurers' incentives to control costs. For example, in a mixed system with 20% proportional risk sharing and 80% capitation (ignoring endogenous risk factors), insurers are responsible for only 80% of profits and losses. More specifically, 20 cents of each euro or dollar saved by the insurer will be "shared," leaving 80 cents net savings for the insurer. So compared to 100% capitation (ignoring the effect of endogenous risk factors), 20% risk sharing diminishes insurers' incentives to control costs by 20%. For more sophisticated risk sharing methods, this figure might be harder to calculate but will go in the same direction. Thus, risk sharing presents the regulator with a trade-off between mitigating selection problems and reducing incentives for cost containment, a trade-off comparable to the one present with endogenous risk adjustors (as discussed in the section "RISK EQUALIZATION AND TRADE-OFFS").

Combining Risk Equalization and Risk Sharing

Different trade-offs presented by risk equalization and risk sharing give the regulator the option to consider the tools together. As discussed in the section "PERFORMANCE OF STATE-OF-THE-ART RISK EQUALIZATION MODELS," risk equalization alone is unlikely to eliminate selection problems. Supplementing risk equalization with risk sharing can help mitigate remaining predictable profits and losses (Newhouse, 1996; Van Barneveld, Lamers, Van Vliet, & van de Ven, 1998; Van Barneveld, Lamers, Van Vliet, & van de Ven, 2001; van Kleef & Van Vliet, 2012; Schillo, Lux, Wasem, & Buchner, 2016; McGuire & van Kleef, 2018A; McGuire et al., 2018). When used together, however, the two features should work as a team. This could mean, for instance, that risk sharing should be targeted at "residual" spending from the risk equalization system rather than total spending. In the other direction, risk equalization payments should take into account the risk sharing system (e.g., by estimating the coefficients for the risk equalization model on spending net of risk sharing). Such teamwork between risk equalization and risk sharing help avoid "double" payments for costly individuals. In addition, risk sharing payments could be targeted at groups for which risk equalization is known to generate (relatively large) underpayments. Such a method directs risk sharing payments to where they are needed most. For these and other considerations about how risk equalization and risk sharing can work together, see McGuire and van Kleef (2018A) and Van Barneveld et al. (2001).

Risk Rating

A third strategy for contending with selection problems is risk rating of premiums. Examples come from the U.S. Marketplaces where insurers can differentiate their premiums on the basis of age, region, and tobacco use (Layton et al., 2018A). Another example comes from the Swiss basic health insurance in which insurers can vary their premiums for basic coverage according to region and age (Schmid et al., 2018).

Effects of Risk Rating on Risk Selection

Risk rating inherently reduces unpriced risk heterogeneity, both from the viewpoint of consumers and that of insurers. Consequently, in principle, risk rating based on all predictable factors mitigates all selection problems summarized in Table 1, which can be illustrated with the information in Figure 1. Imagine a situation with no risk equalization and no risk sharing and assume that insurers are allowed to differentiate their premiums according to the condition groups in Figure 1. This would mean that those with none of the medical conditions were offered a premium of 1,293 euros while those with kidney problems were offered a premium of 45,727 euros. For people without a medical condition, the premium is 867 euros per year lower than with community rating (= 2,160–1,293), which makes basic coverage more attractive for this group, thereby mitigating the problem of risk selection in and out of basic coverage. In addition, risk rating will also reduce the problem of risk selection between low- and high-value plans. When premiums are risk rated (both for low- and high-value plans), the incremental premium for high-value plans equals the incremental spending per condition group. For an illustration, recall the case in which consumers have a choice between a high- and a low-deductible plan. With risk-rated premiums, people without a medical condition will face a lower incremental premium for the low-deductible plan than with a community-rated premium. The opposite is true for people with a medical condition. As the incremental premium for the low- versus the high-deductible plan better reflects incremental spending, incentives for risk selection among plans is reduced. Finally, risk rating of premiums also reduces predictable profits and losses and thus mitigates selection incentives for insurers. Table 4 summarizes these effects.

Table 4. Effects of Risk Rating of Premiums on Risk Selection

Form of Risk Selection		Effect of Risk Rating
Consumers (driven by gaps between premiums and consumers' expectation of spending under a health plan)	In/out of basic coverage	Risk rating aligns premiums with predicted spending and thereby counteracts risk selection by consumers in and out of basic coverage.
	Between high- and low-value plans	Risk rating aligns incremental premiums with incremental spending and thereby counteracts selection between high- and low-value plans.
Insurers (driven by gaps between revenues and insurers' expectation of spending under a contract)	Via plan design	Risk rating reduces predictable profits and losses and mitigates selection incentives for insurers.
	Via marketing and customer service	

Risk Rating and Trade-Offs

Given the extreme distribution of healthcare costs, complete risk rating conflicts with fairness objectives. For example, risk-based premiums can seriously threaten affordability of basic coverage for people with preexisting conditions. As discussed, premium differentiation according to the conditions in Figure 1 would mean that people with kidney problems were to pay a premium of 45,727 euros per person per year, unaffordable for most people, let alone people with a disabling condition. If this leaves these people uninsured, then necessary healthcare is likely to be inaccessible for them, an outcome that is often considered unfair.

However, there is also another side of the coin. Regulators might not necessarily want to have complete cross-subsidization from low- to high-risk people. For example, society might prefer not having cross subsidies for spending variation related to lifestyle or regional factors. van de Ven and Ellis (2000) refer to such factors as N-type factors (i.e., factors for which cross subsidies are not desired), as opposed to S-type factors for which cross subsides are desired. Risk rating can help avoid cross subsidies for N-type factors and enhance the regulator's concept of fairness. Moreover, risk rating according to N-

type factors (e.g., smoking vs. nonsmoking) can incentivize consumers to take preventive actions in order to avoid paying a higher premium.

Apart from fairness, risk rating might involve other trade-offs. First, risk rating reduces transparency of premium schedules, making it more difficult for consumers to compare health plan prices. This disadvantage is important given the growing evidence of substantial consumer inertia and suboptimal health plan choices due to misunderstandings of the properties of health insurance policies (see, e.g., Handel & Kolstad, 2015). Second, risk rating might be perceived by consumers as a sign of profit orientation, undermining trust in the agency role of insurers in social health insurance markets based on regulated competition (van de Ven & Schut, 2011). Third, risk rating comes with "reclassification risk," that is, the risk of moving to a higher premium category after developing a medical condition, implying a welfare loss for risk-averse consumers (Handel, Handel, & Whinston, 2015).

Combining Risk Equalization, Risk Sharing, and Risk Rating

The previous considerations have revealed three motivations for pairing risk equalization and risk sharing with risk rating of premiums. First, risk rating can help reduce predictable profits and losses remaining after risk equalization and risk sharing. For example, when insurers in the Netherlands would be allowed to reflect the remaining difference in profitability between the groups with (very) good self-reported health and fair or (very) poor self-reported health into their premium (Figure 6), they will no longer face incentives to select in favor of or against these groups. More generally, allowing insurers to risk rate their premiums within a certain bandwidth—of say 1,000 euros per person per year—could eliminate many of the systematic group-level profits and losses remaining after risk equalization and risk sharing. (To the extent a bandwidth of 1,000 euros is considered unfair, the regulator could provide high-risk people with a subsidy, as proposed by van de Ven et al., 2015.) Second, risk rating can help avoid cross subsidies based on N-type factors. Third, risk rating can help align incremental premiums (e.g., for low- vs. high-deductible plans) with incremental predicted spending (for low- vs. high-deductible plans), which reduces the problem of risk selection across plans. For example, van Kleef, van de Ven, and Van Vliet (2006) propose to allow insurers to risk rate the incremental premium of a low- versus a high-deductible plan on the basis of risk adjusters included in the risk equalization model. They show how, compared to community rating, this reduces the incremental premium of low-deductible plans for young and healthy people while it increases the incremental premium for the elderly and chronically ill.[7] For two reasons, this can improve efficiency. First, as argued by van Kleef et al. (2006), this makes high-deductible plans more attractive to the elderly and chronically ill, which potentially reduces moral hazard. Second, as argued by Layton et al. (2018C, Box 5.3), this mitigates risk selection between low- and high-deductible plans and thus reduces the problem of inefficient sorting.

As with risk equalization and risk sharing, teamwork between risk rating and other payment features is crucially important. For example, when the regulator wants premiums to be lower for the young than for the elderly, it must make sure that risk equalization (and

risk sharing) retain some of the differences in expected spending between these groups. This can be done by “backing out” the risk rating from the risk equalization transfers, as is done in the U.S. Marketplaces, or the right risk adjustor weights in the presence of risk rating can be solved for directly by a modified form of the conventional risk adjustment statistical model (McGuire et al., 2013). The same is true for other N-type factors. When N-factors are independent of S-factors, compensation for N-factors can be avoided by simply omitting these factors from the regression model used to estimate the risk equalization payment weights. Things are more complicated when N-factors and S-factors are correlated (Schokkaert et al., 2018). An example of such correlation can be that sick people (S-factor) are concentrated in geographical areas with relatively high levels of supplier-induced demand (N-factor). If weights for S-factors are simply determined by a regression of observed spending on the S-factors, these weights will suffer from an omitted variable bias. Consequently, the subsidies will (partly) reflect the spending variation due to the N-factors. Empirical illustrations by Schokkaert and Van de Voorde (2004) and Stam, Van Vliet, and van de Ven (2010) have shown that this bias can be substantial. Different solutions have been proposed to overcome this omitted variable bias. For example, Schokkaert and Van de Voorde (2004) propose to estimate the risk equalization model with both S-type and N-type factors and then neutralize the effect of N-type factors when calculating risk equalization payments. Schokkaert et al. (2018) describe how this method is actually applied in Belgium. An alternative procedure, in the spirit of methods applied by van Kleef, Beck, van de Ven, and Van Vliet (2008) and Stam et al. (2010), is to first “clean” the spending data on which the risk equalization model is estimated for N-type cost variation and then regress the “cleaned” spending on S-type risk adjusters.

Discussion

Many social health insurance markets rely on community rating per health plan to enhance fairness in the financing of healthcare. This article has shown how these markets are vulnerable to risk selection, that is, “actions by consumers and insurers to exploit unpriced risk heterogeneity” (Newhouse, 1996). The concept of unpriced risk from the consumer’s perspective can differ from that of the insurer’s perspective (Table 1). Unpriced risk from the viewpoint of consumers can lead to selection in and out of basic coverage and between high- and low-value plans, resulting in inefficient take-up of basic coverage and inefficient sorting of consumers across plans. Unpriced risk from the viewpoint of insurers provides insurers with incentives for altering their plan offerings in order to attract profitable people, resulting in inefficient plan design and possibly the unavailability of high-quality care. Moreover, insurers have incentives to target profitable people (and to deter the unprofitable ones) via marketing tools and customer service, which—from a societal perspective—can be considered a waste of resources.

This article has discussed three strategies to mitigate unpriced risk heterogeneity: risk equalization, risk sharing, and risk rating of premiums. Risk equalization and risk sharing help reduce unpriced risk heterogeneity faced by insurers and thus diminish selection actions by insurers such as the altering of plan offerings. When financed (partly) with exter-

nal funds, risk equalization and risk sharing lower the community-rated premium and thereby make basic coverage more attractive to low-risk people. Risk equalization and risk sharing also reduce selection-driven premium variation across plans and thus mitigate the problem of inefficient sorting of consumers across plans. Both strategies, however, cannot fully eliminate the problem of inefficient sorting of consumers between low- and high-value plans. The simple reason is that they do not affect unpriced risk from the viewpoint of consumers. This is exactly where risk rating can help. More specifically, risk rating aligns incremental premiums of plans with consumers' incremental expected spending under these plans and thus diminishes the problem of inefficient sorting.

It is worth mentioning that other regulatory interventions can help in contending with selection problems as well. For example, a strong insurance mandate—as applied in most, but not all social health insurance markets—eliminates the problem of selection in and out of basic coverage. This regulatory tool can be very useful, particularly in systems with internally financed risk equalization and risk sharing. Second, (further) standardization of basic coverage will limit the toolkit for insurers to engage in risk selection, thereby mitigating the problem of selection via plan design. Such standardization, however, also limits the insurers' instruments for efficiency, confronting the regulator with another trade-off. Third, regulators could implement subsidies to consumers. As explained by Geruso and Layton (2017), a fixed subsidy to consumers mitigates the problem of selection in and out of the market, in line with the diagram presented in Figure 5 (where S would then be a fixed subsidy to the consumer instead of the insurer). A premium- or risk-based subsidy to consumers can help improve fairness in a system of risk-rated premiums. For a discussion of these interventions, see van Kleef, Schut, and van de Ven (2018C).

Finally, this article has shown that each of the three aforementioned strategies comes with trade-offs. For example, it is well-known that exogenous risk equalization (e.g., based on age and gender) is unlikely to sufficiently reduce unpriced risk heterogeneity faced by insurers. Supplementary measures in the form of endogenous risk equalization (e.g., based on utilization or spending) and risk sharing confront the regulator with a trade-off between selection and incentives for cost containment. Risk rating comes with trade-offs too. First, it might be in conflict with society's concept of fairness. Moreover, it reduces transparency of premium schedules, could undermine consumers' trust in insurers as purchasing agents, and introduces reclassification risk. The optimal blend of strategies takes advantage of the strengths while reducing the weaknesses of each strategy. The composition of this blend will depend on how a regulator weighs the fairness and efficiency objectives and on how the healthcare system is organized. Teamwork, in the form of selecting the specific form of the policy, is called for when more than one strategy is in place.

Further Reading

Breyer, F., Bundorf, K., & Pauly, M. V. (2012). Health care spending risk, health insurance, and payment to health plans. In M. Pauly, T. McGuire, & P. Barros (Eds.), *Handbook of health economics* (Vol. 2). Amsterdam, The Netherlands: Elsevier.

Bundorf, M. K., Levin, J., & Mahoney, N. (2012). Pricing and welfare in health plan choice. *American Economic Review*, *102*(7), 3214–3248.

Cutler, D. M., & Reber, S. J. (1998). Paying for health insurance: The tradeoff between competition and adverse selection. *Quarterly Journal of Economics*, *113*(2), 433–466.

Einav, L., & Finkelstein, A. (2011). Selection in insurance markets: Theory and empirics in pictures. *Journal of Economic Perspectives*, *25*(1), 115–138.

Ellis, R. P., Rose, S., & Martin, B. (2018). Risk adjustment for health plan payment. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

Enthoven, A. C. (1993). The history and principles of managed competition. *Health Affairs*, *12*, 24–48.

Geruso, M., & Layton, T. (2017). Selection in health insurance markets and its policy remedies. *Journal of Economic Perspectives*, *31*(4), 23–50.

Glazer, J., & McGuire, T. G. (2000). Optimal risk adjustment in markets with adverse selection: An application to managed care. *American Economic Review*, *90*(4), 1055–1071.

Layton, T. J., Ellis, R. P., McGuire, T. G., & van Kleef, R. C. (2017). Measuring efficiency of health plan payment systems in managed competition health insurance markets. *Journal of Health Economics*, *56*, 237–255.

McGuire, T. G., & van Kleef, R. C. (2018). Risk sharing. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

McGuire, T. G., & van Kleef, R. C. (2018). Regulated competition in health insurance markets: Paradigms and ongoing issues. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

Newhouse, J. P. (1996). Reimbursing health plans and health providers: Efficiency in production versus selection. *Journal of Economic Literature*, *34*(3), 1236–1263.

van de Ven, W. P. M. M., & Ellis, R. P. (2000). Risk adjustment in competitive health insurance markets. In A. J. Culyer & J. P. Newhouse (Eds.), *Handbook of health economics* (pp. 755–845). Amsterdam, The Netherlands: Elsevier.

van de Ven, W. P. M. M., Beck, K., Buchner, F., Schokkaert, E., Schut, F. T., Shmueli, A., & Wasem, J. (2013). Preconditions for efficiency and affordability in competitive healthcare markets: Are they fulfilled in Belgium, Germany, Israel, the Netherlands and Switzerland? *Health Policy*, *109*, 226–245.

van Kleef, R. C., Schut, F. T., & van de Ven, W. P. M. M. (2018). Premium regulation, risk equalization, risk sharing, and subsidies: Effects on affordability and efficiency. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

References

Akerlof, G. A. (1970). The market for “lemons”: Quality uncertainty and the market mechanism. *Quarterly Journal of Economics*, *84*(3), 488–500.

Bauhoff, S. (2012). Do health plans risk select? An audit study on the Germany’s social health insurance. *Journal of Public Economics*, *96*, 750–759.

Bauhoff, S., Fischer, L., Göpffarth, D., & Wuppermann, A. C. (2017). Plan responses to diagnosis-based payment: Evidence from Germany’s morbidity-based risk adjustment. *Journal of Health Economics*, *56*, 397–413.

Brammli-Greenberg, S., Glazer, J., & Shmueli, A. (2018). Regulated competition and health plan payment under the National Health Insurance law in Israel: The unfinished story. In T. G. McGuire, & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

Breyer, F., Bundorf, K., & Pauly, M. V. (2012). Health care spending risk, health insurance, and payment to health plans. In M. Pauly, T. McGuire, & P. Barros (Eds.), *The handbook of health economics* (Vol. 2). Amsterdam, The Netherlands: Elsevier.

Bundorf, M. K., Levin, J., & Mahoney, N. (2012). Pricing and welfare in health plan choice. *American Economic Review*, *102*(7), 3214–48.

Carey, C. (2017). Technological change and risk adjustment: Benefit design incentives in Medicare Part D. *American Economic Journal: Economic Policy*, *9*(1), 38–73.

Cattel, D., Eijkenaar, F., van Kleef, R. C., van Vliet, R. C. J. A., & Withagen-Koster, A. A. (2018). *Onderzoek risicoverevening 2019: Berekening Normbedragen* [Research on the calculation of payment weights for the risk equalization model 2019]. Research report (in Dutch). Rotterdam, The Netherlands: Erasmus School of Health Policy & Management.

Cutler, D. M., & Reber, S. J. (1998). Paying for health insurance: The tradeoff between competition and adverse selection. *Quarterly Journal of Economics*, *113*(2), 433–466.

Einav, L., & Finkelstein, A. (2011). Selection in insurance markets: Theory and empirics in pictures. *Journal of Economic Perspectives*, *25*(1), 115–138.

Ellis, R. P., & McGuire, T. G. (2007). Predictability and predictiveness in health care spending. *Journal of Health Economics*, *26*(1), 25–48.

Ellis, R. P., Rose, S., & Martin, B. (2018). Risk adjustment for health plan payment. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

Feldman, R. G., & Dowd, B. E. (1991). Must adverse selection cause premium spirals? *Journal of Health Economics*, *10*, 349–357.

Geruso, M. (2016). *Demand heterogeneity in insurance markets: Implications for equity and efficiency*. National Bureau of Economic Research Working Paper 22440.

Geruso, M., & Layton, T. (2015). *Upcoding: Evidence from Medicare on squishy risk adjustment*. National Bureau of Economic Research Working Paper 21222.

Geruso, M., & Layton, T. (2017). Selection in health insurance markets and its policy remedies. *Journal of Economic Perspectives*, *31*(4), 23–50.

Geruso, M., Layton, T., & Prinz, D. (2016). *Screening in contract design: Evidence from the ACA health insurance exchanges*. National Bureau of Economic Research Working Paper 22832.

Glazer, J., & McGuire, T. G. (2000). Optimal risk adjustment in markets with adverse selection: An application to managed care. *American Economic Review*, *90*(4), 1055–1071.

Glazer, J., & McGuire, T. G. (2011). Gold and silver health plans: Accommodating demand heterogeneity in managed competition. *Journal of Health Economics*, *30*(5), 1011–1019.

Han, T., & Lavetti, K. (2017). Does Part D abet advantageous selection in Medicare advantage? *Journal of Health Economics*, *56*, 368–382.

Handel, B. R., Handel, I., & Whinston, M. (2015). Equilibria in health exchanges: Adverse selection versus reclassification risk. *Econometrica*, *83*, 1261–1313.

Handel, B. R., & Kolstad, J. T. (2015). Health insurance for "humans": Information frictions, plan choice, and consumer welfare. *American Economic Review*, *105*(8), 2449–2500.

Layton, T. J., Ellis, R. P., McGuire, T. G., & van Kleef, R. C. (2017). Measuring efficiency of health plan payment systems in managed competition health insurance markets. *Journal of Health Economics*, *56*, 237–255.

Layton, T. J., Ellis, R. P., McGuire, T. G., & van Kleef, R. C. (2018c). Evaluating the performance of health plan payment systems. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

Layton, T. J., Montz, E., & Shepard, M. (2018a). Health plan payment in U.S. marketplaces: Regulated competition with a weak mandate. In T. G. McGuire & R. C. van Kleef

(Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

Layton, T. J., Ndikumana, A., & Shepard, M. (2018b). Health plan payment in Medicaid managed care: A hybrid model of regulated competition. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

Lavetti, K., & Simon, K. (2018). Strategic formulary design in Medicare Part D plans. *American Economic Journal: Economic Policy*, *10*(3), 154–192.

McGuire, T. G., Glazer, J., Newhouse, J., Normand, S.-L., Shi, J., Sinaiko, A., & Zuvekas, S. (2013). Integrating risk adjustment and enrollee premiums in health plan payment. *Journal of Health Economics*, *32*, 1263–1277.

McGuire, T. G., Schillo, S., & van Kleef, R. C. (2018). *Reinsurance, repayments, and risk adjustment in individual health insurance: Germany, the Netherlands and the US marketplaces*. NBER working paper no. 25374.

McGuire, T. G., & van Kleef, R. C. (2018a). Risk sharing. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

McGuire, T. G., & van Kleef, R. C. (2018b). Regulated competition in health insurance markets: Paradigms and ongoing issues. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

Newhouse, J. P. (1996). Reimbursing health plans and health providers: Efficiency in production versus selection. *Journal of Economic Literature*, *34*(3), 1236–1263.

Newhouse, J. P. (2017). Risk adjustment with an outside option. *Journal of Health Economics*, *56*, 256–258.

Paolucci, F., Sequeira, A. R., Fouda, A., & Matthews, A. (2018). Health plan payment in Australia. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice* (pp. 453–489). Amsterdam, The Netherlands: Elsevier.

Price J. R., & Mays, J. W.. (1985). Biased selection in the federal employees health benefits program. *Inquiry*, *22*(1), 67–77.

Rothschild, M., & Stiglitz, J. (1976). Equilibrium in competitive insurance markets: An essay on the economics of imperfect information. *Quarterly Journal of Economics*, *90*(4), 629–649.

Schillo, S., Lux, G., Wasem, J., & Buchner, F. (2016). High-cost pool or high-cost groups? How to handle the high(est) cost cases in a risk adjustment mechanism. *Health Policy*, *120*, 141–147.

Schmid, C. P., Beck, K., & Kauer, L. (2018). Health plan payment in Switzerland. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice* (pp. 453–489). Amsterdam, The Netherlands: Elsevier.

Schokkaert, E., Guillaume, J., & Van de Voorde, C. (2018). Risk adjustment in Belgium: Why and how to introduce socioeconomic variables in health plan payment. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

Schokkaert, E., & Van de Voorde, C. (2004). Risk selection and the specification of the conventional risk adjustment formula. *Journal of Health Economics*, *23*, 1237–1259.

Shepard, M. (2016). *Hospital network competition and adverse selection: Evidence from the Massachusetts Health Insurance exchange*. Harvard University, Cambridge, MA. Unpublished.

Stam, P. J., Van Vliet, R. C. J. A., & van de Ven, W. P. M. M. (2010). Diagnostic, pharmacy-based, and self-reported health measures in risk equalization models. *Medical Care*, *48*(5), 448–457.

Van Barneveld, E. M., Van Vliet, R. C. J. A., & van de Ven, W. P. M. M. (1996). Mandatory high-risk pooling: An approach to reducing incentives for cream skimming. *Inquiry*, *33*, 133–143.

Van Barneveld, E. M., Lamers, L. M., Van Vliet, R. C. J. A., & van de Ven, W. P. M. M. (1998). Mandatory pooling as a supplement to risk-adjusted capitation payments in a competitive health insurance market. *Social Science and Medicine*, *47*(2), 223–232.

Van Barneveld, E. M., Lamers, L. M., Van Vliet, R. C. J. A., & van de Ven, W. P. M. M. (2001). Risk sharing as a supplement to imperfect capitation: A tradeoff between selection and efficiency. *Journal of Health Economics*, *20*(2), 147–168.

van de Ven, W. P. M. M., & Ellis, R. P. (2000). Risk adjustment in competitive health insurance markets. In A. J. Culyer & J. P. Newhouse (Eds.), *Handbook of health economics* (pp. 755–845). Amsterdam, The Netherlands: Elsevier.

van de Ven, W. P. M. M., van Kleef, R. C., & Van Vliet, R. C. J. A. (2015). Risk selection threatens quality of care for certain patients: Lessons from Europe’s health insurance exchanges. *Health Affairs*, *34*, 1713–1720.

van de Ven, W. P. M. M., & Schut, F. T. (2011). Guaranteed access to affordable coverage in individual health insurance markets. In S. Glied & P. C. Smith (Eds.), *The Oxford handbook of health economics* (pp. 380–404). Oxford, U.K.: Oxford University Press.

van Kleef, R. C, Eijkenaar, F., Van Vliet, R. C. J. A., & van de Ven, W. P. M. M. (2018a). Health plan payment in the Netherlands. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

van Kleef, R. C., Eijkenaar, F., & Van Vliet, R. C. J. A. (2018b). *Selection potential in the Dutch basic health insurance market*. Manuscript in preparation.

van Kleef, R. C., Schut, F. T., & van de Ven, W. P. M. M. (2018c). Premium regulation, risk equalization, risk sharing, and subsidies: Effects on affordability and efficiency. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

van Kleef, R. C., van de Ven, W. P. M. M., & Van Vliet, R. C. J. A. (2006). Premium rebate in exchange for a voluntary deductible in social health insurance with risk equalization: Community-rated or risk-rated? *Journal of Risk and Insurance*, *73*, 529–550.

van Kleef, R. C., Beck, K., van de Ven, W. P. M. M., & Van Vliet, R. C. J. A. (2008). Risk equalization and voluntary deductibles: A complex interaction. *Journal of Health Economics*, *27*(2), 427–443.

van Kleef, R. C., & Van Vliet, R. C. J. A. (2012). Improving risk equalization using multiple-year high cost as a health indicator. *Medical Care*, *50*(2), 140–144.

Wasem, J., Buchner, F., Lux, G., & Schillo, S. (2018). Health plan payment in Germany. In T. G. McGuire & R. C. van Kleef (Eds.), *Risk adjustment, risk sharing and premium regulation in health insurance markets: Theory and practice*. Amsterdam, The Netherlands: Elsevier.

Notes:

(1.) Typical fairness objectives regarding health plan financing include individual accessibility and affordability of health plans. Common efficiency objectives are that (a) health plans are designed in a way that they satisfy consumer preferences, (b) people sort into the plan that gives them the highest value over cost, and (c) resources for producing healthcare are used wisely.

(2.) By “health plan” is meant an insurance product that is unique in terms of entitlements (e.g., benefits covered, consumer cost sharing features, provider network, and out-of-network coverage).

(3.) It is worth emphasizing that it is not assumed that all consumers are required to have some health insurance coverage. The reason is threefold. First, although insurance mandates are in place in many social insurance markets, this is not the case in all. Examples of the latter are the voluntary insurance schemes in Australia, Ireland, and Chile, and recently, the U.S. Marketplaces. Second, the need for an insurance mandate can vary across payment system designs. For example, in a payment system where health plans are fully

financed by community-rated premiums, low-risk people—who are typically net payers—might choose not to enroll, which may indeed call for an insurance mandate. In systems where plans are (partly) financed with “external” sources (e.g., tax revenues), however, community-rated premiums will be lower which makes an insurance mandate less necessary (a point that is discussed in more detail in the section “Effects of Risk Equalization on Risk Selection”). Finally, a mandate does not necessarily avoid selection of consumers in and out of the market, for example, when it cannot be effectively enforced (Newhouse, 2017).

(4.) Other factors in addition to risk aversion could affect consumers’ demand for coverage (e.g., distance from the major facilities included in a plan’s network. These other factors are ignored here.

(5.) For reasons of simplicity, differences in mean spending across basic coverage plans are ignored.

(6.) Note that this type of inefficient sorting has strong similarities with the discussion of the diagram in Figure 2. A diagram simulating the choice between a low- and high-deductible plan, however, would not be based on *total* expected spending (plus risk premium) for basic coverage (compared to no coverage), but on *incremental* expected spending (and *incremental* risk premium) for a low- versus a high-deductible plan. As in Figure 2, the slope of incremental expected spending (plus incremental risk premium) for a low- versus a high-deductible plan is typically downward, indicating that consumers with high expected incremental spending are more likely to choose a low-deductible plan than those with low expected incremental spending. In case of a community-rated premium per plan, this type of selection increases the incremental premium for the low-deductible plan compared to the high-deductible plan. Consequently, low-risk people who value a low-deductible plan at more than their incremental expected spending might not enroll in that plan because they are not willing to pay the incremental premium.

(7.) Or, taking the low-deductible plan as the reference point, the premium discount for a high-deductible plan decreases for young and healthy people while it increases for the elderly and chronically ill.

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