HNP DISCUSSION PAPER

Multiple Payers in Health Care: A Framework for Assessment

Peter Zweifel

September 2004

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Health, Nutrition and Population (HNP) Discussion Paper

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Health, Nutrition and Population (HNP) Discussion Paper

Multiple Payers in Health Care: A Framework for Assessment

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Paper prepared for the World Bank's Resource Allocation and Purchasing Project

ABSTRACT: The starting point of the debate about the pros and cons of multipayer systems is the suspicion that in many health care systems, consumers do not get sufficient value for money. This contribution argues that one cause may be a nonoptimal choice of payment systems. Optimal payment of health care providers importantly depends on the amount of information available to the (prospective) patient. If patients have full information about both the effort exerted and the effectiveness of the service provider, the conventional fee-for-service payment is optimal from their point of view. If patients cannot observe true effort exerted while providers are reasonably homogenous with respect to effectiveness, the optimal payment function consists of a fixed payment and a bonus for especially favorable outcomes in terms of health. If the patient in addition does not know whether a given health care provider effective or ineffective, a special informational rent designed to attract the unrecognized favorable type is appropriate. Now, a government is unlikely to come up with payment systems that closely conform to this conditionality, typically preferring single-payer systems that allow service providers to exercise monopsony power and thus keep health care expenditure low. Multiple-payer systems containing competitive health insurers may have an advantage in designing payment systems in a way that maintains or reinforces provider incentives to do the right thing for their patients, resulting in more value for money.

Keywords: resource allocation and purchasing, health care financing, multiple payers in health care; agency theory; complementary agents in health; payment of health care providers; private health insurance.

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FOREWORD

Great progress has been made in recent years in securing better access and financial protection against the cost of illness through collective financing of health care. This publication – *Multiple Payers in Health Care: A Framework for Assessment* by Peter Zweifel – is part of a series of Discussions Papers that review ways to make public spending on health care more efficient and equitable in developing countries through strategic purchasing and contracting services from nongovernmental providers.

Promoting health and confronting disease challenges requires action across a range of activities in the health system. This includes improvements in the policymaking and stewardship role of governments, better access to human resources, drugs, medical equipment, and consumables, and a greater engagement of both public and private providers of services.

Managing scarce resources and health care effectively and efficiently is an important part of this story. Experience has shown that, without strategic policies and focused spending mechanisms, the poor and other ordinary people are likely to get left out. The use of purchasing as a tool to enhance public sector performance is well documented in other sectors of the economy. Extension of this experience to the health sector is more recent and lessons learned are now being successfully applied to developing countries.

The shift from hiring staff in the public sector and producing services "in house" from non governmental providers has been at the center of a lively debate on collective financing of health care during recent years. Its underlying premise is that it is necessary to separate the functions of financing health services from the production process of service delivery to improve public sector accountability and performance.

In this Discussion Paper, Zweifel examines the strengths and weaknesses of multi-purchasers. Both consumers of health care and governments suspect they are not getting their money's worth. Governments point to a high and often rising share of health care expenditure in the gross domestic product (GDP). However, it is not clear that simply reducing this share would be in the interest of consumers and voters, who in their daily lives seek to obtain "value for their money" at least as much if not more than expenditure low. The author concludes that Governments have a comparative advantage in managing challenges that originate domestically, such as aging and the increasing number of one-person households. But they are also more likely to abuse their power as monopsony purchasers to reduce health care expenditure beyond the preference of the society they represent. On the other hand, competitive health insurers as complementary agents are better at adjusting to challenges posed by globalization and changing medical technology. Thus, multiple-payer systems hold the promise of keeping the incentives of service providers aligned with changing world around them, something that governments as single payers often neglect. This is particularly true in low- and middle-income countries.

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INTRODUCTION

When it comes to health care, both consumers and governments suspect that they are not getting their money's worth. Governments point to a high and often rising share of health care expenditure in the gross domestic product (GDP). However, it is not clear at all whether simply reducing this share would be in the interest of consumers and voters, who in their daily lives do not seek just to keep expenditure low but to obtain "value for their money," a favorable ratio between benefits and cost. This ratio may attain its optimal value even at a high cost, as evidenced by the example of private transportation, where many individuals willingly pay 10 percent of their income or more to be able to drive a car. One way to improve the ratio of benefits to cost is to choose payment systems that give providers of health care services the right incentives.

As a matter of principle, either a multiple-payer or a single-payer system for financing health care may convey the right incentives to providers. All economic theory says is that the optimal choice of a payment system importantly depends on the amount of information available to the (prospective) patient. This topic is treated in the second part of this chapter. It starts out with the case of full information, then considers the case of asymmetric information with regard to provider effort only, and ends by considering the most difficult case of asymmetric information both with regard to effort and type of provider. In each case, the optimal payment function is stated and discussed.

However, it turns out that the prospective patient as the uninformed principal is unlikely to find these optimal functions for the physician (or any health care provider) because he or she does not know crucial parameters in the formulas. This failure opens a market for complementary agents, introduced in the third part of the chapter.

Competing health insurers as complementary agents are likely to be associated with multiple-payer systems, while governments as complementary agents are tempted to use their monopsony power to reduce public health care expenditure.

The fourth section is dedicated to a survey of future challenges for health care systems. The choice of a complementary agent and the concomitant payment system should be made in view of these challenges. A final assessment will reveal that governments acting as complementary agents have a comparative advantage in managing challenges that originate domestically, such as aging and the increasing number of one-person households. On the other hand, competitive health insurers as complementary agents will be especially able to adjust to challenges emanating from globalization and changing medical technology. Thus, multiple-payer systems hold the promise of keeping the incentives of services providers aligned with changing asymmetries in their relations with patients. The chapter concludes with a summary and an outlook.

THEORETICAL BACKGROUND

The objective of this section is to show that very different payment systems are optimal for the prospective patient, depending on the amount of information available about the service provider's level of effort exerted and level of ability ("type"). This paves the way for the argument that insurers acting on behalf of their clients should negotiate a choice of payment systems. Following a short review of the case of no information asymmetry, asymmetry with regard to provider effort is discussed and related to medical care. Finally, information asymmetry with regard to both effort and type is considered.

THE CASE OF FULL INFORMATION

The case of full information is described in elementary textbooks of economic theory. Here, the patient can be seen as a purchaser of health care services under a budget constraint. To achieve the maximum health effect, he or she must observe the condition (Zweifel and Breyer 1997, chapter 7.3.3.3):

$$\frac{p_1}{p_2} = \frac{\partial H / \partial M_1}{\partial H / \partial M_2} \qquad (1)$$

Here, p_1 is the fee for the health care service M_1, and similarly for p_2. On the right-hand side of equation (1), is the ratio of two marginal productivities, with $\partial H/\partial M_1$, for example, symbolizing the marginal productivity of health care service M_1 with regard to health status. This optimality condition is nothing but the requirement that the ratio of factor prices be equal to the ratio of marginal productivities. There may be cases where the (prospective) patient can estimate these marginal productivities. For example, the health condition may be well defined and the health care provider's main task will be simply to issue or fill a prescription. However, the following two cases seem far more relevant for health care.

ASYMMETRIC INFORMATION WITH REGARD TO EFFORT ONLY

Economic theory uses principal-agent theory to model the relationship between a patient and a health care provider (Holmström 1979; Grossman and Hart 1983).

CONTROLLING PROVIDER BEHAVIOR THROUGH PAYMENT

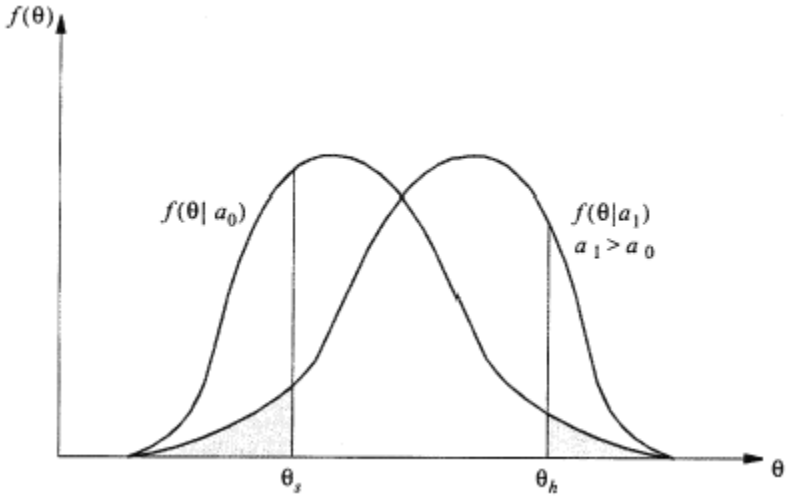
The patient, acting as the principal, seeks to devise a payment scheme that avoids both the tendency toward "flat of the curve medicine," induced by fee-for-service payment, and the tendency toward underservicing, induced by a fixed payment that fails to reward performance (Rodwin 1993).

The difficulty of finding such a payment scheme can be seen from figure 1. It displays density functions defined over outcomes of medical treatment in terms of health outcomes θ, $f(\theta|a_0)$ and $f(\theta|a_1$. Specifically, the density function given a_0 obtains if the provider expends little effort for his or her patient, making unfavorable outcomes (indicated by low values of θ) rather likely. If physician effort is $a_1 > a_0$, favorable outcomes become more probable. Nevertheless, bad outcomes such as θ_s cannot be excluded with certainty. Since the patient, lacking medical knowledge, cannot really judge effort, he or she is constrained to using outcome θ as a basis for

payment. An optimal payment function $p^*(\theta)$ can bring about an optimal outcome in expected value only—a modest standard, considering that in surgery, for example, an individual typically deals with a particular surgeon once in his lifetime.

CONCLUSION 1: *In the physician-patient relationship, opportunity for control by the patient typically is limited to the choice of a payment function that promises to provide the physician with optimal incentives on average.*

Figure 1. Health Outcomes Due to Provider Effort



Source: Zweifel and Breyer (1997, chapter 8.2).

CHOICE OF PAYMENT FUNCTION IN THE CASE OF MEDICAL CARE

Assuming that the principal (the patient) maximizes his or her expected utility through choice of the optimal payment function $p^*(\theta)$, the optimal function satisfies the condition (Levinthal 1988; Rogerson 1985):

$$\frac{u'^{P}\left[\theta - p^*(\theta)\right]}{u'^{A}\left[p^*(\theta)\right]} = \lambda - \mu \cdot \frac{\dfrac{\partial f(\theta|a^*)}{\partial a}}{f(\theta|a^*)} = \lambda + \mu \cdot E, \quad with \quad E := \frac{\dfrac{\partial f(\theta|a^*)}{\partial a}}{f(\theta|a^*)} \tag{2}$$

The left-hand side of equation (2) is a ratio of marginal utilities. Its numerator denotes the marginal utility of the principal (the patient), evaluated at his or her claim to the benefit, $[\theta - p^*(\theta)]$. Its denominator symbolizes the marginal utility of the agent (the physician), evaluated at his claim to the benefit, $p^*(\theta)$. Since marginal utility of the patient decreases with increasing net benefit ($u''^{P} < 0$ due to risk aversion), a high value on the left-hand side of equation (2) indicates a payment function that strongly benefits the physician.

Conversely, if the left-hand side of equation (2) takes on a low value, the major share of the benefit from the transaction goes to the patient.

The right-hand side of equation (2) contains the objective determinants of the optimal sharing rule $p^*(\theta)$:

- The term $\lambda > 0$ is a fixed amount, designed to motivate the physician to conclude the offered contract. A high value of λ occurs if failure to contract would have important consequences for the patient in terms of his or her health. In this situation, a capitation payment may be optimal for the patient. For a case study, from Thailand, see Mills and others (1999).
- The second term corresponds to the incentive component of the fee. It consists of two parts. The first is the Lagrange multiplier $\mu > 0$, which indicates the effect that failure to provide the right incentives to the agent would have on the principal. It takes on a large value if any deviation of physician effort from optimality (as determined by the physician) has a great impact on the utility of the patient. The second component shows the stochastic effectiveness of the physician's treatment. A high value of $\partial f(\theta|a^*)/\partial a$ indicates that additional physician effort would move a great deal of probability mass in the density function defined over health outcomes. Indeed, $\partial f(\theta|a^*)/\partial a$ may be interpreted as the amount of shift in the distribution of health outcomes in figure 1 if physician effort marginally increases, for example, from a_0 to a_1. This shift is normalized by dividing through by the initial value of the density function given effort level a^*, $f(\theta|a^*)$.

Whereas this structuring of the contract has intuitive appeal, the patient's ability to identify such a scheme remains doubtful. In fact, he or she would have to estimate two parameters to be able to identify the optimal amount of incentive payment in the contract. The first indicates the extent to which a violation of incentive compatibility would affect the patient's welfare patient (multiplier μ). Estimating this parameter requires knowledge of the consequences that would obtain if the physician had marginally less interest in concluding the contract. The second factor is crucial. It reflects the effect of medical activity on the distribution over possible health outcomes. The more the physician is able to shift the distribution of health outcomes to higher values of θ (figure 1), the higher should be the incentive component [E in equation (2)].

Both quantities are extremely difficult to estimate for a patient, with the possible exception of a chronically ill person, who has at his disposal repeated observations under side conditions held about constant. As a rule therefore, the patient will be unable to identify the optimal degree of incentive payment in his contractual relationship with the physician. As a consequence, physician effort will generally assume a suboptimal value, often resulting in too unfavorable an outcome of treatment.

CONCLUSION 2: *Under asymmetry of information regarding effort, chances for the patient as the principal to identify such a scheme are minimal, causing treatment outcomes to be suboptimal. In particular, he or she lacks the information with regard to effectiveness of the contribution to the improvement of his health status.*

ASYMMETRY OF INFORMATION REGARDING BOTH EFFORT AND TYPE

Sometimes, a prospective patient is not satisfied with having a contract with a particular health care provider but would like to be sure of access to a good or the best provider available. Indeed, some providers accomplish much more than others with the same amount of effort. Since the prospective patient typically cannot find out which type is which, the asymmetry of information is compounded, existing not only with regard to effort but also type. Under these conditions, Laffont and Tyrole (1993, chapter 1.4) derive the following optimality condition[1]:

$$p(\hat{\beta}, C) = p^*(\hat{\beta}) - \left[1 - \frac{\kappa}{1+\kappa} \cdot \frac{F[\beta]}{f[\beta]} \cdot \psi''[e^*(\beta)]\right] \cdot (C - C^*[\hat{\beta}]), \text{ with} \qquad (3)$$

$$p^*(\hat{\beta}) = \psi'[e^*(\beta)] + U^*(\beta).$$

This condition may be interpreted as follows[2].

- The left-hand side of equation (3), $p(\hat{\beta}, C)$, symbolizes the payment function for a provider type who signals to be type $\hat{\beta}$ and has observed cost C of service. This already points to the problem that signaled and true type (i.e., the effectiveness with which the provider can reduce cost through additional effort, similar to the marginal effectiveness E in terms of improved outcomes in the second section, above) need not coincide. However, for the payment function to be truly optimal, it must induce providers to reveal their true type (the "revelation principle").
- The first term on the right-hand side, $p^*(\hat{\beta})$ symbolizes the optimal payment function if the type of the health care provider is known (which still signaled to be $\hat{\beta}$). As stated in the second line of equation (3), it must cover the psychic marginal cost $\psi'[e^*(\beta)]$ that occurs if the provider exerts the optimal amount of effort e^*. This optimal value clearly depends not on the signaled type $\hat{\beta}$ but true type β. In addition, however, there is the rent $U^*(\beta)$, which is designed to ensure participation. Contrary to the parameter in equation (2), however, $U^*(\beta)$ does not go to all providers equally. Specifically, it is an informational rent received by the more effective types who are not recognizable as such but need to be attracted by a payment that exceeds their true psychic marginal cost.
- The second term of equation (3) shows how deviations from cost targets $C^*[\hat{\beta}]$—which again depend on signaled type—are dealt with. As argued below, the multiplier in square brackets is positive but smaller than one. This means that cost overruns ($C - C^*[\hat{\beta}] > 0$), while causing a deduction from payment, are not fully charged to the provider. This has

[1] Contrary to equation (2), which determines optimal output-augmenting effort, equation (3) is about cost-reducing effort. However, in view of the duality relationship between output maximization and cost minimization, this difference does not really matter. Indeed, Laffont and Tirole (1993, p. 135f) show that a high value of effort e goes along with a high value of output.

[2] For the provider, effort has (marginal) cost regardless of whether it is performance-improving [a in equation (2) in the second section] or cost-reducing [e in equation (3)]. The difference in notation is retained for easier reading of the original literature.

nothing to do with risk aversion (the parties to the contract are assumed risk-neutral) but takes into account the fact that a "steep" payment function would contain powerful incentives also for less effective providers to contribute to output. Cost savings optimally are not fully credited to the provider either.

1. Finally, the multiplier showing the extent to which deviations from cost targets are credited or debited is one minus an attenuation that is the product of three factors:
2. Attenuation is the higher, the higher κ, with κ indicating the amount of inefficiency associated with financing the payment in question. This can occur through tax revenue or contributions to health insurance. In the latter case, it amounts to the loading contained in the premium for health insurance.
3. The second component is $F[\beta]/f[\beta]$, showing the frequency of providers up to level β compared to the frequency at that level, thus the relative frequency of less effective types. The higher this frequency, the larger the attenuation effect—designed to prevent less effective types from exerting too much effort.

The third factor is the increase of marginal cost $\psi''[e^*(\beta)]$. It shows that it would not make much sense to induce much effort on the part of agents whose marginal cost rises sharply with additional effort.

CONCLUSION 3: *Under asymmetry of information regarding both effort and type, optimal payment schemes for health care services contain additional parameters that are not easily observed. Thus, chances for the patient as a principal to identify such a scheme are even slighter, causing treatment outcomes to be more suboptimal still.*

PRELIMINARY IMPLICATIONS FOR THE MULTIPLE-PAYER ISSUE

Conclusions 2 and 3 point to a trade-off. On one hand, multiple payers hold the promise of negotiating remuneration schemes with health care providers that are attuned to the severity of the information asymmetry. On the other, multiple payers may not negotiate in the interest of their clientele and may not base their remuneration schemes on the parameters discussed above, although competition for clients will restrict these tendencies. As soon as premiums do not fully reflect true risk, however, competition induces insurers to use different schemes merely for "cream skimming" (i.e., risk selection activities).

A single payer, by way of contrast, typically establishes one uniform remuneration scheme, which saves transaction costs, especially for health care providers. Except for low-income countries, this argument does not carry too much weight anymore because several computerized medical billing systems now enable a physician or a hospital to bill according to many different payment systems. The crucial argument in favor of one single payer thus seems to be the opportunity to exert monopsonistic power. This means that the payer can negotiate lower fees since the providers lack an alternative (apart from leaving health care or the country). Given low estimated money price elasticities for demand for medical care, lowering fees should result in lowered health care expenditure.

COMPLEMENTARY AGENTS, THEIR OBJECTIVES AND CONSTRAINTS

The provider-patient relationship as the basic element of all health care systems was found to be deficient in the previous section when reviewed in the light of economic theory as soon as there

is asymmetry of information regarding effort, type, or both. Accordingly, a market for complementary agents promising to correct this deficiency may be expected to emerge in health care.

TASKS OF A COMPLEMENTARY AGENT

Within this framework, two different functions of complementary agents can be distinguished, namely, the provision of information and the negotiation of contracts with providers of services.

- ***Provision of information.*** To determine the optimal payment scheme, knowledge of effectiveness of medical treatment was found to be crucial in the preceding section. The complementary agent could theoretically limit its activities to providing this information while leaving identification and negotiation of the payment function to the patient.
- ***Negotiation of contracts.*** Even if a potential patient did have sufficient information to evaluate the stochastic effectiveness of a health care provider, negotiation of the contract is usually costly. Therefore, complementary agents are considered in their role as negotiators in the following.

Given a demand for the services of a complementary agent, which institutions (existing or new) can be expected to meet it? The transaction cost generated in their creation and generated or saved in their use may serve as a guide to explain why certain solutions have proved economically viable while others have not come into existence (Williamson 1985, chapter 1).
The transaction cost argument points above all to medical associations, whose officers, themselves physicians, could assess a member's effectiveness at low cost. In addition, they are engaged in the negotiation of fee schedules in most countries outside the United States.

However, the same argument also applies to private and social health insurers, who routinely collect information that could be used to gauge the effectiveness of providers of medical services while being their negotiating partners. Yet, as Havighurst (1988) notes, in the United States, insurers have been hesitant to implement, for example, second opinion or quality monitoring programs, arguably due to lack of competition.

Since most individuals have a labor contract, the employer also qualifies as a possible complementary agent. Indeed, it was Henri Kaiser, owner of a large construction firm, who "invented" the health maintenance organization by hiring his own physicians to ensure medical care for his employees who were working at very remote sites in the United States. However, many a risk-averse employee may shy away from having his employer organize medical care for him, fearing the possible flow of medical information from hired physicians to the employer, who would then be in a position to easily recognize any loss of productivity caused by deterioration of his health.

Finally, every citizen has an implicit contract, as it were, with his government. Political institutions such as elections and a parliament serve to limit transaction costs involved in charging the government with an additional function, namely to provide information on the quality of medical care, negotiate fee schedules, or hire physicians and run hospitals on behalf of voters. However, the cost of actually using the government as a complementary agent may be deemed too high by a majority of citizens, preventing them from entrusting these functions to public officials.

TYPES OF COMPLEMENTARY AGENTS IN HEALTH CARE

There may well be additional future alternatives in the market for complementary agents. However, instead of speculating about them, we now draw

CONCLUSION 4: *Five types of complementary agent are likely to prevail in present health care systems: medical associations, private health insurers, social health insurers, employers, and the government.*

MEDICAL ASSOCIATIONS AS COMPLEMENTARY AGENTS

Medical associations have to perform two tasks (von der Schulenburg 1987; Feldstein 1996, chapters 3, 4; Zweifel and Eichenberger 1992). They should safeguard and enhance their members' reputations and limit competition among them (table 1). The first task provides a motive to take on the role of a complementary agent in order to relieve the basic physician-patient relationship of some of the deficiencies discussed above.[3]

In many developing countries, professional associations seem to act as an important complementary agent, since neither private nor social insurance (which is usually limited to the formal sector) has the necessary information or resources for negotiation. This situation typically results in a multiple-payer system as in Lebanon, where for open-heart surgery, the Ministry of Health pays 8 million Lebanese pounds, the National Social Security Fund 7.2 million, with private health insurers varying (Cotterill and Chakraborty 2000).

EMPLOYERS AS COMPLEMENTARY AGENTS

Employers can profit in several ways from assuming the role of complementary agent in the health care sector. One is reduced employee turnover, an important objective in industries where hiring a new worker entails a great deal of job-specific investment. By purchasing employee health care from a specific group of physicians and hospitals, an employer makes a change of jobs costly. Arranging for health insurance giving access to specific provider groups has the same effect. However, to retain the more productive workers, employers have an interest in monitoring health status as an indicator of productivity. Medical information becomes quite valuable, and many employees may fear leakages of medical information. This fear may well be a reason employers are not the main complementary agent in any western country (table 1). Former Yugoslavia (before 1985), where enterprises purchased medical care for their employees, probably came closest to assigning an important role to employers as complementary agents Since there is a multitude of employers in a market economy, the resulting system is multiple payers almost by definition. However, payment functions are likely to vary, too. Because employers compete for (productive) workers, they cannot deviate from worker preferences when acting as a complementary agent. Contracts negotiated with provider groups will therefore reflect both the different health conditions of employees and the incentive conditions of physicians and hospitals.

[3] A formal modeling of the choice of a dominant complementary agent is beyond the confines of this paper, but see Zweifel, Lehmann, and Steinmann (2002) for such an attempt.

Table 1. Complementary Agents, Objectives, and Examples

Complementary agent	*Objectives of the complementary agent*	*Countries where complementary agents are important*
Medical association	• Conserve reputation of members • Prevent competition among members	Australia Germany Lebanon
Employer	• Reduce employee turnover • Improve knowledge of employee productivity	United States (health maintenance organizations) Yugoslavia (before 1985)
Private insurer	• Achieve competitive advantage	Netherlands Switzerland United States
Social health insurer	• Foster solidarity • Keep within the budget	Canada Czech Republic France Spain Sweden Thailand
Government	• Accept risks associated with free labor market • Win votes	China Great Britain Italy Portugal

Source: Author's own compilation.

PRIVATE HEALTH INSURERS AS COMPLEMENTARY AGENTS

Private health insurers have an interest in performing as complementary agents provided that this service gives them a competitive advantage over competitors. Creating payment schemes that tie physicians more strongly to the interests of patients may enhance a private insurer's competitive advantage. At the same time, however, health insurance undermines clients' interest in the choice of payment function because it largely protects them from the financial consequences of suboptimal incentives in contracts. Therefore, insurers often prefer not to interfere with pricing (e.g., in the United States and in Switzerland) or to settle for fee schedules negotiated by social health insurers (Germany).

As could be expected, when private insurers are important as complementary agents, multiple-payer systems prevail. In the United States, most providers derive a substantial part of their income from both managed care networks (which usually pay a capitation) and governmental programs such as Medicare (for the aged) and Medicaid (for the poor). In Switzerland, several sick funds have introduced managed care alternatives, where providers are paid a capitation. However, the great majority of physicians continue to derive most of their incomes from fee-for-service practice.

SOCIAL HEALTH INSURERS AS COMPLEMENTARY AGENTS

In few countries do social health insurers compete with each other. They therefore enjoy considerable liberty to pursue two objectives. The first is to foster solidarity, which means that the stochastic income redistribution brought about by private insurance is replaced by a systematic redistribution according to, for example, age, gender, and income. Their second objective is to keep within their budget because this helps insulate the government's budget from the vagaries of the economy. In this way, politicians may use the budget strategically to ensure reelection by favoring decisive voter groups (Van Dalen and Swank 1996).
In some countries, social health insurers have extensive authority, especially in the domain of fee negotiations, making them important complementary agents in the health care sector (table 1). Instances in point are the Czech Republic (Jack 2000), France and, especially, Canada with its uniform national health insurance (Evans 1983). All of them seek to avoid multiple payers in an attempt to keep fees (and public health care expenditure) low. In France, the Securité Sociale even plays two medical associations against each other.

THE GOVERNMENT AS COMPLEMENTARY AGENT

The deficiencies of the physician-patient relationship may be seen as a market failure, suggesting remedial action by the government. Indeed, political decision makers, especially in western industrial countries, have been inclined to take over the role of complementary agent in health care. Citizens of countries with market economies are challenged to make a living in a free labor market full of risks. Since good health greatly increases the probability of success in the labor market, this challenge was sweetened by promising everyone equal access to health care (table 1).

The continued interest of politicians in acting as complementary agents of (potential) patients lies in gaining votes (Feldstein 1996, chapter 2). Acting as negotiators, they have leeway to shift rents to voter groups decisive for (re)election. Usually, the details of negotiation are delegated to medical associations and (social) health insurers. Only in few cases (e.g., China, Great Britain, Italy) does government intervention go as far as to assume responsibility for actually delivering health care services. Quite generally, governments have a wide choice of actions at their disposal such as the power to impose fee schedules and upper limits on medical incomes.[4]

Of course, governments seek to implement single-payer systems. This is achieved to a very great extent in the People's Republic of China, although some private out-of-pocket payment is likely to occur (Yip and Eggleston 1999). This constitutes a second, unofficial source of health care finance. In Great Britain, physicians working for the National Health Service have the right to operate a limited number of private beds, whereas their Italian colleagues may split their work week between public and private practice. Therefore, multiple payers in fact slip in. However, the opportunity to negotiate payment schemes with tailor-made incentives on behalf of consumers is not used by the private insurers, presumably due to lack of competition.

[4] These powers are not at the disposal of a social health insurer as a contractual partner of providers. For this reason, it makes sense to distinguish between social insurance and the government.

SINGLE- VS. MULTIPLE-PAYER SYSTEMS: PRELIMINARY EVIDENCE

The complementary agents, their objectives, and constraints were described above and related to their preferred type of payment system. These hypotheses appear in table 2, where the predicted payer system is listed for each complementary agent.

Medical associations, employers, and private insurers were predicted to opt for multiple-payer systems. In the first case, the opportunity for price discrimination may be the decisive motivation; for the other two, the competitive pressure of the market leads them to look for new ways to better align consumer and provider incentives. The examples cited are in accordance with predictions, with the exception of former Yugoslavia, where worker-managed firms were conceived as autonomous units providing health care in a nonmarket environment.

Table 2. Complementary Agents and Single- vs. Multiple-Payer Systems

Complementary agent	*Predicted payer system*	*Actual payer system (examples)*
Medical association	Multiple	Multiple (Australia) Multiple (Germany) Multiple (Lebanon)
Employer	Multiple	Multiple (United States) Single (former Yugoslavia)
Private insurer	Multiple	Multiple (United States) Multiple (Netherlands) Multiple (Switzerland)
Social health insurer	Single	Single (Canada) Single (Czech Republic) Multiple (France; Mutuelles) Single (Spain) Multiple (Sweden ; health districts) Single (Thailand)
Government	Single	Single (China) Single (Great Britain) Multiple (Italy; health regions) Single (Portugal)

Source: Author's own compilation.

With regard to the second group, comprising social health insurers and governments as complementary agents, the predicted choice is single-payer systems. This is borne out in most cases. One exception is Sweden, where some health districts have been experimenting with purchaser models, resulting in different payment systems within the country. Italy is another exception (this time in the governmental camp), because several regions have attained wide autonomy with regard to health care. Thus, both levels and modes of payment of providers differ somewhat within the same country.

CONCLUSION 5: *Among the five complementary agents considered, medical associations, employers, and private insurers are predicted to prefer multi-payer arrangements; social insurers and governments, single-payer arrangements. These predictions are largely confirmed by the available evidence.*

A CASE STUDY: THE CZECH REPUBLIC

The Czech Republic's experimentation with provider payment systems illustrates the importance of providing favorable incentives through the choice of remuneration (Jack 2000). In 1992, all Czech citizens were enrolled in a single statutory general health insurance company. Private insurers were permitted to enter the market in the following years, but the general health insurance company maintains a dominant market position, covering about 75 percent of the population. Contributions are based on the insured's wages, similar to Germany. However, an insurer receives only 40 percent of an individual's compulsory contribution, whereas 60 percent comes from a central fund.

Thus, private health insurers have little autonomy, stifling competition for members. Moreover, because providers are reimbursed on a uniform point-based scale administered by the Ministry of Health, chances are slim that insurers, through a choice of payment system, give health care providers the right incentives. As shown above, the optimum payment function importantly depends on the type of information asymmetry, which is not compatible with the uniformity imposed by the Ministry of Health. Recent developments are characterized by rising general practitioner fees and hospital admission rates. Some observers suspect that this is due to overuse, over reporting, or both. In all, experience in the Czech Republic seems to drive home the point that, under a uniform payment system for health care providers, important advantages of (potential) competition between health insurers may be lost. The Czech choices of complementary agents seem to favor social health insurance rather than competing private health insurers.

FIVE MAJOR CHALLENGES

Five major challenges confront health care systems throughout the world: new illnesses, an aging population, growing numbers of one-person households, technological change, and opening up to international competition.

- ***Emergence of new illnesses***. The HIV/AIDS pandemic is the single most important disease challenge, certainly for most African countries but also some Asian and Latin American countries.

- ***Aging of the population.*** Most countries will be confronted with an increase in their dependency ratio.[5] Among the industrial countries, this increase will be most marked in the case of Germany by the year 2050, 100 active persons will have to support no fewer

[5] The dependency ratio is defined as the number of 65-year-olds and older relative to the number of persons aged between 15 and 64.

than 42 aged persons, compared to 26 at present (Weber and Leienbach 1989). However, this development also characterizes countries as different as the People's Republic of China and the Czech Republic, with China (but also, e.g., Thailand) expecting a doubling of the dependency ratio between 2000 and 2020. By 2050, Asia as a whole will likely have reached a value of 24 percent, comparable to France in 1990 (Bougaarts 1998).

- ***Increasing number of one-person households.*** The frequency of one-person households in industrial countries has been growing dramatically since about 1960 (Roussel 1986), and a similar trend can be expected for middle-income countries (United Nations 1997).

This individualization has a direct impact on the demand for health care services, as illustrated by a simple thought experiment (Zweifel and Breyer 1997, chapter 9.3). A couple living together is likely to fall back on services provided by third parties only if both partners are ill. The probability that this combined event will occur is lower than the probability that just one person will fall ill. The two partners thus provide mutual protection from health risks, causing them to rely on formal health care less often than two single individuals. Thus, growing prevalence of one-person households is likely to fuel demand for medical care.

- ***Technological change in medicine.*** There is good reason to expect the pace and direction of technological change in medicine to depend on the extent of health insurance (Newhouse 1981). Yet health policymakers cling to the notion of exogenous technological change in medicine, a viewpoint adopted here, for simplicity. Indeed, much of this change occurs internationally, spilling over into the domestic health care sector. Its cost implications are obvious.

- ***Opening up to international competition.*** As in the production of other goods and services, countries have comparative advantages in the production of health care services. Since transportation was costly until well into the twentieth century, social health insurers imposed the principle of local treatment, resulting in almost no international trade in medical services. Factor mobility as fostered by the European Union (EU) is apt to increase international competition in the health care sector. Physicians and dentists have had the right to locate freely within the EU since the mid-1970s, a freedom accorded to dependent workers as well since 1992. Mobility will continue at a low rate, however, as long as the protection afforded by health insurance stops at the border of the country of origin. In practice, it takes full portability of health insurance to give workers an opportunity to choose between national offers of medical treatment. These considerations reduce the importance of international competition as an issue for the health care sectors of low- and middle-income countries.

IMPLICATIONS OF THESE CHALLENGES FOR SINGLE VS. MULTIPLE PAYERS

These five challenges have implications for the choice between single- and multiple-payer systems at two levels. First, they affect the relative importance of the three degrees of information asymmetry distinguished above. If these challenges were to result in the predominance of one of these three types, a single-payer system would become more attractive

(provided that it corresponds to the predominant category). If these challenges can affect information asymmetry either way, however, they would favor the multi-payer alternative. Second, the complementary agents considered do not have equal capabilities to cope with these challenges. If governments, for example, are better able to deal with them than other complementary agents, they are likely to increase the domain of their preferred payment scheme, the single-payer alternative. If competitive health insurers (say) have the comparative advantage in meeting these challenges, however, the domain of multi-payer systems is likely to increase in the future.

DIRECT CONSEQUENCE OF FUTURE CHALLENGES

The emergence of new illnesses initially shifts the weight toward the most severe asymmetry of information, the combination of uncertainty about both effort and type. This calls for an adjustment of remuneration schemes in favor of attenuated incentives, where providers can rely heavily on cost reimbursement. Aging, associated with a prevalence of chronic conditions, tends to reduce information asymmetry, making fee-for-service the appropriate alternative. The growing share of one-person households, however, results in the treatment of minor health losses within the health care sector. Since knowledge about the type of provider is less decisive in this case, this challenge should make the intermediate degree of asymmetry more important. If marginal effort of the service provider does not make much difference [low value of E in equation (2)], a fixed payment in the guise of capitation may increasingly become optimal. In contrast, technological change in medicine boosts the value of E, calling for bonus payment for excellent outcomes. Finally, the opening up of health care systems to international competition does not seem to have any immediate implication for the different degrees of information asymmetry.

In sum, these future challenges have disparate influences on the different degrees of information asymmetry.

CONCLUSION 6: *Some of the five future challenges considered reduce the severity of information asymmetry; some of them increase it. This causes uncertainty about the optimal payment system, conferring some advantage on multiple-payer systems.*

INDIRECT CONSEQUENCES OF FUTURE CHALLENGES

In this section, the comparative ability of the different complementary agents to cope with future challenges is considered first. Since different agents prefer different payment systems (table 2), a prediction can be derived about the likely future importance of multiple- relative to single-payer systems.

To simplify the analysis, the challenges are grouped into two categories. The first group comprises those of domestic origin: the emergence of new illnesses, the aging of the population, and the increased share of one-person households. The second group consists of challenges exogenous in origin: technological change in medicine and opening up to international competition between health care systems.

Medical associations, acting as complementary agents, are prepared to deal with the domestic challenges. Their members can easily organize the redistribution of medical care required by the emergence of new illnesses and aging. With regard to the exogenous challenges, the associations stand ready to ensure the adoption of new medical technology. However, since protecting their members from competition is one of their missions, medical associations cannot easily cope with an opening up of their domestic markets.

In contrast, *employers* are little prepared, acting as complementary agents, to deal with the domestic challenges that call for redistribution that clashes with their own quest for systems with favorable incentives (Clarke and Dorrough 1973). The exogenous challenges match their know-how much better: assessing and monitoring use of new technology and profiting from possibilities of international procurement. This know-how will be valuable if international competition in the health care sector intensifies. So far, however, employers have not been strongly engaged in health care issues,[6] and they cannot be counted upon to become active in the near future.

Competitive *health insurers* will have an advantage as complementary agents because most of the challenges considered do not run counter to the objectives of insurance companies, which moreover have the expertise to deal with most of them. The emergence of new illnesses is an exception because insures shy away from covering risks they cannot (yet) calculate. However, when it comes to manage technological change in medicine, private insurers can be expected to objectively weigh the benefits and costs (reflected in the extra premium) of including a new therapy in their benefit plans. Admittedly, such an unbiased weighing on behalf of consumers comes about only under pressure from competition, after disbanding national cartels still in existence.

The agents of *social health insurance* have the instruments to deal with domestic challenges that call for redistribution. However, exogenous challenges run counter to their mission of budget balance (technological change) or their domestic orientation (increased international competition).

Finally, *governments* can use their powers to impose any redistribution they deem necessary to confront domestic challenges. These powers are not very useful, however, whenever the health care sector has to adjust to technological change in medicine or to intensified international competition.

In sum, no single complementary agent appears to be best prepared to deal with all the emerging challenges. In countries where domestic challenges such as new illnesses loom large, reliance on social insurers and the government may increase in the future. Indirectly, this tendency will enlarge the domain of single-payer systems (table 2). If, however, international challenges such as new medical technology are deemed crucial, competitive health insurers have a comparative advantage as complementary agents, entailing an increased importance of multiple payers (and multiple-payment schemes to the extent that they are permitted to compete on this score).

[6] This need not be a disadvantage, since associating health insurance with the work place is becoming increasingly problematic, because it hampers labor mobility, as evidenced by U.S. experience.

CONCLUSION 7: *The future challenges of domestic origin favor social insurers and governments as complementary agents and, with them, single-payer systems. Those of international origin favor competitive insurers and possibly medical associations and, with them, multiple-payer systems.*

FINAL ASSESSMENT

On efficiency grounds, a case can be made for having three basic payment systems, reflecting the three degrees of information asymmetry distinguished above. The existence of multiple-payer systems increases the chance of having of this choice of payment schemes. Whether this case is strengthened or weakened by the future challenges considered depends on the relative importance of the direct and the indirect effects. The direct effect of these challenges seems to be that differentiated payment schemes will become more appropriate in the future, since the degree of information asymmetry may change unpredictably. However, the indirect effect through a complementary agent may deal with some types of challenges better than with others. If the domestic challenges predominate, social insurers and governments have the advantaged as complementary agents, and this efficiency advantage translates into a tendency in favor of single-payer systems. If international challenges are of primary importance, direct and indirect effects point in the same direction. Competitive health insurers can deal with those challenges while also preferring multiple-payer systems that go along with multiple-payment schemes.

CONCLUSIONS

Applying economic principal-agent theory to the provider-patient relationship leads to the conclusion that the patient, acting as the principal, generally lacks the knowledge to identify the payment scheme that indirectly controls provider effort in an optimal way. In most cases, his or her information seems insufficient to estimate crucial parameters determining the optimal payment function in the presence of asymmetrical information. This failure creates a market for complementary agents whose task is to provide the patient with the necessary information, or negotiate the payment scheme on his behalf, or both. Medical associations, employers, and private health insurers are complementary agents associated with multiple-payer systems, whereas social health insurers and governments favor single-payer systems. The domain of these alternatives will be affected by challenges confronting health care systems, including new illnesses, aging of the population, increasing numbers of one-person households, technological change in medicine, and the opening up of health care sectors to international competition. These challenges have disparate impacts on the different degrees of asymmetry of information, calling for flexibility with regard to payment systems that may come about in multiple-payer systems. However, there is an indirect impact as well, because these challenges favor some complementary agents while putting others at a disadvantage. When the challenges are domestic in origin, social insurers and governments are well prepared to handle them; accordingly, the domain of single-payer systems should increase. For challenges of international origin, private health insurers and possibly medical associations (and with them, multiple-payer systems) have the advantage. Since multiple-payer systems typically go along with multiple-payment schemes, there is a chance to improve matching of contract provisions in health care with the different degrees of information asymmetry, with the promise of an efficiency gain.

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