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## *Author's Reply*

# The Demand for Health Insurance: A Preference for Certain Losses or Desire for Income Transfers If Ill?

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*Abstract:* Two alternative interpretations of the demand for insurance can be derived from the basic insurance model: (1) insurance is a preference for certain losses over uncertain ones of the same expected magnitude, or (2) insurance is a demand for an income transfer if the bad state of the world occurs. Although the former represents convention, many empirical studies show that people actually prefer uncertain losses to certain ones of the same expected magnitude. This paper presents the case that the second interpretation is more generally applicable and, with regard to health insurance, does not lead to the misleading empirical conclusions and misinformed public policy that the first, conventional interpretation has generated. [Key words: Demand for insurance, health insurance, preference for certainty, aversion to risk.]

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## INTRODUCTION

**I**n my book *The Theory of Demand for Health Insurance* (Nyman, 2003), I take issue with two fundamental tenets of conventional health insurance theory. First, I suggest that (*ex post*) moral hazard is not totally inefficient as conventional theory holds (Pauly, 1968), but instead has an efficient

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component that is generated by the income that is transferred (from those who purchase insurance and remain healthy) to those who purchase insurance and become ill. This change has important implications for understanding why people purchase health insurance, for estimating the value of health insurance, and for designing government policy. Second, I suggest the demand for health insurance is not a demand for certainty, as conventional theory holds, but instead is a demand for an income transfer when ill (or in general, when the bad state of the world occurs). This change has important implications for how to think about and model insurance.

In a review of my book, Joseph G. Eisenhauer (this volume) critically evaluates this theory and finds that the first part produces a "valuable insight." He takes issue, however, with the second part of my theory, and also with a number of specific arguments that I use to make my case. In this response, I comment on the areas where we differ. In the next section, I restate the basic theory and address the issue of how best to view the demand for insurance: is it more reasonable to interpret it as a preference for certain losses or as a desire for an income transfer if the bad state of the world occurs? After that, I comment on Eisenhauer's specific criticisms, and in the final section, offer a modest suggestion for how to proceed with research in this field.

## DEMAND FOR CERTAINTY OR FOR AN INCOME TRANSFER?

### Alternative interpretations

Consider the conventional model of demand for health insurance in its most fundamental form. That is, assume that (1) no moral hazard exists, (2) the utility function itself does not depend on the consumer's health state, (3) consumers derive utility only from income that can be spent on goods and services other than medical care, and (4) the consumer's utility function, however derived, exhibits diminishing marginal utility. Consumers face an uncertain loss of income from becoming ill and having to purchase medical care. If  $y_1$  is the original income level and a loss of  $(y_1 - y_0)$  occurs with a probability of  $\pi$ , expected utility without insurance is:

$$(1) \quad \begin{aligned} Eu^u(y) &= \pi u[y_1 - (y_1 - y_0)] + (1 - \pi)u(y_1). \\ &= \pi u(y_0) + (1 - \pi)u(y_1). \end{aligned}$$

Consumers have the option of purchasing actuarially fair insurance. If  $y^*$  is the expected value of income, such that the fair premium is  $(y_1 - y^*)$ ,

then expected utility of fair insurance with a payoff that covers the entire loss is:

$$\begin{aligned}
 (2) \quad Eu^i(y) &= \pi u[y_1 - (y_1 - y_0) + (y_1 - y_0) - (y_1 - y^*)] + (1 - \pi)u[y_1 - (y_1 - y^*)] \\
 &= \pi u(y^*) + (1 - \pi)u(y^*) \\
 &= u(y^*).
 \end{aligned}$$

If the consumer's utility function exhibits the standard concave functional form, then insurance produces a higher expected utility than no insurance.

The conventional interpretation of insurance theory is that the consumers have a choice between equations (1) and (2). If consumers choose to purchase insurance, equation (2), rather than remain uninsured, equation (1), they are "choosing certainty in preference to uncertainty" (Friedman and Savage, 1948, p. 279). To be precise, the "preference for certainty" in the context of this choice model means "a preference for a certain loss over an uncertain loss of the same expected magnitude." Because a choice in favor of one implies a choice against the other, a "preference for certainty" can also be expressed in opposite terms as an "aversion to risk." In what follows, I assume that these three phrases—"preference for certainty," "a preference for a certain loss over an uncertain loss of the same expected magnitude," and "an aversion to risk"—are identical in meaning, and use them interchangeably.

This same behavior can also be viewed as the gain that is realized when insurance is purchased. This gain can be expressed as the difference between equations (2) and (1), or

$$(3) \quad Eu^i(y) - Eu^u(y) = \pi u(y^*) + (1 - \pi)u(y^*) - [\pi u(y_0) + (1 - \pi)u(y_1)].$$

Collecting terms associated with the same states of the world yields:

$$(4) \quad Eu^i(y) - Eu^u(y) = \pi[u(y^*) - u(y_0)] + (1 - \pi)[u(y^*) - u(y_1)].$$

With this specification, the consumer pays a fair premium when healthy (the second term on the right-hand side of equation (4)) in order to obtain an income transfer in the event of illness (the first term on the right-hand side). Instead of a choice, the purchase of insurance under this specification is a *quid pro quo* transaction.

Which interpretation—a preference for a certain loss or the desire for an income transfer if ill—is more "robust," to use Eisenhower's word? The gain in equation (4) is mathematically equivalent to the difference between the expected utilities in equations (1) and (2), so we cannot distinguish

between these two interpretations on the basis of mathematics (see Nyman, 2003, p. 60). Therefore, we must look elsewhere to determine which of these interpretations is more robust.

**Empirical evidence.** One would think that if the preference for certain losses were a dominant behavioral tendency, it would be easy to find empirical evidence of its existence. This, however, is not the case, and in fact, the opposite is true. A large number of empirical studies—including the entire empirical literature underlying prospect theory (Kahneman and Tversky, 1979)—provides evidence that people most often prefer an uncertain loss to a certain loss of the same expected magnitude. For example, in one famous experiment, respondents were given a choice between two alternative programs to combat a hypothetical Asian disease: one alternative would result in a 1/3 chance that 600 people will die, and the in other 200, will die with certainty. When faced with this choice, 78 percent of respondents preferred the uncertain loss over the certain one (Tversky and Kahneman, 1981, p. 453; see Nyman, 2003, p. 24 for a partial list of studies with similar findings).

Especially revealing are the studies that directly compare insurance to a choice between a certain loss and an uncertain one of the same expected magnitude. For example, a study by Slovic, Fischhoff, and Lichtenstein (1988) presents the same problem alternatively as an insurance contract and as a choice. They found that a majority of respondents preferred to purchase an insurance contract for \$5 to cover a 0.001 chance of a \$5,000 loss (as opposed to not purchasing the contract), but when the context was presented as a choice between a certain loss (\$5) and an uncertain loss of the same expected magnitude (a 0.001 chance of a \$5,000 loss), a majority chose the uncertain loss.

These studies suggest that when people purchase insurance, it is not because they prefer certainty of losses. Eisenhauer lists a series of studies (Friedman, 1973; Szpiro, 1986a, 1986b; Eisenhauer and Halek, 1999; Halek and Eisenhauer, 2001) that he claims all represent empirical evidence of risk aversion, but all these studies are based on insurance data. The authors of these studies simply take insurance data, find evidence of diminishing marginal utility of income, and then interpret the finding as evidence of risk aversion. In other words, these studies are claimed to have found evidence of risk aversion because their authors interpret the findings as risk aversion. But to prove that people purchase insurance because of an underlying, natural aversion to risk, it would be necessary to show first that this aversion to risk occurs naturally in some pure form outside of the insurance context. None of the studies cited provide such evidence. Interestingly, Eisenhauer also claims that there are “numerous non-insurance contexts” (this volume, p. 74) where risk aversion is documented empirically, but fails to cite a single study supporting his claim.<sup>1</sup>

## Standard demand theory

Standard demand theory interprets the purchase of most goods and services that occur in the economy as a *quid pro quo* transaction: a payment is made to a supplier and in exchange the consumer receives something of value. The purchase of a commodity is typically explained and evaluated by appealing to the commodity's consumer surplus (Willig, 1976), which is the gain that nets the consumer's maximum willingness to pay for a good or service against the price that must be paid for it (typically assumed to be its marginal cost).

Because of this, it would seem natural to view the purchase of an insurance contract in the same *quid pro quo* context: a premium is paid to an insurer in exchange for a contract that obligates the insurer to transfer a sum of income to the insured person in the event that some insurable event (death, automobile accident, fire, theft, illness) occurs. The net gain from purchasing insurance would be the difference between the value of the contract to the consumer and the premium charged. Unlike the standard demand model, with insurance the consumer's state of the world is uncertain—for example, whether the consumer is (1) healthy and merely pays a premium payment or (2) becomes ill and receives the insurance net payoff—and depends on whether the insurable event occurs or not. But this uncertainty can easily be incorporated into the model, as equation 4 illustrates. Why a “preference for certainty” was originally adopted as the framework for insurance, instead of the more standard “willingness to pay for an income transfer in the event some insurable event occurs” is not clear.

## Health insurance application

Interpreting the purchase of insurance as a choice and a preference for certain losses (rather than a *quid pro quo* transaction and a desire for an income transfer if the bad state occurs) in reality represents only a relatively minor error for most types of insurance. It is an empirical curiosity of little actual consequence because, after all, both specifications result in the same gain mathematically. This, however, is not true for *health* insurance. With health insurance, the interpretation of insurance as a preference for certain losses has been enormously misleading because it established the theoretical context that led to the erroneous conclusion that all of moral hazard is welfare decreasing. This, in turn, has had important consequences for health policy.

If theory had held that the demand for insurance were a demand for an income transfer in the bad state of the world, then in applying this theory to *health* insurance, it would have been clear that much of the additional spending on health care associated with being insured—that is, much of

the moral hazard—was a result of the ill consumer having additional income. It would have been recognized that this income-generated health-care spending results in a welfare gain, and health policy would not have been as preoccupied with reducing moral hazard. Moreover, health insurance would generally have been viewed as welfare increasing, and the U.S. might have even adopted a national health insurance program by now, as all other developed democracies have done.

Instead, conventional theory held that the demand for insurance was due to a preference for certain losses over uncertain ones of the same expected magnitude. So, in applying this theory to health insurance, *health care spending was viewed as a loss*, in the same way that a house burning down results in a loss, not recognizing that health care that is purchased when ill is a very valuable commodity because it can lead to the improvement of the ill consumer's health. Under conventional theory, *health-care spending without insurance was assumed to represent the correct level of spending with insurance*—for example, Arrow wrote in 1968 that health insurance should cover only “normal” expenditures on health care, which are “roughly what would have been bought in the absence of insurance” (Arrow, 1968, p. 538)—not recognizing that the access to otherwise unaffordable health care that the income transfer provides is a central reason why people now purchase, and have always purchased, health insurance. As a result, under conventional theory, any additional spending could only generate a welfare loss because it was not related to any change in income.

Over the last 35 years, the ascendancy of conventional theory has led to a preoccupation with moral hazard in the U.S. and with policies—originally deductibles and coinsurance payments, and later utilization review, capitation payments and bundling, selection of panels of providers, managed care in general, and now health savings accounts and “consumer-driven” health care—designed to reduce it. Conventional theory led to empirical studies that concluded that health insurance, at the coverage levels existing in the U.S. at the time, would make consumers worse off, and that because of the welfare loss from moral hazard, coinsurance rates should be raised to 50 percent, 67 percent, or higher, with no limits on out-of-pocket spending (Feldstein, 1973; Manning and Marquis, 1996). Rather than conducting studies that calculated the gains to society from health insurance and the benefits of policies intended to extend health insurance to the uninsured, studies focused on the benefits of *repealing the employee tax subsidy of insurance premiums*, because the policy was deemed to encourage those with health insurance to buy “too much” coverage (Feldstein and Friedman, 1977; Feldman and Dowd, 1991), all but ignoring the fact that this policy also encouraged some who would otherwise be uninsured to purchase any health insurance at all. Because of conventional theory, health

insurance has been viewed as more the problem than the solution (Gladwell, 2005).

Thus, when applied to health insurance, the conventional insurance demand theory has had consequences that are both important and real, especially for the 45 million Americans who remain uninsured and thereby outside the loop that redistributes income from the healthy to the ill. Eisenhower ignores the role of the conventional “demand for certainty” theory in generating these consequences. He tries to dance around the usual specification of health insurance under conventional theory by arguing that “[t]he concept of risk aversion need not be limited to wealth fluctuations, however, and the access motive which Nyman endorses may even be viewed as a reflection of the consumer’s aversion to health risks” (Eisenhauer, this volume, p. 83). This is simply not a rigorous translation of conventional theory. If we viewed *health* uncertainty as the uncertainty being insured against, we would have to view health insurance as substituting a *certain health loss for an uncertain one of the same expected magnitude*, in order to be consistent with conventional theory. But no one purchases health insurance by giving up some of their health, and few would regard the health care that one receives with insurance as being so effective as to result in a perfectly predictable health state. That is, having health insurance simply does not allow an individual to avoid the uncertain health consequences associated with contracting heart disease or cancer.

Eisenhauer also takes issue with my observation that it is not necessary to include the medical spending as the “loss” in insurance contracts. He argues instead that “... of course, the potential medical expenditures which triggers the insurance reimbursement is the origin of the financial risk and is an explicit feature of any health insurance policy” (Eisenhauer, this volume, p. 82). While this spending may be a feature of current health insurance policies, it not necessary that health insurance contracts have this feature in order to be valued and purchased. Much of my book is devoted to discussing contingent claims health insurance contracts where the consumer receives a lump-sum payoff (say, a cashier’s check) upon diagnosis (rather than upon incurring expenditures) for a specific disease. This type of contract is not used today, in part because of the difficulty in developing legal language that would cover all the treatment contingencies—e.g., complications, infections, unexpected sequellae—associated with a certain diagnosis. If, however, such language could be developed, such a policy would be a reasonable alternative to health insurance that pays for medical expenditures. For example, assuming constant prices, if each “appendectomy A” were so well defined as to always cost exactly \$10,000 to treat, then the consumer would generally be indifferent between a health insurance policy that paid off by paying providers \$10,000 for performing the

procedure, or one that paid the policyholder \$10,000 upon diagnosis of appendicitis requiring appendectomy A. In this type of contract, a consumer would simply pay a premium for a contract that obligates the insurer to write a check if a specific illness occurs, but no medical expenditure "loss" would be part of this contract. Such a contract would be desirable—perhaps even more desirable than one that paid expenses—because it would eliminate the inefficient portion of moral hazard and thus be cheaper. Such a contract would be similar to the conventional life insurance contract, which does not reimburse actual expenditures but simply obligates the insurer to write a check in the event that an insurable event (death) occurs. Even though expenditures are not included as part of the contract, life insurance policies are valuable and as a result are widely demanded. In the same way, an expenditure loss (or any loss of physical property or wealth) is not a necessary component of a desirable health insurance contract.

## **Robust**

So which of these interpretations is more robust? Some types of insurance—perhaps, fire or theft insurance—can be interpreted in either way with no ramifications because (1) a loss of physical property or wealth clearly occurs, (2) efficient moral hazard is unlikely to exist, and (3) the insurable event itself does not alter the insured's utility function. But for other types of insurance—notably health, but also life insurance—it is simply not appropriate to model insurance as a preference for certain losses because of the fact that no loss of physical property or wealth occurs. Moreover, certainty of expenditures is not always desirable if consumers use health insurance to gain access to valuable care that they would not otherwise be able to afford. Finally, there is simply no independent empirical evidence that confirms that consumers naturally prefer certain losses to uncertain ones of the same expected magnitude, and indeed, to my knowledge, all existing studies find that the opposite is true. Thus, from the perspective of identifying a theoretical explanation for the demand for insurance that is generally applicable to all types of insurance, including health insurance, a desire for an income transfer when the bad state of the world occurs seems to be a more robust interpretation of this demand than a preference for certain losses or an aversion to risk.

## **SPECIFIC CRITICISMS**

This section addresses a number of specific criticisms raised by Eisenhauer. Most of these points, I would characterize as misunderstandings. In



addition, Eisenhower raises some mathematical criticisms, one of which is correct. Finally, he incorrectly characterizes the gain from moral hazard from an *ex ante* perspective. It is perhaps this latter characterization that is most in need of comment. I will start with the misunderstandings.

## Misunderstandings

First, Eisenhower characterizes the new theory as a contribution that simply “elaborated on de Meza’s basic insight.” De Meza’s (1983) contribution was important: he showed that insurance that paid off with a lump-sum transfer could generate an increase in health-care consumption. His model, however, did not recognize that actual health insurance policies, which paid off by reducing price, contained within them the same income transfer (as well as a substitution or “pure price” effect). Pauly (1983) recognized and commented on the limits of de Meza’s contribution, writing that despite de Meza’s paper,

“[i]t is nevertheless true that the relevant theory, empirical evidence, and policy analysis for moral hazard in the case of serious illness has not been developed. This is one of the most serious omissions in the current literature” (Pauly, 1983, p. 83).

Thus, Eisenhower’s attempt to magnify de Meza’s contribution and minimize the contribution of the new theory is not consistent with Pauly’s appraisal of de Meza’s contribution at the time.

Second, Eisenhower takes issue with my claim that “[s]ince the advent of Pauly’s influential article [1968], almost all economists (Fuchs, 1996) have believed in a theory that implies that the voluntary purchase of health insurance makes the consumer worse off” (Nyman, 2003, p. 1). In writing that sentence, I chose my words carefully. I did not say that “almost all economists believe that the voluntary purchase of health insurance makes the consumer worse off,” but that they “believe in a theory” that produces that conclusion. I base this claim on two sources of empirical evidence: (1) evidence from surveys of economists (Fuchs, 1996; Feldman and Morrissey, 1990) that suggest that almost all respondents believe in Pauly’s 1968 model; and (2) evidence from empirical studies based on Pauly’s model that find that the purchase of health insurance makes the consumer worse off (Feldstein, 1973; Manning and Marquis, 1996). That is, if one believes in Pauly’s theory, it generates the conclusion that health insurance makes the consumer worse off if its internal logic is followed. Thus, I conclude that most economists believe in a theory with this implication.

Eisenhower then writes that “most economists ... would doubtless consider it irrational and thus extraordinary for an individual to voluntarily purchase insurance (or anything else) that reduced his or her own

utility" (this volume, p. 73). This is exactly the point: it is absurd to regard all who purchase insurance as irrational. As I have written, either you believe that "consumers were irrational, or that our theories were wrong" (Nyman, 2003, p. 178). My book is an argument that consumers are rational, and the conventional theory is wrong.

Third, I argue that in conventional theory, there is no recognition that the income transfers (that are contained within the price reduction) generate increases in consumption. Eisenhauer argues that this is wrong because many empirical studies find evidence of an income effect. Again, this is exactly my point. Conventional *theory* does not recognize an effect of income on medical care consumption, and therefore conventional theory does not incorporate the observation of an income effect into its analysis of moral hazard. But, I cite *empirical* evidence that finds evidence that consumers respond to increases in income by purchasing more health care. Thus, in order to believe conventional theory, you must believe that the income elasticity is zero, which is contradicted by empirical studies. This contradiction is exactly the nature of the anomaly represented here.

Fourth, I attempt to distinguish between the Bernoulli (1738) conceptualization of utility as a function of income and the von Neumann and Morgenstern (1944) conceptualization by noting that Bernoulli's utility function is based on an assumed certainty of income, while von Neumann-Morgenstern's method for eliciting utility is based on uncertain income states. This distinction is likely to generate different results because consumers have preferences regarding uncertainty that would be overlaid on their preferences for income. These preferences regarding uncertainty are different from and more subtle than those identified by conventional theory as stemming from diminishing marginal utility of income. As I note in my book, this is also a point that Mas-Colell et al. (1995) make in their popular microeconomic theory text.

Eisenhauer points out that the trait that both these utility functions share, diminishing marginal utility, "has been inextricably linked with risk aversion." Although that is not the point I was making, I agree with it, nevertheless. Indeed, this is exactly the misconception that I am trying to dispel: the idea that just because people exhibit diminishing marginal utility, they will necessarily prefer certain losses to uncertain ones of the same expected magnitude. Alternatively, diminishing marginal utility is also consistent with the gain from paying a premium when healthy in exchange for an insurance contract that obligates the insurer to transfer income to the policyholder if ill. Since overwhelming empirical evidence suggests that people tend to prefer uncertain losses to certain ones of the same expected magnitude—that is, they exhibit an aversion to certain losses—then for what reason (other than force of habit) do we persist on

referring to a utility function that exhibits diminishing marginal utility as one that is “risk averse”?

## Mathematical criticisms

Eisenhauer notes that my first-order conditions are wrong: the ratio of marginal utilities should be equal to positive price ratios (1 or  $c$ ), rather than negative ones ( $-1$  or  $-c$ ). That is, while they are correctly labeled on the diagrams as negative, the mathematical first-order conditions themselves should exhibit positive price ratios. He is correct. He then claims that “one of the principal difficulties with the book’s exposition is that there are a number of distracting mathematical and typographical errors” (Eisenhauer, this volume, footnote 9, page 85). For mathematical errors, I count these two.

He suggests that another mathematical error is that the consumer’s first-order conditions with insurance should equate the ratio of marginal utilities to  $[(1 - c) + c]$ , rather than  $c$ . This would imply that after purchasing insurance, one’s medical-care spending would influence the level of the premium (otherwise, why care about the portion of expenditures paid for by the insurer?)—that is, the amount that was already paid in order to purchase insurance. This is an awkward, if not impossible, sequence of events. It would require some way of adjusting the consumer’s own premium to reflect her own medical-care consumption under the existing insurance contract, which is not a standard assumption. Instead, in my model I assume that the premium is correctly calculated and established beforehand, based on an accurate actuarial study, and the consumer decides whether she will purchase insurance given that premium, coinsurance rate, and probability of illness. In my model, after the contract is purchased, the consumer responds to the lower insurance price for medical care, but the consumer’s medical-care spending does not again alter the premium that she pays. Since the actuarial study that generated the premium is accurate, the premium that was paid is fair and reflects any additional spending with insurance. This conclusion is consistent with the standard assumption that the health insurance premium faced by the consumer is fair and fixed, and it is also consistent with Eisenhauer’s later assumption (this volume, pp. 83–84) that first the contract is established and then moral hazard occurs, with no feedback.

Eisenhauer criticizes the book for not modeling the insurance decision as determining the optimal coinsurance rate. I address this issue and specifically argue (Nyman, 2003, pp. 153–155) that because the utility function varies with regard to the various disease states possible, and because the gain from efficient moral hazard depends also on each consumer’s income or wealth, it is unlikely that an optimal coinsurance rate

can be identified. Different types of diseases would need to be covered differentially and so would people with differing incomes. Moreover, in the real world, few of us face a range of choices that would allow selection of a cost-sharing policy that is close to optimal. Thus, in the book I simply assume that an insurance policy is available that would cover an insured person's expenditure at a coinsurance rate of  $c$ , that the premium is actuarially fair as a result of an accurate actuarial study, and that consumer has the choice to purchase this policy or not. To go beyond this would have lost many readers unnecessarily in the complexity of what would be a very complex optimal insurance model. In other words, I can show the difference between efficient and inefficient moral hazard, just as Eisenhower demonstrates in his restating of my model (this volume, p. 81), without first finding the optimal coinsurance rate,  $c$ .

### Value of moral hazard from an *ex ante* perspective

Eisenhauer writes,

"Nyman (p. 27) presents this as his fifth anomaly, writing, 'The question therefore arises: Why are such insurance policies voluntarily purchased if they make the purchaser worse off? ... [E]ither this voluntary purchase of unsubsidized insurance represents an irrational act, or the conventional theory is, in some fundamental way, flawed.' But this assertion confuses the welfare of society at large with the welfare of the individual who appropriates resources for which other's must contribute partial payment. Free riding is not necessarily irrational, and Pauly (1968, p. 535) even emphasized that moral hazard was a consequence of 'rational economic behavior.' When the difference between the gain to the individual and the cost to society is recognized, the alleged anomaly disappears." (this volume, p. 75)

Eisenhauer confuses the purchase of medical care with the purchase of an insurance contract. It is rational from an *ex post* perspective (that is, after you purchase insurance and face a price of  $c$ ) to purchase more health care with insurance than without it (and facing a price of 1). However, from an *ex ante* perspective—which is the perspective adopted in considering the purchase of the insurance contract—the consumer pays a fair premium that must reflect the cost of all this additional health care. If all of the additional expenditures are inefficient (as they are assumed to be under the conventional theory, reflecting the generally frivolous nature of the additional medical-care consumption that the consumer would not otherwise purchase), then the fair premium for purchasing health insurance would be higher-than-expected spending on medical care without insurance by a certain amount. Thus, the fair premium would be too high,

compared to the expected gain. According to Feldstein (1973) and Manning and Marquis (1996), who base their calculations on conventional theory and the assumption that all moral hazard is inefficient, the net gain from fair insurance at current coverage parameters is negative, and were it not for some other factor (for example, the tax subsidy), the purchase of insurance would therefore be welfare-decreasing and irrational. Thus, given conventional theory, it would be irrational to purchase unsubsidized insurance at fair premiums that reflect in part all this inefficient moral hazard expenditure. But consumers do purchase health insurance without a subsidy, hence the anomaly.

## IMPLICATIONS FOR FUTURE RESEARCH

Eisenhauer describes conventional theory as “canon” (this volume, p. 83). This is an apt characterization because there appears to be a level of religious feeling associated with this theory. Instead trying to understand why insurance is purchased and confronting the contrary empirical evidence head on, disciples of conventional insurance theory appear to be more interested in defending the faith. As a result, the contrary evidence is ignored and appeals are made to factors such as the longevity of the acceptance of conventional theory as reasons to believe in it.

An alternative perspective is to recognize these contrary empirical studies, evaluate their methods and accuracy, and if they are judged to have integrity, investigate alternative explanations why insurance is purchased. I have suggested that the behavior is consistent with a *quid pro quo* transaction, and that consumers may simply desire an income transfer in the event of illness or, more generally, in the event that the bad state of the world occurs. This is consistent with one study, Connor (1996), that found that consumers switch to favoring insurance as soon as the “loss” is removed as an explicit component of the situation, and as soon as the contract focuses rather on a *quid pro quo* exchange and being able to obtain a payoff in the event that the bad state occurs. One empirical paper supporting this theory, however, hardly represents overwhelming evidence, and as I suggest in the appendix to my chapter 4 (Nyman, 2003, pp. 62–66), other explanations are possible.

For my purposes, I am most interested in showing that the standard health insurance contract *can be* represented as a *quid pro quo* transaction because that interpretation reveals the error of conventional theory in interpreting medical spending as a loss and concluding that all moral hazard is inefficient and welfare-decreasing. This is important because of my interest in developing health policy based on an accurate understand-

ing of the welfare associated with health insurance. While this is the most important implication for me, it would seem that those who are interested primarily in understanding the demand for insurance would have long ago recognized the dissonance between conventional insurance theory and the many empirical studies showing that consumers actually prefer uncertain losses to certain ones of the same expected magnitude. This literature is certainly not new, having been around for over 25 years. I would simply suggest that rather than denying the existence of this literature, it would be better to embrace it and to engage in further research designed to better understand what it is about insurance that makes it desirable. If this research leads to the denial of old theories and the elevation of new ones, all the better, because that is how science advances.

## NOTE

<sup>1</sup>I asked Daniel Kahneman if he was aware of any studies that found that people prefer certain losses to uncertain ones. He replied that he was not aware of any (Kahneman, personal communication, 2006). He also wrote that while he also does not now follow the studies that empirically investigate prospect theory closely, he would probably be aware of a study that found contrary evidence if one existed.

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