

# The Financial Desirability of Long-Term Care Insurance Versus Self-Insurance

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## Executive Summary

- This study compares the financial desirability of buying long-term care insurance versus the opportunity cost of investing the required funds at several different rates of return. Because of the timing differences between premium payments and potential receipts of benefits, the study computes the net present value of buying LTC insurance based on the present value of the expected receipts minus the present value of premium payments.
- The study uses data from the 1999 National Nursing Home Survey (NNHS) and older data from a *New England Journal of Medicine* study to determine the probability of needing nursing home care at certain age ranges (40–55, 55–65, and over 65) and for what length of stay, broken down for male and female. We use a 2002 market quote for insurance costs and benefits from a leading long-term care insurer.
- Use of NNHS data alone indicates that buying insurance appears to be preferred over self-insurance for all but the most aggressive female investors. It is also desirable for cautious male investors, but may not be for more aggressive investors.
- The older *New England Journal of Medicine* statistics show significantly longer lengths of nursing home stays, indicates that LTC insurance is desirable for almost all males studied, and continues to be more desirable for females.
- Follow-up 2006 market quotes for higher premiums did not produce any major changes for women, but made the purchase of LTC insurance even less desirable for some males.

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Providing for a family's protection against financial loss is part of the foundation of prudent money management. Successful financial planning involves organized and mindful activities that result in achieving financial goals. Risk management is an important component in financial planning along with career planning, cash, credit, and cash-flow management, tax planning, goal setting, investment, retirement, and estate planning. For most families, seeking to protect their income and assets is a fundamental, yet significant goal. Long-term care (LTC) costs can devastate a family's financial well-being, if not appropriately planned for, and as life expectancies increase, a greater number of Americans will live long enough to become physically or rationally disabled. Long-term care is usually funded by personal assets, government-sponsored health insurance, and managed-care private insurance. In 1998, Medicaid was the largest payer (47 percent) of total nursing home care (the Medstat Group 1999); however, for families to be eligible for Medicaid, they basically have to spend down most of their assets. Private LTC insurance is an alternative to asset spend-down, but premium costs can be a financial burden for middle-income families in retirement. Weighing the cost of premiums on insurance policies where benefits may never be realized is a major decision.

Since millions of families cannot rely on government support, which is intended for the poor, LTC insurance helps beneficiaries pay for extended health care in the home, an assisted living facility, adult day care center, or nursing home. The rationale for buying LTC insurance consists of

- Preserving control of one's life
- Not burdening children
- Being independent from one's children
- Maintaining self-respect
- Freedom of choice
- Asset and estate protection
- Financial security through retirement

But since most LTC policies now insure the holder only up to a certain daily dollar expenditure (as opposed to medical coverage that may insure all reasonable and usual charges), it might be said that LTC insurance does not necessarily provide insurance against catastrophic loss. Rather, it offers a defined payment much like life insurance (although it could be used several times during the contract, and the payment received is not fixed but is capped with a contract maximum per month).

Given this change in the market, it becomes easier to evaluate the trade-off between the expected value of holding LTC insurance and expected premium costs of the LTC policy, though in most cases for less than lifetime. While some employers offer LTC policies, the more difficult decision about insuring seems to rest with an individual's choice to self-insure. This paper studies that issue.

## Opportunity Cost of Investing Premium Dollars

If an individual chooses to buy LTC insurance, he or she forgoes the income they could have earned on the insurance premiums. As such, the opportunity cost of investing insurance premium dollars over many years can be substantial. On the other hand, if the individual does not buy LTC insurance, he or she has self-insured by default since Ehrlich and Becker's (1972) study shows that self-insurance is always a substitute for market insurance. For a rational individual, the decision becomes whether to pay an almost certain amount (the annual premium) in order to "gain" the expected (in a probabilistic sense) receipts from the LTC contract. The expected receipts are based on the probability that one will need long-term care and the length of that need. Since the premium payments occur early in the process and the receipts from LTC insurance usually occur later, timing becomes important, and a computation of the present value (PV) of both the premium payments and the expected receipts is necessary for a rational decision. In this study, we compute a net present value (NPV) of buying LTC insurance, in which the NPV is the PV of the expected receipts less the PV of premium payments.

One thing that has not yet been mentioned is risk aversion. A risk-averse individual will pay more than the expected value of a loss to insure against that loss. For example, if there is a 1 percent chance that one will have to pay \$100,000, a risk-averse individual is willing to pay more than \$1,000 to insure against that loss (and the amount that he or she is willing to pay above \$1,000 reflects their level of risk aversion). Much of finance theory is based on the assumption that individuals are risk averse. Similarly, McGuire, Pratt, and Zechauser (1991) compare insuring with gambling. They see insuring as reducing small chances of bad outcomes and gambling as increasing small chances of good outcomes. While we do not address risk aversion directly (since we would need to assume some level of risk aversion and because we assume that most investors are risk averse and thus would pay for protection), we will return to this point in our concluding remarks.<sup>sup>1</sup>

The goal to protect financial and human resources is a basic need for families today. Unexpected losses without traditional or nontraditional risk-reduction measures can severely diminish financial wealth. Nevertheless, the majority of families today continue not to carry market insurance for LTC and therefore self-insure by default. They may base their decision to self-insure on several factors. Families with inadequate financial resources will attempt to cut corners and insure those perils that require mandatory minimum levels of coverage by state law or for satisfying institutional

lending policies. Even families that can afford market insurance seek to reduce their market insurance premiums. Finally, strategies such as postponing the purchase of LTC insurance until an older age, buying policies with high deductibles, or carrying fewer riders on potential perils that can be self-insured can be considered a form of self-insuring. But the possibility that self-insurance is not always a conscious decision is seen in a study by Dionne and Eeckhoudt (1985), who show that risk-averse individuals are more inclined to self-insure than to self-protect (that is, pursue activities to reduce the probability of loss). Nevertheless, the relatively low cost of LTC premiums versus the maximum potential coverage may not warrant a self-insurance position.

Our question in this study will be whether LTC insurance is financially desirable. To evaluate this question, we will consider the financial desirability of buying insurance to cover *nursing home care* (since data for nursing homes were more readily available) for up to \$4,000 a month for a maximum of five years. If we find that the NPV of buying this policy is positive, then we can conclude that our data support an individual's purchase of LTC insurance. Even if the NPV is only marginally desirable as a fair bet (that is, the PV of the expected receipts equals the PV of the premiums), we must still consider the additional benefit of mitigating a catastrophic loss.

## Proposed Tests and Statistical Data

**Data.** Much of our data come from the 1999 National Nursing Home Survey (NNHS) administered by the National Center for Health Statistics. This survey is the most recent in a series of nursing home surveys conducted about every five years starting in 1973. It includes responses to questions for a sample of 8,215 current residents and for 6,913 individuals (6,475 usable responses) who have been discharged. We use the data on current residents to estimate the timing of entry into a nursing home, while using data on discharges to estimate average length of stay.

We propose to test whether it appears to be prudent from a financial perspective for an individual to self-insure for long-term care. Specifically, using various rates of return, we compare the net present value of expected (pretax) cash outflows and inflows when one buys long-term care insurance at quoted rates. When the NPV of expected outflows exceeds that of the inflows, it appears to be desirable to self-insure. We propose to perform this comparison for individuals at age 40, 55, and 65, which is further segmented into male, female, and aggregate populations.

To estimate the cash flows, we need the following:

1. A market quote for insurance costs and benefits
2. An estimate of the probability that the individual would need nursing home care
3. An estimate of the length of stay in a nursing home should one be needed

**Market quotes for insurance costs and benefits.** We obtained 2002 premium quotes from a leading long-term care insurer for a policy that would pay up to \$4,000 a month (plus 5 percent cost-of-living adjustment ) for up to 5 years. Costs range from \$1,063 a year for a 40-year-old to \$2,251 a year for one who is 65 years old.

**Probability that the individual would need nursing home care.** Because we are computing an NPV, the age at which one enters a nursing home is important. Thus, for *each* age range (we used five-year periods), we need a way to estimate the probability that the individual will require nursing home care during that period. Our primary source of data for this probability is the 1999 NNHS, which contains detailed empirical information by individual.

One very useful data field in the survey is the age at which each person entered the nursing home. Given this information, we are able to compute an empirical distribution of the probability of entering a nursing home during each age range given that the person will need nursing home care at some point in his or her lifetime. We show the empirical distribution based on the 1999 NNHS data (in summarized form) in Table 1.

<b>Table 1: Probability of Entry by Age</b>		
Age Group	Probability of Entry in Each Age Group	
	Males	Females
40-55	13%	5%
55-65	11%	10%
> 65	76%	85%
<b>Total</b>	<b>100%</b>	<b>100%</b>

We recognize that past experience is not necessarily an accurate predictor of future probabilities, and that reporting data only on nursing home residents who are living may introduce some survivorship bias; nevertheless, the large sample size and seeming objective source are preferable to anecdotal information.

To estimate the unconditional probability that one will enter a nursing home during one of the age ranges, we can use the probability that a 65-year-old will need nursing home care at some point in his or her lifetime. This probability combined with the empirical distribution from the NNHS will allow us to estimate the probability of entering the home during each age range. For example, let's assume that the probability of a 40-year-old male needing nursing home care sometime in his life is 43.3 percent (bear with us for a moment). If so, and given the probabilities shown above, the probability that a 65-year-old male will need nursing home care some time in his life is 33 percent (see Table 2).

<b>Table 2: Probability of Nursing Home Care</b>		
Age Group	Probability of Needing Nursing Home Care	
40-55	$13\% \times 43.3\%$	= 5.5%
55-65	$11\% \times 43.3\%$	= 4.8%
> 65	$76\% \times 43.3\%$	= 33.0%
<b>Total</b>		<b>43.3%</b>

If we can go from the 43.3 percent total (unconditional) probability to the 33 percent (unconditional) probability for a 65-year-old, we can also go in the opposite direction. In other words, if we have an estimate for the probability that that a 65-year-old male will need nursing home care sometime in his life, we can back into an estimate the probability for a 55-year-old and a 40-year-old.

A 1991 study by Kemper and Murtaugh in the *New England Journal of Medicine* estimated that 65-year-old males have a 33 percent probability of needing a nursing home sometime during their remaining lives. The corresponding probability for females is 52 percent. The higher probabilities for females seem plausible since the 1999 NNHS data indicate that about 71 percent of nursing home residents are female. For our purposes, we will use 33 percent for males and 52 percent for females as a starting point.

The reader should note that the premiums for LTC insurance are the same for both males and females in each age range even though probabilities of needing nursing home care are different. This fact will become important as we consider the PV of expected receipts.

**Length of stay (LOS) in a nursing home.** Another key issue in this analysis is length of stay (LOS) in a nursing home. For an estimate of LOS should one need nursing home care, we use data from a different section of the 1999 NNHS survey. The survey gathered data on 6,913 people (of which 6,475 responses were usable) who had been discharged from nursing homes in the year prior to the survey. Information on length of stay of each person discharged is included in this data; we use this data to estimate an average length of stay for males and females (separately) in each age range (five-year ranges from 45 years old to 105).

The data for those discharged indicate an LOS of 9 months for males, and 14 months for females. Other sources tend to report an LOS that is much higher. A key alternative source is Kemper and Murtaugh's 1991 study, which reported average stays of 19 months for males and 26 months for females. Perhaps the main difference is that the LOS statistics from the NNHS are for *each* nursing home stay, and an individual may have multiple visits during his or her lifetime. Kemper and Murtaugh use different data (interviews of relatives of over 16,000 deceased persons in the 1986 National Mortality Followback Survey) to estimate LOS. The questions in the interviews ask for total time in a nursing home, rather than for time for one stay.

We chose to start with the lower figures from the NNHS because they are more recent and still show a robust sample size (6,475). Also, these figures produce a more conservative result (that is, one is less likely to favor purchase of LTC insurance). However, because the methodology in the Kemper and Murtaugh study addresses multiple nursing home stays and is consistent with other anecdotal reports on average stays, we use their LOS figures as a basis for a second view of the desirability of LTC insurance (see Table 4 and the analysis section below).

**Details of computations.** As mentioned above, we analyze three possibilities for each sex: an individual who is either 40, 55, or 65 years old. We divide age groups above age 40 into 5-year segments from 40 to 44.9 up to 100 to 104.9, and assume that the midpoint (for example, 47.5 years for the 45–49.9 group) is the age used to calculate probabilities for the age when entering a nursing home. We also assume that the individual buys insurance for which he or she will pay until either nursing home care is needed or death occurs. The premiums constitute cash outflows in the model and form the basis for the present value of the expected cash outflows.

Cash inflows are for policy benefits paid to the individual assuming that he or she enters the nursing home at the midpoint age and stays for the length of service for that age and gender group. The contract quoted permits a maximum payment of \$4,000 a month (plus 5 percent annual cost-of-living increases) for up to 60 months. The cash inflows are multiplied by the probabilities of needing nursing home care in each age range (to get expected cash flows) and then discounted to the beginning of the contract using several different interest rates. We assume a rate of 4 percent a year for a cautious investor, 7 percent for an "average" investor, and 10 percent for an aggressive investor.

Cash outflows represent the payments made for the long-term care coverage (premiums quoted based on age of applicant). A key assumption is that the premiums will remain constant throughout the contract period. Insurance companies can change premium amounts for a contract, but must do so for the whole class of contracts. Also, we assume that the premium payments stop if the insured enters a nursing home (or dies). Again, we discount the expected value of the payments to the present at the same interest rates as used for the cash inflows.

The net present value of the expected cash flows is defined as the present value of expected inflows minus the present value of expected outflows. Thus, a positive NPV implies that it is preferable for the individual to buy LTC insurance (given the interest rate used).

## Results

Table 3 (panels A and B) illustrates our initial results based on length of stay for those discharges in the NNHS. For cautious males who might require only a 4 percent return on money not invested in an LTC policy, the NPV is moderately positive (\$4,712) for a 40-year-old, and slightly positive (\$818) for a 55-year-old, indicating that

buying LTC insurance appears to be desirable. But even at a 4 percent return, the NPV for a 65-year-old is negative (indicating that self-insurance is preferable). If the male's expected returns exceed 5.4 percent, self-insurance is indicated at all three age levels. For females (panel B), the value of LTC insurance appears to be substantially greater. The expected rate of return (the "break-even rate") on LTC insurance ranges from 7.7 percent (for the 65-year-old) to 9.6 percent (for the 55-year-old), indicating that LTC insurance is desirable for all except the more aggressive investors.

**Table 3: Break-Even Points Based on NNHS, 2002 Premiums**

**A. Probability of 65-Year-Olds Needing Nursing Home Care During Lifetime = 33%  
Value of Long-Term Care Contract, Males Only**

Starting Ages	Annual Payments	Summary: Expected Net Present Value			
		At 4%	At 7%	At 10%	B/E
40	\$1,063	\$4,712	-\$2,502	-\$3,879	5.4%
55	\$1,192	\$818	-\$3,126	-\$4,506	4.4%
65	\$2,251	-\$9,807	-\$9,935	-\$9,653	NM

**B. Probability of 65-Year-Olds Needing Nursing Home Care During Lifetime = 52%  
Value of Long-Term Care Contract, Females Only**

Starting Ages	Annual Payments	Summary: Expected Net Present Value			
		At 4%	At 7%	At 10%	B/E
40	\$1,063	\$29,774	\$3,769	-\$2,530	8.3%
55	\$1,192	\$23,142	\$6,104	-\$554	9.6%
65	\$2,251	\$10,465	\$1,271	-\$3,209	7.7%

- Contract with \$4,000-per-month maximum benefits and 5% COL
- Probability of needing nursing home care = 33% (male), 52% (female)
- Length of service based on 1999 NNHS survey of discharges

Because the length of stay figures from the NNHS are much lower than those reported elsewhere, we chose to analyze the results based on LOS figures from the Kemper and Murtaugh 1991 study. Because our figures from their study are aggregate, we use the breakdown into age ranges that the NNHS provides as a basis for estimating LOS by age category.

Results for this approach are summarized in Table 4. In this case, LTC insurance appears to be desirable for cautious males in all three age groups (40, 55, 65), and for 40 and 55-year-old investors with average risk tolerance. For females, LTC insurance is desirable for all ages of women in all three types of risk preferences. Length of stay varies with age. For example, younger males start off with high lengths of stay, then between age 50 and 60, LOS declines. From 60 to 70, LOS increases and then steadily declines until age 105. Female LOS is highest between 45 and 50. It declines between 50 and 55, increases between 55 and 70, remains constant at the weighted average between 70 and 90, and then steadily declines until age 105. We weighted the LOS by probability of entering a nursing home during each five-year range.

In general, one can conclude that LTC insurance appears to be a better investment for a woman than for a man. Note that women have higher probabilities of needing nursing home care, and have longer stays, on average. Yet the premium costs are the same as for men.

**Table 4: Break-Even Points Based on 1991 Kemper and Murtaugh Study, 2002 Premiums**

**A. Probability of 65-Year-Olds Needing Nursing Home Care During Lifetime = 33%  
Value of Long-Term Care Contract, Males Only**

Starting Ages	Annual Payments	Summary: Expected Net Present Value			
		At 4%	At 7%	At 10%	B/E
40	\$1,063	\$24,013	\$3,801	-\$1,970	8.5%
55	\$1,192	\$17,114	\$5,532	\$516	10.5%
65	\$2,251	\$3,118	-\$1,513	-\$3,860	5.8%

**B. Probability of 65-Year-Olds Needing Nursing Home Care During Lifetime = 52%  
Value of Long-Term Care Contract, Females Only**

Starting Ages	Annual Payments	Summary: Expected Net Present Value			
		At 4%	At 7%	At 10%	B/E
40	\$1,063	\$66,514	\$13,852	-\$130	9.9%
55	\$1,192	\$55,484	\$20,924	\$6,848	13.7%
65	\$2,251	\$38,386	\$17,596	\$6,890	13.9%

- Contract with \$4,000-per-month maximum benefits and 5% COL
- Probability of needing nursing home care = 33% (male), 52% (female)
- Length of service based on average from Kemper and Murtaugh's NEJM study (distributed by ages using NNHS)

An additional analysis, however, using recently available, substantially higher, revised 2006 market-quote premium levels, reveals that the purchase of LTC insurance becomes even less appealing for male investors, and in some cases even for females.

In Table 5, using the NNHS data, the decline in the break-even point in the age-55 category makes investing preferable to insurance for all male investors. For females, the break-even point declines substantially enough that for those in the age 55 category the purchase of insurance becomes desirable only for risk-averse females. For women 65 and older, the new premiums make self-insuring preferable for all females rather than buying insurance.

**Table 5: Break-Even Points Based on NNHS, 2006 Premiums****A. Probability of 65-Year-Olds Needing Nursing Home Care During Lifetime = 33%  
Value of Long-Term Care Contract, Males Only**

Starting Ages	Annual Payments	Summary: Expected Net Present Value			
		At 4%	At 7%	At 10%	B/E
40	\$1,190	\$2,651	-\$3,855	-\$4,848	4.7%
55	\$1,867	-\$8,372	-\$10,154	-\$10,186	0.7%
65	\$3,322	-\$20,901	-\$18,950	-\$17,269	NM

**B. Probability of 65-Year-Olds Needing Nursing Home Care During Lifetime = 52%  
Value of Long-Term Care Contract, Females Only**

Starting Ages	Annual Payments	Summary: Expected Net Present Value			
		At 4%	At 7%	At 10%	B/E
40	\$1,190	\$27,661	\$2,387	-\$3,517	7.7%
55	\$1,867	\$13,637	-\$1,162	-\$6,415	6.6%
65	\$3,322	-\$948	-\$8,035	-\$11,078	3.7%

- Contract with \$4,000-per-month maximum benefits and 5% COL
- Probability of needing nursing home care = 33% (male), 52% (female)
- Length of service based on 1999 NNHS survey of discharges

In Table 6, the Kemper and Murtaugh data with the higher premiums continue to indicate desirability for LTC coverage for risk-averse to moderate female investors in all of the age categories. But the new quotes indicate some noteworthy changes in the desirability of buying LTC insurance for men. With the 2002 premiums, insurance had been desirable for all male investors in the age 55 category, including aggressive investors. But with the higher 2006 premiums, LTC insurance is desirable only for the risk-averse male. At age 65 and above, LTC insurance becomes undesirable for all male investors using the new quotes.

**Table 6: Break-Even Points Based on 1991 Kemper and Murtaugh Study, 2006 Premiums**

**A. Probability of 65-Year-Olds Needing Nursing Home Care During Lifetime = 33%  
Value of Long-Term Care Contract, Males Only**

Starting Ages	Annual Payments	Summary: Expected Net Present Value			
		At 4%	At 7%	At 10%	B/E
40	\$1,190	\$21,755	\$2,225	-\$3,164	7.8%
55	\$1,867	\$7,923	-\$1,496	-\$5,165	6.3%
65	\$3,322	-\$7,976	-\$10,528	-\$11,476	0.4%

**B. Probability of 65-Year-Olds Needing Nursing Home Care During Lifetime = 52%  
Value of Long-Term Care Contract, Females Only**

Starting Ages	Annual Payments	Summary: Expected Net Present Value			
		At 4%	At 7%	At 10%	B/E
40	\$1,190	\$64,199	\$12,241	-\$1,347	9.4%
55	\$1,867	\$45,979	\$13,658	\$987	10.4%
65	\$3,322	\$26,973	\$8,290	-\$980	9.6%

- Contract with \$4,000-per-month maximum benefits and 5% COL
- Probability of needing nursing home care = 33% (male), 52% (female)
- Length of service based on average from Kemper and Murtaugh's NEJM study (distributed by ages using NNHS)

## Summary and Concluding Remarks

Based on the figures from the 1999 NNHS and estimated probabilities of 65-year-olds needing nursing home care at some time in the future, our estimates indicate that buying long-term care insurance appears to be quite desirable for women and moderately so for men. The NPV of buying an LTC insurance policy is positive up to a relatively high return that one could earn from investing the premiums rather than using them for an LTC policy. In addition, because the LTC premiums are the same regardless of gender, and women have a higher probability of needing nursing home care, LTC insurance appears to be a much better choice for women than for men. The apparent desirability of policies for women may reflect demand for these policies. Our guess is that there would be greater demand for LTC insurance among married males, and that the demand would drive up prices for males. Thus, preferences could play a role in the desirability, which we have not reflected in our expected values. It may be more appropriate to apply utility functions to the expected values, but economists have had little success in finding a utility function that is consistent with observed asset prices.

The average length of stay implied by the NNHS study of individuals discharged from nursing homes is shorter than other sources indicate: 9 months for a male and 14 months for a female. In contrast, the Kemper and Murtaugh study in the *New England Journal of Medicine* (1991) estimated LOS to be 19 months for a male and 26 months for a female. If we use these higher LOS figures, LTC insurance appears to be desirable for all 40-, 55- and 65-year-old females requiring a return on investment of up to 10 percent. Similarly, the Kemper and Murtaugh LOS for males implies that LTC insurance is less desirable than for females, but is still a very good choice for 55-year-old males, and even a good choice for those males with a required return of less than 5.8 percent.

The NPV analysis does not take risk aversion into account. For example, if one chooses the more conservative

LOS figures from the NNHS, one may conclude from panel A of Table 3 that LTC insurance is marginally desirable for a cautious 55-year-old (because the break-even return is 4.4 percent). But even an aggressive investor might consider a 4.4 percent expected NPV on the policy to be desirable because, for a relatively small annual premium, it insures against the cost of nursing home care of up to \$240,000 (plus 5 percent annual COLA) should the person need to stay five years. Kemper and Murtaugh estimated that 55 percent of individuals who need nursing home care will be there for at least one year, of which 21 percent will stay five years or more. This statistic is even more dramatic when applied to females, who live longer and are more likely to enter nursing homes during their lives. Kemper and Murtaugh estimated that 60 percent of women who enter a nursing home will stay more than one year, of which 25 percent will stay more than five years. A risk-averse investor should be willing to forgo some income in order to protect against such a probability of high costs.

Also, one should note that this analysis is done before taxes. The federal government and some states may allow deduction of LTC insurance premiums from taxable income, but we have not reflected this in our figures, as the treatment varies. In general, we would expect an after-tax comparison to show LTC insurance in a more favorable light.

Further investigation with the next NNHS dataset would be warranted, as would a series of prices of similar contracts over the past five years (to help determine pricing trends not included in calculations). But at this point, it appears that LTC contracts are clearly desirable for women, and more so than for men (see Table 6 for the effect of 2006 premiums on net present values). Furthermore, it appears that the insurance is not desirable for older men (age 65) at any of the three levels of investment return.

## Endnote

1. For a theoretical understanding of risk aversion and its use in finance, see Huang and Litzenberger, *Foundations for Financial Economics*, North-Holland, 1988, p. 17.

## References

- Dionne, G. and L. Eeckhoudt. 1985. "Self-Insurance, Self-Protection and Increased Risk Aversion." *Economic Letters* 17, 9–42.
- Ehrlich, Isaac and Gary S. Becker. 1972. "Market Insurance, Self-Insurance, and Self-Protection." *Journal of Political Economy* 80 (July/August): 623.
- Health Policy Institute, Georgetown University, based on data from Centers for Medicare and Medicaid Services, Office of the Actuary, National Health Expenditures Tables 2003. Available at <http://cms.hhs.gov/statistics/nhe/historical/>. Accessed April 22, 2003. B.
- Burwell, S. Eiken, and S. Sredl. "Medicaid Long-Term Care Expenditures in FY2001 "(Cambridge, MA: The MEDSTAT Group, May 10, 2002, memorandum).
- Kemper, P. and C. M. Murtaugh. 1991. "Lifetime Use of Nursing Home Care." *The New England Journal of Medicine* 324, 9 (February 28): 595–600.
- McGuire, Martin, John Pratt, and Richard Zeckhauser. 1991. "Paying to Improve Your Chances: Gambling or Insurance?" *Journal of Risk and Uncertainty* 4: 329–330.
- National Center for Health Statistics. 1999. National Nursing Home Survey, National Health Care Survey (Long-Term Care component). Centers for Disease Control (CDC). U.S. government.
- Rubin, Claire B. "Emerging Management in the 21st Century." 2000. Working Paper #104, Boulder, CO, Natural

Hazards Research and Applications Information Center, University of Colorado. <http://www.colorado.edu/hazards/wp/wp104/wp104.html>.