

Chicago Fed Letter

The risks of pricing new insurance products: The case of long-term care

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This article examines what happens when incorrect assumptions are made in pricing new insurance products. The focus is on the mispricing of long-term care (LTC) insurance—which led to the insolvency of Penn Treaty.¹

People often rely on insurance policies to provide support for themselves or their families when things go wrong. Insurance companies manage risks by setting prices (premiums) and investing in assets to ensure their policyholders can be paid when claims are made in the future. Typically, insurers form expectations about the costs of providing insurance coverage by estimating the likelihood of events and policyholder behavior using large amounts of historical data. However, when insurers want to price new products, they must make assumptions about the expected future costs of providing coverage based on the past performance of other (hopefully similar) products. This is why pricing a new product is inherently risky, especially if the product covers events far in the future. If an insurer sets prices too high, it will not be able to sell many policies. However, if the insurer sets prices too low or if its investment assets perform poorly, it may not have the funds to fully pay its policyholders when claims are made.

Underpricing a new product was the major cause of the insolvency of Penn Treaty. Penn Treaty, at the time the tenth-largest LTC insurer,² was placed into rehabilitation (the first stage of the receivership process for insurers) in January 2009.³ When an insurer is in rehabilitation, it continues to operate,

Long-term care insurance was particularly susceptible to incorrect forecasting assumptions because it was a relatively new product.

collecting premiums and paying claims. This can put policyholders in a bind. When Penn Treaty went into rehabilitation, its LTC policyholders were faced with two choices. First, they could terminate their policies, thereby losing the value of prefunding from the premiums already paid (discussed in more

detail later). Terminating their policies would also leave them uninsured. And replacement policies would most likely cost more. Alternatively, they could keep paying premiums in the hope that the insurer emerged from rehabilitation healthy or was acquired (either option could involve large premium increases). However, if policyholders continued paying premiums and rehabilitation failed, the insurer might be liquidated and they might get only a fraction of the amount owed from the assets remaining plus any payments from state guaranty funds.

Penn Treaty's assets were substantially depleted, and it ended up being ordered to liquidate in March 2017. During the eight-year rehabilitation period, many policyholders' claims were paid at their contracted rates. However, other policyholders, who were not yet disabled when the liquidation

process began, lost out because the insurer did not have money left to pay them and state guaranty funds have caps on the payout per policy.⁴

Penn Treaty failed because it used assumptions that turned out to be incorrect to price LTC insurance. LTC insurance was particularly susceptible to incorrect forecasting assumptions because it was a relatively new product, with limited actuarial data and with potential payments occurring as many as 50 years in the future.

In this *Chicago Fed Letter*, we look at what happens when assumptions made in pricing a new insurance product turn out to be incorrect. We first describe LTC and LTC insurance. Next we discuss what went wrong with LTC insurance, with a focus on the insolvency of Penn Treaty. We also examine the extent to which state guaranty funds mitigate policyholder losses. We then offer some concluding comments.

What is long-term care?

People need long-term care when they are disabled and unable to take care of themselves. Their disability may be a cognitive impairment, such as dementia (for which Alzheimer's is the predominant cause); other disabilities include those arising from stroke, arthritis, circulatory disease, and cancer.⁵ LTC includes assistance with activities such as bathing, dressing, and preparing and eating meals. As the name suggests, LTC is needed for an extended period of time. LTC services are generally provided in a nursing home or assisted living facility; increasingly, they are provided in one's own home. The need for LTC has increased as people live longer and the U.S. population ages.

In the U.S., the bulk of LTC costs (72%) are funded by Medicaid and other public programs.⁶ But people have to spend down or otherwise forfeit assets before they are covered by public programs. Protecting assets is thus a primary reason why people buy LTC insurance.⁷ LTC insurance (which covers 8% of LTC costs) also gives people the flexibility to choose better care facilities and a wider set of LTC solutions than Medicaid offers.⁸ A significant proportion of LTC costs (19%) are also funded out of pocket, generally by those who can afford the costs.

How does LTC insurance work?

LTC insurance reimburses care costs subject to limits. Limits include features such as an "elimination period," which is the number of weeks for which the policyholder must pay for care before insurance kicks in. A policy will state the maximum amount a person will receive per day while that individual is disabled and whether these payments include inflation protection. It will also specify a benefit period, which is a limit on how long payments will continue.

LTC insurance is prefunded. Prefunding means that premiums paid to insurance companies in the early years—while policyholders are still relatively young and healthy—are above the amount needed to pay for LTC costs in those years. So, in effect, premiums paid early help fund the cost of benefits received in the future. The amount of this transfer across time depends on the investment returns insurers receive on the payments by young LTC policyholders.

An insurer has the right to raise premiums of LTC insurance policies (subject to regulatory approval); and in some cases, the insurer will offer policyholders benefit reductions in lieu of premium hikes. LTC insurance policies are illiquid because they have no cash surrender value. LTC policies also do not typically provide death benefits.

How do insurers price LTC insurance?

Insurance companies need to make many assumptions in order to determine how much to charge for LTC insurance. For LTC insurance, one key assumption is the *lapse rate*, or the frequency at

1. Assumptions relevant to long-term care (LTC) insurance pricing

Type of assumption	Explanation	What happened?
Lapse	Policyholder voluntarily stops paying premiums	Lapses lower than expected
Mortality	Death either before or during receipt of LTC benefits	Mortality lower than expected
Interest rates	Premiums invested and accumulate interest	Interest rates have been low since the 2008 financial crisis
Claim incidence	Likelihood that a policyholder will require LTC	Claim costs significantly higher than expected
Benefit utilization	What percentage of the daily limit does the insured use while receiving LTC	Claim costs significantly higher than expected
Claim termination	Likelihood of recovery for a policyholder already receiving LTC benefits	Claim costs significantly higher than expected

NOTE: For graphs and tables comparing the numerical values of these assumptions, see Erik J. Bass, Seth Tennant, and Matthew Coad, 2016, "Long term care insurance: The ugly, the bad, and the potentially good," Deep Dive | Equities, Citi Research, June.

which policyholders voluntarily discontinue their policies while they are still healthy. As we mentioned, LTC insurance is significantly prefunded. This feature, combined with the lack of surrender value, means LTC policyholders who let their policies lapse or who die early reduce the cost for those who continue on with their policies.

LTC insurers must also make assumptions about the likelihood of a policyholder needing LTC—such as the probability that someone will become disabled and require LTC and how much money that individual will use while in care relative to the policy limit. Assumptions must also be made about how long a person will require care, which in turn involves assumptions about whether the individual will get better or die. Insurers base these assumptions on some combination of their own experience and the broader insurance industry's experience.

Because LTC claim payments can be made many years in the future, interest rate assumptions are used to derive the present value of claims, as well as that of premiums paid to fund these claims. Insurers typically use the rates of interest they expect to earn on assets they own (or plan to invest in) to derive the interest rate assumptions. When possible, insurers seek to buy assets to match the expected timing of liability payments. However, it is hard to find bonds with long-enough maturities to match payments for very long-term liabilities, such as LTC insurance policies.

Which of the LTC insurance pricing assumptions wound up missing the mark?

Many of the pricing assumptions LTC insurers made were off—and off in the wrong direction, which means that LTC insurance was underpriced. One reason for this was that LTC insurance was a relatively new product and, therefore, insurance companies did not have sufficient experience on which to base their assumptions.⁹ This led many companies to use their experience with other products to price LTC insurance. In addition, companies arguably used less margin of safety than prudent, given the paucity of data on which to base their assumptions about how LTC insurance would perform. We now discuss some of the issues with the assumptions made by insurers. These are summarized in figure 1.

2. Penn Treaty: Key financial data

	2008	2016
Assets	1.1	0.5
Liabilities	1.3	4.5
Capital	-0.2	-4.0
Policyholders	117,000	76,000

NOTE: All values except those in the final row are in billions of dollars.

SOURCES: Authors' calculations based on data from S&P Global Market Intelligence; and Pennsylvania Insurance Department, 2017, insurance commissioner's statement, Harrisburg, PA, March 1, available online, http://www.insurance.pa.gov/Regulations/LiquidationRehab/Documents/Penn%20Treaty/PENN_TREATY_MARCH_1_2017_INSURANCE_COMMISSIONER_STATEMENT.pdf.

Lapse-rate assumptions for LTC insurance—which were mostly based on the history of lapses on annuities—turned out to be too high.¹⁰ As discussed previously, LTC insurance is a “lapse-supported” product. Insurers expected a decent percentage of policyholders to discontinue their policies early without making any claims. It was anticipated that the premiums collected from exiting policyholders would subsidize those remaining as well as provide a source of profit for the insurers. The expected “lapse support” did not materialize.

Morbidity (claim incidence, benefit utilization, and claim termination) and mortality assumptions were based on general population data or on non-LTC insurance data. People choosing

private insurance can have different characteristics than the general population.¹¹

LTC insurance was priced with the expectation that future premiums could be invested at the then-prevailing interest rates before they were used to pay claims. This assumption turned out to be too optimistic given the low-rate environment that has existed since the most recent financial crisis.

As we mentioned before, life insurers have difficulty buying assets with maturities long enough to match liabilities whose payments extend many years into the future (such as LTC policies). This situation was exacerbated when the maturity of liabilities was longer than originally assumed on account of low lapse and mortality rates. The result was that assets matured sooner than liabilities and had to be reinvested at significantly lower interest rates than were needed to fund those liabilities.

The Penn Treaty insolvency

Penn Treaty was a relatively small insurer, with about 117,000 (mostly LTC) policyholders and \$1.1 billion in assets when it became impaired in 2008 (see figure 2).¹² However, it will likely end up as the second-largest insolvency in insurance guaranty fund history (the largest for an accident and health insurer); it is estimated that guaranty funds (discussed further in the next section) will need to assess surviving insurance companies \$2.3 billion to cover the guaranteed portion of Penn Treaty obligations.¹³

A.M. Best, an insurance credit rating firm, described Penn Treaty's failure as follows: “Policyholders were living longer than expected, medical-related expenses were higher than anticipated, and lapse assumptions were much lower than estimated during initial pricing of the product.”¹⁴ Being wrong about assumptions like Penn Treaty was can lead to substantial losses. However, it can take a long time before data become available to show that actual experience is not aligning with what was assumed at the time of pricing. The Penn Treaty insolvency provides an example of this. As Penn Treaty realized that its policies written earlier had been underpriced, it revised its assumptions about policy outcomes. This had the effect of increasing its liabilities. Furthermore, total liabilities increased despite a decline in the number of policyholders. By the time Penn Treaty was ordered to liquidate, it was estimated that liabilities exceeded assets by \$4 billion (see figure 2). In the press release announcing the liquidation of Penn Treaty, the Pennsylvania Insurance Department indicated that premium increases of 300% on average would have been required to rehabilitate the main company and its subsidiary (see note 1); rate increases of this scale, as noted in the release, would “severely harm policyholders and would not be permitted by state regulators, leaving no alternative other than to place the companies into liquidation.”¹⁵

Guaranty funds

The Penn Treaty insolvency also highlights issues with the insurance guaranty system. Guaranty funds are state-based mechanisms to make whole (subject to a cap) policyholders who would otherwise suffer losses due to an insurer's insolvency. Losses are funded after the fact by levies (assessments) on remaining insurers. Guaranty funds do not kick in until an insurer is liquidated. Rehabilitation and liquidation require court approval; with hearings and appeals, the process can be slow. Legal fees and consultant costs during a long receivership process can dissipate assets that could otherwise be used to pay policyholders.

Despite being placed in rehabilitation in early 2009, Penn Treaty was not approved for liquidation by the Pennsylvania Commonwealth Court until March 2017. The process was slowed down by actions taken by other health insurers—which would be among those assessed to cover payments by the guaranty fund, even if they did not write LTC policies; it was also hindered by litigation by insurance agents who continued to receive sales commissions as long as Penn Treaty was not liquidated.¹⁶ As a result, Penn Treaty stayed in rehabilitation, meaning it continued to collect premiums and pay claims (and commissions). But by 2017 Penn Treaty's assets were substantially depleted, providing the impetus to finally liquidate.

Many Penn Treaty policyholders' claims are likely to be larger than guaranty fund limits, so policyholders will suffer losses on their investments. Policyholders will receive varying amounts of coverage from guaranty funds depending on where they resided when the liquidation process for Penn Treaty began. While the typical limit is \$300,000,¹⁷ coverage varies by state and not all policy features may be eligible for coverage. It is estimated that half of all policyholders will have claims in excess of what will be covered by guaranty associations.¹⁸

What were the consequences?

Penn Treaty was not the only insurer that was hurt by incorrect assumptions in pricing LTC policies. However, unlike larger, more diversified insurers, Penn Treaty sold almost exclusively LTC insurance, and the consequences for it were far more severe than for most other LTC insurance sellers.

While the Penn Treaty failure stands out, large insurers CNA (in 2003), MetLife (in 2010), Prudential and Unum (both in 2012), and John Hancock (in 2017) all mothballed their LTC business because of losses.¹⁹ Genworth is now the largest seller of LTC insurance and the only major insurer for whom LTC insurance is a predominant line of business. However, Genworth sustained losses for several years; and in 2016, in order to raise capital, Genworth agreed to be sold to a private buyer.²⁰

As a result, at a time when there is a greater need for LTC insurance due to the aging of the population, the product is less available and is more expensive—as the insurers that still offer it base prices on the experience of prior policies. LTC insurance sales have dropped consistently from 608,000 in 2000 to 104,000 in 2015.²¹ Over the same span, the average annual premium has increased from about \$1,700 to about \$2,700.²²

Concluding comments

One potential risk insurance policyholders face is that their insurer will become insolvent. This risk may be higher when the insurer is selling long-time-horizon products with little historical data on the performance of the products. For many insurers that wrote LTC insurance, initial assumptions about investment returns, mortality, morbidity, and policyholder behavior that turned out to be incorrect wound up hurting their profitability, and for some, their viability. Consumers should consider both price and capital strength when purchasing such products. Finally, policyholders should be aware that guaranty funds may not always make them whole should an insurer fail.

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- ¹ Penn Treaty refers to both Penn Treaty Network America Insurance Company and its subsidiary, American Network Insurance Company (both were placed into rehabilitation in 2009 and were ordered in 2017 to be liquidated).
- ² This is based on 2008 individual LTC insurance premium data from S&P Global Market Intelligence (formerly SNL Financial).
- ³ Available online, <https://www.nolhga.com/companies/public/main.cfm/NAICCode/63282>.
- ⁴ Further details are available online, <https://www.nytimes.com/2017/04/01/business/policyholders-in-limbo-after-rare-failure-of-insurer.html>.
- ⁵ Society of Actuaries, 2011, *Long-Term Care Experience Committee Intercompany Study Report 6: 1984–2007*, Schaumburg, IL, June, available online, <https://www.soa.org/experience-studies/2011/research-ltc-study-1984-report/>.
- ⁶ The percentage breakdown of LTC funding in this paragraph is as of 2013, as reported in Erica L. Reaves and MaryBeth Musumeci, 2015, “Medicaid and long-term services and supports: A primer,” Kaiser Family Foundation, Kaiser Commission on Medicaid and the Uninsured, report, December, available online, <https://www.kff.org/medicaid/report/medicaid-and-long-term-services-and-supports-a-primer/>. The percentages do not add up to 100% because of rounding.
- ⁷ LifePlans Inc., 2017, *Who Buys Long-Term Care Insurance? Twenty-Five Years of Study of Buyers and Non-Buyers in 2015–2016*, report prepared for America’s Health Insurance Plans, Waltham, MA, and Washington, DC, January, available online, https://www.ahip.org/wp-content/uploads/2017/01/LifePlans_LTC_2016_1.5.17.pdf.
- ⁸ For example, there is considerable variation by state in how home care is covered under Medicaid.
- ⁹ Comprehensive LTC insurance (which includes home care) did not become predominant until the mid-1990s (LifePlans Inc., 2017, pp. 21–22). Because of the long time horizon for benefit payments, it took a while for insurers to learn that things were going poorly. For example, the amount of data on benefit payments increased 16-fold from 2000 to 2014; more details are available online, <https://oversight.house.gov/wp-content/uploads/2016/11/2016-11-30-AAA-Kastrup-Testimony.pdf>. It took until the late 2000s for insurers to accumulate enough information to conclude that their pricing assumptions were incorrect.
- ¹⁰ Robert Eaton, 2016, “Long-term care insurance: The SOA Pricing Project,” Society of Actuaries, report, November, available online, <https://www.soa.org/Files/Sections/ltc-pricing-project.pdf>.
- ¹¹ In addition, as explained by the American Academy of Actuaries in a statement to Congress, “Not only did the insured population behave differently than the general population, but improvements in medical diagnostic practices and services, and a large increase in the use of assisted living facilities, helped increase (1) the number of individuals surviving to ages where the levels of disability are higher, leading to higher claim rates per insured; and (2) the survival time following the onset of disability.” The full statement is available online, <https://oversight.house.gov/wp-content/uploads/2016/11/2016-11-30-AAA-Kastrup-Testimony.pdf>.
- ¹² Penn Treaty’s financial difficulties became clear when its reinsurer, in effect, terminated their reinsurance treaty in 2008. Reinsurance is insurance for insurance companies. A second insurer will (re)insure another insurer’s liabilities. Penn Treaty had to recognize that its liabilities were underpriced when, upon termination of the reinsurance agreement, it was forced to bring the liabilities back on to its own balance sheet. More details are available online, <https://www.nytimes.com/2017/04/01/business/policyholders-in-limbo-after-rare-failure-of-insurer.html>.
- ¹³ National Organization of Life & Health Insurance Guaranty Associations (NOLHGA), 2016 insolvency cost data, available online, <https://www.nolhga.com/resource/file/costs/insolvdata16.xlsx>.
- ¹⁴ A.M. Best, 2016, “Penn Treaty liquidation presents potential shock to the health marketplace,” special report, Oldwick, NJ, December 1, available online by subscription, http://www3.ambest.com/ambv/sales/bwpurchase.aspx?record_code=256386.
- ¹⁵ Available online, <http://www.media.pa.gov/Pages/Insurance-Details.aspx?newsid=228>.
- ¹⁶ Available online, <https://www.nytimes.com/2017/04/01/business/policyholders-in-limbo-after-rare-failure-of-insurer.html>.
- ¹⁷ At an average cost of \$205 per day (in 2010) for a semi-private room, the \$300,000 limit would buy four years in a nursing home (less if a private room was used), according to our calculations. One estimate was that in 2010, the average length of a long-term nursing home stay was about three years. The average daily cost for a semi-private room and the average length of stay in 2010 are from R. Anton Braun, Karen A. Kopecky, and Tatyana Koreshkova, 2017, “Old, frail, and uninsured: Accounting for puzzles in the U.S. long-term care insurance market,” Federal Reserve Bank of Atlanta,

working paper, No. 2017-3b, revised July 2017, available online, <https://www.frbatlanta.org/-/media/documents/research/publications/wp/2017/03b-old-frail-and-uninsured-accounting-for-puzzles-in-the-us-long-term-care-insurance-market-2017-07-10.pdf>.

¹⁸Available online, <http://www.media.pa.gov/Pages/Insurance-Details.aspx?newsid=228>.

¹⁹Bass, Tennant, and Coad (2016)—see the note to figure 1; and Greg Iacurci, 2016, “John Hancock ceases sales of traditional long-term-care insurance policies,” *InvestmentNews*, November 10, available online, <http://www.investmentnews.com/article/20161110/FREE/161119991/john-hancock-ceases-sales-of-traditional-long-term-care-insurance>.

²⁰As of this writing, Genworth and China Oceanwide have extended the acquisition deadline to July 2018 to provide additional time for regulatory reviews. Further details are available online, <https://www.prnewswire.com/news-releases/genworth-and-oceanwide-extend-merger-agreement-300620255.html>.

²¹Data from LIMRA surveys.

²²LifePlans Inc. (2017, table 4, p. 22).

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