Enticing Low Risks into the Health Insurance Pool: Tontines for the Invincibles and Other Ideas from Insurance History and Behavioral Economics

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ABSTRACT

Over one third of the uninsured adults in the U.S. below retirement age are between 19 and 29 years old. Young adults, especially men, often go without insurance, even when buying it is mandatory and sometimes even when it is a low cost employment benefit. This paper proposes a new form of health insurance targeted at this group—the "Young Invincibles"—those who (wrongly) believe that they don't need health insurance because they won't get sick. Our proposal offers a cash bonus to those who turn out to be right in their belief that they did not really need health insurance. The concept comes from the tontine life insurance that fueled the rise of the U.S. insurance industry in the late 19th Century. A largely forgotten casualty of the 1906 pacification of the life insurance industry, the tontine idea holds great promise for making health insurance attractive to the invincibles today. The tontine feature frames the health insurance purchase as a smart investment, rather than a way to spend money for something the customer does not think he needs. Tontines make insurance more attractive to the uninsured, without wasting funds by subsidizing those who are already covered. We identify a particular class of individuals (the invincibles), show how a specific cognitive bias accounts for their irrational behavior, and design an insurance mechanism (tontines or deferred dividends) to overcome the effects of this bias. The final sections of the paper offer an empirically calibrated pricing demonstration for a tontine health policy and an analysis of the legality of tontines in this context.

Note: Our paper was written for a legal audience, and hence is longer and more didactic than is traditional for work in economics. We apologize for the length, and for explaining what will be obvious to many sophisticated readers.

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They're young and healthy, and insurance is expensive. As long as they don't … slip on the ice, crash a bike, snowboard into a tree, rupture an appendix, or get hit by a bus, everything will be fine. Right?[3]

Over a third of all uninsured adults below retirement age in the U.S. are between 19 and 29 years old.[4] When young adults, especially men, age out of the dependent care coverage provided by their parents' employment benefits or public health insurance, they often go without, even when buying insurance is mandatory and sometimes even when that insurance is a low cost employment benefit.[5] In the health policy arena, these are the "young invincibles" who are not reached by ordinary health insurance. Young adults grow older, and most of them eventually join the health insurance pool.[6] But some of them face serious medical needs during that uninsured period, and their lack of insurance for those needs imposes costs on others in society, not to mention the consequences for the young adults themselves. [7]

Healthcare policymakers have suggested a number of ways to keep young adults in the health insurance pool. Most obviously, a universal health insurance program would achieve this objective. Other more targeted, incremental approaches include requiring employers to increase the maximum age of children who may be covered under their parent's health care benefits and increasing the maximum age for participation in state-based public insurance programs.[8] All of these are costly, and involve some an element of coercion.

Instead of forcing them to buy something they do not value, or making others subsidize that purchase, we suggest designing a product that the "young invcibles" would be willing pay for. "One size fits all" only rarely satisfies consumers who have choices. Insurance history and behavioral decision research suggest that insurance is no different than other consumer products or services in this regard. Different people have different preferences for insurance. Designing new insurance products to meet insurance-resistant young people's preferences – especially when those preferences do not meet with

[3] David Amsden, *The Young Invincibles*, New York Magazine (March 26, 2007). See also Cara Buckley, *For Uninsured Young Adults, Do-It-Yourself Health Care*, New York Times A1 (February 17, 2009).

[4] Jennifer L. Kriss, et al, "Rite of Passage? Why Young Adults Become Uninsured and How New Policies Can Help" Commonwealth Fund (2008) at p. 2 (reporting that 29% of non-elderly uninsured are from 19 to 29; using their data we compute that 37% of the uninsured non-elderly *adults* are from 19 to 29).

[5] Sally H. Adams, Paul W. Newacheck, M. Jane Park, Clarie D. Brindis and Charles E. Irwin, Jr., "Health Insurance Across Vunerable Ages: Patterns and Disparities from Adolescence to the Early 30s, 119 Pediatrics e1033-e1039 (2007); S. Todd Callahan and William O. Cooper , "Uninsurance and Health Care Access Among Young Adults in the United States, 116 Pediatrics 88-95 (2005); S. Todd Callahan and William O. Cooper, Gender and Uninsurance Among Young Adults in the United States, 113 Pediatrics 291097 (2004). For evidence that Massachusetts' health insurance mandate has reduced the incidence of uninsurance among young adults (at the cost of some coercion), but has left a significant fraction still uninsured, see Commonwealth Connector, Young and Uninsured (presentation to Academy Health National Policy Conference, February 4, 2008).

[6] See Adams et al, supra note 3.

[7] See, e.g., S. Todd Callahan and William O. Cooper, "Access to Health Care for Young Adults With Disabling Chronic Conditions," 160 Arch. Pediatric Adolesc. Med (2006); we discuss the welfare consequences of uninsurance, and the case for reducing it, *infra*.

[8] Karyn Schwartz and Tanya Schwartz, "Uninsured Young Adults: A Profile and Overview of Coverage Options, (Kaiser Comm. 2008); Jennifer L. Kriss, et al, "Rite of Passage? Why Young Adults Become Uninsured and How New Policies Can Help" Commonwealth Fund (2008)

their elders' approval – offers a potentially promising new way to entice low risks into the health insurance pool.

To this end, we offer tontines for the Invincibles—health insurance that pays a cash bonus to those who turn out to be right in their belief that they did not really need health insurance. The simplest arrangement would award the bonus to those who did not consume more than a threshold value of medical care during a three year period, potentially excluding preventive care. We discuss more complicated arrangements below.

The tontine concept comes from the tontine life insurance that fueled the rise of the U.S. insurance industry in the late 19th Century. Tontine life insurance paid a deferred dividend to policyholders who survived and faithfully paid their insurance premiums for a defined period, usually 20 years. The amount of the dividend depended on how many people were left in the insurance pool when the dividend was paid. [9] A largely forgotten casualty of the 1906 pacification of the life insurance industry, the tontine idea holds great promise for making health insurance attractive to the invincibles today. Ironically, late 19th century insurers seem to have understood some things about human nature that were largely forgotten over the intervening 100 years, only to be rediscovered more recently under the rubric of behavioral economics.

There are of course many reasons why everyone should buy life, health, and many other kinds of insurance.[10] But those reasons appeal to rational, prudent people and, especially to the *homo economicus* who populates traditional economic analysis. Insurance-resistant young adults belong to another tribe, at least when it comes to health insurance. They are "Humans," not "Econs," in Richard Thaler and Cass Sunstein's evocative terms; like other Humans, the invincibles predictably err in ways that we can understand and plan for.[11] Like other forms of choice architecture, our health insurance idea is a "nudge," a menu changing strategy that may help Humans make wise choices.

Tontine health insurance would differ from ordinary health insurance or managed care in one main respect. Ordinary health insurance provides a tangible benefit only when you need health care. Tontine insurance would provide a tangible benefit even if you do not. We emphasize *tangible* benefits because the intangible peace of mind that insurance provides is demonstrably not enough to induce the young invincibles to insure. A tontine health insurance policy would pay them a cash benefit when they don't use their health insurance, as well as covering their medical expenses when they do.

The tontine feature frames the health insurance purchase as a smart investment, rather than a way to spend money for something the customer doesn't think he needs. Indeed, the tontine feature provides something close to the holy grail of health policy planners: making insurance more attractive to the uninsured, without "wasting" funds by subsidizing those who are *already* covered. Tontines are like a special net that allows most already insured dolphins to swim through its mesh but catches the

[9] Henry William Manly, *On the American Tontine and Mutual Assessment Societies,* 26 J. Institute of Actuaries 182 (1887)

[10] See, e.g., Arrow key article on insurance

[11] See Richard H. Thaler and Cass R. Sunstein, NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS 7 (2008) (contrasting "Econs" and "Humans").

uninsured tuna, to borrow a metaphor from Jonathan Gruber.[12] Adding a tontine will not motivate an ordinary, risk averse consumer who will already have insurance, but it will provide an incentive for precisely those invincibles who think they face the least risk and, thus, believe they are most likely to get the bonus.

A growing body of work uses behavioral insights to explain insurance demand. An early example is Eisner and Strotz's paper detailing the irrationality of flight insurance, which should not have appealed to a rational consumer, yet was widely purchased.[13] Johnson et al used experimental and anecdotal evidence to show that people are willing to pay more for separate policies covering two risks individually than for a single policy covering of both of them together (presumably because the separate events are more vivid).[14]

In recent work, Kunreuther and Pauly offer an extended taxonomy of anomalies in insurance decision-making on both the demand and supply side of the market, including consumers' preference for insurance policies that offer premium rebates, a concept that is similar to our tontine idea.[15] Their trenchant suggestions for policy include the redesign of insurance coverage to make it more attractive to those who "mistakenly" choose not to purchase it. Our work is also in the spirit of recent papers in the behavioral economics of health and health insurance. We share the conclusion of Jeffrey Liebman and Richard Zeckhauser[16] and Richard G. Frank, [17] that decisions regarding health insurance and health care are precisely the kinds of choices that are likely to be made badly, and that insights from behavioral economics can be used to justify several aspects of institutional design in this area.

The idea that an overly optimistic assessment of risk stands as an obstacle to effective demand for health insurance is by now quite standard.[18] Our contribution is to identify a particular class of individuals (the "young invincibles") subject to this bias, and to design a novel insurance mechanism (tontines or deferred dividends) to overcome its effects. In addition we identify the potential use of

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[12] Jonathan Gruber, *Covering the Uninsured in the United States*, 46 J. Econ. Lit. 571 (2008).

[13] Robert Eisner and Robert H. Strotz, *Flight Insurance and the Theory of Choice*, 69 J. POLITICAL ECONOMY 355 (1961). Flight insurance remains far more common than insurance economists believe. It has become less visible because the airport kiosks of a previous generation have been replaced by automatic flight insurance arrangements sold through credit cards. See Aviation Data v. American Express Travel Related Services Co., Inc., 62 Cal. Rptr. 3d 396 (Cal. App. 1st Dist. 2007) (describing flight and baggage insurance program in the context of a consumer class action).

[14] Eric J. Johnson, *et al*, *Framing, Probability Distortions, and Insurance Decisions*, 7 J. RISK & UNCTY 35 (1993)

[15] Howard Kunreuther & Mark Pauly, *Insurance Decision-Making and Market Behavior*, 1 FOUNDATIONS AND TRENDS IN MICROECONOMICS 63 (2006). See also, David M. Cutler & Richard Zeckhauser, *Extending the Theory to Meet the Practice of Insurance*, Ch. 1, in Robert E. Litan and Richard Herring, eds., BROOKINGS-WHARTON PAPERS ON FINANCIAL SERVICES (2004).

[16] Jeffrey Liebman and Richard Zeckhauser, *Simple Humans, Complex Insurance, Subtle Subsidies*, NBER Working Paper 14330 (2008).

[17] Richard G. Frank, *Behavioral Economics and Health* Economics, NBER Working Paper 10881 at 28 (2004)

[18] See, e.g., Peter Diamond, *Organizing the Health Insurance Market*, 60 ECONOMETRICA 1233 (1992). For a recent appraisal of the evidence on optimism bias, see Alvaro Sandroni and Francesco Squintani, *The Overconfidence Problem in Insurance Markets*, ELSE Working Paper No. 2005 – 2 (2004).

deferred dividends to address *ex post* moral hazard in health insurance, although we defer exploration of this topic to future work.

There are some tricky issues to be addressed in designing a tontine health insurance plan: for example we do not want to discourage the invincibles from using their insurance when they need it. Before fully explaining the concept and addressing this and other important issues, however, we first take a trip through life insurance history, back to a time when insurance companies more openly acknowledged that they had to offer a little "spice" to get customers to buy their products.[19] We then set out the details of our proposal, using behavioral decision research to explain the power of the tontine idea and to address some theoretical objections.

A. Tontine Life Insurance

Tontine life insurance emerged in the United States in the mid-19th century and became a resoundingly successful alternative to traditional life insurance.[20] A tontine life insurance policy paid a deferred dividend to policyholders who timely paid their life insurance premiums for a specified period: ten, fifteen or twenty years, depending on the policy that the applicant chose.[21] People who died earlier would receive the stated death benefit, but they would not receive any share of the dividends. With this arrangement, a tontine life insurance policy paid a cash benefit to customers who otherwise might think that they had lost their bet with the insurance company.[22]

Tontine life insurance evolved out of the traditional life insurance sold by mutual life insurance companies. The evolution started with the level premium life insurance policies sold by ordinary, non-mutual life insurance companies. With those policies, the policyholder paid level premiums over the course of the life insurance policy, and the insurance company paid a fixed death benefit whenever the policyholder died.

Mutual life insurance differed from this arrangement in one respect that at first posed an obstacle to marketing. In a mutual insurance company, the owners of the company are the policyholders, with the result that policyholders have claims on the profits of the company. Like other corporate profits, the profits of a mutual company can be distributed as dividends. This can be an

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[19] Historian Timothy Alborn quotes an early 20th century English insurer, discussing the "noble work" of selling life insurance, who suggests that "man is essentially a gambler, and it is in this feeling that he may score off the insurance companies...that induces him to insure." One broker advised that customers who were "fond of excitement" could be induced to buy insurance by a bonus scheme that added "a zest to life compared to which Kaffir Ketchup is insipid." Timothy Alborn, Regulated Lives: Life Insurance and British Society, 1800-1914, at 310 (U. Toronto P. forthcoming 2009). (The reference here is to Kaffir Limes, the leaves of which are used to spice food in Asian cooking.)

[20] See Sharon Ann Murphy, "Life Insurance in the United States Through World War I, ehnet/encyclopedia/article/Murphy.life.insurance.us ("Estimates indicate that approximately two thirds of all life insurance policies in force in 1905 – at the height of the industry's power – were deferred dividend plans.")

[21] See Manly, supra note 7

[22] Alborn, *supra* note 18 at X (reporting that in 1891 "the *Bankers' Magazine* attributed [the] popularity [of tontine life insurance] to 'the element in human nature which disposes every individual to regard his own chances of life favourably'")

obstacle to marketing mutual life insurance, because the right to dividends complicates the calculation of the policyholders' *net* payments to the insurance company.

Before the advent of tontine policies, mutual companies addressed this complication by distributing the dividends every year as credits against the premiums due that year. This arrangement allowed mutual life insurance salesmen to collapse the insurance premium and the policyholder dividend into a single number when pitching their policies. Although the precise amount of the dividend was not contractually specified, mutual companies strove to declare consistent dividends so that their agents could reliably tell prospective purchasers what the net premiums would be. Mutual life insurance agents do the same thing today. The agents used the mutual status of the company in the sales process, if at all, only to argue that mutual life insurance was cheaper than the competition because there were no shareholders who had a claim on the company's profits.

Sheppard Homans, "the most prominent actuary in the country" in the mid 19th century, recognized the explosive sales potential that lay in exploiting, rather than obscuring, the dividend.[23] He saw that the dividend could be cut loose from the premium and then deferred to provide an enticing cash bonus for loyal, healthy customers.

A company that deferred the dividends and then distributed them only to policyholders who had faithfully paid their premiums for twenty years would accomplish three very useful things.

First, the company would make its life insurance policy more attractive to men (and it was mostly men buying life insurance) who liked a little spice packaged with an otherwise dull purchase. Second, the company would give its agents an excellent answer to the prospect who objected that he was healthy and did not need life insurance. "No problem," the agent could say, "our deferred dividends mean that you can *back your own life,* and you can't lose. Either you die and your heirs emerge as the winner on your behalf, or you survive and we give you a cash payment at the end of twenty years – and, by the by, no need to let your wife or your creditors know about that little bonus." Third, the company would gain "one of the best solutions to the problem of healthier lives lapsing at a higher rate than unhealthy ones – since 'backing one's life' required the continued payment of premiums."[24] In economic terms, the deferred dividend worked as an anti-adverse selection device. It appealed disproportionately to people who thought that they were low risk, and it kept them in the insurance pool.

These new policies were called "tontine" life insurance policies because of their similarities to an investment scheme developed by Lorenzo Tonti in the 17th century and used by governments into the 18th century to raise money, and to finance private projects well into the 19th century.[25] In the original

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[23] Roger L. Ransom and Richard Sutch, *Tontine Insurance and the Armstrong Investigation: A Case of Stifled Innovation, 1868-1905,* 47 J. Econ. History 379, 380 (1987).

[24] Alborn, supra note – at 427.

[25] See generally Kent McKeever, *A Short History of Tontines* (2008 working paper on file with the authors) (noting that "a tontine was one of the options proposed by Alexander Hamilton as Secretary of the Treasury to reduce the national debt of the United States at the beginning of the Republic"). The serial murder incentives posed by the tontine provided the plot for a story by Robert Louis Stevenson and his stepson Lloyd Osbourne, *The Wrong Box*

tontine, contributors pooled their funds and distributed the interest each year to the surviving members of the pool, with the last living member "taking the whole of the fund."[26] With tontine life insurance, all the members of the pool who faithfully paid their premiums and survived to the end of the predefined period split the fund. The tontine feature distinguished this life insurance product from a similar, but less successful product called endowment life insurance, in which the amount of the deferred dividend was fixed in advance.

Tontine life insurance quickly swept the life insurance field, and the mutual life insurance companies selling tontine policies became the largest financial institutions of the day.[27] At the same time, however, the millions of dollars that the companies accumulated during the deferral of the dividend proved too tempting to some of the managers of the leading firms. The result was a scandal and investigation in 1905 that rocked the life insurance industry more profoundly than anything since.[28] One key result was to outlaw tontine life insurance – not because there was anything wrong with such insurance in theory,[29] but rather because tontines allowed the life companies to amass enormous reserves that led executives to public extravagance and gave them too much influence over the companies whose shares they purchased as investments for the reserves.[30]

In short, tontine life insurance was so successful at vacuuming money out of consumers' pockets and into insurance company funds that states legislatures stamped it out as part of what historian Mark Roe has called the "1906 pacification of the insurance industry." [31] As Roe reports, the Armstrong investigation and resulting legislation "fragmented and pulverized the insurance industry," which had

(1889), which was made into a movie in 1966 (starring Michael Caine, Peter Sellers, and Dudley Moore, among others).

[26] Manly, *supra* note 7 at 183.

[27] See Ransom & Sutch, supra note 22 at 380 (reporting, "[i]t is generally acknowledged that the phenomenal expansion of the U.S. life insurance business over the next thirty years was largely driven by the popularity of tontine policies, helped along, perhaps, by the aggressive marketing techniques of the large firms"); Morton Keller, The Life Insurance Enterprise, 1885-1910 56 (1963) ("Nothing was more fundamental to the business growth of the Big Three, or more evocative of the business values that governed them, than the deferred dividend policy"); Murphy, *supra* note 21.

[28] Mark J. Roe, *Foundations of Corporate Finance: The 1906 Pacification of the Insurance Industry*, 93 Colum. L. Rev. 639, 670 (1993).

[29] See Keller, supra note – at 58 (describing deferred dividend policies as "appropriate . . . to their market and their time").

[30] See Gilbert E. Roe, *The Insurance Investigation*, in Robert Marion La Follette (ed), The Making of America, Vol III at 459, 467, 473-74 (1906) (arguing that the tontine-fueled reserves were "being used as compact money power in the hands of five or six men to control the industries of the country" and urging the prohibition of tontine and related deferred dividend life insurance products); H. Gerald Chapin, *The Armstrong Amendments: A Synopsis of New York's New Insurance Legislation,* 14 American Lawyer 389 (reporting that section 83 of the legislation "requires that every polity issued on or after January 1, 1907, contain a provision 'that the proportion of the surplus accruing upon said policy shall be ascertained and distributed annually and not otherwise").

[31] Roe, *supra* note 27at 670 (focusing largely on the companion legislation prohibiting insurance cmpanies from putting more than a small percentage of their reserves into stock, but observing that the legislation also "restricted the sale of key insurance products, holding back growth"). See also Ransom & Sutch, supra note -- at 380-81 (reporting that the Armstrong investigation led to the prohibition of tontine insurance).

been "on the verge of developing not into the passive institution . . . [it] became, but into an institution that would vaguely resemble the powerful German universal banks or the main bank system in Japan."[32]

It was not until the late 20th century that the life insurance industry was able to reassemble some of the tontine's heady mix of prudence and speculation, in the form of the variable life and annuity insurance products that bundle insurance and investment and dominate the life insurance market today. But the life industry never regained the economic control that tontines helped them to gain in the late 19th century.

For us, the payoff from this history lies in what life insurance tontines teach about the sales potential of insurance that allows people to "back their own lives." [33] Ordinary health insurance, like ordinary life insurance, amounts to a bet against the health of the purchaser, since the insurance pays off handsomely only when something goes seriously wrong. The tontine feature changes that equation and, thus, should be especially enticing to people who think that they would lose the ordinary health insurance bet – the invincibles.

B. Tontine Health Insurance – the Basic Idea

A tontine health insurance policy would pay a deferred dividend to a policyholder who maintains his or her health insurance for a specified period—we suggest three years (an arbitrary number that could easily be changed based on market research). Significantly, the amount of the dividend would depend on the extent to which customers use the health insurance. The young invincibles who, in fact, turned out not to use very much insurance would share the dividend, while those who used more insurance would get their benefits from the policy exclusively in the form of the covered health care they received.

The simplest arrangement would condition eligibility for the dividend on the participant not having consumed an aggregate dollar value of medical care above a threshold amount over the relevant period, perhaps with the cost of preventive care not counting against the threshold (in order to encourage preventive care). More complicated arrangements might require the participants to receive preventive care to be eligible for the dividend and, instead of a single three year period, there might be annual, or even quarterly, periods, each subject to lower thresholds, offering participants the ability to lock in some dividend rights as long as they did not exceed the threshold during these shorter periods. In addition, the program might offer periodic lottery-like prizes to eligible participants to help address the problem of hyperbolic discounting. We will explore some of these design options after we discuss the economics of adding the tontine feature to health insurance.

Tontine health insurance structures the insurance benefits to match the invincibles' assessment of their risk. Like tontine life insurance, tontine health insurance allows people to back their own lives. If they are right about their invincibility, they will get a nice cash dividend. If they are wrong, then they really needed the insurance, and they can hardly complain about not getting their money back.

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[32] Roe, *supra* note 27 at 639.
[33] Alborn, *supra* note xx at --.

In behavioral economic terms, tontine health insurance takes advantage of the optimism bias that appears to be particularly prevalent among the young invincibles.[34] In addition, the tontine feature frames the health insurance purchase as a smart investment, rather than a way to spend money for something that the customer does not really need.[35]

C. The Behavioral Economics of Tontine Health Insurance

To an economist, the idea of using what amounts to a gamble to market health insurance has at least two strikes against it.

First, the very idea of "marketing" insurance—if marketing means more than providing basic information on pricing and coverage—is at odds with standard economic theory. Someone who is rational, risk-averse, and can buy insurance that is actuarially fairly priced,[36] should *always* want to buy it, and should not need additional inducements—a tontine "prize" or anything else—to "sweeten the deal."[37] However, the evidence we review below suggests that there are indeed many millions of Americans who have chosen not to buy health insurance that seems roughly fairly-priced and within their means.[38] This is insurance coverage they "should" want to purchase, according to standard economic theory, but they don't do so. It is this group of potential insureds who are the target of our policy proposal. We will shortly explore the size of this population, the possible explanations for its "insufficient" demand, and the problems that this poses for public policy.

The use of bundled gambles to sell health insurance faces a second objection as well, however: why should bundling tontine prizes provide any inducement at all for someone to buy insurance? Insurance is ordinarily understood to be motivated by risk aversion, while gambling is motivated by risk preference. Since the two phenomena seem inconsistent (at least on standard accounts), people who find insurance attractive should have nothing to gain from adding an uncertain prize to their coverage. Indeed, a risk averse individual should by definition prefer a $1 cash discount on her insurance premium

[34] See *infra*, TAN

[35] Cf., Cheris Shun-Ching Chan *Contested Lives, Contested Practices: Culture and the Making of a Life Insurance Market in China* (Oxford U. P. forthcoming 2010) (describing how local insurance companies gained market share from foreign insurance companies by framing life insurance as an investment)

[36] Actuarially-fair (hereinafter, "fair") insurance is that for which the premium is equal to the expected loss: an insured facing a one percent chance of a $100,000 loss has an expected loss of $0.01\times100,000$ = $1,000. If coverage for that risk costs $1,000, it is fairly priced. Of course, perfectly fair pricing is rarely available, since there are administrative costs to providing insurance, but fair pricing serves as a useful benchmark.

[37] Indeed, one definition of what it *means* to be risk averse is that a risk averse individual will always purchase fair insurance for any loss. Moreover, if the insurance is not fairly-priced, it is not clear whether it would enhance welfare to induce people to buy it. Inducing a risk-preferer to buy insurance through clever marketing tricks would presumptively be welfare-reducing.

[38] We hasten to add that the many people lack health insurance not because they choose not to buy it when they could and rationally "should" do so. Rather, there are supply side problems (such as employers who do not offer insurance to their workers) and other factors that account for a substantial fraction of the uninsured. Our proposal is a modest one, whose goal is only to induce some fraction of the uninsured population to take up insurance at a relatively low marketing cost.

to tontine prize with a $1 expected value.[39] Why, then, do "prizes" involving gambles (such as lottery tickets) seem to be an effective tool for marketing insurance in other countries? Why does the historical record reveal significant "gambling" elements in the marketing of insurance, until such practices were banned in the late 19th and early 20th centuries? And why are probabilistic rewards (such as lottery tickets) an unusually effective motivational device in other contexts besides insurance?

1. Who Lacks Health Insurance, and Why?[40]

47 million Americans did not have health insurance as of 2008. As Jonathan Gruber notes, roughly 32 million of these uninsured persons were in families with incomes below twice the poverty line.[41] These people may be too poor to buy health insurance, and are not the targets of our proposal, although some of them might nevertheless respond positively to it. Our audience is the remaining 15 million uninsured who are not poor or near-poor. Rather than looking at the uninsured by income, we can look by age. One third of the non-elderly uninsured (those less than 65 years old) are between the ages of 18 and 24, and just under one-third are between 19 and 29.[42] Of this group, roughly half have incomes greater than 200 percent of the poverty line. They are the special focus of our proposal. As Figure 1 illustrates, eighty percent of people have insurance at age 18 (presumably through their parents or through Medicaid), and nearly as high a percentage have insurance at age 30, but in the intervening years, the proportion drops to just over 60 percent.

[39] If the insured were *not* risk averse, then they would presumably not find it attractive to purchase insurance, even with the lottery ticket thrown in. But see, John A. Nyman, *The Theory of Demand for Health Insurance* (2003), for an alternative motivation for health insurance, based on access to expensive care, rather than spreading financial risk.

[40] This section draws heavily on a recent and authoritative survey article by Jonathan Gruber, *Covering the Uninsured in the United States*, 46 J. ECON. LIT. 571 (2008). Gruber points out that the number without health insurance at any point in time may be twice as large as the number without insurance over the course of an entire year, suggesting that there is substantial mobility between insured and uninsured status. *Id*. at 576.

[41] Id. at 575. The poverty line for a family of four was $19,307 in 2004. For a single individual under age 65, the poverty line was $9800. See, http://www.census.gov/hhes/www/poverty/threshld/thresh04.html, visited December 16, 2008.

[42] Jennifer L. Kriss, et al, "Rite of Passage? Why Young Adults Become Uninsured and How New Policies Can Help" Commonwealth Fund (2008) at p. 2.

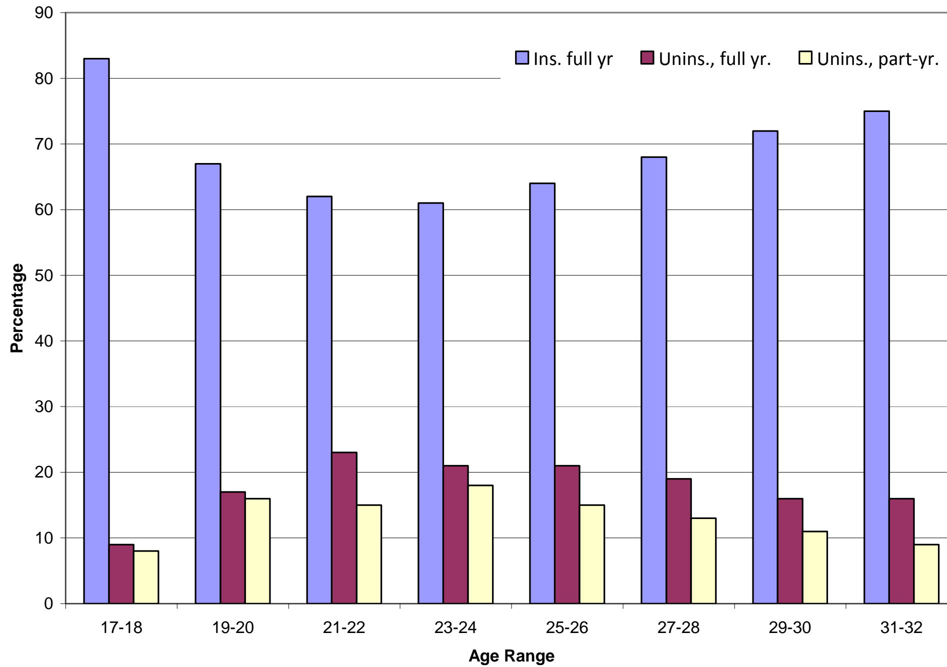

Figure 1: Percentage of Young Adults with and without Health Insurance

Source: Sally H. Adams, et al, *Health Insurance Across Vulnerable Ages: Patterns and Disparities From Adolescence to the Early 30s*, 119 Pediatrics e1033, e1036 (2007) (based on data from 48,800 responses to the National Health Interview Survey).

Gruber points out that surprisingly little is known about why those who can afford it choose to do without insurance,[43] but he considers two major possibilities.

a. Adverse Selection?

Many of the uninsured cannot get insurance from their employer, and much health insurance available on the individual market is quite expensive. A superficially plausible story—albeit one with little supporting evidence[44]—is that individually-purchased health insurance is expensive because of adverse selection. Those who choose to go without health insurance may be (unobservably) healthier than those who do buy it, and therefore find it unattractive to pool with the relatively sick, who require

[43] "[T]here are a variety of hypotheses for why so many individuals are uninsured, but no clear sense that this set of explanations can account for 47 million individuals." Gruber, *supra* at 581.
[44] "There is surprisingly little work on whether those who choose to be insured are adversely selected; the [only] two studies on this topic . . . reach mixed conclusions." *Id*. at 577.

high premiums.[45] On this account, the uninsured make rational comparisons between the cost of insurance and their risk of illness, and when they find that insurance is over-priced (given their risk aversion and a realistic assessment of their own risk of illness), they choose to forego it. The evidence in support of this story is fairly weak, however, and a recent Kaiser Foundation report demonstrates that healthy young adults are actually *more* likely to be insured than their sicker counterparts, which is inconsistent with most adverse selection models.[46]

Moreover, there are low cost health insurance policies marketed to young people that appear quite affordable. For example, Tonik, a health insurance plan marketed explicitly to young people (with a web site featuring "hip" graphics, funky typefaces, and slang) and sold directly to individuals, offers a plan with a $5000 deductible, $20 copays for four in-network office visits per year (which are not subject to the deductible), and some benefits for prescriptions and vision expenses (also not subject to the deductible). The premium for California and Georgia residents is quoted as "as low as $70 per month."[47] That represents an annual premium of $840, only 3.7 percent of the annual income of a single person earning twice the poverty line,[48] and less than the cost of auto insurance in many jurisdictions. Of course, whether Tonik is a good buy depends on one's degree of risk aversion, one's probability and cost of various types of medical treatment, the coverage Tonik provides, and the possibility of alternative (free) care for those whose medical bills exceed their assets. Nevertheless, at least as a first approximation, the existence of such policies suggests that at least some portion of the uninsurance problem for young adults remains unexplained by conventional economics

b**. Behavioral Foibles: The Invincibles**

A second possibility is that the young uninsured may not be making reasonable judgments in the face of excessively high prices, but may instead be reacting irrationally in some fashion. A simple but appealing story is that they underestimate the probability that they will get sick and need health insurance, a kind of optimism bias that has been well-documented in many other contexts. Simply put,

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[45] If the healthy uninsured could credibly convey their health status to their insurers, competition would drive down their premiums. But on this account, they lack any means to distinguish themselves from the sicker people who *do* choose buy insurance, and so they must buy at an actuarially unfavorable rate appropriate for the sicker pool they would have to join.

[46] The study finds that 73 percent of young adults in excellent or very good health have insurance, while only 60 percent of those in worse health do. Karyn Schwartz and Tanya Schwartz, "Uninsured Young Adults: a Profile and Overview of Coverage Options," (June, 2008). This does not seem consistent with an adverse selection story, under which it is the worst risks who should demand the most insurance. The complex relationship between selection and optimism bias is explored by Sandroni and Squintani, *Overconfidence, Insurance and Paternalism*, 97 Amer. Econ. Rev. 1994 (2007). In their model, where some high risk agents have incorrect perceptions of their own riskiness, many of the standard conclusions about selection no longer obtain.

[47] See, https://www.tonik.com/ca/ and https://www.tonik.com/ga/, visited May 17, 2009. The site quotes premiums for similar coverage in the following states as follows: Colorado ($75), Connecticut ($131.05), New Hampshire ($145.13), and Nevada ($103). Note that the average individually-insured 18-29 year old paid monthly premiums of about $120 in 2006-2007. See,
Individual Health Insurance 2006-2007: A Comprehensive Survey of Premiums, Availability and Benefits (2007) at Table 2 (available at http://www.ahipresearch.org/pdfs/Individual_Market_Survey_December_2007.pdf).

[48] See, http://www.census.gov/hhes/www/poverty/threshld/thresh08.html (visited May 19, 2009), listing official 2008 poverty threshold for a single person under 65 with no children as $11,201.

many people tend to have an unfounded belief that bad things will not happen to them. Such a belief, whether mistaken or not, obviously makes insurance less attractive—why pay for coverage for losses that you "know" you won't experience?

Optimism bias can be formally defined as the tendency of individuals to believe that they are less likely to experience negative events (accidents, job loss, poor health) than the average person, and more likely to experience positive events. In an early study, Weinstein found that such a bias was widespread among college students for both positive and negative events.[49] Weinstein also observed that the "perceived controllability" was highly positively correlated with the extent of optimism bias: subjects tended to be more optimistic about events they believed they could control (contracting a venereal disease) than about those they thought were outside of their control (buying a car that turned out to be a lemon).[50]

Other studies suggest an important reason why the young should be especially likely to experience optimism bias—they tend to lack relevant experience with the negative outcomes. As one survey put it,

> Experience matters . . . Drivers who have been hospitalized after a road accident are not as optimistic as drivers who have not had this experience. Similarly, middle-aged and older adults are less optimistic about developing medical conditions than their younger counterparts are, presumably because older persons have had more exposure to health problems and aging. Acutely ill college students (approached at a student health center) perceive themselves to be at greater risk for future health problems than do healthy students, indicating that risk perceptions can be ''debiased'' if the person has a relevant health problem. Acutely ill students, however, continue to be unrealistically optimistic about problems that do not involve physical health.[51]

In health policy circles, the uninsured who choose to go bare in the belief that they will not get sick or be injured have a name—"The Invincibles."[52] Although there is no definitive study of this group, recent NEW YORK magazine and WALL STREET JOURNAL articles are suggestive. The Journal reported that companies trying to market health insurance to young people found that such buyers were often uninterested in plans that offered bare-bones (major medical) coverage for premiums of $50 to $100 a

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[49] Neil D. Weinstein, *Unrealistic Optimism About Future Life Events*, 39 J. PERSONALITY & SOC. PSYCH. 806 (1980). Optimism bias has even been given a possible neurological basis: more-optimistic individuals (as measured by a psychological test) were more likely to "expect positive events to happen closer in the future than negative events, and to experience them with a greater sense of pre-experiencing." Tali Sharot et al*, Neural mechanisms mediating optimism bias*, 450 NATURE 102, 102 (Nov. 1, 2007). In a neuro-imaging study, the parts of the brain that may be used to retrieve memories of past events in constructing representations of the future—in particular the rostral Anterior Cingulate Cortex—were more likely to be activated in positive imaginings (relative to negative ones) in those who scored higher on a measure of psychological optimism. *Id*. at 103.

[50] Weinstein, *supra* at 813, Table 2.

[51] David Dunning, Chip Heath and Jerry M. Suls, *Flawed Self-Assessment: Implications for Health, Education, and the Workplace*, 5 PSYCH. SCI. IN THE PUBLIC INTEREST 69, 80 (2004) (citations omitted).

[52] See, e.g., David Amsden, *The Young Invincibles*, NEW YORK, March 26, 2007, http://nymag.com/news/features/29723/, visited January 19, 2009

month. "What came through loud and clear in focus groups . . . was that people didn't see value in a [catastrophic coverage] plan with just a high deductible," apparently because they viewed such a plan as paying for something they would probably never use.[53]

In order for the invincibles to be victims of optimism bias, they not only have to believe they won't get sick; they must also be wrong in their assessment of their own risk. Apparently, they often are. For example, "[o]ne in five uninsured young adults report that they were unable to get needed care due to cost, . . .[and] 18 percent . . . said they could not afford a prescription" within the past year.[54]

Callahan and Cooper report similar findings based on the National Health Interview Survey, a representative nationwide sample taken between 1998 and 2001. Among respondents aged 19-24, even after controlling for income, race, and gender, "the uninsured remained at significantly higher risk for reporting delayed or missed medical care, not filling a prescription because of cost, having no contact with a health professional, and having no usual source of health care, relative to privately insured peers."[55] The lack of insurance is a particular problem for young adults with chronic health conditions. In subsequent work, Callahan and Cooper demonstrate that those with chronic conditions who lacked insurance had 6-8 times higher rates of unmet health care needs because of cost, when compared to otherwise similar young adults who did have insurance.[56] In sum, the blasé attitude about risks and costs that seem to characterize the invincibles appears to be factually unfounded: the invincibles may be healthier than the population average, but they are ultimately just as vincible as their insured peers.[57]

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[53] Vanessa Fuhrmans, *Health Insurers' New Target; Companies Go After the Uninsured With Cheaper Plans, Clever Marketing, but Benefits Are Sparser*, WALL ST. J., May 31, 2005. at B.1. Kenneth Abraham also discusses why people buy low deductibles.

[54] Schwartz and Schwartz, *supra* at 7.

[55] S. Todd Callahan and William O. Cooper, *Uninsurance and Health Care Access Among Young Adults in the United States*, 116 PEDIATRICS 88, 88 (2005).

[56] S. Todd Callahan and William O. Cooper, *Access to Health Care for Young Adults With Disabling Chronic Conditions*, 160 Arch Pediatr Adolesc Med. 178, 180 (2006). Although people who already know that they have a serious chronic condition are unlikely to find tontine insurance appealing, some of the young people with chronic conditions are likely to have developed those conditions only after "aging out" of dependent care coverage and, thus, would have been good candidates for the tontine health insurance.

[57] Of course, there is a large and growing catalogue of deviations from fully rational behavior, and Optimism Bias is by no means the only possible explanation for the invincibles' failure to purchase health insurance. We focus on this explanation because it seems to fit the stylized facts so well, and is so analytically tractable, but we recognize that other explanations may play some role in the underinsurance problem. A related type of irrationality is the tendency to "overvalue short-run insurance costs relative to [future] medical expenditure risk." Gruber*, supra* at 577. This kind of myopia has been extensively analyzed by behavioral economists under the rubric of "time-inconsistency" or "hyperbolic discounting," whereby individuals apply a steeper discount rate to long-term benefits than to short term costs. In this context, it can lead to essentially the same results as optimism bias. Rather than understating the probability that one will get sick and need benefits, a hyperbolic discounter applies too high a discount rate to these future benefits, and thus ends up undervaluing them in comparison to present costs

2. Why Adding a Prize to an Insurance Policy Should Make it *Less* Attractive to Homo Economicus

This section explores the logic of the standard model of insurance demand and explains why a rational, risk averse individual—an "Econ"—would always prefer a fair insurance policy without an actuarially fair prize to one that contained such a prize.

To start, consider a rational, risk-averse, expected utility maximizing individual who faces a loss L with known probability p. Since he is risk averse, his marginal utility of wealth falls as his wealth increases. Thus, the individual benefits (in utility terms) if can reduce his wealth in the state of the world where wealth is high, while increasing his wealth in the state of the world where wealth is low. Moving a dollar from the high-wealth to the low-wealth state of the world leaves him better off because he is giving up low-marginal utility dollars and getting back high marginal utility dollars, which are worth more in utility terms.

Actuarially-fair insurance is available when the premium charged is equal to the expected loss (pL), and any risk-averse individual should want full insurance if it is available at the fair price. Full insurance guarantees that the individual's wealth is the same, regardless of whether the loss occurs; this means that the insured has maximized expected utility by equalizing the marginal utility of wealth in both states of the world (whether the loss occurs or not).[58] That in turn implies that *wealth* itself should be equalized in the two possible states of the world, which is only possible if the individual buys full insurance.

Now, consider adding a stylized tontine "prize" to this problem. (We can loosely define a tontine as any insurance policy that pays off both when the loss occurs and when it doesn't. The "prize" is the amount paid if there is no loss.) Under this arrangement the individual can pick an amount of coverage, I, under the same conditions as above. In addition, though, the individual can also choose to receive an amount T if the loss does *not* occur (which happens with probability $(1-p)$).[59] The fair premium for this payment is $(1-p)T$, and just as with insurance, the tontine premium must be paid whether or not the loss occurs or the prize is awarded.

[58] The only way for the marginal utility of wealth to be the same in both states of the world is for wealth to be the same in both states, which implies full insurance.

[59] Of course, this amount T doesn't fall out of the sky. It must be paid for somehow. One possibility is that T is paid for out of additional premiums. That is, the insured might be charged an actuarially fair premium, p, to cover expected losses, and an additional amount to cover payouts in the event that there is no loss. So, for example, if p is 0.1, then the probability of no-loss is $(1-p) = 0.9$. Suppose the loss, L, is equal to 1000 and the tontine "prize" T is equal to 10. Then the premium required to support the prize is $(1-p)T = 0.9\times10 = 9$. Thus someone who bought the combined tontine policy would have to pay $0.05\times1000 = 50$ for the insurance coverage and 9 for the "prize," for a total of 59. T might alternatively (or in addition) be paid for out of investment income earned by the insurance company on the "float" between the time when premiums are collected and the time when losses are paid out. But that complication doesn't really add anything to the simple model we consider because if there were such a float, it could be used to reduce premiums *below* the actuarially fair level, were there no tontine element to support.

As before, the individual still prefers full insurance. But what about the optimal size of *T*? It should be clear that a risk-averse individual will not find paying a fair rate for a tontine prize (paid if the loss doesn't occur) to be in his interest. Doing so requires the insured to move dollars from the loss state, where he pays the tontine premium with dollars that are scarce (and thus worth more, in utility terms) to the no-loss state, where he receives the tontine prize in dollars that are plentiful (and thus worth less, in utility terms). Put another way, the prize *adds* financial risk, and should thus be abhorrent to a rational, risk averse utility maximizer.

3. Why Tontines Should be Attractive to the Invincibles

a. Optimism Bias Leads to Under-Insurance (or none at all)

Instead of assuming that individuals have accurate perceptions of all relevant risks, consider an Invincible—someone who suffers from optimism bias. We can characterize this bias in many ways, but simplest version is that for a loss that occurs with objective probability *p*, an Invincible assigns it a subjective probability of *q*, which is smaller than *p*. In making his insurance purchase decision, the optimistic individual will choose the amount of coverage to maximize expected utility given his *subjective* probability of loss, not the objective one. The objective probability will still be used by the insurer to set the actuarially fair premium, however.

It is easy to show that someone characterized by optimism bias who faces an actuarially fair premium will choose to buy less than full insurance, and may purchase none at all: this makes sense, since such a person sees less reason to transfer wealth from the no-accident to the accident state of the world. Invincibles don't appreciate the need for insurance, precisely because their subjective assessment of the probability of loss is too low.

b. A Prize Makes the Policy Look More Attractive to an Optimist

Since the insurer is by assumption charging actuarially fair rates, it is not possible to lower premiums to induce the optimist to buy (more) insurance—that would mean the insurer could not collect sufficient premium revenue to cover its payouts, and would earn losses (unless it received a subsidy).[60]

However, a fairly-priced tontine structure would break even for the insurer, and under some conditions, could induce optimists to buy insurance who would otherwise not want to do so. The reason is that the insurer needs to charge (1-*p*) per dollar of tontine prize awarded. The insured, however, expects to receive the prize with probability (1-*q*), where by definition (1-*q* > (1-*p*). The gamble thus looks like a *good* deal for exactly the same reason (optimism bias) the insurance looks like a *bad* one.

[60] If the insurance is being sold with some load factor that makes premiums larger than is actuarially fair, it might be possible to lower the load factor, reduce premiums, and still allow the insurer to cover its costs. But it's difficult to imagine how society could easily force insurers to lower their costs. Given that such cost-reduction is difficult to achieve, it is widely understood that the only way to make insurance more attractive to the uninsured without making it unprofitable to provide is to subsidize their purchase. We suggest otherwise, however.

Although the insurance contract by itself will not be attractive to some invincibles, the perceived subsidy from bundling a prize should be enough to induce some of them to sign up for the prize/insurance combination. The reason is that the optimist's under-assessment of the probability of *loss* is at least partially matched by his over-assessment of the probability of *gain*. The availability of the tontine "prize" balances out the Invincible's unwarranted undervaluation of the insurance. In fact, tontine health insurance has a kind of "ju-jitsu" element to it, because it uses consumers' irrationality to their own benefit.

It is important to be clear that adding the prize only works, in mathematical terms, if the wrongly perceived "extra" value of the prize is as large as the wrongly perceived "discounted" value of the insurance. Suppose for example that the true probability of a $20,000 loss is 10%, but the optimist mistakenly believes the probability to be only 1%. Even if full insurance against this loss can be purchased for $2,000, the Invincible will likely reject such insurance, believing it should cost only $200. Now suppose that the insurer bundles the fairly-priced insurance with a tontine prize of $10,000 (payable if the loss does not occur, which happens with 90% probability). The fair price for the prize alone is $9000, and the fair price for the combination of prize and insurance is thus $11,000. Although the Invincible believes he is getting a good deal on the prize element (paying $9,000 for a perceived 99% chance of winning $10,000), he also believes he is getting a correspondingly bad deal on the insurance element; and since the "extra" value attributable to his optimistic assessment of the likelihood of winning the tontine prize ($999) is smaller than the "discounted" value of the insurance ($1800), the prize/insurance bundle is still unattractive.

There are several reasons to think that, in practice, the prize/insurance bundle might be more attractive than this simple example suggests. The first reason is history. The prize/insurance bundle was tremendously successful in the life insurance context despite the same mathematical limitation. The second reason is that real insurance is not complete (most significantly because of loading costs), which reduces the wrongly assessed discounted value of the insurance that the prize needs to offset. Using the numbers from above, if we assume that the insurance covers only 80% of the loss, then the (wrongly) discounted value of the insurance will be $1620 ($1800-180). That is still more than $999, but the gap is smaller. Third, it's plausible that optimists may be loss averse. They misperceive the risk, but they are still willing to pay some amount above the actuarially fair price of the risk that they do perceive, further reducing the discount that the optimist places on the value of the insurance, and they may even be risk-preferrers for small gambles, which of course makes the prize more attractive than it would be on purely actuarial grounds. Finally, the fact that insurance is socially desirable to purchase increases its perceived value even to an optimist, who presumably is just as motivated to do socially acceptable things as everyone else.

So, for example, a young man might be willing to pay significantly more than what he perceives to be the actuarially fair price for health insurance, not only because he is risk averse, but also because that will make his mother happy and make him feel responsible. He is not willing to buy the insurance as it exists today, because the price is just too far from what he thinks the insurance is worth, even considering risk aversion and social expectation, but the gap between the price and the willingness to pay is smaller than his optimism, alone, would predict.

These other factors should not impact the prize side of the equation to the same extent. The loading charge for adding a prize element to health insurance should be close to trivial. Risk aversion does not appear to be symmetric, as the research suggests that humans have a taste for gambling as long as the stakes are not too large. Finally, his mother is not likely to care very much that he chose the insurance policy with a prize, especially if it's called something more socially acceptable. We'll call the prize a deferred dividend, and market tontine health insurance as a tool that helps young people save for the future. His mother will like that and, we predict, so will he.

3. Targeting, Efficacy and "Bang for the Buck" Issues

Given the political economy of health care, and the widespread belief that we will need to subsidize insurance for the currently uninsured out of public funds, one legitimate concern for public policy is the size of such subsidies, and the extent to which they are directed towards those who currently lack insurance, rather than just making health insurance cheaper for those who already have it. Finding a way to make insurance more attractive to the uninsured, without "wasting" funds by making it cheaper for those who are *already* insured, is thus a difficult institutional design issue, as Gruber stresses. In his helpful analogy, [61] we can

> think about the uninsured as tuna and those who already have insurance as dolphins. The goal of environmentally conscious fishermen is to catch as many tuna as possible in their nets, while minimizing the number of dolphins who are caught. . . . If the uninsured tunas were swimming in a separate ocean than the insured dolphins, the problem would be minimized. And if the uninsured tunas greatly outnumbered the insured dolphins, then there would also be a minimal dolphin catch. But, in reality, the 47 million uninsured tunas mostly swim in a part of the ocean where there are 190 million privately insured dolphins, making it difficult if not impossible for policymakers to design insurance nets to capture the tuna without pulling in the much more numerous dolphins.

As Gruber points out, "the vast majority of the uninsured . . . [have incomes that put them in parts of the] income distribution where they make up less than one quarter of the population."[62] Basing subsidies for health insurance on income would thus result in spending considerable sums on those who are *already* insured, while netting relatively few uninsured.

Tontine health insurance can help to mitigate this problem, however, for two reasons. First, allowing private insurers to bundle prizes with health insurance requires no governmental outlay at all! At least from a budgetary perspective, this is a zero-cost strategy for reducing uninsurance.[63] Moreover, tontines are like a special net that allows most dolphins to swim through its mesh and only catches tuna.

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[61] *Id*. at 585-6. To the extent that one is using subsidies to alter behavior, any money directed towards those who are already engaged in the desired behavior is a waste. In tax policy, the problem of subsidizing pre-existing conduct while trying to create incentives for new behavior is known as "buying the base."
[62] *Id*. at 586.
[63] It is important to remember that budgetary outlays are not an end in themselves, and that a true welfare analysis is substantially more complicated.

Adding a tontine to a health insurance policy will be most appealing to those who are currently without insurance: as noted earlier, a tontine prize will not motivate an ordinary consumer, but will provide an incentive for precisely those Invincibles who are suffering from optimism bias.[64] Few dolphins would be harmed (or benefited) in this process.

D. Design Options

If we are to be true to the tontine idea, then the payoff in the good state of the world should be a deferred dividend paid to people who did not otherwise use their insurance, rather than a monthly prize or other lottery for which all policyholders are eligible. Even limiting the product design in that way, there are still a wide variety of options. To explore those options, we ask a series of questions and provide some thoughts about how to answer them. An actual tontine health insurance product, we expect that the company would obviously require extensive consumer research, for which our discussion is no substitute. Instead, our goal here is to describe some of the ways that a tontine health insurance product could be designed and to highlight some of the more important choices involved in the design process.

How should we think about the health care expense threshold that will be used to condition eligibility for the dividend? Setting a precise number will require technical assistance from a health insurance actuary, but there are judgments involved that have marketing and, in some cases, even public policy consequences. For example, should the threshold be set relatively low so that fewer people can get larger dividends, or should it be set higher so that more people get relatively smaller dividends? In general we are agnostic with regard to this and subsequent questions. We prefer whatever product design *works*, in the sense of being most appealing to people who do not buy traditional health insurance. But it is possible that setting the threshold too low might in some cases discourage participants from getting care that they need. We address this concern shortly.

Should eligibility for the dividend be conditioned on something other than the health care expense threshold? For example, should eligibility for the dividend be conditioned on the policyholder having received designated preventive care? For us, once again, the best answer is whatever the marketing research reveals to be most popular. We predict that simpler plans will work better, and that conditioning eligibility on preventive care smacks of the paternalism that the young invincibles reject. The same public health benefits sought to be achieved by mandating preventive care may be gained by exempting preventive care expenses from counting against the threshold, and by marketing preventive care to the participants as the smart thing to do to stay healthy enough to get the dividend.

Should the deferred dividend be fixed in advance? Or should it depend on variables such as the percentage of policyholders who are eligible for the dividend at the time of distribution? If it is not fixed, what are potential variables, and what is at stake with regard to each? Here we predict that a variable

[64] In this respect at least, a tontine prize it is like other aspects of insurer-side selection. See, e.g., Jacob Glazer & Tom McGuire, *Optimal Risk Adjustment in Markets with Adverse Selection: An Application to Managed Care*, 90 AM. ECON. REV 1055 (2000), who point out how HMO coverage can be designed to select for certain groups: bundling a health club membership with premiums is especially attractive to young, healthy low-risk insureds; offering excellent oncology care has exactly the reverse selective effect.

dividend would out-perform a fixed dividend, by recruiting the optimism bias to magnify the predicted size of the dividend that the invincible participant believes he will receive. A variable dividend also works better from an actuarial perspective by reducing the risk to the insurance company. The tontine idea suggests simply dividing the dividend pie by the number of the people eligible for the dividend. It would be interesting to take that idea a step further and make the size of the pie depend on the profitability of the pool. We predict that young adults would not like this last variation because they would not trust health insurance companies' computation of profits, but, once again, market research should produce a more reliable answer than our intuitions.

How long should the deferred dividend period be? Answering this question requires more granular information than we have about health insurance purchasing patterns. If the period is too short, the dividend will not appear enticing enough. If it is too long, the hyperbolic discounting that is likely to be another characteristic of the Young Invincibles will make the dividend appear too small. Moreover, people may think that they will never be able to collect, perhaps because they will assume that they will eventually get a good job that includes good health care benefits. This last issue brings us directly to our next question.

How should tontine health insurance interact with employment based health benefits? We conceived of tontine health insurance as an individual market product, not something that would be offered as an employment benefit (but we could imagine that deferred dividends could play an important role in managing moral hazard in the employment context, as we plan to explore in subsequent work). Our current focus in the relationship between tontine health insurance and employment based benefits lies in alleviating the young invincibles' legitimate concern that they might not qualify for the dividend because they will find a good job, with good benefits, before the deferred dividend period is up. To address that concern, we suggest the tontine policies offer participants the ability to cash out their dividend rights if they exit the plan to purchase an employment-based policy for which they recently became eligible. In addition, we are intrigued by offering the option of retaining the deferred dividend participation rights if the participant enrolls in an employment-based program run by the same company as the company running the health insurance tontine.

Should there be a single health care expense threshold that applies to the entire deferred dividend period? Or should there be a series of shorter time periods (with lower healthcare expense thresholds) in which policyholders can earn dividend rights that are then vested, so that a policyholder who incurs a lot of health care expenses in one period can still earn deferred dividends in other periods? From a marketing perspective, we think simpler is better, so that a design with one long period will outperform a more complicated design with many shorter periods. But shorter periods with vested dividend rights could be one answer to the concern about inverse moral hazard -- avoiding the doctor in order to keep dividends. With shorter periods, going to the doctor only risks the dividend rights from the current period, not the rights to the entire three year deferred dividend. On the other hand, the easier the dividend is to get, the more people who will get it, and the smaller and therefore less enticing it will have to be.

Under what plausible circumstances might a participant's concern about exceeding the health care expense threshold lead him or her to forgo incurring a health care expense and suffer adverse health consequences as a result? What could be done to address that problem? Again, we take no firm position on this important issue, preferring to leave the question to future experimentation. We do note that economists almost universally believe that the approximately first-dollar coverage provided by virtually all health insurance plans is overly generous. The reason is that more-generous coverage encourages (ex post) moral hazard and over-use of insurance, while first dollar coverage provides relatively little of the consumption-spreading benefits that (allegedly) motivate insurance purchases in the first place. Martin Feldstein's design for optimal insurance, for example, would involve a 50 percent copayment for expenses up to 10 percent of the insured's income, with full coverage thereafter.[65] In short, there may be good reasons to discourage "over-use" of health insurance (while, of course, lowering premiums). If so, the tontine element could be designed to serve this function by appropriately calibrating eligibility for the "prize" to the amount of use. More complicated prize functions could exempt certain kinds of health care expenditures (e.g., preventative medicine such as routine checkups, flu shots, etc.). Usage-based restrictions on prize eligibility might be accompanied by lower co-pays if it was found to be unnecessary to use both of these methods to discourage over-use.

E. Implementation: An Empirical Example

In this section, we consider a back-of-the-envelope empirical implementation of a tontine health insurance policy. We envision the tontine element bundled with ordinary health insurance policy (as sold on the individual market), rather than being priced separately: our calculations are meant to give a rough sense of how much the tontine add-on might be expected to raise premiums and what kind of "prizes" could be offered.

We rely on the Medical Expenditure Panel Survey (MEPS) data for 2006 to calibrate the relevant parameters. We divide the population of uninsured 18-29 year-olds by gender, but do not attempt to differentiate them any further. We assume a tontine period of three years, and further assume that the rate of return on invested premiums is just equal to the load factor, allowing us to ignore these issues.[66]

Our tontine policy consists of four parameters, of which any three can be chosen by the insurer. We define:

T = size of tontine prize at the end of three years.

τ = monthly premium collected to support the prize

Θ = Threshold for spending over the previous three years that defines eligibility for the tontine

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[65] *See*, Martin S. Feldstein, *A New Approach to National Health Insurance*, 23 PUBLIC INTEREST 93 (1971). Gruber, *supra* at 578-79.

[66] The administrative expenses associated with running the tontine should be very low, since the policy would be piggy-backing on—and indeed, would be bundled with and indistinguishable from—ordinary individual health insurance. There might be some fixed costs associated with setting up the software to keep track of eligibility, but marginal costs should be quite low.

prize.[67]

$p = F(\Theta)$ = probability that an insured is eligible for the prize (i.e., spends less than the threshold amount), where F is the empirical cumulative distribution function for health care expenditures by individually-insured policyholders of a given gender between the ages of 18-29, as calculated from the MEPS data.

To close the model, we simply assume that competition among insurers drives the expected payout to equal the total monthly premium collected, or

$p(\Theta)T = 36\tau$.

Selection issues are, of course, of paramount importance in the provision of insurance. An important feature of the tontine policy, however, is that it has precisely the reverse selection effect from ordinary insurance—the tontine is most attractive to the individuals who think they are the healthiest (since they are most likely to expect to receive the end-of-period rebate). To account for moral hazard, we calibrate healthcare usage, and hence the threshold and prize amounts, based on the *insured* population of 18-29 year olds. That is, we assume that the uninsured will have the same utilization as the currently insured. (To the extent that the uninsured who would be motivated to buy a health tontine insurance policy are healthier than the currently insured because of adverse selection, this imparts a conservative bias to our utilization estimates.[68])

We do not account, however, for "inverse moral hazard," created by the incentive that the tontine provides to *under*utilize insurance. Of course, the advantage of bundling a tontine with an ordinary health insurance policy is that deliberate underutilization of the insurance to secure eligibility for the prize creates a benefit to the insurer. But consider someone facing a $500 expenditure threshold and a prize of $1000. At the margin, a reduction in spending of $1 earns $1000 by putting the person below the threshold, while the insurer saves $1 and pays out $1000. In other words, if there is "bunching" at the threshold, the insurer's savings in covered expenses may be outweighed by the additional payouts for prizes to those falling below the threshold. One solution, in keeping with the design of the original tontines and with modern variable annuities, might be to make the prize a share of the total deferred dividend: the more shares, the smaller the dollar value of each individual's share of the dividend, and vice versa. Alternatively, we could use percentile, rather than dollar thresholds to qualify for the prize. That is, instead of specifying that those spending below, say, $500, are eligible, one could instead limit eligibility to the lowest-spending 10 percent of all insureds.[69] Both solutions transfer

[67] For instance, if Θ = $2,000, those individuals who spend less than $2000 over three years are eligible for a rebate at the end of that period.

[68] A more problematic assumption relates to the correlation of health care expenditures across years. Since the MEPS data do not permit one to track individuals for 3 years, we assume in constructing our estimates that health care usage is independent across years. To the extent that this is not true, the threshold may need to be lower to achieve the same T. This uncertainty is yet another reason to promise a deferred dividend that is based on a share of the dividend pool, rather than a specific amount.

[69] If, for example, 20 percent of insureds spent nothing, then the prize could be given randomly to only half of those 20 percent, or the prize amount could be cut in half.

the risk of inverse moral hazard the insureds themselves.

According to a report by AHIP, the average monthly premium of 18-29 year olds in the individually-insured market was about $120 in 2006-7.[70] We consider monthly premia, τ, of $10, 25 and 50, and eligibility thresholds (Θ) of $250, 500, 750, and 2000. This yields a 3×4 matrix of possible prizes that could be offered, consistent with the insurer's breakeven constraint, which we display in Table 1.

Table 1: Size of Tontine Prize (T), for various Monthly Premia and Spending Thresholds[a]

(insured 18-29 year old men only)

Monthly Tontine Premium, τ:	3-year Spending Threshold, Θ:			
	$250	**$500**	**$750**	**$2000**
$10	878	720	643	493
$25	2,195	1,800	1,607	1,223
$50	4,390	3,600	3,214	2,466

[a] Source: authors' calculations based on MEPS data for N=1376 men ages 18-29, for 2006. "Premium" is for the tontine element only and excludes the premium for insurance itself.

The key fact that underlies Table 1 is the relatively low utilization rate of 18-29 year old men. For example, 41 percent of insured 18-29 year old men reported spending less than $83 on medical care in 2006 (less than $250 over three years, on our assumptions). This means that the prize that can be awarded for spending less than $250 over three years is only (1/0.41 =) 2.4 times the total premium collected. As the thresholds get larger, the percentage of participants qualifying for the prize necessarily gets smaller, so a $10 per month premium can only support a $493 prize if the threshold for eligibility is spending less than $2000 over three years. Since women are more likely to use care than men, the corresponding prizes for women are larger by a substantial degree: at the $250 threshold, the prize for women is 100 percent greater than for men, falling to about 55 percent greater at the $2000 threshold.

Table 2 takes the tontine prize amount as given at $5000, and asks what combinations of monthly premia and eligibility threshold would finance this payout.

[70] Individual Health Insurance 2006-2007: A Comprehensive Survey of Premiums, Availability and Benefits (2007) at Table 2 (available at http://www.ahipresearch.org/pdfs/Individual_Market_Survey_December_2007.pdf). The survey covered 2.3 million individual market policies, of which 555,000 were issued to policyholders between 18 and 29 years of age. The $120 figure represents the weighted average premium for the 18-24 and 25-29 year old groups. These premiums are in the same range as the Tonik premiums referred to, *supra* note XX.

Table 2: Eligibility Threshold for a $5000 Tontine Prize (T), for various Monthly Premia[a] (18-29 year old men only)	
Monthly Tontine Premium, τ:	3-year Threshold Amount for Eligibility, Θ:
$10	0[b]
$25	0[b]
$50	$96

[a] Source: see Table 1.

[b] Since about 20 percent of those surveyed reported $0 expenditures, the $10 premium permits only about 1/3 of are eligibles to collect the $5,000 prize; the $25 premium permits about 90 percent of eligibles to collect. A randomization procedure would be required to determine which of the eligibles would collect.

$10 per month represents $360 in total premiums over three years. Since we know we will pay out $5000 to those who qualify, it follows that we are looking for a threshold (Θ) at roughly the (360/5000=) 7th percentile of the health care utilization distribution. In fact, roughly 20 percent of insured men age 19-29 had no health care expenses at all in 2006, so the threshold is 0 for both $10 and $25 premia. To award a $5000 prize therefore requires some sort of randomization for any premium below about $28/month. For example, at a $10/month premium, only about one-third of those with no spending could actually receive a $5000 prize. The similar figures for women place the 7th percentile at 0, the 18th percentile (corresponding to $25/month premium) at $165, and the 36th percentile at $1,077.

Table 3 examines the possibility of exempting "Preventive Care" from counting against an insured's expenditures for purposes of tontine eligibility. As we discussed earlier, it would make sense from a policy perspective to encourage insureds to undertake preventive care such as vaccinations, routine checkups, and so on. An obvious way to do this would be to exempt such expenditures from counting towards the tontine threshold. MEPS does not classify expenditures by "preventive" vs "other," so we adopt an extremely crude definition of what constitutes preventive care: for these purposes, "Preventive" expenditures are everything except Emergency Room and in-patient hospital expenses.

Table 3: Size of Tontine Prize (T), for various Monthly Premia and Spending Thresholds[a] (18-29 year old men only)				
Monthly Tontine Premium, τ:	3-year Spending Threshold, Θ′ (excluding "Preventive Care"):[b]			
	$250	**$500**	**$750**	**$2000**
$10	409	465	522	562
$25	1023	1162	1306	1404
$50	2045	2324	2612	2808

[a] Source: see Table 1.

[b] "Preventive" care assumed to include everything but expenditures on ER and hospital inpatient care.

Men use less "non-preventive" care than total care, of course, so the prize that can be offered for a given premium and threshold is smaller when "preventive" care doesn't count towards eligibility. Comparing Table 3 and Table 1, the prizes that can be offered to men for a given premium are about 50-75 percent as large if we exclude everything but ER and in-patient expenses. The male/female gap in "non-preventive" care is smaller than for total care expenses, with the result that eliminating "preventive" care from counting towards the eligibility threshold substantially lowers the size of the prize available to women, cutting the amount by more than two-thirds for the lowest threshold.

Finally, we consider a scenario that attempts to account for selection. The tontine will be least attractive to those uninsured with the highest expected health care utilization, since they are least likely to qualify for the prize. (Of course, these are precisely the people who would have been most likely to sign up for insurance already, but suppose for some reason they failed to do so.) Table 4 shows what happens if the tontine policy were not attractive to this group. As compared with Table 1, feasible prizes are about two-thirds to three quarters as large, because instead of, for example, 41 percent of all insureds spending less than $250 over three years, 63 percent do (once we've eliminated the top 10 percent of all spenders).

Table 4: Size of Tontine Prize (T), for various Monthly Premium Amounts and Spending Thresholds[a] (18-29 year old men only, excluding the highest-using 10 percent)				
Monthly Tontine Premium, τ:	3-year Spending Threshold, Θ:[b]			
	$250	**$500**	**$750**	**$2000**
$10	574	479	433	367
$25	1,435	1,198	1,803	917
$50	2,871	2,397	2,166	1,835

[a] Source: see Table 1.

[b] Assumes that the highest-utilizing 10 percent of uninsured do not sign up for coverage, and that their spending would be equivalent to that of the 10 percent highest-using insureds.

F. If Health Tontines Would be so Effective, Where are They?

One short answer is that something like a health tontine already is being marketed in China, where the Ping An Life Insurance Company recently began selling "policies that combine life, accident, hospitalization, critical disease, endowment and dividend features."[71] Like insurance companies in other developing countries – including the U.S. in the 19th Century and Japan in the mid 20th Century – Chinese insurers have found that deferred dividends appeal to the insurance resistant.[72] Appendix A lists a variety of deferred dividend and other spicy insurance products sold around the world today. It also discusses non-insurance examples in which probabilistic prizes (such as lottery tickets) have been shown to have demonstrable effects on behavior. Often, these effects are substantially larger than would be plausible if participants viewed the prizes as worth just their expected monetary value, and even larger than would be the case if participants were risk averse.

A longer and admittedly more speculative answer to this question revolves around the longstanding effort to separate insurance from gambling, a related commitment among insurance practitioners to an understanding of insurance that leaves little room for spicy insurance products, the self-conscious transformation of health insurance companies into health care companies, and lingering (but misplaced) concerns about the legality of tontines.

Separating insurance from gambling. Until Parliament passed the Gambling Act in 1774 it was possible and, indeed, common to purchase insurance on a stranger's life in Great Britain.[73] Such insurance came to be condemned as gambling, and the Gambling Act was part of an effort to separate

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[71] See Cheris Shun-ching Chan, "Creating a Market in the Presence of Cultural Resistance: The Case of Life Insurance in China." 38 *Theory and Society* -- (Forthcoming 2009)

[72] See Cheris Shun-chin Chan, *Contested Lives, Contested Practices: Culture and the Making of a Life Insurance Market in China*, epilogue (forthcoming 2010) (reporting history of life insurance in Japan).

[73] See Geoffrey Clarke, Betting on Lives. Cf. Robin Pearson, *Thrift or Dissipation: The Business of Life Insurance in the Early Nineteenth Centure*, 43 Econ. Hist. Rev. 236, 253 (1990) (concluding that the prudential aspect of life insurance did not succeed the speculative aspect until at least 1850).

insurance from speculation that continues today, as represented by the current controversies over credit default swaps and stranger owned life insurance.[74]

States in the U.S. adopted the Gambling Act's insurable interest requirement, which prohibited the purchase of insurance on a life or property in which the purchaser did not have an interest. Even with this legal fence between insurance and gambling in place, 19th Century bankers still derided insurance as gambling, on the grounds that the insurance payoff depended on a random event – death in the case of life insurance – rather than the slow and steady accumulation of savings.[75] Insurance entrepreneurs responded to this charge in a variety of ways: drawing analytical distinctions (gamblers seek gains while insurers seek protection against loss),[76] pointing to the good reputation and high standards of people in the insurance industry,[77] and publicizing their efforts to exclude the immoral from the insurance pool.[78]

Nevertheless, the gambling charge clearly struck home. Indeed, some prominent insurance industry leaders mounted that same charge against tontine life insurance.[79] While these insurance men surely would not accept the "gambling" label for a lump sum payment made upon the fortuity of the death of a particular insured (i.e., the death benefit), they were willing to apply that label to a lump sum payment that depended on the fortuity of the number of people who died before the deferred dividend was paid. As inconsistent as that position may have been in theory, this internal critique from within the insurance industry played an important part in the early 20th Century reform of the mutual life insurance business. [80]

When reformers sought to pacify the powerful mutual life insurance companies that profited from tontine life insurance, they used all the rhetorical tools at their disposal – including the conceptual

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[74] See Derivative Markets Transparency & Accountability Act, HB ___ (proposing insurable interest requirement for credit default swaps); Sarah Quinn, *The Transformation of Morals in Markets: Death, Benefits, and the Exchange of Life Insurance Policies*, 114 Am. J. Sociol. 738, 740 (2008) (investigating "questions of wagering, speculation, and trust" in the secondary market for life insurance). Cf., Edwin W. Patterson, Hedging and Wagering on Produce Exchanges, 40 Yale L. J. 843 (1931) (exploring the difficulty of distinguishing between hedging and speculation).

[75] See, e.g., A.B. Johnson, *The Relative Merits of Life Insurance and Savings Banks*, 25 Hunt's Merchants' Mag. & Com. Rev. 670, 671 (1851) (arguing that "life insurance assimilates with gambling" and that "we should provide for these purposes by self-denying accumulations" – in banks such as those operated by him, of course).

[76] See, e.g., George W. Savage, Origin and Nature of Fire Insurance, 4 Hunt's Merchants' Mag. 159, 169 (1842) ("insurance is, in reality, nothing more than a wager … but in a moral point of view, it should be considered entirely different").

[77] See, e.g. H.S. Tiffany, Tiffany's Instruction Booklet for Fire Agents at 20 (10th ed. 1882) ("This business is not mere lottery or game of chance, but an honorable one in which some of the most experienced men of the age are engage, and in which millions of dollars are invested").

[78] See Vivian Zelizer, Morals and Markets: The Development of Life Insurance in the United States 72, 91-117 (1979). Cf. Quinn, supra note -- at 741 ("the spirit of insurable interest … established the *decency* of life insurance … because it dept the insurance from being a gamble…")

[79] See Keller, supra note – at 57 ("deferred dividends becames a special target of insurance men opposed to the corporate values of the great companies")

[80] See, e.g. Jacob Greene (President of Connecticut Mutual Life Insurance Company), "Facts about Tontine! The Alleged Enormity of the Wickedness" The New York Times, May 9, 1885 ("the tontine principle is absolute, unqualified gambling"); Manly supra note --/. See generally, Connecticut Mutual Life Insurance Co, Papers Relating to Tontine Insurance (1885-1886)

link between tontines and gambling. When the reformers succeeded in 1906, they outlawed tontine life insurance, and their victory story recounted the earlier debased nature of the insurance industry and the morally superior forms of life insurance that remained after the Armstrong investigation's "ordeal of sackcloth and ashes."[81] To this day, the fact that some life insurance companies did not participate in the "tontine affair" of the late 19th century life insurance industry remains a point of pride among their employees.[82]

A cultural commitment to insurance as a risk management technology. When the sociologist Cheris Shun-ching Chan investigated the Chinese life insurance market in the early 2000s, she was initially surprised at the success of inexperienced, undercapitalized local insurers in their competition with well capitalized, experienced Western insurers in the Chinese market. She concluded that the local insurers' inexperience actually gave them an advantage, because they were more willing to provide what their customers wanted: life insurance that paid deferred dividends.[83] The foreign insurers' experience had taught them that life insurance was "really" about managing the risk of premature death, and that life insurance was not a good savings or investment product. Yet their Chinese customers did not want to talk or even think about premature death. Instead they wanted to accumulate money to live the comfortable old age that precedes a good death. So they preferred to buy the financially insecure, but more culturally resonant products offered by the upstart local companies. Eventually, the foreign insurers caught on, and began offering similar products.

Although this is a difficult claim to document, we think that U.S. health insurers are even more committed to insurance as risk management than U.S. life insurers.[84] The Blues grew out of efforts by doctors to provide financing for hospital care, and their leadership always resisted being considered part of the insurance industry. Although the big commercial U.S. health insurers like Aetna and CIGNA mostly grew out of the life insurance business, the primary connection between the life and health businesses in those companies was a shared commitment to selling group policies to large corporate customers. Group life insurance, like group health insurance, is marketed in the U.S. exclusively as a risk management product, not as a way to accumulate savings. Aside from this shared marketing, the life and health divisions in a commercial insurance company have little to do with each other, and the

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[81] Keller, supra note – at 275. See, e.g. Address of Young E. Allison, Proceedings of Seventeenth Annual Convention of Life Underwriters, 58, 65 (1906) (describing the poison of tontine life insurance and explaining that the results of the Armstrong will be to "take the element of gambling out" of life insurance and restore it to "highest gospel of cooperative organization that was ever preached"); Burton J. Hendrick, The Story of Life Insurance 1907 (recounting the events leading up to the Armstrong Investigation as a "thirty year war" between "the good and the bad in life insurance" concluding with the triumph of Jacob Greene – the "good" anti-tontine leader who lost in market share but won in principle – over over Henry Hyde – the "bad" purveyor of tontines who won in market share but lost his reputation).

[82] Personal communication with Robert Googins, former General Counsel of Connecticut Mutual Life Insurance Company.

[83] See Chan, supra note --. See also Cheris Shun-chin Chan, *Marketing Death: Culture and the Making of a Life Insurance Market in China* (forthcoming 2010); Cheris Shun-ching Chan, Honing the Desired Attitude: Ideological Work on Insurance Sales Agents, in Ching Kwan Lee (ed.) *Working In China: Ethnograhies of Labor and Workplace Transformation* 229-46 (London: RoutledgeCurzon, 2007).

[84] Cf., Quinn, supra note – at 742 ("Just as a geological formation bears the traces of the environment that sculpted it, so too does a market bear the imprint of the social currents that shaped its development")

designers of the health insurance products do not think of themselves as being in the same business as more "spicy" asset accumulation life insurance products. Accordingly, both the Blues and the commercial insurers share an understanding of health insurance as a health risk management and risk spreading product, not an instrument of accumulation. Some people today advocate health care savings accounts as an alternative or supplement to health insurance, but these savings accounts are a tax-preferred way to save money for health care expenses, not a bonus or dividend paid to someone who turns out not to have needed much health care.

The transformation of the health insurance industry into a health care administration industry. The transformation of the traditional indemnity health insurance product into the plethora of managed care products that dominate the health insurance market today has made a health insurance tontine even less thinkable for an executive at an Aetna, CIGNA, United Health, or a Blue. Today, health *insurance* is about the administration of *health care*, and many people in the industry would deny that they are in the insurance business at all.[85] The more that health insurance becomes a business of delivering and managing health care, the less plausible the tontine feature will seem to a health insurance company executive. Indeed, the tontine feature highlights the messy, morally ambiguous history of the insurance business, just the kind of thing that the health care financing industry MBAs and MDs are running away from as quickly as they can.

The recent efforts that some health insurance companies have made to develop new products that would be more appealing to the young invincibles provides a useful illustration of the disconnect between the young invincible's preferences and the health insurance industry's assessments. The marketing materials for the new policies reflect the need for some spice. There are snappy graphics, fast cuts on web pages, and slang drawn from extreme sports. But the products are just stripped down managed care policies that offer less coverage for a lower price.[86] These bland products may appeal to people who are not buying insurance because they need the money to pay the rent, but they are not going to appeal to people who don't think that they need health insurance. The invincibles will reason – correctly – that they are even less likely to "collect" under the stripped down policies.

Lingering concerns about the legality of tontine insurance. We have identified three potential legal concerns about insurance tontines, none of which would apply to a properly designed health tontine. First, state insurance codes commonly prohibit insurance rebating, which is the practice of refunding to customers some or all of their premiums or providing some other benefit to them (other than insurance) in return for their premiums.[87] This might seem to present a serious legal objection to a tontine. But, on close analysis, however, the objection melts away, because the statutes explicitly permit rebating that is "*plainly expressed in the insurance contract.*"[88] Moreover, tontines are not the

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[85] See Email from John Day, former Chief Health Counsel at CIGNA, February 18, 2009 (further explaining that the vast majority of the health insurance business today is administrative, with other parties bearing much of the risk).

[86] Vanessa Fuhrmans, *Health Insurers' New Target; Companies Go After the Uninsured With Cheaper Plans, Clever Marketing, but Benefits Are Sparser*, WALL ST. J., May 31, 2005. at B.1.

[87] See Kimball and Jackson, The Regulation of Insurance Marketing, 61 Colum. L. Rev. 141, 191 (1961).

[88] §4 (1) of the NAIC model "Act Relating to Unfair Methods of Competition and Unfair and Deceptive Acts and Practices in the Business of Insurance" provides the parameters of the rebating practices proscribed by the Model

kind of agreement that the anti-rebating statutes were designed to discourage, since they do not threaten the solvency of the company or agents' commission rates, and there is no covert discrimination between similarly situated policyholders. [89]

Second, New York and many other states passed legislation immediately after the Armstrong investigation that prohibited life insurance tontines. Significantly, this legislation applies only to "life insurance companies,"[90] and not to health insurance companies (which did not exist at the time of the 1907 legislation). Moreover, the primary objective of this anti-life tontine statute was to prevent life insurance companies from using the deferred dividends to accumulate large surpluses over long periods, tempting insurers to engage in financial manipulation, a concern that would not apply to to a health insurance tontine.

Third, states closely regulate games of chance and gambling, and there might be some concern in light of insurance history that tontine health insurance could be characterized as being in part a game of chance or a lottery.[91] In our judgment these laws would not apply to health tontines any more than similar laws would have applied to life insurance tontines. A health tontine is not a true lottery or game of chance. The participants' right to the dividend would depend on their own health experience: precisely the sort of legally permissible contingency that lies behind traditional health and life insurance, albeit in an opposite direction. And the amount of individuals' dividends would depend on the health experience of the group as a whole: precisely the sort of legally permissible contingency that lies behind traditional mutual insurance dividends.

Act. The National Association of Insurance Commissioners (NAIC) promulgated this greatly influential Model Act in 1947. As of 1990, forty-nine states and the District of Columbia had an anti-rebating statute (California passed but later repealed a statute), and forty-seven of those states have modeled their statute directly on the Model Act, so there is general uniformity in anti-rebating laws among the states. See Id. at 775.

[89] As the Supreme Court of Pennsylvania argued, "it is obvious that the object of [the anti-rebating statute] is to outlaw 'unfair treatment of prospective insurants of the same class by offering inducements to one person that are not available to all persons of the same class.'" McDowell v. Good Chevrolet-Cadillac Inc., 397 Pa. 237, 242 (1959); quoting In re Insurance Rebate, 19 Pa. D. 567, 2 (Pa.Atty.Gen. 1909).

[90] See, N.Y. Ins. Code §4232. Policyholder's participation in surplus of life insurance companies:

> (a)(1) Except as herein otherwise provided, every domestic life insurance company shall ascertain and distribute annually, and not otherwise, the proportion of any surplus accruing upon every participating insurance policy and annuity or pure endowment contract entitled as hereinafter provided to share therein, issued on or after the first day of January, nineteen hundred seven.

[91] See, e.g,, Mass Gen Law C. 271 §7 Lotteries; Disposal of Property by Chance

Whoever sets up or promotes a lottery for money or other property of value, or by way of lottery disposes of any property of value, or under the pretext of a sale, gift or delivery of other property or of any right, privilege or thing whatever disposes of or offers or attempts to dispose of any property, with intent to make the disposal thereof dependent upon or connected with chance by lot, dice, numbers, game, hazard or other gambling device, whereby such chance or device is made an additional inducement to the disposal or sale of said property, and whoever aids either by printing or writing, or is in any way concerned, in the setting up, managing or drawing of such lottery, or in such disposal or offer or attempt to dispose of property by such chance or device, shall be punished by a fine of not more than three thousand dollars or by imprisonment in the state prison for not more than three years, or in jail or the house of correction for not more than two and one half years.

Conclusion

Our positive thesis is that there is a significant and identifiable group of individuals—the invincibles—who do not buy health insurance they can afford and "should" want. The reason is that they wrongly believe that the insurance isn't worthwhile, since nothing bad will happen to them, a form of optimism bias. Our normative recommendation is that health insurance should be reformulated so as to make it more attractive to these invincibles so as to take advantage of their optimism. By bundling health insurance with a deferred dividend or "prize," insurers should be able to entice this group to buy coverage they would not otherwise choose to purchase. Prizes have historically been used to sell life insurance in much this way, with great success.

But is this a good thing? Why should we 'trick' people into buying insurance they wouldn't otherwise want?[92] We think that the case for doing so is actually quite strong, although we recognize not everyone will be convinced. First, there are possible externalities at play when the uninsured fail to secure care for communicable diseases, although the magnitude of these externalities is likely to be small. The uninsured also rely heavily on the public fisc to pay for the care that they do receive, but the amount of uncompensated care is quite small compared to total health care expenditures, so the fiscal externality is not large. The strongest argument comes from the evidence (cited above) that a significant number of young adults who lack insurance are hampered in their ability to seek medical care, relative to those who are insured. So there is a plausible paternalistic rationale for getting the invincibles enrolled in health care for their own good.[93] As noted earlier, moreover, our proposal only works because it appeals to the invincibles' optimism bias. Anyone who is rational and immune to the bias should not find tontine health insurance attractive. Thus, we can be fairly confident that whoever is "tricked" into buying under our proposal suffers from a cognitive illusion that impairs their potential claims to be the best judge of their own interests.

Tontine health insurance has an additional advantage over other plans to cover the invincibles: it would be much less coercive than insurance mandates, and much less costly than subsidizing insurance to make it cheap enough to be attractive. [94] Even those who disagree with the idea of extending coverage to the invincibles would presumably agree that whatever coverage we *do* provide should be done as cheaply and as light-handedly as possible. Tontine health insurance meets those objectives.

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[92] As Jonathan Gruber, *supra* at 581 perceptively notes, "the simple fact that so many are without insurance is not necessarily a cause for public-policy intervention; many more individuals don't own their own homes or are obese."

[93] Gruber concurs, suggesting that "the major motive for caring about the uninsured is paternalism." *Id*. at 582.

[94] One insurance blogger recently wrote that

> "unless the gummint [sic] makes it more painful to not buy coverage than to do so, people are more likely to ignore any such requirement. We saw this in Massachusetts, where folks who failed to play along lost an exemption worth about $200. Compared to potentially thousands of dollars for insurance premiums, who can blame them? Young, healthy people aren't stupid: if you don't hurt them in the wallet, a lot of them are just going to say "the heck with it."

http://insureblog.blogspot.com/, Monday Sept. 15, 2008 (visited February 19, 2009).

The time has come, we think, to revive the tontine, a 19th century insurance innovation that capitalizes on some fundamental truths about human nature to design better insurance today.

Appendix: Tontine-Style Policies in Other Countries

Although available information is scanty, the use of probabilistic prizes or lotteries is a feature of insurance policies in several markets outside of the United States.[95] For example, several Latin American countries permit the use of lotteries, raffles, or other prizes in the marketing of insurance, as Table 1 makes clear. We have not found any instances of prizes for health insurance, but drawings for prizes (keyed to the national lottery) are used in Brazil, and insurers in Argentina, Bolivia, and Ecuador also use prizes to market auto and/or life insurance.

Country	**Insurance/Lottery Regulation**	**Use of Prizes in Insurance Marketing**
Argentina	Some general restrictions on sales promotions that include an element of chance (Ley No. 22802, art. 10). Insurance Law (Law No. 20,091 1973) also prohibits insurance plans that include raffles ("sorteos") as part of the plan itself, but apparently this has not been used to prohibit offering prizes?	Many insurance companies offer prizes, ranging from PlayStations to cars and tractors (for hail insurance). However, no prizes seem to be offered for life insurance policies.
Bolivia	National Lottery must approve all sales promotion raffles. No specific regulations governing insurance company sales promotions.	Since 2006, companies that were authorized to sell mandatory car insurance started promoting their services. One of them has announced that it will raffle-off hundreds of household appliances.
Brazil		Direct use of lottery/gambling in life (but not health) insurance market, designed to attract younger, low-risk insureds. Paid-up insureds receive monthly number keyed to federal lottery drawing. Winners eligible for various prizes incl. cars, cash, vacations, etc.

[95] We note that while we have not found U.S. examples of prizes used to supplement premiums, as with tontines, probabilistic prizes are widely used as an incentive for insurance agents and/or to generate new business via referrals: for example, "Refer a friend or anyone you think would like our level of service. . . . [F]or every referral, you'll . . . be entered in our monthly drawing for a chance to win a $50 gift certificate from a restaurant of your choice." See, http://www.summitinsurance.com/refer.asp (visited February 13, 2009).

Country	**Insurance/Lottery Regulation**	**Use of Prizes in Insurance Marketing**
Ecuador	Consumer Protection Act allows sales promotions in which there is an element of chance. No insurance-specific regulation.	Insurance companies undertake promotions that raffle-off prizes such as paid-for holidays for policyholders.

Chan's study of the emergence of the life insurance market in China notes that Chinese culture does not seem friendly to the concept of life insurance because of a widespread popular beliefs that "the topic of death should be avoided at all costs."[96] Nevertheless, the volume of life insurance has grown dramatically in recent years, largely because life insurance products have been re-packaged as financial investments that pay dividends (in good times) as well as a benefit when the policyholder dies. In Chan's survey of 282 policies held by 128 consumers, 44 percent contained a dividend component,[97] and her ethnographic work suggests that the investment/dividend element, rather than risk-replacement, played a significant role in attracting new customers to purchase life insurance.

We have found a few other examples of insurance prizes offered by Indian and Chinese companies in connection with life insurance. Life insurance offered by the Postal Service in the Thiruvananthapuram region of Kerala state in Southern India, for example, is bundled with a series of prizes for which policy holders are eligible.[98] The Shanghai branch of the China Life Insurance Company apparently offers those who have paid a premium in excess of 20,000RMB (a little less than $3,000) a chance to win a flat screen TV.[99] Kaiser's survey of poor villagers in the Philippines found that awarding small prizes could (hypothetically) induce much higher take-up rates for health insurance than would otherwise obtain.[100]

The motive for using prizes as insurance marketing devices in other countries—especially in the third world, where insurance markets are immature—is probably somewhat different from our story about optimism bias. In these instances, prizes are more-likely designed to overcome cultural resistance to or unfamiliarity with insurance, rather than optimism bias. At another level, however, these examples fit comfortably with our general view that payoff structures not based on risk-aversion can help sell insurance to customers who would otherwise be reluctant to buy it.

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[96] Cheris Shun-ching Chan, *Creating a Market in the Presence of Cultural Resistance: The Case of Life Insurance in China*. 38 Theory and Society ___ (2009).

[97] *Id*. at Table 1.

[98] Prizes include a computer, LCD TV sets (2nd prize) and DVD players (3rd prize). See http://pibtvm.gov.in/index.php?option=com_content&task=view&id=7833&Itemid=1 (visited February 12, 2009).

[99] See http://www.shapp.e-chinalife.com/newinsure/good%20custom.html (in Chinese) (visited February 12, 2009 by someone who speaks Chinese).

[100] **Error! Main Document Only.**F. Markus Kaiser, INCENTIVES IN COMMUNITY-BASED HEALTH INSURANCE SCHEMES (2004).