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Liquidating Tontine (or  
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# **Can a Continuously-Liquidating Tontine (or Mutual Inheritance Fund) Succeed where Immediate Annuities Have Floundered?**

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## **Abstract**

A new instrument (the Mutual Inheritance Fund or MIF) is proposed whose purpose is to help people carry their savings forward from the moment they retire into their old age. Like annuities, this instrument requires an up-front payment before people receive any benefits while also protecting people from the risk that they will live a long time. The funds that individuals contribute to a MIF are invested in a mutual fund. The proceeds from the fund's underlying assets are reinvested until the contributor dies or he turns an age specified in advance. If a contributor dies before this pre-specified age, his shares are liquidated and the proceeds are distributed to the other contributors to the MIF. Contributors who are alive at the pre-specified age are also paid the value of their accumulated shares. Like tontines, of which MIF is a variant, this instrument has returns that are more tilted towards old age than annuities. Several advantages of this are discussed, including some that may explain why tontines have proven popular with consumers in the past. JEL: D14

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<sup>1</sup> I wish to thank John Gourville and David Moss for several conversations on this subject.

The changeover from defined benefit to defined contributions retirement plans in the United States has created a vast group of individuals that faces (or will face) the difficult problem of using a lump of assets to provide consumption for a relatively long but uncertain number of years. One asset class that has been touted as being useful to such individuals is the immediate annuity. In exchange for a lump sum payment, these annuities provide their buyers with a pre-specified steady stream of income for as long as they live. Individuals forfeit this income when they die and this "longevity insurance," allows individuals who remain alive to maintain a higher standard of living for longer than if they invested in assets that pass on to their heirs. One reason one might have expected annuities to have become popular is that they allow individuals to regain some of the benefits of defined benefit plans. Up to this point, however, consumers appear not to have embraced annuitization.

In this note I suggest an alternative instrument that, like immediate annuities, provides longevity insurance and postpones income until old age. The proposed "Mutual Inheritance Fund" (MIF) is a tontine variant and works as follows. A pool is formed by having individuals of a particular age buy shares in a mutual fund. Given that the mortality rates differ by gender, it makes sense to have separate MIF's for males and females. The income from the underlying assets in the mutual fund is reinvested in the fund so that the value of the shares in an individual's name (and possibly also the number of these shares) grows over time.

The idea behind the MIF is that the shares of pool members who die are liquidated. The proceeds are then distributed in cash to the remaining members in proportion to the number of mutual fund shares that are currently in their name. One way of implementing this is to set up anniversary dates, and liquidate on those dates the shares of people who died between the previous and the current anniversary date.

In practice, it seems easier to also create separate "distribution funds" for each individual. Then, the MIF would liquidate the shares assigned to a member whenever the MIF's manager learns that this member has died. The dead individual's distribution funds as well as the proceeds of this liquidation would then be placed in the distribution accounts of the members who remain alive (in proportion to their contribution). Each month, presumed live individuals could then be mailed a check for one twelfth of the amount in their distribution accounts. Checks sent to people who have died would not clear, and this could trigger the liquidations described earlier.

Any particular MIF would operate until either a pre-specified number of people remain alive or until all the remaining members reach a certain age (say 95 for illustration). At that point, all the shares of the MIF would be liquidated and individuals would receive the value of the shares that are in their name. Thus, the scheme can be thought of as one where the individual is always the "owner" of his

shares, and receives them back at a certain point, but where the individual lets the remaining members of the pool inherit his shares if he dies before that point.

One attraction of this scheme is that no financial institution bears any risk and the administrative costs of the mutual fund offering a MIF should be small. Consumers ought to benefit from small fees and from being insulated from the risk that the sponsoring institution will go bankrupt. By contrast, financial institutions who offer immediate annuities suffer longevity risk since they cannot predict how long their customers will live.<sup>2</sup> In a MIF, this risk is borne by the people who join. In part for this reason, the payments from a MIF are not nearly as smooth as those from an annuity. Thus, MIFs are likely to be less attractive than annuities from the point of view of standard economic models of consumers. However, many retirees show little desire to smooth their income since they place nontrivial fractions of their wealth in risky assets.

### Timing of payments

MIFs also differ from basic annuities in the expected timing of their payments. The funds paid out by a MIF in a given year equal roughly the value of the shares of those who died in the previous year (this would be exact if payments were made once a year and were based on the assets of people that died between anniversary dates). If all individuals contribute the same number of shares, the payments made per share outstanding are thus equal to the mortality rate of the group in the previous year divided by one minus this mortality rate.<sup>3</sup> Because mortality rates rise with age after retirement, these payout rates do as well.

As an illustration, suppose people enrolled in MIFs have the same mortality rates as healthy annuitants in 2000 and that the number of people in the MIF is sufficiently large that the fraction that dies is close to the mortality rate.<sup>4</sup> One can then use Society of Actuaries (2000), to compute these payout rates, and these are depicted for retirees in Figure 1. For males they rise from 1.36% at age 65 to 36.5% at age 95. For females, they equal 1.05% at 65 and 24.1% at 95. For purposes of comparison, Brown et al (2001, p. 80) report that, in 1995, average annual payout rates for annuities acquired by 65 year olds equaled about 9.53% for males and 8.60% for females. These numbers are not strictly comparable because the payout rates in Brown et al. (2001) are nominal whereas those for the proposed scheme are relative to the value of an individual's mutual fund shares, and this value grows over time.

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<sup>2</sup> The uncertainty of the adverse selection among people who buy annuities may enhance this risk.

<sup>3</sup> This is the ratio of the number that died last year to the number that remains alive at the beginning of the current year.

<sup>4</sup> Payouts would obviously be less smooth and predictable if the number of participants were small. For smoothness, it is particularly important that there be a large number of members whose contribution is close to the maximum contribution of any member. Otherwise, the death of a member with a large contribution would trigger a relatively large payout. Except for this, it is inessential that contributions of different members be equal.

Supposing that the mutual fund returns 4% per annum, the nominal payout rate from a MIF acquired by a male at age 65 would reach 9.2% at age 78. For a female that invests at age 65, the nominal payout rate would equal 7.5% at age 79 and 8.7% at age 80. The MIF thus has considerably lower payout rates than an annuity for the first 10 years, somewhat comparable ones for the next 7 years and much higher ones later. Having a lower payout rate immediately after retirement seems like a benefit because individuals with DC plans can be expected to keep non-annuitized assets at the beginning of their retirement years. The relatively high payout rates when individuals are in their 80's and early 90's could be attractive to consumers if they fear having considerable medical and nursing home expenses at this age. Some additional reasons why these high payout rates might be appealing are discussed below.

One way of driving home the large returns that MIFs earn for people who survive into old age is to compute the internal rate of return from buying one share of the mutual fund at age 65. I compute this by supposing the pool is liquidated at age 95 so that the last payment consists of the age 95 payout plus the accumulated value of the investment in the fund. Since it is based on the mortality rates of Figure 1, this internal rate of return is in terms of mutual fund shares, so that this return is earned over and above the return on the fund itself. For males, the resulting (annualized) IRR is 6.9% while it is 5.3% for females. These returns are higher still if individuals buy into these funds at age 75 (and the funds still liquidate at age 95). The IRR's are then 11.0% for males and 8.2% for females.

## **Other tontines**

High realized returns for survivors may well have been one reason for the popularity of tontines in the past.<sup>5</sup> Some of the more spectacular of these paid out only the interest on invested funds until the end, when they gave the entire principal to the last member alive. Except for this last individual, their payouts were thus mostly lower than those of MIFs.

Tontine elements also appear to have been responsible for the growth of life insurance policies in the United States during the XIX<sup>th</sup> century.<sup>6</sup> These policies accumulated reserves while purchasers were young and paid these out (in lump sum or as annuities) only to policyholders who reached old age. They were ultimately outlawed but the main reason for this appears to have been that life insurers were accused of self-dealing as the reserves were accumulated. Moreover, the practice that was outlawed was the deferral of dividends from life insurance policies, which is not an issue that is relevant for MIFs.

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<sup>5</sup> See McKeever (2009) for a brief history.

<sup>6</sup> This discussion draws on Ransom and Sutch (1987).

MIFs are related to Goldsticker (2007) who shows that a mutual fund can provide a retirement asset by pooling the resources of contributors and using them to make payments exclusively to members that remain alive. Goldsticker's (2007) proposal, like MIFs, transfers all longevity risk to the plan's participants. The difference is that Goldsticker (2007) tries to remain close to the annuity concept and sets each year's payments equal to a measure of "fair annuity payments" computed by actuaries. My proposal does away with this difficult and somewhat arbitrary calculation and thus makes the level of payments simpler to understand for participants.<sup>7</sup>

### **A life insurance interpretation**

The MIF proposal has been presented as involving investments in mutual funds because this provides a simple way to describe it, because it emphasizes the irrelevance of the financial soundness of the sponsoring firm, and because the mutual funds that people are already attracted to can serve as the basis for a MIF. MIFs can, however, be seen as life insurance policies with one-time premia if the cost of joining is interpreted as a purchase of a life insurance policy on other people.

In this view, a life insurance company that receives an initial payment of, say \$100, issues a policy whose death benefit is the accumulated value of the \$100 at the time of death.<sup>8</sup> This policy is initially assigned to all members of the pool in proportion to their contribution. If a person dies before the pre-determined date at which the MIF expires, this person bequeaths the policies assigned to him (as well as the benefit that is paid out to him) to the members of the pool that remain alive. At the date specified in advance, the insurance pays out as if all the members had died, and members simply receive the benefits that have been assigned to them.

While this implementation may appear more complex, it serves to re-emphasize that the essence of a MIF is that people within a pool are bequeathing benefits to each other. This commonality of purpose among the members of the pool fits with the "mutual insurance" idea with which a great deal of insurance was started. It also suggests that the MIF might be more successful when the members of a pool have some reason to feel some altruism towards each other (perhaps because they worked for the same organization). This altruism may be able to counteract an aspect of annuities that potential customers dislike, namely that they "get nothing" after they die.

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<sup>7</sup> This calculation is arbitrary in part because there is no consensus regarding how expected returns should be calculated.

<sup>8</sup> This makes the analogy exact. If a variant of a MIF were offered by a life insurance company, it might involve fixed benefits at the cost of some risk to the insurance company itself.

Another attraction of this life insurance interpretation is that it provides a natural way to think about why tontines and life insurance policies have been successfully sold together in the past: people might be more inclined to buy life insurance on other people when they are buying life insurance on themselves. Or, they might implicitly think simultaneously about bequeathing money to their heirs in the event of their death (life insurance) and bequeathing funds to other members of their pool (tontine).

Perhaps the most interesting commonality between life insurance and tontines (including a MIF) is their implicit concern for direct descendants. While annuities are sometimes seen as robbing children of their inheritance, the strong tilt of the MIF towards old age leads to a lottery-like component where heirs have a good chance to inherit some of the tontine's proceeds if a policyholder survives until old age. If children act as if they expected their parents to be immortal, the consistency of their attitudes may drive them to welcome tontines while they oppose annuities.

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Figure 1: Payout rates from MIFs

